THESIS

THE PROTECTIVE ROLE OF AWE ON SELF-FOCUSED ATTENTION AND DEPRESSIVE SYMPTOMS

Submitted by

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ABSTRACT

THE PROTECTIVE ROLE OF AWE ON SELF-FOCUSED ATTENTION AND DEPRESSIVE SYMPTOMS

Depression is a public health concern that negatively affects millions of individuals living in the United States. Maladaptive self-focused attention has been found to strongly predict the onset and maintenance of depressive symptoms. Awe is a positive emotion that may protect against this cognitive vulnerability given its ability to elicit the "small self." The present study examined whether awe buffered against the impact of self-focus on depressive symptoms at both the trait and state level. A sample of 286 students were recruited from an undergraduate research pool. Participants completed an online survey that assessed for different measures of self-focus (i.e., first-person singular pronouns, rumination), trait positive emotions, depressive symptoms, and positive and negative affect. One week later, they were randomized to watch an awe-eliciting video or amusement-eliciting video and subsequently completed another survey that assessed for rumination, "small self" feelings, state positive emotions, and positive and negative affect. Results indicated mixed findings. At the trait level, depressive symptoms were positively associated with rumination (but not first-person singular pronouns). This positive association between self-focus and depressive symptoms was attenuated as levels of awe increased when using the measure of rumination, but not the measure of first-person singular pronouns. At the state level, rumination was positively associated with "small self" feelings. In addition, no interaction was found between the effects of the awe inductions and "small self" feelings in

relation to rumination. While researchers have proposed that awe has a potential therapeutic role in depression, this study appears to be the first to provide empirical support at the trait level. Future research should examine the relationship between rumination and "small self" feelings or consider more potent elicitors of awe when understanding its effects at the state level.

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CHAPTER 1: INTRODUCTION

Depression is a serious public health concern that impacts millions of individuals in the United States (National Institute of Mental Health, 2021; Substance Abuse and Mental Health Services Administration, 2020). A cognitive factor that plays a role in the onset and maintenance of depression is self-focused attention (Ingram, 1990; Nolen-Hoeksema et al., 1991; Pyszczynski & Greenberg, 1987). While it is normal for a person to think about themselves, self-focused attention is detrimental when it becomes sustained, excessive, and rigid. Indeed, studies have shown that maladaptive levels of self-focus are elevated among people with depression, as well as predictive of future depressive symptoms in non-depressed individuals (Connolly & Alloy, 2017; Mor & Winquist, 2002; Nolen-Hoeksema et al., 1994; Nolen-Hoeksema, 2000; Ruscio et al., 2015). Thus, dampening maladaptive self-focus may be an important avenue for reducing depressive symptoms.

Whereas substantial research has concentrated on the detrimental effects of self-focus on depression, less is known about protective factors that can buffer this cognitive vulnerability. Positive emotions, and in particular awe, may offer a promising avenue for addressing maladaptive self-focus. Awe is an emotional state that arises in response to vast stimuli that challenges one's usual frame of reference (Keltner & Haidt, 2003). It has also been shown to give rise to a "small self" by broadening the self-concept to include others (Bai et al., 2017; Perlin & Li, 2020; Piff et al., 2015). Given these characteristics of awe, the purpose of this study is to examine whether awe buffers against self-focused attention, thereby reducing symptoms of depression in an undergraduate student sample.

Depression

Depression is extremely common in the United States. In 2019, 19.4 million adults experienced at least one major depressive episode (NIMH, 2021; SAMHSA, 2020). This number accounted for 7.8% of all adults in the U.S (NIMH, 2021; SAMHSA, 2020). However, young adults appear to be the most impacted as those between the ages of 18 and 25 had the highest prevalence of a major depressive episode at 15.2% (NIHM, 2021; SAMHSA, 2020). Over the years, universities have also witnessed a significant increase in depression in their students, as well as the utilization of mental health services (Ibrahim et al., 2013; Lipson et al., 2019).

