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Expressive writing (EW) is an experimental paradigm developed by Pennebaker and colleagues (Pennebaker & Beall, 1986). In traditional EW tasks, participants are asked to disclose their deepest thoughts and emotions concerning the most traumatic or stressful event of their lives. Consistent with the notion that EW may be beneficial for those with psychological diagnoses, research has looked to individual differences that infer risk or are associated with the maintenance of psychological disorders. It has been posited that an underlying mechanism of EW is the implicit message for participants to be accepting and non-judgmental towards their emotions and cognitions through the instruction to delve into one's deepest thoughts and feelings. Thus, EW may be a particularly useful intervention tool for individuals prone to rumination, a repetitive form of thinking about the self, especially one's sad or depressed feelings (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). In particular, Baum and Rude (2013) proposed self-compassion as a related construct that may further enhance the benefit of EW. The current study sought to align multiple arms of EW research that have typically been separately pursued: comparing traditional EW to an adapted paradigm (e.g., providing instructions that guide participants to engage in principles of self-compassion,); measuring individual differences which may impact EW benefit; and conducting linguistic analysis to further understand psychological processes occurring during writing. Overall, participants reported both EW conditions as beneficial, on average. Negative

affect increased across writing sessions for the full sample, consistent with typical

immediate effects of EW. However, none of the hypothesized differences in affect or

cognitive word use by EW condition were supported, nor were the moderation effects of

rumination.

TRADITIONAL VS. SELF-COMPASSIONATE EXPRESSIVE WRITING:

DIFFERENTIATING PROCESSES THROUGH

LINGUISTIC ANALYSIS

by

Anahita Z. Kalianivala

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_____
Committee Chair

To my parents, grandparents, labmates and cohort. To Greensboro, NC. To the mentors who provided unconditional love, kindness, and support.

To forgive and be free, you must honor your measure of grief, betrayal, the whole difficult story, and hold it with all the compassion you can. Remember that you are bigger than anything that happens to you. Then you can turn your heart toward forgiveness. – Jack Kornfield

This dissertation written by ANAHITA Z. KALIANIVALA has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair   _____
                              Kari M. Eddington

Committee Members   _____
                              Gabriela Livas Stein

                              _____
                              Levi R. Baker

                              _____
                              Janet J. Boseovski

_____
Date of Acceptance by Committee

_____
Date of Final Oral Examination

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CHAPTER I

INTRODUCTION

Expressive writing (EW) is an experimental paradigm developed by Pennebaker and colleagues (Pennebaker & Beall, 1986). They developed the paradigm after an incidental discovery that individuals who experienced a traumatic event had poorer health outcomes (see Pennebaker, 2018). EW promotes emotion expression and processing through the writing of stressful or traumatic events in a structured confidential manner. It was developed from the hypothesis that disclosing traumatic events may improve individuals' health. Since its inception, EW has been widely examined as a self-help intervention tool (see Frattaroli, 2006 for review).

In traditional EW tasks, participants are asked to disclose their deepest thoughts and emotions concerning the most traumatic or stressful event of their lives. Participants usually repeat this exercise several times, typically writing for three to five consecutive days for 15 to 30 minutes each day. EW is intended to parallel the therapeutic process of disclosure through labeling a problem and discussing its causes and consequences (Pennebaker, 1997). Pennebaker theorized that not only is the acknowledgement of a problem and its related emotions a fundamental part of this process, but also the act of disclosing one's thoughts and feelings to another person is a "powerful therapeutic agent" (p. 162).

Expressive Writing Theory

Several authors have discussed the underlying theories regarding how EW achieves its far-reaching benefits (e.g., Pennebaker, 1997; Nazarian & Smyth, 2008; Sloan & Marx, 2004). While a full review of EW theory is outside the current scope, leading theories incorporate both the emotional and cognitive components that can contribute to psychological functioning. Two theories in particular are commonly used in EW literature: cognitive assimilation and exposure.

Cognitive assimilation refers to adapting to a traumatic event by integrating it into one's existing schemas (Sloan & Marx, 2004). For example, if an individual's core schemas include that the world is fair, just, and meaningful, a traumatic experience can disrupt these beliefs. Thus, in order to cope with the experience, the individual has to reconcile the incongruence and reestablish their view of the world, which may involve either 1) assimilating their experience into the old set of assumptions or 2) changing their assumptions to accommodate the new experience. Pennebaker (1997) and others have suggested that EW can provide a framework in which an individual gives structure, organization, and cohesion to their traumatic memory. The writing process may in turn promote insight into cognitive assimilation or accommodation of the traumatic experience. It is speculated that EW helps individuals construct a narrative, thereby engaging in cognitive processing, which facilitates decreased stress and subsequent improvements in physical health (Pennebaker, 1990; Pennebaker & Beall, 1986).

The *exposure hypothesis* of EW is rooted in learning theory and asserts that psychological stress, especially anxiety, is maintained when individuals avoid aversive

stimuli, whether the response is conditioned or unconditioned (see Sloan & Marx, 2004

for further discussion of Mowrer's (1960) two-factor theory). Foa and Kozak (1986)

asserted that exposure reduces fear by activating an individual's fear structure (i.e.,

cognitive representation of their fear) and providing corrective information about the

stimuli, their responses, and interpretations. That is, not only is the individual becoming

emotionally habituated to exposure of feared stimuli, but also the exposure allows for

corrective feedback to erroneous cognitive schemas that were altered as a result of the

trauma. Written disclosure in the context of EW may serve as a context that allows

individuals to be exposed to previously avoided aversive stimuli. Additionally, repeated

exposure (e.g., over several writing sessions) may extinguish the pairing of the

conditioned and unconditioned stimulus, or it may activate the fear structure and provide

corrective information, contributing to improved health outcomes.

Most authors espouse a combination of theoretical models that include cognitive

and emotional processing to explain the benefit of EW. It is noted that theoretical

investigations of the EW paradigm are difficult given the highly diverse nature of studies,

e.g., sample population, duration of writing, repetition, writing topic, outcome variables.

A dual processing model involving exposure to emotionally salient material and the

cognitive integration of said material into working memory is supported by the work of

Ullrich and Lutgendorf (2002) and Sloan and colleagues (2007). Thus, for the current

study, a combination of cognitive assimilation and exposure theories will be used to

guide the investigation, especially as empirical evidence (through linguistic analysis,

described in further detail below) best supports the importance of narrative coherence and

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the use of both cognitive processing (i.e., cognitive assimilation hypothesis) and emotional expression (i.e., exposure hypothesis) through language.

Outcomes Associated with Expressive Writing

Early studies with the EW paradigm investigated its associations with physical health correlates, e.g., reduced healthcare utilization. In the decade that followed the initial studies (e.g., Pennebaker & Beall, 1986; Pennebaker, 1987; Pennebaker, 1988), outcome measures were extended to include physiological markers (e.g., Hepatitis B antibody levels, skin conductance, heart rate), behavioral markers (e.g., grade point average, reemployment, absenteeism), and self-report (e.g., physical symptoms, distress, depression) (see Pennebaker, 1997 for review). Given EW's promising associations across a breadth of domains important to psychological and physical health functioning, the paradigm has yielded hundreds of studies, comprising a literature of its own. Several meta-analyses have demonstrated the small yet reliable and beneficial effects of EW (e.g., Frattaroli, 2006; Frisina, Borod, & Lepore, 2004; Smyth, 1998). Frattaroli (2006) indicates that the overall effect size of EW is a Cohen's $d = .08$. While this effect is quite modest, it is notable for a very brief intervention to significantly impact meaningful outcomes several weeks later (Smyth & Pennebaker, 2008).

Outcomes in healthy vs. clinical samples. Reviews of the initial EW literature indicate that a diversity of physically healthy populations (e.g., medical students, recently unemployed men, maximum-security prisoners, and crime victims) have exhibited physical health benefits following EW (Pennebaker & Seagal, 1999). Additionally, individuals suffering from physical illnesses also benefit from EW (Broderick,

Junghaenel, & Schwartz, 2005; Danoff-Burg, Agee, Romanoff, Kremer, & Strosberg, 2006; Petrie, Fontanilla, Thomas, Booth, & Pennebaker, 2004; Smyth, Stone, & Hurewitz, 1999; Stanton et al., 2002). For example, breast cancer patients who were randomly assigned to an EW condition were less symptomatic and had fewer doctor's visits at three-month follow-up than the control condition (Stanton et al., 2002). In a sample of individuals with HIV, participants who engaged in EW showed immune system improvements (Petrie et al., 2004). Thus, several studies have demonstrated that physical health benefits of EW are generalizable across a range of populations.

Regarding psychological health, EW studies have demonstrated clinically significant reductions in post-traumatic stress disorder (PTSD) symptoms (Sloan, Marx, & Epstein, 2005) and improvements in depressive symptoms (Sloan & Marx, 2004) after emotion disclosure among individuals suffering from PTSD. Studies have also shown that individuals with PTSD experience decreases in anger and tension and exhibit less reactivity (as measured by cortisol levels) to traumatic images (Smyth, Hockemeyer, & Tulloch, 2008). Psychiatric inmates suffering from a variety of psychological disorders visited the prison infirmary less often after participating in EW compared to inmates in a control condition (Richards, Beal, Seagal, & Pennebaker, 2000).

Consistent with the notion that EW may be beneficial for those with psychological diagnoses, research has looked to individual differences that infer risk or are associated with the maintenance of psychological disorders. One example includes the study of alexithymia, or difficulty expressing or describing emotions, in relation to EW. Research has shown that the benefits of EW are greater for those higher in

alexithymia (i.e., with fewer emotion regulation resources) compared to low alexithymic participants (Baikie, 2008; Paez, Velasco, & Gonzalez, 1999; Solano, Donati, Pecci, Perischetti, & Colaci, 2003). In fact, low alexithymic individuals did not show much improvement after EW (Paez et al., 1999; Solano et al., 2003). Solano et al. (2003) theorized that low alexithymic participants may have already processed their experiences ahead of writing (e.g., internally or with others) and thus EW did not necessarily help them further integrate their emotions, one proposed mechanism of EW. These findings imply that EW may be especially helpful for individuals who employ maladaptive coping or emotion regulation strategies. This hypothesis is supported by evidence that individuals who use maladaptive emotion regulation strategies such as suppression and rumination seem to benefit from emotion disclosure techniques (Gortner et al., 2006; Sloan, Marx, Epstein, & Dobbs, 2008).

Differential effects and individual differences. Although there is evidence that EW can benefit individuals across physical and psychological domains, a meta-analysis examining EW among clinical populations (both physically and mentally ill) indicated that improvements are greater in physical health domains than psychological domains (Frisina, Borod, & Lepore, 2004). Another meta-analysis by Frattaroli (2006) indicated that psychological outcomes are differentially affected by the EW intervention. For example, depression and distress improve with EW, but eating-disorder behavior and grief/bereavement are less likely to improve as a result of EW. It has been argued that this pattern of results, in which psychological symptoms are not as universally improved as physical health symptoms, occurs due to the distorted thinking and severe distress that

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can be associated with psychological disorders, thus impairing an individual's ability to write productively (Frisina et al., 2004).

Baum and Rude (2013) posited that EW interventions may be better suited for individuals at-risk for psychological disorders, e.g., depression-vulnerable individuals. There is evidence to suggest that among non-depressed populations, EW can improve mood, depressive symptoms and negative affect (Broderick et al., 2005; Langens & Schuler, 2005; Lepore, 1997; Soliday, Garofalo, & Rogers, 2004). Further evidence that EW may be beneficial for those suffering from depressive symptoms comes from a study conducted by Gortner et al. (2006) in which participants at-risk for depression were randomly assigned to an EW condition vs. control condition. Individuals in the EW condition who reported high trait levels of emotion suppression exhibited fewer depressive symptoms at six-month follow-up compared to the control condition. This decrease in depressive symptoms was additionally mediated by changes in brooding, an aspect of rumination. Other studies have found that individuals with brooding tendencies benefited most from EW with regards to depressive symptoms (Sloan et al., 2008). Therefore, it seems that EW not only impacts depression symptoms but also rumination patterns, which are considered a correlate of depression (Nolen-Hoeksema, 1991).

Rumination and Emotion Regulation

Depressive rumination is a repetitive form of thinking in which one repeatedly ponders about the self in an abstract-evaluative manner, especially about the possible causes, meanings, and implications of one's sad or depressed feelings (Nolen- Hoeksema, Wisco, & Lyubomirsky, 2008; Watkins, 2008). Rumination is well established as a risk

factor for the onset, maintenance and relapse of depression (Brinker & Dozois, 2009; Just & Alloy, 1997; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Nolen-Hoeksema, Parker, & Larson, 1994; for reviews, see Nolen-Hoeksma et al., 2008 and Watkins, 2008).

As an emotion regulation strategy, rumination is thought to be particularly problematic due its focus on the gap between one's current and ideal state. In particular, focusing on the content of this gap and ignoring the related emotion limits one's opportunities for effective emotion processing. Liverant, Kamholz, Sloan, and Brown (2011) found that rumination was positively associated with emotion suppression and negatively associated with acceptance. In other words, rumination can be conceptualized as a type of emotional avoidance that limits the processing of negative emotion. Thus, it is an important individual difference in the consideration of psychological wellbeing, especially in the context of self-compassion, given the robust negative associations between self-compassion and depression and anxiety.

Regarding the cognitive components of emotion regulation, negative thought suppression and persistent rumination can indicate incomplete or unsuccessful cognitive processing (Lepore & Greenberg, 2002; Lumley, Tojek, & Macklem, 2002). Thus, an intervention such as EW that promotes cognitive processing of negative events may reduce the accessibility of depressogenic schemas, e.g., ruminative focus on the discrepancy between one's current and desired state. It has been posited that individuals who recognize having negative emotions but who are ambivalent to express them, who inhibit them, or who excessively worry about them are most likely to benefit from disclosure (Lumley et al., 2002; Gortner, Rude & Pennebaker, 2006).

Research indicates that rumination is reduced when participants are encouraged to perceive negative events and subsequent reactions in a broader context that acknowledges the universality and transience of distress (Rude, Mazzetti, Pal, & Stauble, 2011). On the surface, it seems paradoxical that increased focus on negative events may help individuals high in rumination, as rumination has been characterized as paying too much attention to one's distress. However, several researchers have posited that there are both productive and unproductive aspects of attending to one's distress (e.g., Rude, Maestas, & Neff, in press; Segerstrom, Stanton, Alden, & Shortridge, 2003; Trapnell & Campbell, 1999; Treynor, Gonzalez, & Nolen-Hoeksema, 2003; Watkins, 2004). Thus, there may be productive and unproductive aspects to rumination, as well.

