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**BREAKING THE COGNITIVE SPELL: COGNITIVE FUSION MEDIATES THE
RELATION OF COGNITIVE ANXIETY SENSITIVITY AND RUMINATION IN
UNDERGRADUATE COLLEGE STUDENTS**

By

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University of South Dakota

A Thesis Submitted in Partial Fulfillment
Of the Requirements for the
University Honors Program

Department of Psychology
The University of South Dakota
May 2021

The members of the Honors Thesis Committee appointed
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ABSTRACT

Breaking the Cognitive Spell: Cognitive Fusion Mediates the Relation of Cognitive Anxiety Sensitivity and Rumination in Undergraduate College Students

Jacey L. Anderberg

Director: Christopher R. Berghoff, Ph.D.

Rumination (i.e., intrusive and repetitive self-directed thinking) predicts the onset, severity, and maintenance of depression (Galecki & Talarowska, 2017). Ruminative behavior is positively associated with cognitive anxiety sensitivity (i.e., fear of losing internal control; CAS), which may be attributed to cognitive vulnerabilities of depression. However, researchers have not clarified the link between these variables, and mechanisms responsible for change in CAS following treatment are unclear (Tull & Gratz, 2008). Accordingly, clarification of intermediate factors that may be targeted in psychosocial interventions appears warranted. Cognitive fusion (i.e., engaging with thoughts as true reflections of reality rather than products of thinking; CF) may influence this relation, as individuals with high CAS may be attached to and impacted by negative thoughts, leading to ruminative behavior. We hypothesized CF would mediate the CAS-rumination relation in undergraduate students. Bootstrap analyses suggested CF significantly mediated the CAS-rumination relation, $ab = 1.12$, 95% CI [0.88, 1.40], indicating CF may partially account for the association of CAS and ruminative behavior. Accordingly, CF may be a productive target to reduce rumination (Bramwell & Richardson, 2018), especially for individuals with high CAS.

KEYWORDS: depression, college students, rumination, anxiety sensitivity, cognitive fusion, mediation

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Breaking the Cognitive Spell: Cognitive Fusion Mediates the Relation of Cognitive Anxiety Sensitivity and Rumination in Undergraduate College Students

Depression is a psychiatric disorder denoted by its negative effect on mood and quality of life (Brenes, 2007). Among the most prevalent mental health disorders in the United States, depression is a leading public health concern for health care officials and society (McLaughlin, 2012). Major depressive disorder is characterized by severe sadness and an inability to experience pleasure to such degree that everyday activities become difficult to complete (APA, 2013). An estimated 17.7 million U.S. adults report experiencing at least one major depressive episode within the past year (Substance Abuse and Mental Health Services Administration, 2019), and over half of these individuals experience a return in symptoms at least once in their lifetime (Galecki & Talarowska, 2017). Workplace related costs (e.g., work absenteeism, decreased efficiency) and medical expenses (e.g., pharmaceuticals, inpatient and outpatient therapeutic services) result (Greenberg et al., 2015), leaving significant financial burden for individuals and society as a whole. Major depressive disorder is estimated to be responsible for an economic burden of \$210.5 billion per year in the United States, which is an accumulation of direct and indirect costs of the disorder (Greenberg et al., 2015). Additionally, individuals experiencing subclinical levels of depression (i.e., those who experience symptoms not severe enough to warrant diagnosis) are 4.4 times more likely to have a major depressive episode (Horwath et al., 1994; Ji, 2012) and experience serious consequences that impair participation in life activities (Cuijpers et al., 2014). For instance, those exhibiting subclinical depressive symptoms are at an increased risk of fatality resulting from elevated rates of suicide and unhealthy behavior (e.g., excessive

drinking, sedentary lifestyle; Cuijpers & Smit, 2002). Consequently, major depression and subthreshold symptoms thereof can be argued and treated as deadly disorders (Cuijpers & Smit, 2002). Given the prevalence and consequences of depression and its associated problems, identification of factors that contribute to onset and maintenance is warranted.

College students appear to be particularly susceptible to experiencing depressive symptomology (Hunt & Eisenberg, 2010). University students are exposed to new and uniquely stressful experiences (e.g., adjustment to an unfamiliar location, increased academic expectations, change in sleeping and eating patterns, familiarizing oneself with a new group of people; Acharya et al., 2018) that can lead to mental health difficulties (Hunt & Eisenberg, 2010). Researchers suggest 53% of students report experiencing some degree of depressive symptomology since starting college (Furr et al., 2001), and rates of depression more than doubled between 2007 and 2018 among U.S. undergraduate students (Duffy et al., 2019). Accordingly, depression has a significant impact on university counseling service providers. Recent research revealed nearly half of university students seeking services suffered from depression (LeViness et al., 2019). The National Center for Education Statistics predicts about 19.7 million students will attend colleges and universities this academic year (U.S. Department of Education, 2019). Consequently, college students represent a large and at-risk population in which factors that contribute to depressive symptomology may be identified.

Depressive symptomology is inversely related to student success and well-being inside and outside the academic environment. University students with depression typically have lower GPAs and a higher likelihood of dropping out compared to those

without depression symptoms (Ansari et al., 2013; Eisenberg et al., 2009; Fazio & Palm, 1998). Accordingly, depression represents a significant burden for those trying to obtain a higher education. Depressed college students are also more likely to participate in risky and violent behavior (Schwartz et al., 2015). For example, those who exhibit depressive symptomology often engage in problematic alcohol and substance use (Acuff et al., 2018), which, in turn, is associated with high physical (e.g., health problems, injuries; Hingson et al., 2009), social (e.g., unsafe sex, involvement with the police, academic problems), emotional (e.g., high anxiety and depressive symptomology; Rodgers et al., 2000) and cognitive (e.g., diminished attention and processing speed, impaired decision-making) disturbances, and low quality of life (Blanco et al., 2008). Depression is also related to high rates of suicidal thoughts and actions (Arria et al., 2009), such that high levels of depression are associated with suicidal ideation. Suicidal ideation, defined as recurrent and distressing thoughts about suicide (Arria et al., 2009), has been established as a precursor to suicidal behavior (Allan et al., 2014; Allan et al., 2015; Capron et al., 2012). Ultimately, depression has a negative impact on students pursuing higher education and the collegiate environment broadly. Though risk-factors for depression have been extensively studied (see Liu et al., 2018 for review), modifiable psychological constructs that maintain such risk-factors for depression have received considerably less attention. Thus, the present study aimed to identify malleable influences that may contribute to the maintenance of risk-factors for depressive symptomology among college students.

Etiological theories of depression point to rumination as a reliable and predictive risk-factor for the onset, in addition to being a cardinal symptom, of depression (Galecki

& Talarowska, 2017; Nolen-Hoeksema et al., 2008; Papageorgiou & Wells, 2003).