Symptoms of depression include subjective feelings of sadness, emptiness, or hopelessness; inability to experience joy or pleasure in usual activities; changes in weight or appetite; restlessness; slowed movement or speech; sleep disturbances; decreased energy; feelings of worthlessness or guilt; impairments in focus; as well as suicidal ideation (American Psychiatric Association, 2013). To be diagnosed with depression, individuals must endorse at least five of the aforementioned symptoms (with one of them being either depressed mood or loss of interest or pleasure) and experience impairment in functioning in one or more domains (e.g., social, occupational) over a two-week period (APA, 2013).

Cognitive theories of depression are a particularly helpful framework for understanding the etiology of depression. Two theories that have been most influential in guiding psychological research on depression are Beck's (1967) theory of depression and Abramson and colleagues' (1989) hopelessness theory of depression. Beck's (1967) theory asserted that dysfunctional schemas or beliefs about oneself, the world, and others create a negativity bias that leaves people vulnerable to developing depression when encountering events that impact these schemas. In a similar vein, the hopelessness theory of depression (Abramson et al., 1989) proposed that the tendency to make negative inferences about the self, negative inferences about the consequences

of a negative life event, as well as the tendency to attribute negative life events to "stable, global causes" (p. 361) creates a sense of hopelessness that increases susceptibility to developing depression.

Most relevant to the current studies is a set of cognitive theories that emphasize the role of self-focused attention in producing adaptive and maladaptive responses to negative life events (Duval & Wicklund, 1972; Carver & Scheier, 1981; Pyszczynski & Greenberg, 1987). Duval and Wicklund (1972) conceptualized self-focused attention as an automatic and self-evaluative process that compares one's current state to a "standard" (i.e., schemas of appropriate behaviors, attitudes, and traits) in a self-relevant domain (e.g., intelligence, physical attractiveness). Falling short of that standard would lead to negative affect, thus motivating someone to adjust a set of behaviors to conform to that standard (Duval & Wicklund, 1972). Other researchers such as Carver and Scheier (1981) thought that negative affect, including depression, arises when an individual finds that the chance of achieving that standard is low.

While several researchers thought that elevated levels of self-focus were related to psychopathology more broadly (e.g., Ingram, 1990), theorists like Pyszczynski and Greenberg (1987) found that heightened self-focus was particularly relevant in depression, calling it the "depressive self-focusing style" (p. 122). They applied Duval and Wicklund (1972) and Carver and Scheier's (1981) models of self-focused attention to conceptualize the depressed individual as someone who gets "stuck" in a self-regulatory cycle of unsuccessful attempts to reduce discrepancies between current and desired states. As a result of this, the person enters a feedback loop of "virtually constant self-focus, resulting in intensified negative affect, self-derogation, [and] further negative outcomes" (Pyszczynski & Greenberg, 1987, p. 122). Thus, the tendency

to focus on oneself and their internal experience leaves them more vulnerable to developing depression, particularly when they have difficulty disengaging from self-focus.

Self-Focused Attention

Duval and Wicklund (1972) presented their concept of self-focus in their theory of objective self-awareness. The terms "objective" and "subjective" indicated the directionality of attention – "objective" meaning that attention is directed inward so "he is the 'object' of his own consciousness" and "subjective" meaning that attention is moving toward environmental stimuli so that "he is the 'subject' of the consciousness that is directed toward external objects" (Duval & Wicklund, 1972, p. 2). According to Duval and Wicklund, focusing on oneself initiates a process of self-evaluation that compares an individual's current state to a standard in a self-relevant domain like intelligence or physical attractiveness. If one meets or surpasses that standard, positive affect is experienced; if one is unable to achieve that standard, negative affect is experienced (Duval & Wicklund, 1972).