Experimental studies have shown that rumination can intensify dysphoric mood and negative thinking while impairing problem solving (e.g., Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Watkins & Baracaia, 2002). In contrast, attending to one's internal states and self-experiences are hypothesized to be essential components of emotion processing (Rachman, 1980) and self-regulation (Carver & Scheier, 1982, 1990). To help resolve these contrasting consequences, it has been proposed that it is not only the content of one's rumination (e.g., focus on negative mood, problems, self) that is important, but also the exact manner in which one is engaging in self-reflection that can promote productive or unproductive consequences (e.g., successful emotion regulation vs. depressive symptoms) (McFarland & Buehler, 1998; Teasdale, 1999).

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Teasdale (1999) proposed distinct levels of processing self-related information to better capture the dynamic nature of self-focus: propositional and implicational processing. The *propositional* level is characterized by conceptual, analytical, evaluative "thinking about" the self, in which one is focused on the discrepancies between current and desired outcomes. (This is consistent with traditional definitions of depressive rumination.) The *implicational* level is characterized by non-evaluative, intuitive, direct experiential awareness of an experience. (This is consistent with mindful, present-moment awareness.) Watkins (2004) tested the difference between these evaluative (or propositional) and experiential (or implicational) modes of self-focus, predicting that experiential self-focused attention would better facilitate mood-related recovery from an upsetting event in comparison to the evaluative mode.

Participants in Watkins' study wrote about an induced failure in either the evaluative condition (e.g., why did you feel this way) or experiential condition (e.g., how did you feel moment-by-moment). Individuals higher in trait rumination had greater increases in post-writing negative mood in the evaluative condition than the experiential condition, suggesting a protective effect in the condition that encouraged non-evaluative, direct experience of one's thoughts and emotions. Furthermore, these results support the hypothesis that the specific mode of one's self-focused attention can produce differential effects.

Thus, the self-focus aspects of rumination are likely not one-dimensional, helping to explain various productive and unproductive consequences of cognitive and emotional engagement with one's distress. As this relates to written disclosure, it is plausible that

EW can be a particularly useful intervention for individuals prone to rumination, as it implicitly encourages acceptance and non-judgment towards emotions and cognitions through the instruction to delve into one's deepest thoughts and feelings (Baum & Rude, 2013). Furthermore, it also promotes exposure to and engagement cognitions and emotions that may otherwise be ignored, e.g., due to over-focus on negative aspects of an event or discrepancy in desired and actual outcomes. However, depending on the mode of processing encouraged by the EW prompt, e.g., more concrete, evaluative approach vs. a more abstract, experiential approach, depressogenic schemas may be strengthened rather than reappraised. That is, it is possible that individuals high in rumination may use emotion disclosure as an opportunity to further confirm or explore their typical cognitive and emotional schemas (e.g., negative details, discrepancies). Thus, EW adaptations which make an experiential mode of processing more explicit may further promote productive processing among high ruminators. Relatedly, Baum and Rude (2013) proposed self-compassion as a construct that may further enhance the benefit of EW.

Definition of Self-Compassion

As Neff (2009) conceptualizes it, there are three components to self-compassion: self-kindness, common humanity, and mindfulness. Self-kindness involves being gentle and understanding with oneself rather than harshly critical or judgmental. Common humanity involves the recognition that we are part of a common experience. Thus, our experiences of both joy and suffering are connected with others, and we should not feel isolated or alienated by our suffering. Mindfulness requires holding experiences in balanced awareness, rather than ignoring pain or exaggerating it. Compassion can be

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extended towards the self in any circumstance of suffering, whether a situation is perceived as the person's fault or not (Neff, 2009).

Distinction from mindfulness. Of note, the constructs of self-compassion and mindfulness are closely linked; mindfulness refers to the ability to hold a balanced awareness of and non-judgmental attention towards the present moment. Self-compassion refers to holding negative self-relevant emotions in mindful awareness while generating feelings of kindness towards the self and holding insight into the connected nature of the human experience (Neff & Lamb, 2009). Thus, mindfulness is required to experience self-compassion. Additionally, the mindfulness component of self-compassion is narrower than the overall construct of mindfulness (Neff & Germer, 2013). Mindfulness in general refers to the ability to pay attention to any experience, regardless of emotional tone, with acceptance and equanimity. However, mindfulness required for self-compassion specifically refers to having a balanced awareness of *negative* thoughts and feelings associated with personal suffering. Empirically, these constructs have also been distinguished (e.g., Van Dam, Sheppard, Forsyth, & Earleywine, 2011; Williams, Dalgleish, Karl, & Kuyken, 2014), including results that suggest that self-compassion helps explain the effectiveness of mindfulness-based interventions (Baer, 2010; Hollis-Walker & Colosimo, 2011; Kuyken et al., 2010).

Distinction from self-esteem. Self-compassion has also been distinguished from self-esteem; self-esteem is a well-established manner of relating to the self and has been moderately correlated with self-compassion (e.g., Leary, Tate, Adams, Allen & Hancock, 2007; Neff, 2003). While self-esteem has been largely regarded as a positive correlate of

wellbeing, more recent research has highlighted the costs associated with pursuing high self-esteem (Crocker & Park, 2004), including narcissism (Bushman & Baumeister, 1998), distorted self-perceptions (Sedikides, 1993), prejudice (Aberson, Healy, & Romero, 2000), and violence toward those who threaten the ego (Baumeister, Smart, & Boden, 1996). One of the posited strengths of self-compassion is that it should confer the same benefits of self-esteem – generating positive self-affect, positive self-regard, and self-acceptance – without potential negative correlates.

Self-Compassion and Its Psychological Correlates

A fast-growing literature strongly espouses the positive correlates of self-compassion. Broadly, it has been associated with more positive emotions, less negative emotions, and less severity of depressive symptoms in both healthy and clinical samples (Neff & McGeehee, 2010; Neff et al., 2007; for an overview, see Hofmann, Grossman, & Hinton, 2011 and MacBeth & Gumley, 2012). Neff, Rude, & Kirkpatrick (2007) found self-compassion to be associated with aspects of personality and psychological functioning, including curiosity, exploration, happiness, optimism, and positive affect.

Especially among college students, self-compassion has been positively associated with life satisfaction (Wei, Liao, Ku, & Shaffer, 2011) and well-being (Neely, Schallert, Mohammed, Roberts, & Chen, 2009). It has also been negatively associated with depression (Raes, 2011) and anxiety (Neff, Hseih, & Dejitthirat, 2005). Self-compassion has been linked to higher levels of self-efficacy (Iskender, 2009), increased motivation (Breines & Chen, 2012), adaptive emotion coping (Neff et al., 2005), and more adaptive responses to fear and failure (Neely et al., 2009).

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Self-Compassion Interventions

Beyond Neff's definition of the three components of self-compassion, theoretical and empirical literature on the topic has thus far provided multiple levels of analysis: considering it as a trait-level attitude or manner of relating to the self (e.g., Neff, 2003), as an emotion regulation strategy (e.g., Diedrich et al., 2014, 2016), and as a target of intervention (e.g., Leary, et al., 2007). Given its associations with psychological wellbeing, researchers have examined empirical and clinical interventions to induce or enhance self-compassion. Regarding clinical interventions, treatments with a self-compassion focus have been developed, including Compassion-Focused Therapy (CFT; Gilbert, 2010) and Mindful Self-Compassion program (MSC; Neff & Germer, 2013). Feasibility and pilot studies (Gilbert & Procter, 2006; Laithwaite et al., 2009; Lucre & Corten, 2013; Mayhew & Gilbert, 2008) as well as a randomized controlled trial (Braehler et al., 2013) have demonstrated efficacy of CFT in reducing symptoms of depression. Evidence for the efficacy of MSC comes from a study with a community sample in which there was a greater reduction in depression symptom severity for those participating in MSC than those participating in the waitlist control (Neff & Germer, 2013). Additionally, increased self-compassion among the MSC participants was significantly associated with decreased depressive symptoms. While clinical interventions nor clinical samples are the focus of the current study, these studies demonstrate efficacy of self-compassion at reducing depressive symptoms and even increasing trait levels of self-compassion.

Regarding experimental inductions, studies have shown the beneficial effects of a self-compassion stance, especially upon psychological correlates of depression. For example, a four-session intervention to enhance self-compassion was associated with reduced self-criticism (Gilbert & Irons, 2004). Among acne sufferers, a two-week self-soothing imagery intervention reduced shame and skin complaints (Kelly, Zuroff, & Shapira, 2009), and writing about recalled shame and experiencing it with self-compassion resulted in less shame and negative affect after two months (Johnson & O'Brien, 2013). In a study of recovered depressed individuals, individuals were instructed on the practice of acceptance (e.g., bringing awareness to the present moment, registering thoughts and feelings, accepting their experience as part of the human experience) and then participated in a negative mood induction (Singer & Dobson, 2009). Compliance with the acceptance-based cognitive strategy was associated with greater reductions in negative mood. Together these findings suggest that self-compassion is protective against negative mood states across a variety of samples.

Self-compassion interventions have often been studied among college females in particular, as evidence shows female students tend to have lower levels of self-compassion than male students (Neff, 2003; Neff & McGeehee, 2010; Neff, Pisitsungkagarn, & Hseih, 2008). Smeets et al. (2014) examined the effectiveness of a self-compassion intervention among Dutch female undergraduates. They found that the self-compassion intervention compared to the active control intervention (i.e., time management) resulted in a significant reduction in rumination, consistent with previous findings in which rumination mediated the association between self-compassion and

depression (Raes, 2010). Furthermore the intervention led to significant increases in self-compassion, mindfulness, optimism, and self-efficacy.

In a non-clinical sample, Leary and colleagues (2007) conducted a series of studies in which participants were exposed to negative, unpleasant, or embarrassing stimuli. Their results indicated that people higher in self-compassion demonstrated less negative emotion and more accepting thoughts as compared to individuals low in self-compassion. Additionally, higher self-compassion was associated with less severe reactions and a greater tendency for perspective-taking while also acknowledging personal responsibility in the face of negative or distressing stimuli. Thus, one way self-compassion may operate is to promote engagement with (rather than avoidance of) negative stimuli and potential negative self-evaluations that may arise. In fact, Neff, Hseih, and Dejitthirat (2005) found that avoidance in the face of academic failure was less likely among students with higher levels of self-compassion. In a study of university students with trauma-related symptoms, Thompson and Waltz (2008) found that participants with greater self-compassion had fewer avoidance symptoms, a correlate of posttraumatic stress.

Furthermore, it has been found that self-compassionate individuals are less likely to use maladaptive emotion regulation strategies that are related to depression, such as rumination, avoidance, and thought suppression (Barnard & Curry, 2011; Neff et al., 2007; Raes, 2010). In fact, self-compassion has been negatively correlated with rumination (Neff, 2003; Neff & Vonk, 2009), consistent with what would be expected, given that self-compassion requires taking a balanced approach to one's emotional

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experience in contrast to 'running away with' one's feelings (Neff, 2009). It has been suggested that individuals high in self-compassion may experience less negative affect (e.g., depressed or anxious mood) following a negative event because they are less likely to ruminate about possible negative implications of the event (Leary et al., 2007). Thus, incorporating components of self-compassion into EW, which aims to help participants engage with negative or distressing emotions, may enhance the benefits of EW especially for individuals prone to ruminative thought styles.

Self-Compassion Adaptations of Expressive Writing

One of the earliest experimental studies involving self-compassion included an EW component (Leary et al., 2007). After writing about a negative event that involved failure, humiliation, or rejection, participants were assigned to a self-compassion induction, self-esteem induction, writing control, or true control. It was found that participants in the self-compassion condition reported lower negative affect than any other condition. Furthermore, they were more likely to indicate that the event was caused by the kind of person they are. That is, the self-compassion induction led participants to report less negative affect even as they acknowledged how their own personal characteristics may have played a role in causing a negative event. Leary and colleagues suggested that this indicates a 'decoupling' effect of the self-compassion writing intervention: it allowed participants to acknowledge they are the kind of people who make mistakes without feeling badly about something that is a common experience, e.g., they were less defensive and less distressed.

Baum and Rude (2013) intended to examine an adapted EW intervention among depression-prone college students. Their adapted instructions included mindfulness-related strategies, such as self-compassion, emotion acceptance, and contextual thinking. They posited that "big picture thinking" might be an important cognitive component of mindfulness, as it can help reduce self-judgment and experiential avoidance. As previously noted, avoidance of negative emotions or thoughts has been associated with depression and anxiety symptoms and is thus a less adaptive strategy. Baum and Rude's study included three writing conditions: emotion-acceptance EW (e.g., components of mindfulness and self-compassion), traditional EW, and a control condition. In the emotion-acceptance condition, participants were given directions adapted from mindfulness and self-compassion interventions (e.g., Leary et al., 2007; Segal et al., 2002), in addition to traditional EW instructions. In the control condition, participants were asked to write objectively about how they spend their time.

Direct comparisons of the traditional EW and emotion-acceptance EW conditions did not yield significant differences in post-test depression (five weeks after the intervention). However, initial levels of depression moderated these effects. The emotion acceptance condition was beneficial to participants with mild initial depression; the traditional EW was beneficial to participants with low to no initial depression. Notably, traditional EW had a negative impact among those with high levels of initial depression, predicting greater post-test depression scores than the control condition. Thus, Baum and Rude (2013) determined that initial levels of depression predicted differential benefit of EW conditions. Furthermore, their findings indicate that the original EW paradigm is not

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adaptive for all individuals, consistent with Watkins' (2004) findings that different modes of processing (i.e., evaluative and experiential) can have different outcomes for depression-vulnerable individuals.

One explanation for Baum and Rude's findings is that traditional EW instructs participants to immerse themselves in the deepest emotions about a painful event, which may feed into a ruminative thought style associated with depressive symptoms. That is, without the instructions to remain nonjudgmental and unattached towards one's emotional experience (as in the emotion acceptance condition), EW may foster rumination. However, rumination was not measured in the Baum and Rude (2013) study. Additionally, while Baum and Rude (2013) conducted linguistic analyses for the purpose of a manipulation check (i.e., to see that emotion words were more frequent in the active writing conditions and less frequent in the control writing condition), their study did not examine other linguistic categories that may capture psychological processes of EW (e.g., cognitive processes like insight and causation words). Thus, while their results clearly illustrate that traditional EW varies from self-compassion adapted instructions in meaningful ways, the examination of linguistic processes that may have impacted the psychological processes (i.e., post-writing depressive symptoms) was limited.