Evolutionary theories suggest depression emerged as a result of faulty connections in the brain and damaging factors in one's environment (Galecki & Talarowska, 2017). Per this theory, rumination is a product of malfunctions of the frontal lobe, a portion of the brain particularly susceptible to adverse stimuli (Galecki & Talarowska, 2017; Hoffmann, 2013; Penner et al., 2016), and is therefore a strong predictor of depression. As such, rumination has become a highly researched predictor of depression over the past 30 years (Papageorgiou & Wells, 2003; Smith & Alloy, 2009). Many conceptualizations of rumination exist (e.g., Stress Reactive Rumination [Alloy et al., 2000]; Rumination on Sadness [Conway et al., 2000]; S-REF [Wells & Matthews, 1996]) and, consequently, it is crucial to consider the context in which ruminative behavior is being exhibited (e.g., cognitive vulnerability to depression, cognitive models of social phobia, self-regulation, self-focus, trauma, emotion regulation; Smith & Alloy, 2009). Currently, the most widely cited conceptualization of rumination, and that which is used in the present study, is Nolen-Hoeksema's (1991) Response Styles Theory (RST), which defines rumination as a repetitive response characterized by frequent contemplation regarding the causes, symptoms, and outcomes of experienced distress. Rumination, per RST, is framed as a general process in which the function of cognitive processes (i.e., thoughts and feelings) have focus rather than their content. Said simply, RST identifies rumination as a cognitive susceptibility to depression (Ciesla & Roberts, 2007; Koster et al., 2011; Nolen Hoeksema, 1991). As such, rumination coping mechanisms intensify the consequences of depression on cognition by interfering in goal-directed behavior (Nolen-Hoeksema, 1991). This conceptualization fits with evolutionary theories of depression, which posit

that ruminative thinking derives from exposure of the frontal lobe to damaging environmental factors that, in turn, cause impaired thinking patterns (Galecki & Talarowska, 2017). Accordingly, RST is a promising conceptualization of rumination as it is related to depression (Nolen-Hoeksema, 2000; Spasojević & Alloy, 2001).

Many lines of research identify associations of rumination and depression (Sun et al., 2014). Excessive rumination distinguishes individuals with a history of depression from those without any depressive experience (Watkins & Brown, 2002). High rumination is predictive of both elevated levels of depressive symptomology and the onset of depression (Nolen-Hoeksema, 1991; Nolen-Hoeksema, 2000; Nolen-Hoeksema et al., 1993; Nolen-Hoeksema et al., 2008). Furthermore, research has begun distinguishing the interactive effects of rumination and life stress in the prediction of depression broadly (Connolly & Alloy, 2017). This means that rumination may be one factor which can be useful in reducing depressive symptoms. Relevant to the current study population, rumination appears to be positively associated with depressive symptomology in college students (Cribb et al., 2006). This suggests identification of factors that predict or maintain rumination may be useful to inform campus programs and psychosocial interventions aimed at addressing the rising problem of depression across universities. Anxiety sensitivity may be one such predictor of rumination.

Anxiety sensitivity, defined as the fear of unpleasant sensations associated with fear itself (Reiss & McNally, 1985; Reiss et al., 1986; Taylor, 1996), is a multifaceted construct specified along 3 domains: (1) cognitive, (2) physical, and (3) social distress (Taylor, 1996; Wheaton et al., 2012). Cognitive anxiety sensitivity is defined as the fear of losing psychological or cognitive control (Reiss & McNally, 1985; Reiss et al., 1986;

Taylor, 1996). An individual exhibiting high levels of cognitive anxiety sensitivity may fear they are going crazy or ‘losing their mind.’ Physical anxiety sensitivity refers to the fear that physical consequences of anxiety-related experiences (e.g., chest pain, stomach aches, heart racing) will result in a serious detriment to one’s health (Reiss & McNally, 1985; Reiss et al., 1986; Taylor, 1996). Social anxiety sensitivity is defined as the fear of being judged for publicly observable behaviors (e.g., trembling, blushing, sweating) experienced as a result of anxiety (Reiss & McNally, 1985; Reiss et al., 1986; Taylor, 1996). College students are regularly faced with new and social situations (e.g., giving a speech, group activities, parties) where many are forced to exit their comfort zone and, consequently, experience high levels of anxiety (Acharya et al., 2018). Thus, being largely exposed to distressing and anxiety-provoking situations, high levels of anxiety sensitivity may be particularly detrimental to university students and advance individual maladaptive tendencies (Harwell et al., 2010; Lebowitz et al., 2015; Zvolensky et al., 2014), one of which may be rumination.

Indeed, researchers have demonstrated theoretical and empirical connections between anxiety sensitivity cognitive concerns and rumination, such that cognitive anxiety sensitivity may be postulated as a predictive factor to rumination and, consequently, depression. Cognitive anxiety sensitivity is uniquely related to depressive symptomology (Saulnier et al., 2018), of which rumination has been identified as an important risk factor (Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 2008). Contrarily, physical and social components of anxiety sensitivity exhibit no significant relations with depression (Allan et al., 2014; Olthuis et al., 2014). Research also suggests cognitive anxiety sensitivity is predictive of depression symptom intensity, indicating the

existence of a “depression-specific form of anxiety sensitivity” (Taylor, 1996, p. 478). Furthermore, individuals diagnosed with depression report elevated anxiety sensitivity (Allan et al., 2014; Naragon-Gainey, 2010) even in the absence of anxiety symptoms (Olatunji & Wolitzky-Taylor, 2009; Olthuis et al., 2014), and relations of cognitive anxiety sensitivity to depression are indirectly accounted for by rumination (Brown et al., 2014; Cox et al., 2001). This suggests the effect of cognitive anxiety sensitivity on depressive symptomology is related to relative levels of rumination. As such, interventions in ruminative behavior may prove vital for preventing depressive symptomology in individuals with high levels of cognitive anxiety sensitivity. Indeed, extant research shows a unique relation between cognitive anxiety sensitivity and rumination in children, such that high anxiety sensitivity and rumination are predictive of the onset of future depressive symptomology (Brown et al., 2014). Though cognitive anxiety sensitivity appears related to depression and even more so rumination, less is known about factors that may maintain the cognitive anxiety sensitivity-rumination relation (Tull & Gratz, 2008). Cognitive fusion may be one such influencing factor.