Building on objective self-awareness theory, Carver and Scheier (1981; Carver, 1979) considered this self-evaluative process as a "matching-to-standard sequence" feedback system that is not only self-regulatory, but also goal-oriented. If an individual achieves a desired state, or the "salient standard," then that individual can exit the self-regulatory cycle. If not, one would continue in a cycle of behaviors and self-evaluations until the behavioral standard is met. While Duval and Wicklund (1972) thought that negative affect arises when a discrepancy occurs between one's current self and ideal self, Carver and Scheier (1981) thought that the low likelihood of achieving one's ideal self was what led to negative affect. Later, they added that negative affect arises when one's progress towards reducing the discrepancy takes too long

(Carver et al., 1996, 1999; Carver & Scheier, 1998). According to these models, self-focus therefore serves an important self-regulatory function.

While these models of self-focused attention imply a dichotomy of an internally focused state and an externally focused state, Ingram (1990) noted that these states are not mutually exclusive. It is possible to be simultaneously self-focused and environmentally focused. For instance, a person can give a lecture to an audience, yet have some degree of self-focus at the same time. This notion allows self-focused attention to be viewed as a continuum. Thus, flexibility can be considered to be a parameter of self-focus. According to Ingram (1990), a flexible attentional state can be represented as "a balance between external and internal attention" (p. 167).

Other parameters of self-focus include duration, content, and intensity – all of which illustrate the multifaceted nature of self-focus. Mor and Winquist (2002) stated that self-focused attention should be considered as an "umbrella term" (p. 651) that includes different variations of self-focus based on contextual factors. These variations can result in different "types" of self-focus. For instance, adaptive forms of self-focus include self-reflection and experiential self-awareness. Studies have found that self-reflection can have a positive valence (Trapnell & Campbell, 2011). It can also encourage curiosity, self-knowledge, as well as improve interpersonal skills (Takano et al., 2011; Trapnell & Campbell, 1999). In addition, experiential self-awareness – a kind of self-awareness that's mindful, present-focused, and non-judgmental – has been shown to decrease negative mood and improve memory (Watkins, 2004; Watkins & Teasdale, 2004).

Most relevant to the proposed studies are maladaptive forms of self-focus. Typically, these versions of self-focus are rigid, held for longer periods of time, have a negative valence,

and are uncontrollable. Indeed, when reviewing the role of self-focus among various clinical disorders, Ingram (1990) used the term "self-absorption" to characterize pathological self-focus as inflexible, sustained, and excessive. In a large meta-analysis by Mor and Winquist (2002), it was found that self-focus was significantly associated with negative affect that indicated a moderate effect size. Results of this meta-analysis also yielded other important findings. Focusing on positive aspects of the self was correlated with less negative affect, whereas focusing on negative aspects of the self was related to more negative affect (Mor & Winquist, 2002). Further, when individuals engaged in self-focus after a negative event had occurred, this was correlated with increased negative affect; on the other hand, engaging in self-focus after a positive event had no significant impact on negative affect (Mor & Winquist, 2002). Other studies corroborate with these findings that individuals who engage in maladaptive self-focus tend to focus on negative self-aspects, rather than positive self-aspects (Rimes & Watkins, 2005; Vassilopoulos & Watkins, 2009). Similarly, momentary experience sampling studies have found that ruminative self-focus is strongly predictive of negative affect after facing a stressor (Moberly & Watkins, 2008a; Moberly & Watkins, 2008b).

Self-Focused Attention and Depression

As Pyszczynski and Greenberg (1987) proposed, self-focused attention is particularly salient in individuals with depression. Many studies strongly support this notion that depressed individuals engage in elevated levels of self-focus than nondepressed individuals (e.g., Greenberg & Pyszczynski, 1986; Ingram, 1990; Mor & Winquist, 2002; Ruscio et al., 2015). Even in a nondepressed sample, self-focus was related to more depressive symptoms (Harrington & Blankenship, 2002). One subtype of self-focus that is particularly relevant to depression is rumination (Mor & Winquist, 2002; Smith & Alloy, 2009). Nolen-Hoeksema (1991) defined

rumination as a style of thought that involves a focus on one's depressive state, as well as the implications and consequences of their depressive symptoms in a repetitive way. Researchers have also further distinguished a kind of ruminative response called stress-reactive rumination. Robinson and Alloy (2003) characterized this as a type of rumination that underlies the tendency to focus on maladaptive self-referential thoughts after stressful events. Longitudinal studies have revealed that stress-reactive rumination predicted onset, more episodes, and longer duration of depressive episodes in non-clinical samples (Connolly & Alloy, 2017; Robinson & Alloy, 2003; Ruscio et al., 2015).