In pursuit of better capturing individual differences that impact EW processes, Odou and Brinker (2014) examined the effects of self-compassion vs. traditional EW tasks on mood and included a consideration of dispositional rumination, implicated in the findings of Baum & Rude (2013). Their sample included Australian undergraduate students who underwent a negative mood induction prior to EW. Odou and Brinker

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(2014) found that writing condition, pre-writing affect, and rumination were significant predictors of post-writing negative affect. Specifically, participants in the traditional expressive writing condition were more likely to experience worse mood after the task than those in the self-compassion writing condition. There was also a significant interaction between pre-writing affect and rumination, such that in the traditional EW condition, individuals with higher pre-writing negative affect and higher rumination were most likely to experience negative affect after writing, compared to those with low rumination. Notably, the experimental procedures in Odou and Brinker (2014) were no more than 15 minutes long, including writing a brief description of the negative event and then engaging in a single EW episode. Thus, the resulting changes in affect occurred across a brief period of time, adding to the evidence that self-compassion can have fast-acting benefits in a non-clinical population.

The number of variations in the EW paradigm that have been utilized since its inception, e.g., variations in the number and duration of sessions, have allowed us to distinguish between immediate and longer-term benefits of EW, an important difference. The immediate impact of EW, when compared to control conditions, typically includes short-term increases in distress, negative mood, and physical symptoms and decreases in positive mood. EW participants also tend to rate their writing as more personal, meaningful, and emotional compared to control participants (Baikie & Wilhelm, 2005). As previously reviewed, longer-term benefits can include outcomes such as fewer doctor's visits, improved immune system functioning, and reduced psychological symptoms. Of note, a meta-analysis by Smyth (1998) showed that neither number of

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sessions nor duration of sessions impacted overall effect size in the long-term benefits of EW. However, other variations in the EW paradigm, e.g., writing instructions, can impact the immediate, shorter-term benefits, as demonstrated by the results associated with self-compassion adaptations of EW.

Baum and Rude (2013) and Odou and Brinker (2014) both compared traditional EW paradigms to self-compassion and mindfulness-related adaptations of EW in undergraduate samples, although their aims were different: Baum and Rude intended to examine a sample at-risk for depression; Odou and Brinker intended to examine whether EW could mitigate risk for negative mood states in the context of individual differences (e.g., rumination and trait self-compassion). Odou and Brinker's study expanded upon the findings of Baum and Rude, explaining differences in effectiveness between traditional EW and a self-compassion adaptation through differences in rumination. However, Odou and Brinker's study did not include linguistic analyses and Baum and Rude only evaluated emotion word use as a manipulation check. Thus, both studies lacked in-depth analysis of the language used in the writing paradigms, which can provide valuable insight into the process through which these interventions work.

Expressive Writing and Linguistic Analysis

As implicated above, linguistic analysis, or analyzing word use in EW passages, is an additional method that can be used to better understand the mechanisms of EW, i.e., how it achieves its benefits. Furthermore, examining differences in word use in the context of individual differences such as rumination can further inform researchers about

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the psychological processes that participants undertake during the intervention and whether these vary by writing condition.

In order to assess the linguistic content of participants' EW samples, Pennebaker and Francis developed a computerized text analysis program, the Linguistic Inquiry and Word Count (LIWC; Pennebaker & Francis, 1996). Their program was developed from a history of language analysis tracing back to initial psychoanalysis (see Tausczik & Pennebaker, 2010). Language analysis is a rich literature and a thorough review is beyond the scope of the current paper. However, associated concepts that are relevant to the current study's linguistic analysis via LIWC are discussed below.

Pennebaker and Francis posited that writing or talking about an event alters the way it is represented in memory. That is, the event becomes linguistically coded as a product of putting it into a language format (cf. Schooler & Engstler-Schooler, 1990). Clark (1993) argued that when ideas are communicated through language, three components are required: coherence, self-reflection, and the use of perspective. From a linguistic perspective, these communication factors should be identifiable through word use. For example, individuals who are engaging in analyzing the cause and meaning of an event through their writing should use causal words and phrases (e.g., words like "because," "reason," or "cause"). Individuals who are trying to make sense of the event should use words associated with insight (e.g., "realize," "understand," or "reconsider").

Pennebaker and Francis additionally acknowledged the emotion processing that occurs in the context of event recall. They posited that translating emotions into language alters previously dormant or underdeveloped feeling states into conscious verbal labels.

This is supported by research suggesting that simply labeling an emotion can reduce its perceived intensity (Berkowitz & Troccoli, 1990; Keltner, Locke, & Audrain, 1993; Schwarz, 1990). In the context of language, labeling of emotional experiences should be identifiable in the use of emotion words (e.g., "sad," "angry," "happy," or "love").

Pennebaker and colleagues aimed to create a more comprehensive and psychologically salient text analysis method with the LIWC program, with a primary goal of using the program to better understand the functions of language in EW paradigms. Thus, unique about LIWC was its focus on words related to emotional and cognitive processing and the inclusion of functional words (e.g., pronouns, articles, conjunctions), in contrast to the sole focus on content words (e.g., nouns, adjectives, verbs) in previous linguistic analysis programs. The LIWC performs text analysis on a word-by-word basis, i.e., reading a designated portion of text and calculating the percentage of words falling into several different categories. (Further description of the computing procedures is provided in the "Methods" section below, see page 34.)

The first iteration of the program, described in Pennebaker (1993), included cognitive and emotion word categories, as well as general text dimensions like number of words and percentage of unique words used. Three versions of the program have been released since. In the second version of the program, LIWC2001 (Pennebaker, Francis, & Booth, 2003), there were 84 possible output variables, including 17 standard linguistic dimensions (e.g., word count, percentage of pronouns, articles), 25 word categories tapping psychological constructs (e.g., affect, cognition), 10 categories related to relativity (e.g., space, time, motion), and 19 personal concern categories (e.g., work,

home, leisure). In the most recent version of the LIWC (LIWC2015; Pennebaker, Booth, Boyd, & Francis, 2015), there are approximately 90 available output variables, including four summary language variables (analytical thinking, clout, authenticity, and emotional tone), three general descriptor categories (words per sentence, percent of target words captured by the dictionary, and percent of words in the text that are longer than six letters), 21 standard linguistic dimensions (e.g., percentage of words in the text that are pronouns, articles, auxiliary verbs, etc.), 41 word categories tapping psychological constructs (e.g., affect, cognition, biological processes, drives), six personal concern categories (e.g., work, home, leisure activities), five informal language markers (e.g., fillers, swear words, netspeak), and 12 punctuation categories (periods, commas, etc). The LIWC has notably expanded with each iteration.

An initial LIWC pilot study using archival EW data found that increases in negative emotion words, decreases in positive emotion words, and increases in insight and causation words across three or four repetitions of EW were associated with long-term health change (Pennebaker, 1993). Later research has maintained the importance of the same four categories in predicting health benefit (Pennebaker, 1997; Pennebaker & Chung, 2007). The use of LIWC cognitive words has received particular attention from Pennebaker and colleagues in their empirical research. While LIWC dictionaries include an overall cognitive process category and several subcategories (e.g., causation, insight, discrepancy, tentative), the majority of research has focused on the specific subcategories of *causation* (e.g., "allow," "create," "intend," "motivation," "reason") and *insight* (e.g., "accept," "idea," "notice," "recognize," "reflect") words.

Pennebaker and colleagues developed LIWC's word dictionaries by reviewing language used in common emotion rating scales (e.g., PANAS; Watson, Clark, & Tellegen, 1988), Roget's Thesaurus, and standard English dictionaries (Pennebaker, Boyd, Jordan, & Blackburn, 2015). Psychometrics of the methodology are discussed further below; however, it is important to note in describing the categories that while the LIWC program utilizes dictionary labels to categorize words that tap into psychological constructs, the categories and constructs themselves have not been well-defined by the authors or the related literature. While word categories like "singular 1st person pronouns," "negative emotion," and "positive emotion" are more concrete and circumscribed in their make up, categories like "cognitive processes" and its respective subcategories are less so.

For the purpose of the current study, we reviewed the target words within the **insight** and **causation** cognitive process subcategories to determine working conceptual definitions. Both word categories have in common the theme of active appraisals (or reappraisals) and attempts to rationalize about an event or topic. Unique to insight words appears to be the focus on internal self-reflection processes (e.g., I *wonder* about him all the time) and attempts to understand or reason through a subject (e.g., I *think* I could have prevented the accident). Causation words appear to focus more on attempts to decipher causes and reasons. They may be used in relation to actions of the self or others and/or to understand broader, perhaps existential causes, e.g., my actions *resulted* in this outcome, *thus* I deserved it.

In reference to causation and insight words, Pennebaker asserted the importance of cognitive word use, positing that increased use of cognitive words is a measure of creating a coherent story about the event (Pennebaker, 1997). Similarly, Tausczik and Pennebaker (2010) asserted that the use of causal (e.g., because, cause) and insight (e.g., think, consider) words were associated with health improvements because they indicated the development of a narrative in which participants began to actively process and reappraise events during EW. These arguments are consistent with the cognitive assimilation theory of EW, such that increasing use of causal and insight words may suggest active cognitive processing in which an individual is working to integrate a negative or traumatic event into prior schemas. In support of this are findings that demonstrate writing about a stressful event in a non-narrative format fails to result in any health benefits (Smyth, True, & Souto, 2001). Thus, writing about a stressful event in a narrative format like EW may produce beneficial effects through the task's ability to engage individuals with a cognitive representation of the event.

Psychometrics of Linguistic Inquiry and Word Count. Psychometric properties of the LIWC program were initially tested by the creators of the program (Pennebaker & Francis, 1992; Pennebaker et al., 2003). The creators note that psychometrics of natural language are less straightforward than traditional, self-report questionnaires. For instance, once a person says something, they do not typically state it again within the same passage. Thus, the nature of discourse is such that people typical state an idea or concept and move on to the next one; stating the same thing over and over again would be considered bad form in language. Given these constraints, the threshold

for acceptable reliability coefficients is lower in natural language than commonly seem among other psychological tests. The program's language manual describes both the dictionary development and psychometric properties in detail. In the most recent version of the program, LIWC2015, corrected alphas using the Spearman-Brown prediction formula ranged from .18 to .93 (Pennebaker, Booth, Boyd, & Francis, 2015). Examples of dictionary categories with low internal consistency included prepositions and common adjectives; categories with higher internal consistency included 3rd person singular pronouns, overall social process words, and overall cognitive process words.

Construct validity was embedded in the development of LIWC dictionaries, as word banks were initially derived utilizing existing emotional and other related questionnaires, as well as traditional dictionaries and thesauruses. Furthermore, content words were judged in two rounds of expert ratings in order to be included in a dictionary or subdictionary. Additional work by Pennebaker and colleagues has sought to further support construct validity. Pennebaker and Francis (1996) had four judges rate over 200 essays on general LIWC dimensions. LIWC text analyses and judges ratings yielded moderate correlations (average $r = .54$). More recently, Bantum & Owen (2009) compared LIWC with another computerized text analysis program, the Psychiatric Content Analysis and Diagnosis (PCAD; Gottschalk, Winget, & Gleser, 1969) and raters' codings. Overall, their findings indicated that computerized analysis captured most of the emotion rated by coders (LIWC sensitivity = .88; PCAD sensitivity = .833), although they both overidentified emotion expression (LIWC positive predictive value = .31; PCAD positive predictive value = .19). Correlational analyses indicated better convergent

and discriminant validity for the LIWC program. Even with the noted limitations, the authors concluded that LIWC was a superior program for the identification of emotional expression in text.

Utility of word-level analyses. There are several opinions regarding word-level lexical analysis. Arguing for more complex, holistic coding, Olson and Salter (1993) have argued that word frequency data is too remote a measure from which to infer interpretive patterns. On the other hand, Pennebaker and colleagues argue that counting and categorizing words people use to describe experiences may even be more informative than what people are actually saying (Newman, Pennebaker, Berry & Richards, 2003). Adopting a middle ground, Bruner and Feldman (1996) assert that word-level lexical analysis can sharpen the focus of analysis, though its utility is dependent upon appropriate interpretation.

Although linguistic analysis based on word count can be considered a low-level, bottom-up approach that is less capable of capturing complex linguistic and narrative features than holistic measures like coding, this type of descriptive analysis has an advantage in that it does not rely on subjective ratings and allows for a precision of measurement not typically pursued in coding methods (Boals & Klein, 2005). In particular, Boyd and Pennebaker (2017) argue that language analysis allows researchers a better understanding of individuals' real world functioning than traditional self-report measures. Thus, the incorporation of linguistic analysis can make valuable contributions in our understanding of how and why EW works.

There are several benefits to the LIWC, specifically, as a linguistic analysis program, including its ability to quickly analyze large portions of text, its demonstrated reliability (discussed in "Methods" below), and its transdisciplinary nature. That is, given the broad scope of psychologically-relevant word categories included in the LIWC program, it has garnered attention and widespread use in both social and clinical psychology. This makes it a powerful tool in an era of research that values the ability to replicate findings across samples, as it allows for multiple fields of research to jointly contribute to empirical knowledge of the utility of the EW paradigm and of linguistic analysis. Knowing the importance of careful interpretation when utilizing word-level analysis, the current study aims to examine the two well-supported LIWC cognitive categories (i.e., causation and insight) in the context of notable individual differences that can contribute to the effectiveness of EW.

However, computerized text analysis is not without its pitfalls. Notably, while the language categories of LIWC are sophisticated and capture a wide range of words related to psychological functioning, the actual analysis is relatively crude: because the program analyzes individual words, it is not taking into account context, irony, sarcasm, or idioms. For example, the word "mad" is categorized as an anger word. However, it could also be used to describe a positive emotion (e.g., "I'm mad about him") or to describe a person (e.g., "He's mad as a hatter"). Thus, like any computerized program, LIWC is a probabilistic system. In the LIWC program, if a word can fit into more than one dictionary, it will be incrementally counted towards each of them. Thus, a word will likely be characterized in the correct category, but it may also be characterized in more

than one category that does not align with the writer's intention. The program developers posit that the incidence of this mischaracterization is low (Pennebaker, Boyd, Jordan & Blackburn, 2015), although no published studies to date have explicitly tested this question.