Cognitive fusion is defined as the tendency of individuals to accept thoughts as true reflections of the nature of reality rather than as products of thinking, which in turn leads to an undue influence of thought on behavior at the expense of sensitivity to environmental contingencies (Gillanders et al., 2014; Hayes et al., 2012). Conversely, cognitive defusion, the counterpart to cognitive fusion, is defined as noticing thoughts as mental representations that may have no basis in reality (Hayes et al., 2012). Cognitive defusion has been identified as a useful strategy for diminishing the negative impact of cognition on behavior (Larsson et al., 2015). Techniques used in psychotherapies such as

Acceptance and Commitment Therapy leverage cognitive defusion as a therapeutic change process (Hayes et al., 2012), such that fusion represents a characteristic under individual control that can be deliberately targeted and changed with continual practice and implementation of cognitive defusion treatment strategies within the context of everyday stress. Indeed, improvements in depression symptoms appear to be associated with increases in cognitive defusion (Bramwell & Richardson, 2018). Treatment strategies used to modify cognitive fusion processes do not focus on changing the content or frequency of one's thoughts, but rather attempt to influence the functions of cognitions in such a way that they do not exert inappropriate influence on behavior (Hayes et al., 2012). Research indicates high cognitive defusion is associated with low emotional distress and belief of negative thoughts toward oneself (Masuda et al., 2010), which are common symptoms indicative of elevated anxiety sensitivity (Allan et al., 2015) and rumination (Smith & Alloy, 2009). Similarly, cognitive fusion is positively related to both anxiety sensitivity and psychological distress broadly (e.g., depression, anxiety, stress; Bardeen & Fergus, 2016). Considering the high association between rumination and psychological distress (Morrison & O'Connor, 2004), cognitive fusion may be one beneficial variable to investigate in the cognitive anxiety sensitivity-rumination relation. Overall, this evidence suggests cognitive fusion may be one factor by which the relation of cognitive anxiety sensitivity and rumination can be clarified.

Our theory that cognitive fusion may represent an intervening variable between cognitive anxiety sensitivity and rumination warrants investigation. If cognitive anxiety sensitivity is thought of as fear related to the cognitive symptoms of anxiety, and rumination as a constant behavioral outcome of such fear, the driving force pushing the

boundary between cognition and reality may be one's perception of such reality. For example, if someone fears a serious consequence to losing their train of thought, it is likely the difference between them holding this conception in mind, and ruminating the consequences thereof, is their perception of whether there will be a truly negative outcome to their loss in clear thinking (e.g., losing their job, embarrassment). However, if one relates to these negative cognitions as simply thoughts, rather than a reflection of true reality, rumination may be avoided. As such, cognitive fusion may play a role in explaining observed relations of cognitive anxiety sensitivity and rumination.

Overall, research related to depression risk-factor maintenance in college students is limited. Although cognitive anxiety sensitivity is positively associated with rumination, factors that account for the relation of cognitive anxiety sensitivity and rumination are underspecified. Cognitive fusion may be one factor that accounts for the cognitive anxiety sensitivity-rumination relation. The present study aimed to clarify the relation of cognitive anxiety sensitivity and rumination wherein cognitive fusion was evaluated as a potential mediator of this relation. We expected a significant indirect association of cognitive anxiety sensitivity and rumination to occur by way of cognitive fusion. Identification of such factors that account for rumination may inform the development and delivery of campus programs and psychosocial interventions that reduce depression in undergraduate populations.

Summary and Purpose of the Present Study

College students are a high-risk population for developing depression, which, in turn, is associated with negative student experience and well-being. Rumination has been identified as a reliable and predictive risk-factor of depression in college students that

increases the severity of symptoms and likelihood of recurrent episodes. Furthermore, extant research has identified cognitive anxiety sensitivity as a significant precursor to depression-related rumination. However, treatment of rumination has proven difficult, and indirect influences in the cognitive anxiety sensitivity-rumination relation are unclear. As such, identification of mediating factors that may also function as potential targets of therapeutic intervention appears warranted. One factor, cognitive fusion, may mediate this relation, as it is uniquely related to both cognitive anxiety sensitivity and rumination within the context of depression. This suggests that those who have high fear of the cognitive symptoms of anxiety may become attached to and influenced by these thoughts, leading to ruminative tendencies. The current study attempted to clarify these relations using a mediation analysis. All distinct aims and hypotheses are presented below.

Aims and Specific Hypotheses of the Present Study

Aim 1: Identify the relation of cognitive anxiety sensitivity, cognitive fusion, and rumination in a sample of undergraduate college students.

H1: Cognitive anxiety sensitivity will exhibit a significant positive correlation with rumination and cognitive fusion.

H2: Cognitive fusion will exhibit a significant positive correlation with rumination.

Aim 2: Examine the relation of cognitive anxiety sensitivity, cognitive fusion, and rumination within a unified model.

H3: Cognitive fusion will significantly mediate the cognitive anxiety sensitivity-rumination relation.

Method

Participants

Power Analysis

A power analysis was conducted using G*Power v3.1.9.3 (Faul et al., 2013) to determine the necessary sample size. Parameters were based off the mediation analysis (2 predictors and 1 cross-product) proposed for this study. The power analysis indicated a minimum of 222 participants were required to achieve a power of .80 based on expected small effect sizes ($f^2 = .05$), 3 predictors, and alpha of .05.

Recruitment Strategy

University of South Dakota (USD) students were recruited via SONA systems, social media posts (e.g., Facebook, Twitter, Instagram), and advertisements throughout campus (e.g., posters, Muenster University Center announcements). All participants were required to be 18 years or older to participate. No exclusion criteria were implemented.

Participants

Consenting individuals from the undergraduate student population at the University of South Dakota composed the participant pool for this study. Participants ranged from 18 to 41 years old ($M = 19.5$, $SD = 2.41$). The majority of participants identified as White (94%), female (78%), straight (86%), single (68%), full-time students (99%), and were born in the United States (97%). Table 1 displays participant characteristics for the 237 participants included in final analyses.

Table 1
Participant Characteristics

| Variable | <i>n</i> | Percent (%) |
|-----------------------------|----------|-------------|
| Sex | | |
| Male | 53 | 22.4 |
| Female | 184 | 77.6 |
| Gender | | |
| Man | 53 | 22.4 |
| Woman | 182 | 76.8 |
| Nonbinary | 1 | 0.4 |
| Questioning or unsure | 1 | 0.4 |
| Ethnicity (could select >1) | | |
| White | 223 | 94.1 |
| American Indian | 3 | 1.3 |
| Black/African American | 4 | 1.7 |
| Asian/Asian American | 7 | 3.0 |
| Hispanic/Latino | 5 | 2.1 |
| Middle Eastern | 1 | 0.4 |
| Sexuality | | |
| Straight (Heterosexual) | 203 | 85.7 |
| Gay | 2 | 0.8 |
| Lesbian | 2 | 0.8 |
| Bisexual | 20 | 8.4 |
| Asexual | 1 | 0.4 |
| Pansexual | 5 | 1.7 |
| Questioning or unsure | 4 | 1.7 |
| Relationship | | |
| Single | 161 | 67.9 |
| Committed relationship | 63 | 26.6 |
| Living with a partner | 10 | 4.2 |
| Married | 2 | 0.8 |
| Separated | 1 | 0.4 |
| Student | | |
| Part-time | 2 | 0.8 |
| Full-time | 234 | 99.2 |
| Employment | | |
| Unemployed | 108 | 45.6 |
| Part-time | 123 | 51.9 |
| Full-time | 6 | 2.5 |

Note. *N* = 237.

Measures

Demographics

Demographic characteristics including sex, race/ethnicity, gender identity, marital status, student status, employment status, and socioeconomic status were assessed using a brief questionnaire constructed for standard usage in the laboratory (see Appendix A).

Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991)

The RRS is a 22-item self-report measure used to assess an individual's response to symptoms of depression (i.e., “think about how alone you feel;” “go away by yourself and think about why you feel this way;” “think about how angry you are with yourself;” see Appendix B). The RRS provides three subscale scores (i.e., Depression, Brooding, and Reflection), which assess the way a respondent generally reacts when faced with depressed mood. Participants report the extent to which they engage in ruminative behavior when depressed by responding to items using a 4-point Likert-type scale (1 = *almost never* to 4 = *almost always*). Scores are computed as the sum of all items (Range: 22–88), with high scores indicating high levels of ruminative behavior. The RRS has adequate internal consistency ($\alpha = 0.89$; Nolen-Hoeksema & Morrow, 1991; Parola et al., 2017) and correlates with the onset of depression, extended depressive experiences, delayed recovery from depression, and increased suicidal ideation (Eshun, 2000; Nolen-Hoeksema, 2000). Furthermore, the RRS correlates with actual ruminative responses when experiencing depressed mood ($r = .62$; Nolen-Hoeksema & Morrow, 1991) and prospectively predicts depression onset (Nolen-Hoeksema, 2000; Spasojević & Alloy, 2001). Relevant to our study population, high RRS scores are associated with decreased ability to problem solve, impaired motivation, and diminished academic concentration in

college students (Lyubomirsky et al., 2003; Lyubomirsky & Nolen-Hoeksema, 1993). The RRS demonstrated excellent consistency within the present study ($\alpha = 0.96$).

Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007)

The ASI-3 is an 18-item self-report measure of an individual's fear of symptoms that accompany anxiety across cognitive, physical, and social subscales (Taylor et al., 2007; see Appendix C). Participants report agreement with statements by responding to each item using a 5-point Likert-type scale (0 = *very little* to 4 = *very much*). The ASI-3 yields a total score, calculated as the mean of all responses, in addition to subscale scores, calculated as the mean of subscale items. High scores indicate high levels of anxiety sensitivity. The cognitive subscale (i.e., items 2, 5, 10, 14, 16, 18) was used for the present study. The cognitive component of the ASI-3 assesses the fear of symptoms associated with anxiety that may interfere with intellectual activity (e.g., mind going blank, inability to concentrate). Research indicates the ASI-3 has adequate internal consistency ($\alpha = .79$ to $.91$, $.76$ to $.86$, and $.73$ to $.80$ for cognitive, physical, and social concerns respectively), such that use of both subscale and total ASI-3 scores to address college student anxiety sensitivity is supported (Taylor et al., 2007). The ASI-3 also has adequate test-retest reliability (Hovenkamp-Hermelink et al., 2019). Taylor et al. (2007) demonstrated the convergent and discriminant validity of the ASI-3 by comparing the cognitive, physical, and social subcomponents with the original version of the ASI. The ASI-3 showed criterion-related validity, such that ASI-3 scores were found to be typical of diverse populations (Taylor et al., 2007). Relevant to the present study, the ASI-3 appears to be a reliable and valid measure of anxiety sensitivity in university students, demonstrating measurement invariance across sex, age, race/ethnicity, and sexual

minority status (Jardin et al., 2018). Internal consistency for the ASI cognitive subscale in the current study was excellent ($\alpha = 0.91$).

Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014)

The CFQ is a 7-item self-report measure designed to assess cognitive fusion and defusion. Participants report how true each item is to their experience using a 7-point Likert-type scale (1 = *never true* to 7 = *always true*; see Appendix D). Sample items include: “My thoughts cause me distress or emotional pain;” “I struggle with my thoughts;” and “It’s such a struggle to let go of upsetting things even when I know that letting go would be helpful.” Total scores are computed as the sum of item responses, ranging from 7 to 49. High scores indicate high levels of cognitive fusion. The CFQ has adequate internal consistency ($\alpha = .94$), test-retest reliability, and temporal stability in student and community samples (Gillanders et al., 2014; Lucena-Santos et al., 2017). The CFQ also appears to have adequate convergent and divergent validity (Gillanders et al., 2014; Hayes et al., 2012; Lucena-Santos et al., 2017). CFQ scores are positively related to depression, anxiety, stress symptomology, psychological inflexibility, and rumination (Lucena-Santos et al., 2017). Conversely, the CFQ exhibits a negative relation with mindfulness and decentering (Lucena-Santos et al., 2017). Within the present study, the CFQ exhibited excellent internal consistency ($\alpha = 0.95$).

Attention Check Items (Abbey & Meloy, 2017)

Participant inattention and negligence was evaluated using three attention check items (Abbey & Meloy, 2017; see Appendix E) presented randomly throughout the study. Items consisted of one honesty check (“Did you expend effort and attention sufficient to warrant using your responses for this research study?”), one directed question (“For this

query, mark NO and move on.”), and one logical statement (“I would rather eat a piece of fruit than a piece of paper.”). Roughly 2% of recruited participants ($n = 6$) were excluded from final analyses for responding inappropriately to one or more items in this measure. An additional 12% ($n = 33$) were excluded for failing to respond to all three inquiries.

Procedure

The University of South Dakota Institutional Review Board approved all procedures for this study. Interested individuals were directed to the study website where they first provided electronic informed consent. Those declining consent were thanked for their time and redirected to the SONA systems sign-in page. Students who provided informed consent completed an electronic survey battery consisting of the measures previously discussed, as well as additional measures included as part of a larger study that took approximately 30 minutes to finish. Upon completion, participants were thanked for their time and instructed to close their web browser to protect confidentiality. Students automatically received 3 SONA research credits in exchange for participation.

Analytic Strategy

Data Preparation

Data analyses were performed using SPSS version 25 statistical software. Appropriate data preparation and cleaning procedures, as well as evaluation of statistical assumptions (Tabachnick & Fidell, 2013), were completed prior to data analysis. Ultimately, 284 participants were recruited, of which 47 participants were excluded from final analyses. Of the excluded participants, 33 failed to respond to all attention check items, and 1 provided missing data for all behavioral measures. An additional 6 participants were excluded for providing inappropriate responses to one or more attention

check items. Data from another 6 participants was omitted from final analyses for repetitive or patterned responses (e.g., lengthy strings of invariant responses; Huang et al., 2012). Lastly, data from 1 participant was removed to account for an unrealistic demographic characteristic (i.e., improbable age response). No participants were identified as univariate or multivariate outliers.

Statistical Analyses

Descriptive statistics were examined using standard techniques. Analytic methods for obtaining inferential statistics are discussed below according to study aim.

Aim 1 was to distinguish the relations of cognitive anxiety sensitivity and rumination, cognitive anxiety sensitivity and cognitive fusion, and rumination and cognitive fusion in undergraduate college students. Zero-order correlations were assessed using three Pearson product-moment correlations.

Aim 2 was to investigate the relation of cognitive anxiety sensitivity, cognitive fusion, and rumination within a comprehensive framework. A mediation analysis was conducted using the PROCESS macro for SPSS (Model 4; Hayes, 2018), which employs path-analytic regression and 10,000 bootstrapped sample-derived confidence intervals for evaluating statistical significance. In our model, cognitive fusion was specified as a mediator of the cognitive anxiety sensitivity-rumination relation.