Using these definitions, rumination can be thought of as inflexible (i.e., difficulty shifting out of self-focus), sustained (i.e., repetitive), and centering on negative content. Indeed, ruminative self-focus has been found to be associated with the onset of depression, as well as prolonged depressive moods (Nolen-Hoeksema, 1991; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Morrow, 1993). A daily diary study also revealed that momentary self-focus was correlated with current negative affect – a relationship that was especially heightened in people with a recent diagnosis of depression (Mor et al., 2010). Interestingly, poor attentional control (i.e., difficulty directing attention away or disengaging from negative stimuli) has been linked with rumination which in turn was related to greater severity of depressive symptoms (Hsu et al., 2015). Similarly, difficulty moving attentional resources away from self-generated thoughts has also been found to exacerbate the link between dysphoria and maladaptive self-referential thinking (Rochat et al., 2012). These findings reflect the flexibility parameter of self-focused attention – that an inflexible way of attending to self-information is related to poor mental health outcomes. Many of these findings are also supported by neuroimaging studies. In an extensive review by Lin and colleagues (2018), excessive self-referential processing in certain brain

regions and networks (i.e., cortical midline structures, limbic, and prefrontal regions; default mode network) is highly characteristic of internalizing disorders like depression. Thus, self-focus attention that is rigid, perseverative, and based on negative content has clear implications for increasing susceptibility to developing, and even prolonging, depressive symptoms. Finding ways to dampen this cognitive tendency is particularly important in protecting against symptoms of depression.

Awe

Positive emotions have been theorized to not only broaden specific sets of thoughts and behaviors, but also to build personal resources during times of safety (Fredrickson, 2001). One of the positive emotions that may be particularly apt at doing this is awe. In their seminal paper, Keltner and Haidt (2003) presented a comprehensive, theoretical account of awe by drawing on literature from religious studies, sociology, philosophy, and psychology. They proposed that awe had two defining characteristics: a perceived sense of vastness and a need for accommodation.

First, appraising a stimulus as vast means that one is experiencing it as "being much larger than the self, or the self's ordinary level of experience or frame of reference" (Keltner & Haidt, 2003, p. 303). Keltner and Haidt (2003) also noted that vastness isn't limited to physical size, but that it can refer to social or conceptual size as well. For instance, one could feel awestruck when encountering a celebrity, by a sheer act of selflessness, or even by a mathematical formula that succinctly explains a pattern in nature. Second, Keltner and Haidt (2003) used the term accommodation to capture the process of adjusting one's mental schemas (or knowledge) when encountering an awe-eliciting stimulus. This term was originally coined by Jean Piaget who was a cognitive developmental psychologist. First, assimilation was used to describe the way in which a child would interpret a stimulus in their environment that is

congruent with current knowledge – thus, accommodation was used to describe the process in which a child revises an existing schema or forms a new schema in order to interpret or understand a novel stimulus in their environment (Piaget & Inhelder, 1969). To illustrate, many children have a basic schematic map of what a bird is – it has two legs, feathers, wings, and can fly. When a child encounters a bird that fits into these categorical descriptors, they are assimilating that bird into their current knowledge. However, when a child first encounters a bird that cannot fly (e.g., penguins), they undergo a process of accommodation in order to adjust their understanding of birds (e.g., not all birds can fly).

A very similar process occurs when an individual experiences awe. For instance, witnessing the Northern Lights for the first time may cause someone to not only perceive it as vast, but undergo a process of accommodation due to the novel, unusual, and colorful ways in which light is illuminating the night sky. Experiencing something that challenges one's usual frame of reference can also result in a feeling of awe. This accommodative process can be seen as the attempt to "make sense" of what is happening before an individual.