Validity of cognitive words and narrative development. Of note, very few studies have directly pursued the question of whether LIWC cognitive words do in fact measure narrative processes, as posited by Pennebaker and his colleagues. A literature review of the subject is notable for a paucity of psychometric studies after Pennebaker's initial establishment of insight, causation, positive emotion and negative emotion word categories as the most pertinent for health benefit, i.e., while these categories have been repeatedly evidenced to correlate with beneficial outcomes, no explicit validity studies have been conducted since the establishment of the word categories. Additionally, while there are additional word categories related to cognitive processes available in the LIWC program (e.g., certainty, differentiation, discrepancy, and tentative words in LIWC2015), these are not regularly employed in published research. At the time of the present study, there were only two publications that examined both LIWC word categories and aspects of narrative processing through coding (Boals, Banks, Hathaway, & Schuettler, 2011; Hoyt, Austenfeld & Stanton, 2016). While coding methodology was not directly assessed in the current study, it is vital to address empirical associations in the literature in order to better understand the interpretive value of the LIWC program.

Boals et al. examined meaning making and narrative coherence in EW passages about past negative events, as well as the association of LIWC categories including

emotion words and cognitive process words. They found that participants in the EW condition exhibited greater meaning making than individuals in the control condition who were asked to simply describe the negative event, with no further instructions. These findings support theories that EW imparts benefit through a search for meaning about a negative event, e.g., cognitive assimilation. Furthermore, they found that cognitive words were associated with self-reported and rater-coded meaning making, which was associated with outcomes such as post-traumatic growth. Of note, cognitive words were not associated with rater-coded narrative coherence in this study. Boals and colleagues argued this was because an active search for meaning precludes narrative coherence (Klein & Boals, 2010). Thus, they expected that when cognitive process words were greater, participants were in the active stages of processing that come before achieving coherence.

Hoyt and colleagues conducted an EW intervention with medical students and coded passages for constructive and unconstructive processing, e.g., planning and problem-solving vs. worrying and ruminating. While their coding was not specifically directed at assessing narrative development nor designed to answer questions regarding the validity of LIWC word categories, this is one of the few studies that engaged in narrative-related coding methods and included linguistic analysis. Specifically, Hoyt et al. (2016) examined LIWC affect words and insight words as mediators of constructive and unconstructive processing. While there were no significant associations for insight words, higher use of affect words mediated the effect of constructive processing on lower depressive symptoms and fewer healthcare visits.

Despite the limited psychometrically aimed studies, several other researchers have demonstrated correlational findings between particular word categories, such as cognitive process words, and health improvements (e.g., Pennebaker, 1993; Petrie, Booth, & Pennebaker, 1999; Rivkin, Gustafson, Weingarten, & Chin, 2006; Ullrich & Lutgendorf, 2002). Together, these studies provide support for the utility of the LIWC methodology, though they suggest mixed results regarding the association of cognitive process words depending on the specific LIWC category used, as well as the methodology. Still, there is evidence that LIWC is associated with active emotion and cognitive processing that can occur through writing, as posited by its creators.

Summary and Current Study

The ever-expanding EW literature has made several attempts to explain when EW works best and for whom (e.g., sample characteristics, timing of writing, mode of expression such as typed or handwritten, EW repetitions, etc.; Frattaroli, 2006; Frisina et al., 2004; Sloan & Marx, 2004). As might be expected, results vary greatly based on the parameters used by each experimenter, a noted limitation that prohibits robust conclusions about the effective components of EW (see Sloan & Marx, 2004). While several studies have attempted to manipulate aspects of the experimental paradigm itself in order to predict physical and psychological wellbeing (e.g., spacing of writing sessions in Chung & Pennebaker, 2008; adapted EW instructions in Sloan, Marx, Epstein, & Lexington, 2007), few studies have examined *apriori* individual differences that may impact the effectiveness of EW. As noted, depression and its correlates (e.g., rumination) have been implicated as potential individual characteristics that may contribute to EW

benefit. In particular, depressogenic rumination has been shown to have differential outcomes (e.g., reduced depressive symptoms vs. worse mood recovery) in the context of written emotion disclosure. Examining whether individual differences are associated with differential processing during EW is of particular interest in the current study. Specifically, the current study sought to examine a self-compassion adaptation of EW, as well as salient individual differences (i.e., rumination) that may differentially predict cognitive and emotional engagement with EW (i.e., cognitive word use and reported affect). Principles of emotion acceptance that are implicitly present in EW's instructions (e.g., to "let go" into one's emotions) are closely aligned with the core components of self-compassion, making EW an ideal framework to induce a self-compassionate stance among participants.

Furthermore, linguistic analysis of EW passages can provide insight into how adaptations of EW operate, although LIWC has not been robustly used across studies that investigate adaptations of EW. As previously noted, prior studies with self-compassion adaptations of EW have either not used linguistic analysis methods or employed them with limited scope (e.g., as a manipulation check). To better understand the cognitive and emotional process that individuals may be experiencing while writing in traditional vs. adapted EW conditions, and to better understand the function of self-compassion instructions on one's emotion regulation of negative events, future studies must consider the potential for linguistic analysis.

Overall, the current study sought to align multiple arms of EW research that have typically been separately pursued: comparing traditional EW to an adapted paradigm (e.g.,

providing instructions that guide participants to engage in principles of self-compassion, including self-kindness, mindfulness, and common humanity); measuring individual differences which may impact EW benefit; and conducting linguistic analysis to further understand psychological processes occurring during writing. Thus, the primary aim of the current study was to evaluate the cognitive and emotional processes underlying traditional vs. self-compassion EW via linguistic analysis and identify writing condition differences. The secondary aim of the current study was to evaluate changes in positive and negative affect across these writing exercises. The third aim of the current study was to investigate the moderating effect of rumination on the association between EW condition and linguistic content, as well as measured affect.

Hypothesis 1: Effect of expressive writing condition on cognitive word use. In the literature, insight and causation words (measured by LIWC) have been strongly associated with EW benefit, e.g., improved psychological and physical health outcomes. They have also been associated with the psychological process of meaning making during writing, one of the posited mechanisms by which EW produces its benefits. As conceptualized for the current study, and consistent with past empirical research, insight and causation words represent active, productive components of cognitive processing. The current study sought to further understand differences in word use associated with cognitive processing by comparing traditional EW and a self-compassion adaptation. Studies have shown that a self-compassionate stance can impact processing of a negative event, e.g., promoting perspective taking and personal responsibility (Leary et al., 2007). Conceptualizing self-compassion as an emotion regulation strategy in which *common*

humanity encourages a broader perspective on one's difficulties and *self-kindness* and *mindfulness* promote engagement and acceptance of one's emotions, we posited that, in comparison to traditional EW, self-compassion EW would promote more productive processing of a negative event. That is, we expected that participants in the self-compassion EW condition would use a higher proportion of insight and causation words, in comparison to participants in the traditional EW condition.

Hypothesis 2: Rumination as moderator of expressive writing condition and cognitive word use. Extending the simple effects of hypothesis 1, rumination was hypothesized to moderate the effect of EW condition on cognitive word use. Borrowing from Teasdale's (1999) theoretical concept of evaluative vs. experiential modes of processing self-relevant information, we expected that traditional EW would parallel an evaluative mode and self-compassion EW would parallel an experiential mode. That is, the traditional EW condition was expected to promote more detail-oriented, concrete evaluations of negative events, in comparison to the self-compassion EW condition, which was expected to promote a more abstract, experiential narrative of participants' chosen events. Research suggests that experiential processing is more adaptive for individuals who are prone to depression, especially ruminative thinking (e.g., Watkins, 2004). For instance, previous research has found that individuals at risk for depression benefited from a self-compassion adaptation of EW, but had increased depressive symptoms as a result of traditional EW (Baum & Rude, 2013).

Given that individuals high in rumination are prone to over-focus on negative aspects of an event, it was hypothesized these individuals would be less likely to engage

in cognitive processing by use of insight and causation words, which are more consistent with productive appraisals that consider multiple rational aspects of a subject in order to reach increased understanding. Furthermore, it was expected that the self-compassionate stance encouraged by the adapted EW condition would be protective for high ruminators. Specifically, it was expected that individuals high in rumination would use a greater proportion of insight and causation words in the self-compassion EW condition than the traditional EW condition. Given that individual difference hypotheses were driven by the goal of understanding differential outcomes for psychologically vulnerable individuals (i.e., high ruminators), no differential hypotheses were predicted for low ruminators.

Hypothesis 3: Change in affect across expressive writing. Studies have shown that self-compassion EW lowers negative affect in the context of mood inductions (e.g., Odou & Brinker, 2014). Thus, in the current study, we sought to extend these findings in direct comparison to traditional EW, rather than a writing control. EW encourages participants to become engaged with their emotional responses to negative events, thus we expected that negative affect would increase across EW and positive affect would decrease across EW for participants in both conditions, consistent with the negative valence of the task.

Regarding condition-based differences, we expected that the self-compassion condition would function as a model for acceptance-based emotion regulation strategies. That is, even if participants were engaged with a negative event through writing, a self-compassionate stance would encourage them to maintain mindful awareness of their emotions as well as a broader view of humanity, which may result in less attachment to

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the negative content and thus less decline in mood. This is consistent with acceptance-based emotion regulation strategies that are hypothesized to facilitate mood improvement through lowering the discrepancy between one's desired and actual state, thereby lowering the appraisal of the current situation as aversive (Berking & Whitley, 2014). Thus, in the current study, we expected the emotion regulation strategies promoted by the self-compassion EW condition to result in lesser mood decline (i.e., less negative affect increase and less positive affect decrease) in comparison to participants in the traditional condition.

Hypothesis 4: Rumination as moderator of expressive writing condition and change in affect. Extending the hypotheses related to group-related changes in affect (i.e., traditional EW condition would have greater increases in negative affect and greater reductions in positive affect compared to self-compassion EW condition), it was hypothesized that rumination would moderate changes in affect. As previously noted, rumination is strongly associated with depressogenic thinking and mood, promoting onset, relapse, and maintenance of depression (for reviews, see Nolen-Hoeksma et al., 2008 and Watkins, 2008). While depression was not an explicit outcome of the current study, we expected that individual differences in rumination would be associated with affect change related to written emotion disclosure. Specifically, given that rumination as an emotion regulation strategy involves over-focus on negative aspects of an event, as well as discrepancies between current and desired outcomes, it was expected that participants higher in rumination would be more likely to experience mood decline after EW. As noted in the rationale for hypothesis 2, it was expected that the self-compassion EW

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would promote an experiential focus on participants' chosen negative event, which has been associated with better mood recovery than an evaluative focus among individuals prone to rumination (Watkins, 2004). Thus, we expected that high ruminators in the self-compassion EW condition would experience less mood decline than participants in the traditional EW condition. No specific directional hypotheses were made for low ruminators, as our predictions were based on theories of productive and unproductive aspects of self-focus (i.e., high levels of ruminative thinking styles).

CHAPTER II

METHOD

Participants

Participants were recruited through the Psychology Department subject pool.

There were 273 responses to the online portion of the study and 146 of these completed

the EW lab visit. Of these, only one participant had incomplete data on study variables

and was eliminated from the data set. Additionally, three cases were removed for non-

adherence to the writing task (described in "Materials and Measures" below). Thus, the

final sample for the current study was 145. Participants' ages ranged from 15.10 to 40.16

years old ($M = 19.79$, $SD = 3.25$). The sample was comprised of mostly female

participants (73%) and individuals who identified as White (45%) or Black/African

American (28%). Frequencies for race, first language, sex, and gender are presented in

Table 1. Given the low frequency of non-binary gender identity, birth sex was used in

final analyses as a potential covariate.

Procedures

Participation occurred across two potions of the study, an initial online portion

and an in-person lab portion. Upon completion of both portions, participants were

awarded course credit. Informed consent was completed during both portions of the study.

Minor participants (under 18 years of age) were initially asked to provide an email

address for their parent or guardian, who was directly emailed a consent form for both the online survey and lab visit. After the parent/guardian consent was received, minor participants were allowed to enroll in the study; they provided assent across both portions. Study data and consent forms were collected electronically, via Qualtrics.

After participants signed up for the online portion via the subject pool website, they were emailed an online survey with a battery of randomly-ordered questionnaires, including demographic measures and self-report questionnaires. Completion of the online survey was conducted by participants independently, outside the lab. Once the initial survey was completed, participants were emailed an access code to enroll in the lab experiment.

Lab visits were conducted one-on-one, with a participant and an experimenter. When participants arrived to their appointment, they were instructed to leave their belongings in the experimenter workroom, which was either monitored by the experimenter or locked during their participation. The experimenter escorted participants to the private lab room and explained the procedures and consent information. Once participants provided their informed consent, via lab computer, the experimenter exited the room and allowed them to complete the remainder of the appointment privately.

Procedures for the writing tasks were administered via a Qualtrics survey that automatically assigned participants to one of the two EW conditions in alternating order to balance sample sizes in each condition. First, participants were instructed to complete a measure of their current mood state, including both positive and negative affect. Then, they responded to prompts regarding their initial and current subjective distress related to

the event about which they were going to write. Next, participants completed the EW task, as described below. Lastly, participants rated their current mood state after writing and completed the post-writing evaluation.

Materials and Measures

   Expressive writing task. As noted, participants were alternately assigned to one of two writing conditions. One condition followed the traditional EW instructions devised by Pennebaker and colleagues (Pennebaker, 1997; Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990), referred to in this study as the *traditional EW* condition. The other condition added self-compassion components to the disclosure elements of the EW task, per Baum and Rude (2013). In the current study, this is referred to as the *self-compassion EW* condition. While EW can be assigned for periods upwards of 20 minutes, the current study shortened the duration of the writing disclosure to 15 minutes. This was in effort to minimize participant burden and based on other studies' effectiveness achieving affect change in as few as 8 minutes (Odou & Brinker, 2014). Instructions provided to participants when they were assigned to the traditional EW condition are provided in Appendix A. These instructions are from the original paradigm developed by Pennebaker and colleagues (Pennebaker, 1997; Pennebaker, Colder, & Sharp, 1990). Instructions provided to participants when they were assigned to the self-compassion EW condition are provided in Appendix B. They were borrowed from Baum and Rude (2013), who adapted these instructions from Neff (2003b), Segal et al. (2002) and Pennebaker (1997).