Results

Table 2 displays descriptive statistics. Average anxiety sensitivity in our sample appeared representative of similar studies involving college students (Jardin et al., 2018). Average cognitive fusion scores were moderate and within 0.5 standard deviation of related surveys of university students (Krafft et al., 2018). Lastly, mean rumination

scores appeared moderate and were also within 0.5 standard deviation of similar college samples (Calmes & Roberts, 2008).

Table 2

Descriptive Statistics of Study Variables

| Variable | <i>M</i> | <i>SD</i> | Range | Skewness | Kurtosis |
|------------|----------|-----------|-------|----------|----------|
| CAS | 5.07 | 5.68 | 0–24 | 1.17 | 0.60 |
| CF | 24.7 | 10.6 | 7–49 | 0.03 | -0.81 |
| Rumination | 45.3 | 15.8 | 22–84 | 0.41 | -0.71 |

Note. $N = 237$; CAS = Cognitive Anxiety Sensitivity; CF = Cognitive Fusion.

Bivariate correlations are reported in Table 3. In line with Hypothesis 1, cognitive anxiety sensitivity was positively correlated with both rumination and cognitive fusion, $ps < 0.001$. Similarly, Hypothesis 2 was supported. The relation of cognitive fusion and rumination was significant and positive, $p < .001$. In brief, all hypotheses regarding Aim 1 were supported.

Table 3

Bivariate Correlations of Study Variables

| Variable | 1 | 2 | 3 |
|---------------|-------|-------|---|
| 1. CAS | - | | |
| 2. CF | 0.60* | - | |
| 3. Rumination | 0.62* | 0.80* | - |

Note. $N = 237$; CAS = Cognitive Anxiety Sensitivity; CF = Cognitive Fusion.

* $p < .001$

Mediation analysis results suggested cognitive anxiety sensitivity was positively related to cognitive fusion ($a = 1.12, p < .001; 95\% \text{ CI } [0.93, 1.31]$), which was, in turn, positively related to rumination ($b = 1.00, p < .001; 95\% \text{ CI } [0.86, 1.14]$; see Figure 1). The direct association of cognitive anxiety sensitivity and rumination was significant and positive ($c' = 0.59, p < .001; 95\% \text{ CI } [0.34, 0.85]$) within the unified model. As hypothesized, cognitive fusion significantly mediated the relation of cognitive anxiety sensitivity and rumination ($ab = 1.12, p < .001; 95\% \text{ CI } [0.88, 1.40]$).

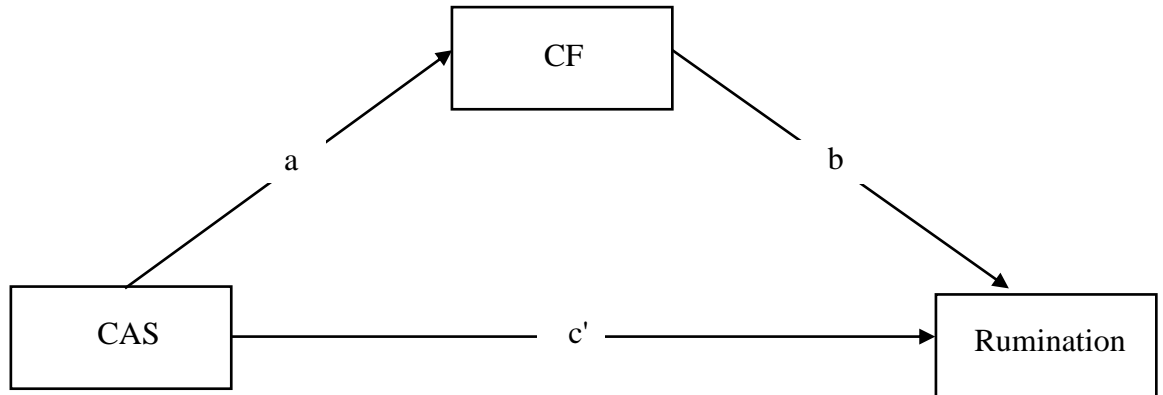
Discussion

Depression is associated with broad negative life outcomes, and college students are particularly vulnerable to experiencing depressive symptomology (Hunt & Eisenberg, 2010). In fact, depression has negative consequences specifically related to student success and well-being (e.g., lower GPA and likelihood of graduating, heavy drinking and risky substance use, higher likelihood suicidal ideation and suicidality; Acuff et al., 2018; Arria et al., 2009; Eisenberg et al., 2009; Fazio & Palm, 1998; Schwartz et al., 2015) and, as such, may represent one risk-factor in not obtaining a higher education. Accordingly, research focused on depression maintenance has received substantial attention. Rumination, briefly defined as negative and repetitive self-focused thinking, has been identified as a significant and unique risk-factor for depression (Galecki & Talarowska, 2017; Nolen-Hoeksema et al., 2008; Papageorgiou & Wells, 2003) that warrants attention.

Previous research has placed significant focus on variables that predict rumination, given the broad implications as a risk-factor for depression. This area of inquiry has led to the identification of cognitive anxiety sensitivity as a predictor of

Figure 1

Path Analysis of Study Variables



| Effect | Coefficient | 95% CI |
|--------|-------------|--------------|
| a | 1.12 | [0.93, 1.31] |
| b | 1.00 | [0.86, 1.14] |
| c' | 0.59 | [0.34, 0.85] |
| ab | 1.12 | [0.88, 1.40] |

Note. Indirect effects of cognitive anxiety sensitivity on rumination through total cognitive fusion. Bold lines represent significant relations. All effects shown in table are statistically significant. CAS = Cognitive Anxiety Sensitivity. CF = Cognitive Fusion.

ruminative behavior (Brown et al., 2014; Cox et al., 2001). That is, those who exhibit a fear of the cognitive symptoms associated with anxiety (e.g., difficulty concentrating or thinking clearly) contemplate their distress in such a way that negatively interferes with everyday life (e.g., fear of becoming insane or developing a mental illness). However, although cognitive anxiety sensitivity has been established as a predictive factor of

rumination, amenable behavioral factors that account for this relation and inform intervention strategies have not been previously identified.

One factor that may explain the cognitive anxiety sensitivity-rumination relation is cognitive fusion (i.e., mental compounding of thought and experience), which appears to be related to both anxiety sensitivity and depressive symptomology (Bardeen & Fergus, 2016). Rumination, in turn, has been identified as a strong predictor of depression (Galecki & Talarowska, 2017; Papageorgiou & Wells, 2003) and an important foundation for beginning therapeutic intervention (Umegaki et al., 2021). However less is known about maintenance of rumination within Acceptance and Commitment Therapy (Ruiz et al., 2016). Despite theoretical connections, cognitive anxiety sensitivity, cognitive fusion, and rumination have yet to be studied in one comprehensive model. As such, the relations between these three variables have yet to be clarified. The present study aimed to distinguish these relations wherein cognitive fusion was specified as a potential mediator of the cognitive anxiety sensitivity-rumination relation.