What elicits awe? Keltner and Haidt (2003) thought there could be social, physical, and cognitive elicitors and came up with five themes of awe: threat (e.g., a tornado), beauty (e.g., nature), ability (e.g., an Olympic athlete), virtue (e.g., a charitable, compassionate individual), and supernatural causality (e.g., witnessing spirits). Many empirical studies have focused on physical elicitors of awe that fall into the realm of beauty. For instance, while music, art, and other people's accomplishments were endorsed as elicitors, Shiota and colleagues (2007) found that nature was the most common elicitor of awe. Indeed, many experimental studies have used nature-related videos (Bai et al., 2017; Koh et al., 2019; Piff et al., 2015; Rivera et al., 2020; Valdesolo & Graham, 2014; Yang et al., 2018), as well as immersive nature experiences (e.g.,

white-water rafting, Yosemite National Park, a redwood grove) to successfully induce experiences of awe (Anderson et al., 2018; Bai et al., 2017; Ballew & Omoto, 2018; Piff et al., 2015; Stellar et al., 2018; Sturm et al., 2020). Further, the use of Virtual Reality headsets has been a novel way to successfully elicit awe. Studies that have used this method have not only incorporated images or videos of expansive natural landscapes, but also images or videos of outer space and Earth (Chirico et al., 2017; Kahn & Cargile, 2021; Nelson-Coffey et al., 2019; Quesnel & Riecke, 2018). Gordon and colleagues (2017) were also the first to empirically test Keltner and Haidt's hypothesis that a threat-based variant of awe exists. In a group of 202 individuals, roughly 21% of them described an awe experience with appraisals of threat and danger that involved either nature, social events, or religion. In addition, interpersonal elicitors of awe (e.g., witnessing character strengths) have been found, but do not appear to elicit awe as intensely as nature-related stimuli (Graziosi & Yaden, 2019).

Importantly, awe has been conceptualized as a self-transcendent emotion, along with gratitude, compassion, admiration, elevation, and love (Stellar et al., 2017; Yaden et al., 2017). Taking a social functional approach, Stellar and colleagues (2017) theorized that self-transcendent emotions have evolved to "bind" individuals into a social collective as a way to build social resources, as well as bring about cooperation and "group stability" by moving beyond one's own needs and attending to the needs of a group. Thus, self-transcendent positive emotions should encourage prosocial behavior. In fact, many empirical studies support this hypothesis. Piff and colleagues (2015) found that inducing awe led individuals to make more ethical decisions when presented with hypothetical scenarios, become more generous, and exhibit higher prosocial tendencies in a resource allocation game. Similarly, in a sample of Chinese college students, those who exhibited greater dispositional awe were more likely to

endorse greater prosocial tendencies (Guan et al., 2019). Further, this same group of individuals were more likely to donate their money and time to strangers after being experimentally induced to feel awe. These tendencies to move towards group-oriented concerns may be explained by awe's ability to elicit a small sense of self.

Awe and the "Small Self"

A unique feature of awe is its ability to give rise to a "small self." This phenomenon was first empirically documented by Shiota and colleagues (2007). They asked individuals to write about an experience of awe and subsequently found that people endorsed items such as "I felt small or insignificant," "I felt the presence of something greater than myself," "I felt connected with the world around me," and "I was unaware of my day-to-day concerns" more often than those who were asked to write about an experience of pride. Further, when exploring the content of self-concepts in awe-prone individuals, they also found that these people were more likely to describe themselves with statements that indicated membership of a larger group (e.g., "an inhabitant of the Earth"). This same finding was also found when Shiota and colleagues (2007) experimentally induced awe by asking individuals to look at a large replica of a *Tyrannosaurus rex* skeleton – people in the awe condition tended to endorse self-statements that were more universal in nature. These series of findings were among the first to indicate that awe could bring about shifts in self-appraisals.