Linguistic analysis. Linguistic analysis was conducted using the LIWC program (LIWC2015; Pennebaker, Booth, Boyd, & Francis, 2015) described earlier. The LIWC program is composed of two components: the text processing module and the dictionary file. The text processor refers to the computational component of the program, which reads user-entered text files to perform the analysis. The dictionary file stores groups of words that tap into a particular domain (e.g., negative emotion words), referred to as *dictionaries*. For example, the negative emotion word dictionary is comprised of 744 words or word stems. A word stem allows the dictionary to count variations of words into the category, e.g., the stem *angr** would allow the words *angry*, *angrier*, and *angriest* to be included in the negative emotion word category. Dictionaries may also have subcategories or subdictionaries, measuring more specific components of the domain, e.g., anxiety, anger, and sadness are subdictionaries of the negative emotion word dictionary.

As the text processor analyzes each passage, it scans each word and looks for a dictionary that matches the current target word. If the target word is matched with a dictionary word or stem, the appropriate categories are incremented. That is, if a word matches more than one category, they will each be incremented. Additionally, given that the LIWC output includes compositional elements like word count and punctuation, these categories are incremented per word, as well. In the most recent version of the program, LIWC2015, nearly 6,400 words, word stems and select emoticons comprise the dictionary, which includes 74 word categories (excluding word count and summary language variables such as words per sentence and words greater than six letters) (see Appendix C).

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In the current study, each participants' EW passage was reviewed for spelling errors, using a word processor spell check tool for guidance. Errors were corrected by the main experimenter when a participant's intent was clearly evident. Otherwise, passages were left unedited. Errors related to capitalization (e.g., "i" or "i'm") were not corrected, as the LIWC program does not read capitalization. As recommended by the LIWC2015 Operator Manual (Pennebaker, Booth, Boyd, & Francis, 2015) program, we planned to only include writing passages that were at least 50 words, as passages with lower word counts are considered unreliable. The minimum word count in the current study was 74; thus no responses were excluded per this guideline. Furthermore, word count in the current study's essays were examined for outliers. Essays with 225 words or less (n = 14) were determined to be outliers per stem-and-leaf analyses. Thus, word count was evaluated as a potential covariate for hypothesized analyses.

A computerized text file including each participant's spelling-corrected essay was run through the program's processing module. After the processing module read and accounted for all the words in a participant's passage, the program calculated the percentage of total words that matched each dictionary category (see Appendix C for categories). For example, if a passage of 2,000 words was analyzed and 184 words were determined to be positive emotion words, the program would convert this to 9.2, indicating the percentage of positive emotion words from the total word count. Thus, output yields a proportion of words used in each category, in relation to the participant's total word count. In the current study, causation and insight words were the LIWC

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categories of interest. Reliability statistics for individual word categories can be found in the LIWC2015 Development Manual (Pennebaker, Boyd, Jordan, & Blackburn, 2015).

Pre- and post-writing affect. The Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988) was used to assess participants' mood before and after each writing task. The PANAS asks participants to rate themselves on 20 feelings and emotions on a 5-point Likert scale, based on a temporal measure (e.g., in the past week, right now). In the current study, instructions asked participants to rate their current emotional experiences from 1 (very slightly or not at all) to 5 (extremely). See Appendix D for measure instructions and items. The PANAS was obtained two times, directly before and directly after completing the EW task in order to assess change in affect, as random assignment to writing conditions was not used. Scores for the positive affect (PA) and negative affect (NA) composites range from 10 to 50, with higher scores indicating higher affect levels. Reliability of both the PA (Cronbach's $\alpha = .86$) and NA (Cronbach's $\alpha = .87$) scales has been established (Watson et al., 1988), and similar patterns were found in the current sample (PA: $\alpha = .90-.91$, NA: $\alpha = .88-.91$, for pre- and post-writing measures). To assess change in affect, the residualized change method was used: pre-writing affect was regressed on respective post-writing affect and the unstandardized residual was utilized as a measure of the remaining variance in post-writing affect. This method allows for prediction of post-writing affect after accounting for a participant's baseline, i.e., pre-writing affect.

Writing benefit. After completing the post-writing PANAS, participants completed a brief evaluation of the writing task both as a manipulation check of their

engagement with EW and to assess perceived benefit. Participants were asked how personal they felt their essays were, the extent to which they felt they revealed their emotions in the essays (from procedures of Zakowski, Herzer, Barrett, Milligan, & Beckman, 2011), how meaningful their essays were, and how valuable they perceived the exercise to be (from procedures of Imrie & Troop, 2012). With anchors appropriate for the respective questions, items were rated on a 7-point Likert scale (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). An average writing benefit score was computed using the above four questions; scores ranged from 1 to 7. This measure was used as an overall measure of participants' perceived benefit of EW. Cronbach's alpha for the average benefit score was .78.

Rumination. The Ruminative Thought Style questionnaire (RTS; Brinker & Dozois, 2009) consists of 20 items that measure a general tendency for ruminative thought (see Appendix E for items). The RTS is distinct from other measures of rumination in that it measures trait rumination, rather than rumination as a thinking style in the context of depression, which other measures have emphasized. Sample items include "I find myself reliving events again and again" or "When I am looking forward to an exciting event, thoughts of it interfere with what I am working on." Thus, this scale was selected to measure rumination because it does not confound depressed mood with ruminative thinking within the items. Participants rated items on a 7-point Likert scale based on how well each item described them from 1 (not at all) to 7 (very well). Sum scores of general ruminative tendencies range from 20 to 140, with higher scores indicating greater ruminative tendencies. The RTS displays good internal reliability (.92)

and construct validity (Brinker & Dozois, 2009). In the current study, Cronbach's alpha was .95.

Covariates. Vocabulary and subjective distress related to the event were assessed as potential covariates with study variables. As previously described, EW word count was also evaluated as a potential covariate, as were demographic variables including age and sex (see Appendix G for demographic questionnaire).

Vocabulary. A vocabulary performance test adapted from the Shipley Institute of Living Scale (Zachary, 1986) was administered to participants as a proxy for reading ability (see Appendix F for items). Additionally, previous studies have utilized vocabulary as a measure of crystallized intelligence (e.g., Rawson & Touron, 2009; see Park, 2000 for review). The vocabulary test includes 40 multiple-choice items in which participants were presented with a stem word and selected the closest synonym from four responses. The stem words varied in difficulty, from easy to hard. Possible scores range from 0 to 40, with higher scores indicating greater vocabulary ability. In the current study, Cronbach's alpha for the scale was .64, indicating adequate reliability.

Subjective event-related distress. Prior to engaging in the EW task, participants reported on initial and current levels of event-related distress by answering, "For the event you will write about: (1) *when it first occurred, how stressful, upsetting, and/or bothersome was this event for you?* and (2) *right now, how stressful, upsetting, and/or bothersome is this event for you?*" Responses were provided on a 7-point Likert scale from 1 (not at all stressful or upsetting) to 7 (extremely stressful or upsetting). The items were used as separate, single-item measures to assess initial and current distress.

Data Analytic Plan

Regarding missing data, only cases with complete data were considered for the final sample; as previously noted, only one participant was excluded using this criteria. Given that participants completed the writing passages privately and independently, post-experimental coding was conducted to confirm that participants' writing was on-task. *On-task writing* was defined as (1) the topic is a past event and (2) there is an indication within the written passage that the event was perceived as negative or distressing to the participant at some point (i.e., initially, currently, or both). Any passages that did not meet the above criteria were deemed as *off-task* and eliminated from future analyses.

Analyses were conducted using IBM SPSS Statistics 26 (IBM, 2019). Preliminary analyses included descriptives and correlations. Descriptive statistics were reviewed for normality and outlier analyses were conducted as appropriate (i.e., if skewness or kurtosis values were +/- 3). To confirm equivalence of demographic and covariate variables across writing conditions, a one-way ANOVA was conducted; chi-square tests of independence were conducted for categorical demographic variables such as race and sex. Correlations were conducted using a two-tailed Pearson correlation with an alpha level of .05. Age, vocabulary, EW word count, and subjective event-related distress (initial and current) were evaluated as potential covariates through correlation analyses. Sex was evaluated as a potential covariate through ANOVA. Those variables that were significantly associated with hypothesized outcomes were entered as covariates in subsequent regression analyses, as reported below.

To test replication hypotheses related to change in affect across the EW task (hypothesis 3), a two-way mixed ANOVA was conducted, with EW condition as the between-participants variable and time (i.e., pre- and post-writing) as the within-participants variable. This analysis tests for main effects of EW condition and time, as well as their interaction (i.e., whether change in affect over time varies as a function of EW condition). To test the effect of EW condition on cognitive word use (hypothesis 1), a one-way ANOVA was conducted including insight and causation words as dependent variables.

To test interaction hypotheses (2 and 4), Hayes' (2017) PROCESS (version 3.3) macro for SPSS was used. The macro conducts a simultaneous-entry (vs. hierarchical) regression to test the conditional effects of a moderator on the association between the independent and dependent variable. Conditional effects (i.e., simple slopes) are tested at low (-1SD), mean, and high (+1SD) levels of the moderator. Simple slopes were evaluated and interpreted when interaction terms were significant at $p < .05$. PROCESS output also yields R-squared change specifically attributable to the interaction term, allowing for interpretation of the moderation's contribution to overall model fit. The interaction term is calculated as a multiplicative product of the independent and moderating variable. In the current study, for hypothesis 2, the independent variable was EW condition, the moderator was rumination, and the dependent variables were insight and causation words. While directional hypotheses for cognitive word categories were parallel, they were tested in separate models in order to detect possible differential patterns. Thus, the dependent LIWC variables were tested in separate analyses. For

hypothesis 4, the independent variable was EW condition, the moderator was rumination, and the dependent variables were negative affect change and positive affect change. The dependent affect variables were tested in separate analyses. For all analyses conducted using the PROCESS macro, percentile-based bootstrapping procedures were used (5,000 draws) to determine 95th percentile confidence intervals.

CHAPTER III

RESULTS

As previously described, coding was conducted to assess participant's on-task writing. Among participants with complete data (n = 145), three passages (2%) violated criterion 1, as they contained a present rather than a past event. Thus, these three *off-task* passages were eliminated from study analyses, resulting in a final sample of 142.

Preliminary Statistics

Descriptive statistics. Frequencies for race, first language, sex, and gender are presented in Table 1. Given the low frequency of non-binary gender identity, birth sex was used as a potential covariate in correlational analyses. Vocabulary scores ranged from 11 to 39 (M = 28.89, SD = 5.06), indicating a range of performance-based vocabulary in the current sample. The average number of words used in EW passages was 353.92 (SD = 73.53), ranging from 74 to 427. EW benefit scores ranged from 2.25 to 7.00 with an average of 5.41, suggesting participants in the current study found the EW exercise beneficial and engaging.

Variables were examined for normality using the +/-3 rule of thumb for skewness and kurtosis values (see Table 2). Age was slightly skewed and leptokurtic, consistent with a college-age population that included minor-age participants (i.e., high school students taking college-level classes) and adult learners. Initial event-related distress was

slightly leptokurtic. Stem-and-leaf analyses indicated that ratings of 4 or less (n = 11) were outliers, i.e., the majority of participants identified events for their EW rated as 5 or greater on a 1 (not stressful) to 7 (extremely stressful) scale. These outlier analyses indicate participants were indeed identifying distressing events for their EW passages, in line with task instructions. Thus, no transformation was conducted.

Negative affect change (measured by residual scores) was leptokurtic. Stem-and-leaf analyses indicated that differences less than or equal to -21 (n = 1) and greater than or equal to 16 (n = 5) were outliers. Given that variability in negative affect change was central to primary hypotheses in the current study and the PANAS subscales from which the residual score was derived were normally distributed, no transformations were performed. All other study variables were normally distributed.

Homogeneity of writing conditions. A one-way ANOVA was conducted to compare EW condition differences among demographic and covariate variables. As expected, the conditions were equal across mean-level age, word count, vocabulary, and event-related distress (initial and current), and pre-writing negative and positive affect; see Table 3. Chi-square tests of independence were conducted to assess categorical demographic variables. As expected, there were no significant associations between EW condition and sex ($X^2[1] = 0.74$, $p = .39$), race ($X^2[4] = 4.45$, $p = .35$), or first language (i.e., native vs. non-native English speakers; $X^2[1] = 0.86$, $p = .35$).

Correlational analyses. Correlations are presented in Table 3. Broadly, higher age was correlated with higher vocabulary, less current event-related distress, greater positive affect, and less rumination. Greater word count was associated with increased

initial event-related distress, increased negative affect, and increased EW benefit. Vocabulary scores were not significantly associated with study variables. Event-related distress was positively correlated with writing benefit. Additionally, current distress was positively associated with all measures of negative affect. PANAS-related variables were associated with each other in the expected directions. Rumination was significantly associated with pre-writing negative affect, but not with other study variables. LIWC cognitive word categories were not significantly associated with study variables, although insight and causation words were positively correlated with each other. EW benefit was associated with greater pre-writing positive affect, greater pre- and post-writing negative affect and negative affect change.

ANOVAs were conducted to examine the association between categorical demographic variables and study variables. Vocabulary significantly differed by sex (F[1, 140] = 97.21, p = .05, η_p^2 = .03). On average, male participants had higher vocabulary scores (M = 30.26) than female participants (M = 28.39). Age and EW word count significantly differed by language (age: F[1, 140] = 5.78, p = .02, η_p^2 = .04; word count: F[1, 140] = 11.01, p < .01, η_p^2 = .07). That is, native English speakers were younger (M = 19.47; non-native: M = 21.09) and wrote more during EW (M = 363.73; non-native: M = 314.00) than non-native speakers.

Hypothesis 1: Effect of Expressive Writing Condition on Cognitive Word Use

To assess group differences in insight and causation words, a one-way ANOVA was conducted with EW condition as the independent variable and cognitive words as the

dependent variables. No significant group differences were found (insight: $F[1, 140] =$ 0.17, $p = .68$, $\eta_p^2 = .001$; causation: $F[1, 140] = 0.001$, $p = .97$, $\eta_p^2 < .001$).