The hypotheses presented in this study were supported. Cognitive anxiety sensitivity was significantly correlated with cognitive fusion and rumination. Similarly, cognitive fusion exhibited a significant relation with rumination. Lastly, consistent with expectations, cognitive fusion significantly mediated the cognitive anxiety sensitivity-rumination relation.

Correlations of Cognitive Anxiety Sensitivity, Cognitive Fusion, and Rumination

Cognitive Anxiety Sensitivity and Rumination Correlation

As expected, results from correlation analyses indicated high cognitive anxiety sensitivity was significantly related to high rumination. Conceptually, our theory that

individuals who experience high cognitive anxiety sensitivity are more inclined to consistently think about and consider their distress warrants merit. For example, if someone has a high fear that they are losing cognitive control, it is likely they will contemplate the thought that they may be ‘going crazy’ to such degree that it becomes intrusive in everyday life and results in rumination and, as suggested by previous research, depression (Cox et al., 2001). This finding supports previous research that suggested cognitive anxiety sensitivity and rumination are uniquely related to the development of depressive symptoms (Brown et al., 2014). However, in contrast to Brown et al.’s analysis of anxiety sensitivity and rumination (2014), the present study did not include a measure of depression, and therefore cannot confirm that rumination plays an intermediate role in the cognitive anxiety sensitivity-depression relation. Rather, the present study examined a mediating variable in the cognitive anxiety sensitivity-rumination relation that is under individual control, which may be more useful in a clinical setting aimed at targeting specific precursors of depression. Future research may consider specifying a path model wherein cognitive fusion mediates the cognitive anxiety sensitivity-rumination relation that, in turn, predicts depression.

Cognitive Anxiety Sensitivity and Cognitive Fusion Correlation

As hypothesized, cognitive anxiety sensitivity demonstrated a significant positive association with cognitive fusion, suggesting that those who report a propensity to fear cognitive symptoms of anxiety (Reiss & McNally, 1985; Taylor et al., 2007) also experience high psychological attachment to their thoughts (Gillanders et al., 2014; Hayes et al., 2012). Accordingly, cognitive fusion may be heightened in individuals with high levels of cognitive anxiety sensitivity. This can have adverse consequences as

excessive fusion may result in behavior guided by unhelpful cognition at the expense of sensitivity to environmental contingencies, which may exacerbate the symptoms of cognitive anxiety sensitivity (Bardeen & Fergus, 2016). However, since the nature of this analysis does not definitively associate these two constructs (Hayes, 2018), future research may use experimental designs to confirm this relation, which may then be used in forming effective therapeutic strategies for individuals with high cognitive anxiety sensitivity. In so doing, collection of physiological data related to anxiety sensitivity (e.g., heart rate and parasympathetic activity; Busscher et al., 2013) and clinical interviewing related to cognitive fusion may be combined to help further elucidate this relation.

Cognitive Fusion and Rumination Correlation

Consistent with hypothesis 2, cognitive fusion and rumination were positively associated. Conceptually, this finding suggests those who think about troublesome thoughts in a cyclical manner may view these perceptions as true experience. For example, if someone consistently thinks about how alone they feel, it is reasonable to conclude that their perception of reality is that they are alone. If we think of rumination as a constant and recurring process, per Nolen-Hoeksema's Response Styles Theory (1991), it is possible these individuals form a deep connection with their thoughts in a way that modifies their judgement of true experience. This finding supports previous research in which the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991), the pre-modified version of the Ruminative Response Scale, was highly associated with cognitive fusion (Gillanders et al., 2014). Interviewing and diagnostic clinical methodology may be used to further understand this relation.

Mediation via Cognitive Fusion

Our mediation analysis indicated cognitive fusion significantly mediated the cognitive anxiety sensitivity-rumination relation, consistent with hypothesis 3. Said another way, the relation between cognitive anxiety sensitivity and rumination was partially accounted for by cognitive fusion. Theoretically, the previously identified association between cognitive anxiety sensitivity and rumination (Brown et al., 2014; Cox et al., 2001) may occur because cognitions, which would otherwise come and go, are viewed as true indicators of reality. Alternatively, rumination on the idea that there is something terribly wrong with oneself (i.e., cognitive anxiety sensitivity symptoms) may not happen if individuals relate to thoughts as mental events that need not dictate behavior. Indeed, the process of disengaging with one's thoughts in such a way that they no longer become invasive in everyday life is targeted during participation in psychotherapies such as Acceptance and Commitment Therapy (Hayes et al., 2012). As such, cognitive fusion may be one potential behavioral process to be targeted during psychosocial treatment for depressive rumination (Watkins, 2015). Our results suggest these interventions may be useful for individuals who experience cognitive anxiety sensitivity-related rumination. Future research may clarify these relations using interventional or experimental methods.

Strengths

The current investigation possessed several strengths. First, results from this study advance overall understanding of ruminative tendencies in undergraduate college students, which may contribute to depression maintenance. Results of previous investigations that suggest cognitive anxiety sensitivity is substantially associated with

rumination were supported. Furthermore, cognitive anxiety sensitivity and rumination both exhibited positive correlations with cognitive fusion. Mediation analysis results suggested that cognitive fusion indirectly accounted for the cognitive anxiety sensitivity-rumination relation. As such, the current study provides insight into a mechanism through which individuals with high cognitive anxiety sensitivity may be able to effectively manage their ruminative tendencies. This new ability to actively regulate ruminative behavior may decrease one's overall propensity for experiencing depression, as previous research has shown that high rumination predicts depressive symptomology (Galecki & Talarowska, 2017; Nolen-Hoeksema et al., 2008; Papageorgiou & Wells, 2003). Further research and support of the current results has the potential to inform therapeutic programs aimed at reducing depressive symptomology through risk-factor management.

Limitations and Future Directions

Sample Limitations and Future Directions

The sample in this study was limited to college students, and therefore results may not generalize to other populations. Participants were mainly within the ages of 18 and 23, and the large majority of participants were White (94%). Future research may examine these relations in more representative samples of college students broadly. Alternatively, investigation into other at-risk groups (e.g., the elderly, minority individuals) may provide further insight into depressive symptomology in diverse populations.

The present study did not include measures of depression symptoms or use any diagnostic criteria. Therefore, it is unclear whether those reporting ruminative tendencies

actually suffered from depression, which may influence the relevance of the current findings within this context. Testing the model presented herein with a sample of clinically depressed individuals may increase the clinical utility of the present study. Moreover, ruminative behavior occurs across several different psychiatric disorders, such as anxiety (e.g., worries about future negative outcomes), substance use (e.g., repetitive thinking related to a drug of choice and difficulty regulating usage), somatic (e.g., thoughts about appearance), and eating disorders (e.g., thoughts about weight and caloric intake; Grant et al., 2002; Nolen-Hoeksema et al., 2007; McLaughlin & Nolen-Hoeksema, 2011). Given the positive association of anxiety sensitivity and anxiety symptoms over time (Hovenkamp-Hermelink et al., 2018), the present model may be relevant to individuals who struggle with an anxiety disorder. Repetitive thinking within substance use disorders may emerge from anxious fear related to, for example, harmful effects of substance misuse and possible return to misuse. Likewise, ruminative behavior in the context of somatic and eating disorders may be linked to fear of potentially harmful effects of disorder-specific behavior. Thus, identification of the relations of cognitive anxiety sensitivity, cognitive fusion, and rumination in these populations may lead to the identification of potentially useful targets for therapeutic intervention.