Post-hoc analysis. Although specific hypotheses were not posed for other LIWC cognitive word categories due to limited empirical support, an exploratory post-hoc ANOVA was run to examine whether remaining LIWC cognitive word categories varied by EW condition in the current sample. Specifically, a one-way ANOVA was conducted with the remaining subcategories (i.e., differentiation, discrepancy, certainty, tentative) and the overall cognitive process category (which includes all six subcategories). No significant differences were found for the post-hoc cognitive word categories, although certainty and tentative words demonstrated a trending effect (certainty: $F[1, 140] = 2.88$, $p = .09$, $\eta_p^2 = .02$; tentative: $F[1, 140] = 2.60$, $p = .11$, $\eta_p^2 = .02$). Specifically, certainty words were greater in the traditional EW condition ($M = 2.00$) than the self-compassion EW condition ($M = 1.73$). Tentative words were greater in the self-compassion EW condition ($M = 2.59$) than the traditional EW condition ($M = 2.27$).

Hypothesis 2: Rumination as Moderator of Expressive Writing Condition and Cognitive Word Use

To test the moderating effect of rumination on the association between EW condition and insight and causation word use, moderations using the PROCESS macro were performed. No covariates were determined for either dependent variable. The overall model for insight words was not significant, $F(3, 138) = 0.33$, $p = .80$, $R^2 = .01$ (see Table 5). Similarly, the overall model for causation words was not significant, $F(3, 138) = 0.34$, $p = .79$, $R^2 = .01$ (see Table 6).

Post-hoc analysis. Given the post-hoc findings in hypothesis 1 that certainty and tentative words had trending group effects, parallel post-hoc moderation analyses were also run for these two word categories. No significant covariates were determined for either dependent variable. For certainty words, the overall model was not significant (F[3, 138] = 1.91, p = .13, R^2 = .04), although there was a significant main effect of EW condition (B = -1.36, p = .05, 95th percentile CI: -2.70 to -0.02). No other main or interaction effects were found. The overall model for tentative words was not significant (F[3, 138] = 1.05, p = .37, R^2 = .02) and no main or interaction effects were found.

Hypothesis 3: Change in Affect across Expressive Writing

To replicate changes in negative and positive affect demonstrated by previous EW studies, a two-way mixed ANOVA was conducted for change in negative affect and change in positive affect by EW condition. Both analyses met the assumptions for equality of variances; sphericity was not examined as there were not more than two levels per factor.

Negative affect. Between-subjects tests indicated no significant main effect of EW condition on negative affect, F(1, 140) = 0.33, p = .57, η_p^2 = .002. Within-subjects tests indicated a significant main effect of time (i.e., pre-writing and post-writing) on negative affect, F(1, 140) = 40.86, p < .001, η_p^2 = .23. Negative affect significantly increased from pre-writing (15.46) to post-writing (19.29) (mean difference = 3.82, SE = .60, 95% CI: 2.64 to 5.00). There was not a significant interaction of condition and time predicting negative affect, F(1, 140) = .83, p = .36, η_p^2 = .01. This indicates that change in negative affect did not significantly vary as a function of EW condition.

Positive affect. Between-subjects tests indicated no significant main effect of EW condition on positive affect $F(1,140) = 1.96$, $p = .16$, $\eta_p^2 = .01$. Within-subjects tests indicated a significant main effect of time on positive affect, $F(1, 140) = 27.17$, $p < .001$, $\eta_p^2 = .16$. Positive affect significantly reduced from pre-writing (27.91) to post-writing (24.42) (mean difference = -3.49, SE = .67, 95% CI: -4.81 to -2.17). There was not a significant interaction of condition and time predicting positive affect, $F(1, 140) = .15$, $p = .70$, $\eta_p^2 = .001$. This indicates that change in positive affect did not significantly vary as a function of EW condition.

Hypothesis 4: Rumination as Moderator of Expressive Writing Condition and Change in Affect

To test the moderating effect of rumination on the association between EW condition and change in negative and positive affect, moderations using the PROCESS macro were performed. For negative affect change, covariates included current event-related distress and EW word count. The overall model for negative affect change was significant, $F(5, 136) = 7.21$, $p < .001$, $R^2 = .21$, due to the effect of current distress. Specifically, higher levels of current event-related distress were associated with increases in negative affect across EW (Table 7). No other main or moderating effects were found. For positive affect change, no covariates were determined in correlational analyses. The overall model for positive affect change was not significant, $F(3, 138) = 0.42$, $p = .74$, $R^2 = .01$ and no main nor moderation effects were found (Table 8).

Post-Hoc Manipulation Check

Given that none of the hypothesized group differences were found, a post-hoc manipulation check was conducted to help determine whether the traditional and self-compassion EW conditions generated the expected variations in language use. Although, writing benefit was assessed as an overall manipulation check to confirm both EW conditions were engaging to participants, no specific differences were expected between groups. Given that the current study did not employ formal manipulation check methods to assess differences between the conditions, LIWC word categories were considered for their potential to capture the intended differences between the self-compassion manipulation of EW and the traditional EW condition. The categories included in the manipulation check were first-person plural pronouns, first-person singular pronouns, social processes, affective processes, positive emotion, negative emotion, past focus and present focus. Expected group differences and rationale for these are presented in Table 9, along with average word proportions per EW condition and one-way ANOVA results. Significant results were only determined in the negative emotion word category. These results were in the expected direction: participants in the self-compassion EW condition used more negative emotion words than participants in the traditional EW condition. All other examined word categories were not significantly different across conditions.

CHAPTER IV

DISCUSSION

EW has been robustly associated with physical health outcomes and

improvements in mood and psychological wellbeing (e.g., Baikie & Wilhelm, 2005;

Sloan & Marx, 2004). EW studies across decades have attempted to explain when EW

writing works best and for whom (e.g., Sloan & Marx, 2004). One of the main

manipulations of EW has been to adapt the original instructions in order to enhance its

beneficial effects on psychological outcomes. Typically, adaptations incorporate various

emotion regulation techniques to examine whether participants can be primed to utilize

more adaptive emotion processing through written disclosure. One tool to examine the

processing occurring during EW is linguistic analysis. In the current study, the LIWC

program developed by the creators of the EW paradigm was utilized to examine

differences between a traditional EW paradigm and an adapted, self-compassion EW

paradigm. It was expected that the adapted paradigm would enhance participant's ability

to engage in the processing inherent in EW, as assessed by cognitive word use.

Furthermore, it was expected that the self-compassion EW condition would buffer the

immediate negative mood impacts of EW, promoting less increase in negative mood and

less decrease in positive mood. The current study also incorporated rumination as an

individual characteristic that may impact one's ability to benefit from EW, as research

has shown EW may be most helpful for individuals who are psychologically vulnerable,

e.g., depression-prone (Baum & Rude, 2013). In particular, self-compassion was expected to be of particular benefit for individuals who are higher in rumination, as it would promote a broader view of the negative event, as well as mindful awareness and acceptance of one's emotions related to the event. It was also expected that the traditional EW condition would promote less cognitive and emotional processing, as research has demonstrated that depression-prone individuals can actually have an increase in depressive symptoms after EW. Unfortunately, none of the hypotheses regarding differences by EW condition nor the moderating effect of rumination were supported. Specific considerations regarding the lack of significant results are described per hypothesis below, followed by limitations of the study overall and future directions.

Hypothesis 1 addressed the prediction that there would be group differences in cognitive word use. While patterns related to EW condition and cognitive process words have been established in other research (e.g., Junghaenel, Smyth, & Santner, 2008; Pennebaker & Seagal, 1999), no significant group differences were found for causation and insight words in the current study. Nor did the exploratory analyses of the remaining cognitive word categories (i.e., certainty, differentiation, discrepancy, tentative) yield significant results. Previous findings that have demonstrated group differences in word use have had high contrast between conditions, e.g., Wong and Mak (2015) compared a self-compassion EW condition to a control condition and found that insight and causation words were higher in the treatment group; Grisham, Flower, Williams & Moulds (2011) found differences in causal word use across their rumination and reappraisal conditions, which were intended to contrast adaptive and maladaptive regulation strategies. It is

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likely that similar findings were not detected in the current study due to our aim of comparing an adapted EW paradigm to the traditional EW paradigm rather than to a control condition. Thus, there may not have been enough difference between the traditional and self-compassion conditions to elicit expected differences in cognitive words. This conclusion is supported by the post-hoc manipulation check utilizing LIWC word categories, in which only one of the eight predicted word categories demonstrated significant differences between EW conditions (i.e., negative emotion words were higher in the self-compassion condition, as expected).

A related methodological limitation that may help explain the lack of findings is that the current study only included one EW session. Earlier studies that established the utility of causation and insight words demonstrated increase in word use across several (e.g., 3-4) writing sessions (e.g., Pennebaker, 1993). Thus, while null results in the current study may reflect a true similarity in cognitive word use between the EW conditions, it is also the case that the current study's design prevents direct comparison to earlier work in which cognitive word use was associated with physical and psychological benefit.

Of note, certainty and tentative words displayed a trend ($p = .09$ and $p = .11$, respectively): certainty words (e.g., "always," "confident," "fact," "obvious") were greater in the traditional EW group and tentative words (e.g., "almost," "confused," "nearly," "probably") were greater in the self-compassion group. Given that certainty words and tentative words are in contrast and had differential patterns across the EW conditions, it is likely that the trends found in the current study are a reflection of the

writing manipulation. That is, it may be the case that tentative words are more consistent with a mindful approach to processing a negative event (e.g., Leary et al., 2007; Segal et al., 2002). In contrast, the traditional EW condition may have promoted a more straightforward approach to disclosure, as reflected by certainty words. Given the limited correlational or theoretical evidence of psychological processes associated with these word categories, it is difficult to draw conclusions past the current trend being a measure of the experiment's EW manipulation, especially given its non-significant level.

Hypothesis 2 tested the moderating effect of rumination on EW group and cognitive word use. Neither the model for causation words nor insight words was significant. At the time of the current study, no published research had explicitly examined the association between rumination and causation or insight words (e.g., correlations, regressions). One study examined EW as an intervention to mitigate risk for recent marital separation and found no significant correlation between rumination and overall cognitive process words (Sbarra, Boals, Mason, Larson & Mehl, 2013). Other studies included measures of rumination and LIWC analyses, including cognitive words, however no statistics were reported regarding the association between rumination and word use (Caldwell & Shaver, 2015; Slonim, 2014). While it is surprising that rumination was not associated with cognitive word use in the current study, given the theoretical association between ruminative thought style and cognitive processing (e.g., Liverant et al., 2011; Rude et al., 2011) and the empirical associations between EW and depression and its correlates (e.g., Gortner et al., 2006; Sloan et al., 2008), our null results are consistent with one study that made comparable comparisons.

As previously noted, the lack of repeated writing sessions in the current study's design may have impeded our ability to detect informative differences in cognitive word use across conditions. That is, perhaps one 15-minute written disclosure was not a sufficient sample from which to detect individual differences in word use intended to capture cognitive processes. In the current study, proportions of cognitive word use in the current sample were above base rate cut-offs used in other studies (e.g., < .01 in Pennebaker & King, 1999; < 0.5 in Groom & Pennebaker, 2005). Thus, there is evidence that participants provided produced an adequate number of causation and insight words in their EW passages. However, it may be the case that individual differences in word use (i.e., the moderating effect of rumination) become more apparent across repeated samplings of a participant's writing. This is supported by computational science research in which LIWC word use has been used to detect personality and psychological factors from social media samples (e.g., Twitter posts, Facebook statuses, and blog posts). Haber (2015) found that 4,000-5,000 words are required to predict Big 5 personality traits at 95% confidence with an average variability of +/- 10. They noted differences in variability were correlated by how long or short the messages were (e.g., email messages vs. Twitter posts), with shorter messages being less variable in their prediction of personality traits and thus requiring smaller word samples. Although the current study did not seek to predict individual differences using LIWC word categories, findings from big data research support the assumption that a larger sampling of individuals' word use is required to better capture the differences predicted in the current study.

Hypothesis 3 predicted group differences in negative and positive affect, such that increases in negative affect and decreases in positive affect would occur to a lesser degree in the self-compassion EW group. Group differences were not supported, although a main effect of time was present. That is, among the full sample, negative affect significantly increased from pre-writing to post-writing, and positive affect significantly decreased from pre-writing to post-writing. This is consistent with typical immediate effects of EW, in which participants experience an increase in negative mood and decrease in positive mood (see Baikie & Wilhelm, 2005 for review). However, we did not find the same condition differences as found in other studies, in which self-compassion EW (e.g., Leary, et al., 2007; Odou & Brinker, 2014) and acceptance-based cognitive reappraisal strategies (e.g., Arimitsu & Hoffman, 2017; Singer & Dobson, 2009) have buffered against negative mood impact.

Hypothesis 4 expected that rumination would serve as a moderator of group differences in affect change. There were no significant moderations for negative or positive affect change. There was a significant covariate, such that higher levels of current event-related distress predicted increases in negative affect across writing. These findings are relatively intuitive: that emotionally engaging with a reported distressing event (per EW instructions) increases related negative mood. The lack of significant findings regarding rumination as a moderator of affect change is inconsistent with prior research. For example, Odou and Brinker (2014) found that high ruminators in the traditional EW group with higher pre-writing negative affect experienced the most post-writing negative affect, compared to low ruminators.

The current study's null results regarding affect change (hypothesis 3 and 4) may be explained by the fact that participants' baseline affect was not altered with a mood induction, as has been the case in studies in which self-compassion or acceptance-based strategies have acted as a negative mood buffer (e.g., Leary et al., 2007; Odou & Brinker, 2014). As evidenced by the findings of the current study, when participants do not engage in a negative mood induction, traditional EW vs. self-compassion EW do not seem to have differential effects on mood. Thus, previous research demonstrates that a self-compassionate stance can have beneficial effects on mood in the face of an acute negative event (e.g., mood induction). However, our results suggest that perhaps this effect does not generalize to baseline levels of affect among a non-clinical sample, i.e., when mood is not experimentally manipulated.

It has also been posited that longer-term benefits of EW may not be immediately present after the task. For instance, Pennebaker and Francis (1996) acknowledged that language used during EW can bring about short-term improvements, but the act of writing can facilitate subsequent long-term cognitive processing not measured by the experimenter. While the current study explicitly set out to assess momentary psychological processes captured by EW and did not assess outcomes after writing, the lack of longer-term follow-up may be a fundamental limitation in our ability to draw conclusions about the respective benefits of traditional and self-compassion EW. That is, without a longer-term follow-up, it may be the case that we do not have a full picture of the benefits (or costs) imparted to participants. Future study designs may incorporate a multi-step and/or lagged collection of post-writing affect measures in order to better

assess the posited differential effects. For example, a study might collect post-writing affect immediately after the written disclosure as in the current study, then collect secondary and tertiary measures in 15-minute increments after the writing task to assess affect change after a brief recovery period (e.g., Grisham et al., 2011). This would allow for greater inquiry into the self-compassionate stance as a potential emotion regulation strategy in the context of an adapted EW condition.

Strengths, Limitations, and Future Directions

A primary strength of the current study is the rigorous methodology employed, including a between-subjects design that compared two experimental conditions, as compared to previous studies that have typically compared adapted EW instructions to a control condition. Contributing to the strong experimental design, the LIWC program, a computerized text analysis with good reliability, was used to perform linguistic analysis. Furthermore, notable covariates were incorporated into the analyses, including event-related distress associated with EW event.

The current study sample included a non-clinical community population of psychology students at a southeastern university. While a non-clinical, community sample allows for greater generalizability of the results, it may also be a limitation in the current study, given the premise of examining differences in EW engagement among a psychologically-vulnerable population. While rumination is a characteristic and correlate of depression, rather than a clinical syndrome or diagnosis, it may still be the case that oversampling for individuals high in depression, rumination, or other related characteristics, such as self-criticism, might have been a more appropriate sample with

which to test our question. Future studies may consider oversampling methods in order to collect an adequate sample of individuals who score highly on the variables of interest. Additionally, future studies may incorporate the use of other individual differences which may benefit from a self-compassionate stance, e.g., self-criticism. Research suggests that it is the strength of negative emotions towards oneself and an inability to adequately cope with these emotions that put highly self-critical individuals at risk for the development and maintenance of depressive episodes (e.g., Gilbert et al., 2004; Greenberg, Elliott, & Foerster, 1990). Components of self-compassion such as self-kindness may be particularly beneficial for highly self-critical individuals (Gilbert & Procter, 2006).

As noted, a limitation of the current study is the lack of EW repetition as well as the lack of follow-up measures to assess long-term change, as both these alterations to the study design would have provided more data from which to measure the predicted EW condition and individual difference effects. An additional study design limitation was the timed nature of the writing task. EW was timed at exactly 15 minutes so that each participant spent the same amount of time on the task. This design was intended to encourage participants to use the maximum allotted time writing, rather than minimizing effort and writing short essays to progress through the lab visit more quickly. However, a noted limitation in this design is that there is not a measure of variability in writing duration, which may have informed the analyses, e.g., examining whether writing duration varied with event-related distress or pre- or post-writing affect.

Furthermore, while narratives were not read in their entirety in the current study, it was noted that several participants' passages ended mid-sentence. This implies that

many participants might have continued writing past the allotted 15 minutes, and this is likely not attributable to EW condition, as there were no group differences in word count. For participants who ended their passages on an incomplete thought, it might be the case that the full scope of their linguistic process may not be captured. Studies related to EW assert that the benefit of written disclosure occurs when participants are able to develop a narrative in which they actively process and reappraise events (e.g., Pennebaker, 1993; Petrie, Booth, & Pennebaker, 1999; Rivkin, Gustafson, Weingarten, & Chin, 2006; Tausczik & Pennebaker, 2010; Ullrich & Lutgendorf, 2002). Thus, it is plausible that, with a longer writing window and the freedom to complete their passages, individuals may have used additional or different cognitive language as they narratively processed their event.

Future studies may incorporate alternative designs that allow for greater examination of differences in language. For example, implementing a flexible writing window would allow for variability in writing duration. As noted, implementing Pennebaker's original methodology of repeated writing sessions would not only allow for a greater sample of language, but also it would allow for analyses of within-person change in language. Future studies could also combine computerized linguistic analysis with narrative coding methods, such as the meaning-making and narrative coherence methods used in Boals et al. (2011). This would allow for further empirical support of the theoretical associations between language use and narrative construction.

Studies of adapted EW paradigms may also evaluate specific portions of the instructions in order to determine how instruction facilitates changes in language. Using

self-compassion as an example, the three components of self-kindness, mindfulness, and common humanity could be separated into three prompts with separate essays, allowing for specified analysis of language facilitated by each component. These increasingly sophisticated designs will continue to extend the literature in understanding why such interventions like written disclosure are effective and can help practitioners make more salient recommendations when helping individuals process a negative event.

Relatedly, future studies that employ a more sophisticated study design, e.g., multiple EW administrations and repeated measures related to pre- and post-affect as well as psychological outcomes, may also employ more sophisticated statistical models that allow for the consideration of multiple individual differences in a single model. For example, future studies may hypothesize structural equation models that simultaneously account for both adaptive and maladaptive aspects of self-regard (e.g., self-compassion and self-criticism). Furthermore, statistical methods that allow for path modeling and multiple dependent variables can better represent the association among linguistic variables derived from the same essay, and they would allow for simultaneous examination of psychological functioning as a part of the model.

As previously discussed, it may be the case that the current study's EW conditions were not different enough to detect several of the hypothesized group differences. One limitation of the current study is that no formal manipulation checks were administered, e.g., to directly assess participants' interpretations of the writing prompts and whether the experimental condition was manipulating self-compassion, as intended. As indicated by the post-hoc manipulation check utilizing LIWC word categories, participants did not

show significant differences in word use across expected categories (e.g., pronouns, social words). This implies that participants in the self-compassion EW group did not write in a way that displayed increase use of such principles during their disclosure, e.g., greater use of plural pronouns and social words to reflect common humanity, greater use of present focus words to reflect mindfulness. Not only does this present a limitation in understanding the differences between the EW conditions in the current study, but also it may help to explain the null findings across hypotheses: the EW conditions in the current study likely did not induce different enough experiences for participants to result in the expected group-based differences. Future studies may utilize similar comparisons of EW prompts with repeated administrations in order to assess whether longer-term exposure to a self-compassionate stance impacts language use over time.

Performing formal manipulation checks might have informed us whether there were qualitative differences in participants' perceptions of the prompts. For example, assessing participants' understanding of self-compassion (especially in the self-compassion condition) may have been useful in ensuring they understood core components of the prompt before proceeding. A brief quiz to assess understanding of self-compassion components could be used in future study designs. Ensuring the participants understood the quality of the prompt may have strengthened the effect of the adapted self-compassion condition. Additionally, an open-ended assessment of what participants perceived as the goal of the study (e.g., in conversation with experimenter upon completion of the study) might have been helpful in assessing differences in participant perception across conditions. Similar debriefing strategies have been utilized

by Pennebaker and colleagues (e.g., Pennebaker, 1997; Pennebaker & Francis, 1996), in which they gathered several subjective reports of participants' perceived immediate benefit of the EW paradigm.

Implications and Conclusion

Despite the lack of statistical significance in the current study of EW, the fact remains that participants routinely report benefit from the exercise. As compared to control conditions, EW participants report their essays are more personal, more meaningful, and more emotional (Baikie & Wilhelm, 2005; Pennebaker, 2018). In the current study, too, participants rated the exercise as beneficial, on average. This did not vary by EW condition, suggesting that regardless of specific instructions, written disclosure tasks are perceived as beneficial among a non-clinical sample. The combination of a lack of significant results in the current study, yet participants' report of subjective benefit from EW highlights a discrepancy not uncommon in EW studies: despite an entire literature supporting the benefits of EW, there is still a lot we do not know about how the task works (Baikie & Wilhelm, 2005; Pennebaker, 2004; Sloan & Marx, 2004). The current study sought to tackle some of these questions by integrating an examination of traditional EW compared to an adapted self-compassion condition, examine linguistic analysis, and include the context of individual differences (i.e., rumination). Unfortunately, we were not able to establish the expected associations between EW conditions, rumination, cognitive word use and reported affect. There were notable limitations in the current study's design (e.g., only one brief writing session and lack of follow-up measures), which may have impacted our ability to detect hypothesized

results. These limitations and other future directions can be altered in forthcoming studies

in order to continue the investigation of EW mechanisms.

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APPENDIX A

TRADITIONAL EXPRESSIVE WRITING CONDITION INSTRUCTIONS

I would like for you to write about your very deepest thoughts and feelings about an extremely difficult or emotional event that has affected you and your life. In your writing I would like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others including parents, lovers, friends, or relatives, to your past, present, future or to who you have been, who you would like to be, or who you are now. Don't worry about spelling, sentence structure, or grammar. Once you begin writing, continue to do so until the time is up. The page will automatically progress after 15 minutes.

APPENDIX B

SELF-COMPASSION EXPRESSIVE WRITING CONDITION INSTRUCTIONS

I would like for you to write about your very deepest thoughts and feelings about an extremely difficult or emotional event that has affected you and your life. In your writing I would like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others including parents, lovers, friends, or relatives, to your past, present, future or to who you have been, who you would like to be, or who you are now.

Before writing, please take a moment to notice your feelings related to the emotional event you've chosen. When people go through extremely difficult events they often experience distressing emotions such as shame, hate, jealousy, resentment, anxiety, sadness, and embarrassment. Sometimes people experience physical reactions such as, racing heart, sweaty palms, upset stomach, and tears. Often people try to avoid these experiences and feel ashamed of painful emotions. Although your impulse may be to move away from your distressing emotions, try to bring a curiosity to your experience and be accepting of any emotions or thoughts that arise. Think about how you would react to a close friend experiencing these emotions. Try to express the same sort of kindness, understanding and compassion towards yourself as you would towards someone you really cared about. It is important to remember that part of the human experience includes difficult feelings about distressing events. This is something we all go through - you aren't alone in your experience. Try to feel the emotions that come up for you just as they are, without suppressing them but also not making an overly dramatic story line out of them. All emotional experiences and thoughts are ok just as they are.

Don't worry about spelling, sentence structure, or grammar. Once you begin writing, continue to do so until the time is up. The page will automatically progress after 15 minutes.

APPENDIX C

LIWC2015 ANALYTIC AND WORD CATEGORIES

- **Linguistic Dimensions**
    - Total function words (*e.g., it, to, no, very*)   n = 491
        - Total pronouns (*I, them, itself*)   n = 153
            - Personal pronouns (*I, them, her*)   n = 93
                - 1st pers singular (*I, me, mine*)   n = 24
                - 1st pers plural (*we, us, our*)   n = 12
                - 2nd person (*you, your, thou*)   n = 30
                - 3rd pers singular (*she, her, him*)   n = 17
                - 3rd pers plural (*they, their, they'd*)   n = 11
            - Impersonal pronouns (*it, it's, those*)   n = 59
        - Articles (*a, an, the*)   n = 3
        - Prepositions (*to, with, above*)   n = 74
        - Auxiliary verbs (*am, will, have*)   n = 141
        - Common Adverbs (*very, really*)   n = 140
        - Conjunctions (*and, but, whereas*)   n = 43
        - Negations (*no, not, never*)   n = 62
- **Other Grammar**
    - Common verbs (*eat, come, carry*)   n = 1,000
    - Common adjectives (*free, happy, long*)   n = 764
    - Comparisons (*greater, best, after*)   n = 317
    - Interrogatives (*how, when, what*)   n = 48
    - Numbers (*second, thousand*)   n = 36
    - Quantifiers (*few, many, much*)   n = 77
- **Psychological Processes**
    - Affective processes (*happy, cried*)   n = 1,393
        - Positive emotion (*love, nice, sweet*)   n = 620
        - Negative emotion (*hurt, ugly, nasty*)   n = 744
            - Anxiety (*worried, fearful*)   n = 116
            - Anger (*hate, kill, annoyed*)   n = 230
            - Sadness (*crying, grief, sad*)   n = 136
    - Social processes (*mate, talk, they*)   n = 756
        - Family (*daughter, dad, aunt*)   n = 118
        - Friends (*buddy, neighbor*)   n = 95
        - Female references (*girl, her, mom*)   n = 124
        - Male references (*boy, his, dad*)   n = 116
    - Cognitive processes (*cause, know, ought*)   n = 797
        - Insight (*think, know*)   n = 259
        - Causation (*because, effect*)   n = 135

- ▪ Discrepancy (*should, would*) — n = 83
- ▪ Tentative (*maybe, perhaps*) — n = 178
- ▪ Certainty (*always, never*) — n = 113
- ▪ Differentiation (*hasn't, but, else*) — n = 81
- o Perceptual processes (*look, heard, feeling)* — n = 436
  - ▪ See (*view, saw, seen*) — n = 126
  - ▪ Hear (*listen, hearing*) — n = 93
  - ▪ Feel□(*feels, touch*) — n = 128
- o Biological processes (*eat, blood, pain*) — n = 748
  - ▪ Body (*cheek, hands, spit*) — n = 215
  - ▪ Health (*clinic, flu, pill*) — n = 294
  - ▪ Sexual (*horny, love, incest*) — n = 131
  - ▪ Ingestion (*dish, eat, pizza*) — n = 184
- o **Drives** — n = 1,103
  - ▪ Affiliation (*ally, friend, social*) — n = 248
  - ▪ Achievement (*win, success, better*) — n = 213
  - ▪ Power (*superior, bully*) — n = 518
  - ▪ Reward□(*take, prize, benefit*) — n = 120
  - ▪ Risk (*danger, doubt*) — n = 103
- o **Time orientations**
  - ▪ Past focus (*ago, did, talked*) — n = 341
  - ▪ Present focus (*today, is, now*) — n = 424
  - ▪ Future focus (*may, will, soon*) — n = 97
- o Relativity (*area, bend, exit*) — n = 974
  - ▪ Motion (*arrive, car, go*) — n = 325
  - ▪ Space (*down, in, thin*) — n = 360
  - ▪ Time (*end, until, session*) — n = 310
- o **Personal concerns**
  - ▪ Work□(*job, majors, xerox*) — n = 444
  - ▪ Leisure□(*cook, chat, movie*) — n = 296
  - ▪ Home (*kitchen, landlord*) — n = 100
  - ▪ Money (*audit, cash, owe*) — n = 226
  - ▪ Religion (*altar, church*) — n = 174
  - ▪ Death (*bury, coffin, kill*) — n = 74
- o **Informal language** — n = 380
  - ▪ Swear words (*fuck, damn, shit*) — n = 131
  - ▪ Netspeak□(*btw, lol, thx*) — n = 209
  - ▪ Assent (*agree, OK, yes*) — n = 36
  - ▪ Nonfluencies (*er, hm, umm*) — n = 19
  - ▪ Fillers (*Imean, youknow*) — n = 14

***Bold** levels are labels for broader sections, not word categories that are counted
*Italicized words in parentheses are examples provided by LIWC2015 manual

APPENDIX D

POSITIVE AND NEGATIVE AFFECT SCHEDULE (PANAS)

The following words describe different feelings and emotions. Indicate to what extent you feel this way right now, that is, *at the present moment*.