Theoretical Limitations and Future Directions

A possible limitation within the present study is the potential overlap between the CFQ and RRS. Though cognitive fusion and rumination were positively associated as expected, the correlation was high, which calls into question our ability to statistically distinguish between constructs (Tabachnick & Fidell, 2013). As previously indicated, the idea that those who ruminate may be fused or psychologically connected with their

thoughts is conceptually plausible and supported by our results. However, rumination and cognitive fusion are different constructs, in which rumination is focused on the behavioral outcome of distress (Nolen-Hoeksema, 1991), whereas cognitive fusion focuses on a cognitive connection with distressing thoughts (Hayes et al., 2012). For instance, someone who thinks “I am selfish,” as opposed to “I am having the thought that I am selfish,” may not necessarily ruminate the consequences of such, but rather achieve distance from the upsetting thought, thus allowing for behavior guided by positive reinforcement from the environment. Perhaps the individual chooses to volunteer their time or actively seeks to become a better listener as a result. In this way, cognitive fusion and rumination are related, but not inevitably confounded. Therefore, the possibility that the CFQ and RRS are measuring the same underlying construct seems unlikely, yet possible (Tabachnick & Fidell, 2013). Future research that clarifies discriminant validity between these two measures using factor analysis would help address this potential limitation (Jackson, 1969).

Within the present study also lies the possibility of omitted variables that may influence the relation of cognitive anxiety sensitivity and rumination. Investigation into other constructs related to depression may provide a more comprehensive understanding of this relation. For instance, emotion regulation has been identified as an indirect influence in the relation of anxiety sensitivity and symptoms of depression and anxiety (Ouimet et al., 2016). As such, it is plausible that those with high cognitive anxiety sensitivity may not manage emotional experience effectively and experience one highly relevant symptom of depression, rumination, as a result. Alternatively, psychological flexibility, of which cognitive fusion is a subprocess (Hayes et al., 2012), may serve an

intermediate role, and the results in the current study may be a mere reflection of this reality. Ultimately, this means that those with high cognitive anxiety sensitivity may become more inflexible, or unable to appropriately respond to environmental occurrences as a result of psychological rigidity (Hayes et al., 2012), and therefore are forced to expend their energy through ruminative behavior. As such, future research may benefit from investigating both psychological flexibility and the six subprocesses thereof (acceptance, *cognitive defusion*, being present, self as context, values, committed action; Hayes et al., 2012) within the context of cognitive anxiety sensitivity-related rumination. Lastly, perceived distress and distress tolerance may provide further insight into this relation. Both cognitive anxiety sensitivity and rumination are significantly related to distress (Brown et al., 2014) and, as such, one's perception of and ability to manage their distress may reduce ruminative tendencies in individuals who report high levels of cognitive anxiety sensitivity. Overall, future research may consider investigating other potential factors which may exhibit a significant indirect effect on the cognitive anxiety sensitivity-rumination relation such as emotion regulation, psychological flexibility, and measures of distress tolerance.

Finally, a potential limitation of the present study concerns the applicability of Nolen-Hoeksema's Response Styles Theory (1991), and therefore the Ruminative Response Scale as a measurement, within these conditions. Although, generally speaking, RST is the most popular conceptualization of ruminative behavior, it may not necessarily be the best within this population. Considering college nature, perhaps Goal-Progress (Martin et al., 1993) or Stress Reactive Rumination (Alloy et al., 2000) would be more applicable in these circumstances. For instance, given that college students are

constantly trying to meet goals (e.g., due dates for assignments, high GPA, graduating on time), their repetitive thought about goal discrepancy, as posited by Martin et al.'s Goal-Progress Model of rumination (1993), may be more relevant than rumination in respect to current negative affect, as is suggested in Nolen-Hoeksema's Response Styles Theory (1991). However, the Goal-Progress theory does not assume specificity to depression, and therefore still has certain limitations within the current context. Alloy et al.'s Stress Reactive Model of rumination (2000) may provide a useful alternative. For instance, since college students are particularly prone to stressful experience (e.g., meeting an assignment deadline, large workload, maintaining a social life), their ruminative tendencies may be theoretically related to the stress they experience. Moreover, this model of rumination appears to be useful in predicting depression (Robinson & Alloy, 2003). However, since the current study did not include other measurements of rumination, no other approach to this construct can be analyzed and no definitive comment can be made on other conceptualizations of rumination within the context of the current study. Future research may consider including measurements informed by other theories of rumination to determine the appropriateness of using RST at present and in future contexts.

Methodological Limitations and Future Directions

Perhaps the most obvious limitation of the current investigation is the reliance on self-reported survey data. Although data was cleaned and regulated with attention check items to avoid inattentive responding, introspective reflection may be difficult for some participants, which could lead to errors in measurement of the constructs in this study. Fatigue may have also played a role in responses, as this investigation featured a

secondary data analysis, and the surveys presented were part of a larger study (Porter et al., 2004). The cross-sectional nature of this study produces some concern. Cross-sectional analyses that are indicative of longitudinal mediation are subject to significant bias, as true mediation develops over time (Maxwell & Cole, 2007). The results in this study may be construed as a result. Moreover, cross-sectional data inhibits our ability to analyze changes in study variables across time and make causal inferences based upon our results. This may influence the applicability of our findings as it is uncertain whether cognitive fusion truly mediates the cognitive anxiety sensitivity-rumination relation, or contrarily, whether it is merely correlated. In reference to our hypotheses, future researchers may consider using structural equation modelling to distinguish between true signals and common method variance when using only self-report measures. Alternatively, clinical interviewing, behavioral observation, and physiological methodology (e.g., skin conductance), may provide further validation of the results in this study and allow for definitive conclusions.

Conclusion

The current study sought to expand upon limited research that has examined how constructs related to rumination, one specific risk-factor of depression, may be explained. The present study is the first to examine the indirect influences related to risk-factors of depression, specifically rumination. Consistent with previous research, rumination was correlated with both cognitive anxiety sensitivity and cognitive fusion. Furthermore, cognitive anxiety sensitivity was positively associated with cognitive fusion, as expected. Lastly, mediation analysis results indicated cognitive fusion significantly mediated the cognitive anxiety sensitivity-rumination relation. Thus, cognitive fusion may be an

effective therapeutic target to reduce ruminative behavior that occurs as a result of cognitive anxiety sensitivity. Generally speaking, the content and methodology of this study allowed for new awareness of one risk-factor of depression, rumination.