Scale:

1	2	3	4	5
Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery
19. Active
20. Afraid

APPENDIX E

RUMINATIVE THOUGHT STYLE QUESTIONNAIRE (RTS)

Scale: 1 (not at all) to 7 (very well)

For each of the items below, please rate how well the item describes you.

1. I find that my mind often goes over things again and again .□
2. When I have a problem, it will gnaw on my mind for a long time. □
3. I find that some thoughts come to mind over and over throughout the day. □
4. I can't stop thinking about some things.
5. When I am anticipating an interaction, I will imagine every possible □scenario and conversation.
6. I tend to replay past events as I would have liked them to happen. □
7. I find myself daydreaming about things I wish I had done.
8. When I feel I have had a bad interaction with someone, I tend to imagine □various scenarios where I would have acted differently. □
9. When trying to solve a complicated problem, I find that I just keep coming □back to the beginning without ever finding a solution.
10. If there is an important event coming up, I think about it so much that □I work myself up.
11. I have never been able to distract myself from unwanted thoughts .□
12. Even if I think about a problem for hours, I still have a hard time coming □to a clear understanding.
13. It is very difficult for me to come to a clear conclusion about some problems, □no matter how much I think about it.
14. Sometimes I realize I have been sitting and thinking about something for hours.
15. When I am trying to work out a problem, it is like I have a long debate in □my mind where I keep going over different points.
16. I like to sit and reminisce about pleasant events from the past.
17. When I am looking forward to an exciting event, thoughts of it interfere □with what I am working on. □
18. Sometimes even during a conversation, I find unrelated thoughts popping □into my head.
19. When I have an important conversation coming up, I tend to go over it in my □mind again and again. □
20. If I have an important event coming up, I can't stop thinking about it.

SHIPLEY INSTITUTE OF LIVING SCALE – VOCABULARY TEST

Instructions:

In the test below, the first word in each line is printed in capital letters. Opposite it are four other words. Select the one word which means the same thing, or most nearly the same thing, as the first word. If you don't know, guess. Be sure to select the one word in each line that means the same thing as the first word.

Sample items:

PERMIT	allow	sew	cut	drive
RENOWN	length	head	fame	loyalty
FACILITATE	help	turn	strip	bewilder
LISSOM	moldy	loose	supple	convex
TEMERITY	rashness	timidity	desire	kindness

APPENDIX G

DEMOGRAPHIC QUESTIONNAIRE

What is your date of birth?

    [month dropdown menu]
    [day dropdown menu]
    [year dropdown menu]

What is your current gender identity? (listed alphabetically)

- ☐ Female
- ☐ Female-to-male (FTM) / Transgender Male / Trans Man
- ☐ Genderqueer, neither exclusively male nor female
- ☐ Male
- ☐ Male-to-female (MTF) / Transgender Female / Trans Woman
- ☐ Other, or Additional Gender Category (please specify): _____

What sex were you assigned at birth on your original birth certificate? (listed alphabetically)

- ☐ Female
- ☐ Male

What is your race? (mark all that apply; listed alphabetically)

- ☐ Asian ☐
  - o *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 ☐
  - o *A person having origins in any of the Black racial groups of Africa – includes Caribbean Islanders and other of African origin.*
- ☐ Native American, American Indian, or Alaska Native ☐
  - o *A person having origins in any of the original peoples of North and South America (including Central America), and who maintains a tribal affiliation or community attachment. ☐*
- ☐ Native Hawaiian or Other Pacific Islander ☐
  - o *A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.*

100

☐ White ☐
  o *A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.*
☐ Other, please specify: _____

If you would like to provide additional or more specific information to describe your race, such as your country of origin, please do so in the space below:
[free text box]
Regarding your romantic and/or sexual orientation, do you think of yourself as…

☐ Asexual
☐ Bisexual
☐ Heterosexual
☐ Homosexual
☐ Pansexual
☐ Queer
☐ Questioning
☐ Something else
☐ Don't know

If "something else" ➔ By <u>something else</u>, do you mean that….

☐ You have not yet figured out or are in the process of figuring out your sexuality
☐ You do not think of yourself as having a sexuality
☐ You personally reject all labels of yourself
☐ Your romantic and sexual orientation are different from each other.
☐ You mean something different from these choices
  o ➔ What do you mean by <u>something else</u>? _____

If "don't know" ➔ By <u>don't know</u>, do you mean that…

☐ You don't understand the words
☐ You understand the words, but you have not figured out or are in the process of figuring out your sexuality
☐ Your romantic and sexual orientation are different from each other.
☐ You mean something different from these choices.
  o ➔ What do you mean by <u>don't know</u>? _____

On either of above 'routed' questions, if "Your romantic and sexual orientation are different from each other." ➔

Regarding your <u>romantic</u> orientation, do you think of yourself as…

☐ Aromantic
☐ Biromantic

☐ Heteroromantic
☐ Homoromantic
☐ Panromantic
☐ Queer
☐ Questioning

Regarding your <u>sexual</u> orientation, do you think of yourself as…

☐ Asexual
☐ Bisexual
☐ Heterosexual
☐ Homosexual
☐ Pansexual
☐ Queer
☐ Questioning

Which of the following best describes your current relationship status?

☐ Seeing someone
☐ Single
☐ Married

If "seeing someone" or "married" → Is your relationship…

☐ Monogamous
☐ Non-monogamous/open

How long ago did you begin school at UNCG? Select the number below that represents the current semester you are in (e.g., "1" means this is your first semester at UNCG)
[dropdown menu] semesters ago
selection options in dropdown menu will go from 1 to 20, by integers and then be "21+"

How many credit hours have you completed at the college level? (Include courses taken *outside* of UNCG.)
[free text] hours

How many hours are you enrolled in <u>during the current semester</u>?
[free text] hours

What is your current employment status?

☐ I am a student.
☐ I am earning social security and/or disability benefits.

☐ I am unemployed and actively seeking <u>full-time</u> work.
☐ I am unemployed and actively seeking <u>part-time</u> work.
☐ I am unemployed and <u>not seeking work</u> at this time.
☐ I am working full-time.
☐ I am working part-time.

Have you ever served in the military?

☐ Yes
☐ No

If "yes" → What is your military status?

☐ Active
☐ Reserve
☐ Veteran

Have you ever <u>in your lifetime</u> been a parent to any biological, step and/or adopted children?

☐ Yes
☐ No

If "yes" → Are you <u>currently</u> a parent to any biological, step and/or adopted children?

☐ Yes
☐ No

TABLES

Table 1. Frequencies of Categorical Demographic Variables

(Listed alphabetically unless otherwise noted)

	N	%
1. Race		
Asian	18	12.70
Black or African American	40	28.20
Native American, American Indian, or Alaska Native	2	1.40
White	64	45.10
Other	18	12.70
2. First Language (descending)		
English	114	80.3
Spanish	10	7.0
German	4	2.8
Chinese	3	2.1
Arabic	2	1.4
Gujarati	2	1.4
Korean	2	1.4
Vietnamese	2	1.4
Hindi	1	0.7
Hmong	1	0.7
Nepali	1	0.7
3. Birth Sex		
Female	104	73.2
Male	38	26.8
4. Current Gender Identity*		
Female	102	71.8
Male	38	26.8
Female-to-male (FTM)	1	0.7
Genderqueer, neither exclusively male nor female	1	0.7

Other categories were provided as response options, but only endorsed categories listed above

Table 2. Descriptive Statistics

	Mean	Std. Dev.	Min.	Max.	Skew	Kurtosis
1. Age	19.79	3.25	15.10	40.16	3.53	16.70
2. Word Count	353.92	73.53	74.00	427.00	-1.62	1.81
3. Vocabulary	28.89	5.06	11.00	39.00	-0.45	0.85
4. Initial Distress	6.15	1.14	1.00	7.00	-1.63	3.26
5. Current Distress	3.20	1.62	1.00	7.00	0.51	-0.44
6. Negative Affect (Pre)	15.46	6.29	10.00	38.00	1.49	1.56
7. Negative Affect (Post)	19.29	8.71	10.00	49.00	1.20	1.05
8. Positive Affect (Pre)	27.91	8.52	10.00	47.00	0.01	-0.98
9. Positive Affect (Post)	24.42	9.35	10.00	50.00	0.65	-0.25
10. Negative Affect Change	0.00	7.02	-20.74	31.19	1.36	4.46
11. Positive Affect Change	0.00	7.43	-17.47	16.53	0.10	-0.37
12. Rumination	93.21	22.77	25.00	140.00	-0.69	0.90
13. LIWC Insight Words	3.26	1.39	0.00	8.16	0.43	0.41
14. LIWC Causation Words	2.17	1.09	0.00	5.63	0.49	0.02
15. Writing Benefit	5.41	1.12	2.25	7.00	-0.39	-0.43

Table 3. Mean-Level Differences in Demographic and Covariate Variables by EW Condition

	Traditional EW (n = 72)		Self-Compassion EW (n = 70)		ANOVA ($df = 1$)	
	M	SD	M	SD	F	p
1. Age	19.82	3.60	19.75	2.87	0.02	.898
2. Word Count	352.96	77.04	354.91	70.27	0.03	.875
3. Vocabulary	28.76	5.01	29.03	5.15	0.10	.757
4. Initial Distress	6.14	1.08	6.17	1.20	0.17	.680
5. Current Distress	3.32	1.68	3.07	1.55	0.00	.973
6. Neg. Affect (Pre)	14.88	6.23	16.07	6.34	1.29	.259
7. Pos. Affect (Pre)	27.11	8.99	28.73	7.99	1.28	.260

Table 4. Correlation Coefficients

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	—													
2. Word Ct.	-.03	—												
3. Vocab.	.17*	.02	—											
4. Initial Dist.	-.03	.33**	.12	—										
5. Curr. Dist.	-.20*	.16	-.12	.14	—									
6. Neg. (Pre)	.02	.13	-.15	.07	.26**	—								
7. Neg. (Post)	.00	.24*	-.04	.16	.51**	.59**	—							
8. Pos. (Pre)	.19*	.07	-.08	.02	-.03	.10	.23**	—						
9. Pos. (Post)	.20*	-.01	-.06	-.08	-.10	-.04	-.08	.61**	—					
10. Neg. Δ	-.01	.17*	.06	.14	.44**	.00	.81**	.21*	-.07	—				
11. Pos. Δ	.11	-.07	-.02	-.12	-.10	-.12	-.27**	.00	.80**	-.25**	—			
12. Ruminat.	-.17*	.11	-.03	.03	.16	.22**	.14	-.15	-.11	.02	-.02	—		
13. Insight	-.14	-.03	.04	-.04	-.13	.01	-.03	-.07	.00	-.05	.06	.05	—	
14. Causation	-.09	-.03	-.04	-.06	-.01	.00	.13	.06	.02	.16	-.02	.04	.34**	—
15. EW Benefit	-.03	.26**	.02	.21*	.17*	.22**	.29**	.25**	.15	.20*	.00	.09	.07	.09

Note. *p < .05, **p < .01

Table 5. Rumination Moderating EW Condition and LIWC Insight Words

Variable	B	*p*-value	95th Percentile Bootstrap CI	
			LL	UL
EW Condition	0.77	.44	-1.20	2.75
Rumination	0.01	.37	-0.01	0.02
EW Condition x Rumination	-0.01	.49	-0.03	0.01

Model statistics for interaction term: R^2 Change = .004, F(1, 138) = 0.48, p = .49

Table 6. Rumination Moderating EW Condition and LIWC Causation Words

Variable	B	*p*-value	95th Percentile Bootstrap CI	
			LL	UL
EW Condition	-0.70	.37	-2.25	0.85
Rumination	-0.002	.75	-0.01	0.01
EW Condition x Rumination	0.01	.36	-0.01	0.02

Model statistics for interaction term: R^2 Change = .01, F(1, 138) = 0.86, p = .36

Table 7. Rumination Moderating EW Condition and Negative Affect Change

Variable	B	*p*-value	95th Percentile Bootstrap CI	
			LL	UL
Current Distress	1.87	< .01	1.19	2.54
Word Count	0.01	.15	-0.004	0.03
EW Condition	-1.20	.79	-10.16	7.76
Rumination	-0.02	.47	-0.09	0.04
EW Condition x Rumination	0.01	.86	-0.09	0.10

Model statistics for interaction term: R^2 Change = .0002, F(1, 136) = 0.03, p = .86

Table 8. Rumination Moderating EW Condition and Positive Affect Change

Variable	B	p-value	95th Percentile Bootstrap CI	
			LL	UL
EW Condition	4.60	.39	-5.92	15.13
Rumination	0.01	.79	-0.06	0.08
EW Condition x Rumination	-0.04	.49	-0.15	0.07

Model statistics for interaction term: R^2 Change = .003, F(1, 138) = 0.47, p = .49

Table 9. Post-Hoc Manipulation Check with LIWC Word Categories

LIWC Category	S-C EW	Trad EW	Rationale (e.g., SC component)	M (SD)	F (1, 140)	p
1st Person Plur. Pronouns	↑	↓	Common humanity	S-C: 0.71 (1.01) Trad: 0.82 (1.11)	0.43	.51
1st Person Sing. Pronouns	↓	↑	Common humanity	S-C: 11.51 (2.64) Trad: 11.56 (2.61)	0.01	.92
Social Processes	↑	↓	Common humanity	S-C: 10.59 (4.22) Trad: 10.08 (4.80)	0.45	.50
Affective Processes			Mindfulness, acceptance / awareness of emotional states	<u>Affect</u> S-C: 5.68 (1.58) Trad: 5.39 (1.61)	1.21	.27
Positive Emotion				<u>Positive</u> S-C: 2.23 (1.20) Trad: 2.41 (1.27)	0.73	.39
Negative Emotion	↑	↓		<u>Negative</u> S-C: 3.36 (1.40) Trad: 2.89 (1.23)	4.46	.04*
Past Focus	↓	↑	Mindfulness, present-moment awareness	S-C: 10.30 (2.70) Trad: 9.61 (3.34)	1.82	.18
Present Focus	↑	↓	Mindfulness, present-moment awareness	S-C: 7.13 (2.92) Trad: 7.45 (3.56)	0.34	.56

*Note: *p < .05.*