Overall, the present study advances our understanding of rumination within the context of a particularly vulnerable population, college students. Future research is needed to test this relation in larger, more diverse samples that may be more applicable to depressed individuals at large. Additionally, other variables related to cognitive anxiety sensitivity and rumination may be examined to help determine whether alternative confounding variables may be affecting the present relation. Lastly, future researchers may consider using more thorough methodology, such as longitudinal or experimental designs, to help further clarify the present results. This research and support for the current findings may inform interventions aimed at reducing rumination and overall depressive symptomology. Specifically, individuals with high cognitive anxiety sensitivity may be well-suited to leverage cognitive fusion as an effective therapeutic and behavioral target in reducing ruminative behavior.

Appendix A

Demographics Questionnaire

What was your sex at birth?

- 0 = Male
- 1 = Female
- 2 = Intersex
- 3 = Other

What is your current gender identity? (Check all that apply)

- 1 = Man
- 2 = Woman
- 3 = Trans man
- 4 = Trans woman
- 5 = Genderqueer
- 6 = Gender fluid
- 7 = Agender
- 8 = Questioning or unsure
- 9 = Other

What is your date of birth? Please enter in the format mm/dd/yyyy.

What is your age (in years)?

Is English a second language for you?

- N = No
- Y = Yes

Were you born in the United States?

- N = No
- Y = Yes

If NO:

How long have you been living here? _____

Where were you born? _____

What is your ethnic background?

- 1 = White
- 2 = American Indian/Alaska Native
- 3 = Black/African American
- 4 = Asian/Asian American
- 5 = Hispanic/Latino
- 6 = Native Hawaiian or Other Pacific Islander
- 7 = Middle Eastern/Northern African
- 8 = Other (including multi-ethnic, please specify): _____

How do you self-identify?

- 1 = Straight (Heterosexual)
- 2 = Gay
- 3 = Lesbian
- 4 = Bisexual
- 5 = Queer
- 6 = Questioning or unsure
- 7 = Asexual
- 8 = Same-Gender-Loving
- 9 = Pansexual
- 10 = Other

What is your current relationship status?

- 1 = Single, never married
- 2 = Widowed
- 3 = Married
- 4 = Separated
- 5 = Divorced
- 6 = Living with partner (but not legally married)
- 7 = Long-term committed relationship

What is the highest grade or degree you have completed?

- 1 = Eighth grade or less
- 2 = Some high school
- 3 = GED
- 4 = High school graduate
- 5 = Business or technical training beyond high school
- 6 = Some college
- 7 = College graduate
- 8 = Some graduate or professional school beyond college
- 9 = Master's degree
- 10 = Doctoral degree

Are you a student?

- 1 = Not a student
- 2 = Part-time student
- 3 = Full-time student

What is your employment status?

- 1 = Unemployed
- 2 = Employed part-time (working 1-30 hours a week)
- 3 = Employed full-time (working more than 30 hours a week)
- 4 = Home-maker
- 5 = Retired

What is your total household/family income?

- 1 = Less than \$9,999
- 2 = \$10,000 - 19,999
- 3 = \$20,000 - 29,999
- 4 = \$30,000 - 39,999
- 5 = \$40,000 - 49,999
- 6 = \$50,000 - 59,999
- 7 = \$60,000 - 69,000
- 8 = \$70,000 - 79,000
- 9 = \$80,000 - 89,000
- 10 = \$90,000 - 99,999
- 11 = \$100,000 or more

Appendix B

Ruminative Response Scale

People think and do many different things when they feel depressed. Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you *generally* do, not what you think you should do.

| 1 | 2 | 3 | 4 |
|--------------|-----------|-------|---------------|
| almost never | sometimes | often | almost always |

1. think about how alone you feel
2. think "I won't be able to do my job if I don't snap out of this"
3. think about your feelings of fatigue and achiness
4. think about how hard it is to concentrate
5. think "What am I doing to deserve this?"
6. think about how passive and unmotivated you feel.
7. analyze recent events to try to understand why you are depressed
8. think about how you don't seem to feel anything anymore
9. think "Why can't I get going?"
10. think "Why do I always react this way?"
11. go away by yourself and think about why you feel this way
12. write down what you are thinking about and analyze it
13. think about a recent situation, wishing it had gone better
14. think "I won't be able to concentrate if I keep feeling this way"
15. think "Why do I have problems other people don't have?"
16. think "Why can't I handle things better?"
17. think about how sad you feel
18. think about all your shortcomings, failings, faults, mistakes
19. think about how you don't feel up to doing anything
20. analyze your personality to try to understand why you are depressed
21. go someplace alone to think about your feelings
22. think about how angry you are with yourself

Appendix C

Anxiety Sensitivity Index-3

Please rate each item by selecting one of the five answers for each question. Please answer each statement by clicking the number that best applies to you.

| 0 | 1 | 2 | 3 | 4 |
|-------------|----------|------|------|-----------|
| Very little | A little | Some | Much | Very much |

1. It is important for me not to appear nervous.
2. When I cannot keep my mind on a task, I worry that I might be going crazy.
3. It scares me when my heart beats rapidly.
4. When my stomach is upset, I worry that I might be seriously ill.
5. It scares me when I am unable to keep my mind on a task.
6. When I tremble in the presence of others, I fear what people might think of me.
7. When my chest feels tight, I get scared that I won't be able to breathe properly.
8. When I feel pain in my chest, I worry that I'm going to have a heart attack.
9. I worry that other people will notice my anxiety.
10. When I feel "spacey" or spaced out I worry that I may be mentally ill.
11. It scares me when I blush in front of people.
12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.
13. When I begin to sweat in a social situation, I fear people will think negatively of me.
14. When my thoughts seem to speed up, I worry that I might be going crazy.
15. When my throat feels tight, I worry that I could choke to death.
16. When I have trouble thinking clearly, I worry that there is something wrong with me.
17. I think it would be horrible for me to faint in public.
18. When my mind goes blank, I worry there is something terribly wrong with me.

Appendix D

Cognitive Fusion Questionnaire

Below you will find a list of statements. Please rate how true each statement is for you by clicking a number next to it. Use the scale below to make your choice.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------------|------------------|-------------|----------------|-----------------|--------------------|-------------|
| never true | very seldom true | seldom true | sometimes true | frequently true | almost always true | always true |

- | | | | | | | | | |
|----|--|---|---|---|---|---|---|---|
| 1. | My thoughts cause me distress or emotional pain | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I get so caught up in my thoughts that I am unable to do the things that I most want to do | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I over-analyze situations to the point where it's unhelpful for me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | I struggle with my thoughts | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I get upset with myself for having certain thoughts | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | I tend to get very entangled in my thoughts | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix E

Attention Check Items

Did you expend effort and attention sufficient to warrant using your responses for this research study?

Y = YES

N = NO

For this query, mark NO and move on.

Y = YES

N = NO

I would rather eat a piece of fruit than a piece of paper.

I agree

Not sure

I disagree

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