The notion that awe diminishes the sense of self has been strengthened by many other studies. In a series of cross-sectional, longitudinal, and experimental studies done by Bai and colleagues (2021), it was found that those who experienced more awe in their daily lives perceived their self-size to be smaller. This same effect was also found in those visiting a national park – specifically, when asking people to draw a picture of themselves on a piece of

paper and sign the picture by writing "me," their self-image and signature was significantly smaller compared to those who didn't visit the national park (Bai et al., 2017). Experimental awe inductions have also led people to endorse items such as "I feel small or insignificant," "I feel like I am in the presence of something grand," or "I'm just a small part of something much bigger than myself" (Nelson-Coffey et al., 2019; Piff et al., 2015; Rivera et al., 2019). One novel measure of the small self was done by Sturm and colleagues (2020) who asked individuals to go on a walk outside and take pictures of themselves in the scenery they were in. Those who went on an "awe walk" had an increasingly "small self" over a period of 8 weeks – quantified by dividing the number of "self" pixels by the total number of pixels in the photograph (Sturm et al., 2020).

These "small self" studies reveal that awe appears to broaden one's self-concept to include others while shrinking a sense of "me." This seems to generate a sense of connectedness towards an "other." The paradoxical idea that awe seems to have properties that both reduce self-salience and increase connectedness is something that Yaden and colleagues (2017) have proposed. Specifically, they stated that self-transcendent experiences, including awe, have two subcomponents: an annihilational component (i.e., boundaries of the self fade away) and a relational component (i.e., the self expands to include others) (Yaden et al., 2017). While completely losing one's sense of self in either direction does not seem to produce adaptive outcomes for a person's well-being, a balanced state of self-concern and group-concern may. Perlin and Li (2020) addressed this notion by articulating what exactly is meant by a "small self." They noted that awe might not exclusively shift attentional focus towards other-oriented concerns, but rather facilitate a "quiet ego" – a self that is working towards growth, prosocial motivations, and an "appreciation of self-other interdependence" (p. 292). Thus, perhaps a more

accurate and succinct way of describing awe's "small self" phenomenon is that awe promotes an interdependent self.

Awe and Self-Focused Attention

Pertaining to self-focused attention, awe's capacity to generate a more interdependent self could mean that awe enhances adaptive forms of self-focus, while simultaneously lessen maladaptive forms of self-focus. Again, adaptive versions of self-focus generally have parameters that are positively valenced, momentary, and flexible. On the other hand, maladaptive versions of self-focus tend to have parameters that are negatively valenced, sustained, excessive, and inflexible.

Studies have shown that inducing awe in individuals has led them to become less focused on themselves by disagreeing with items such as "I focus on what I will say and do next" or "I focus on the impression I am making on the other person" (Bai et al., 2017). In addition, this diminished self-focus also led individuals to endorse more collective engagement, measured by how much a circle representing "self" overlapped with a circle representing "community" (Bai et al., 2017). Further, going on an "awe walk" increased more experiences of prosocial emotions (i.e., compassion, admiration, amusement, appreciation, gratitude), as well as greater feelings of social connectedness by end of eight weeks (Sturm et al., 2020).

Self-perspective – an aspect of the small self that was clarified by Tyson and colleagues (2021) – may be notable for generating more adaptive forms of self-focus. This construct is captured with items like "I feel like my own day to day concerns are relatively trivial" and "In the grand scheme of things, my own issues and concerns do not matter as much." These items closely resemble self-reflection which is considered to be an adaptive version of self-focused attention.

Again, these findings indicate that awe may not move one's attention entirely away from the self but expand one's attention toward a state of self-other balance as Perlin and Li (2020) suggested. This idea is reminiscent of Ingram's (1990) proposal that an attentional state involving a balance between internal and external focus is a flexible one. As such, feelings of awe may be a promising way of reducing maladaptive self-focused attention by broadening one's attention to include others.

It is clear in the research literature that engaging in maladaptive levels of self-focus can promote the onset of depression, as well as maintain depressive symptoms. Given that awe has implications for dampening self-focus and promoting feelings of connectedness, awe may be able to mitigate the effects of self-focused attention on depression. While researchers have addressed awe's potential therapeutic role in depression (e.g., Chirico & Gaggioli, 2021), no empirical studies appeared to have studied these relationships.

Language Use as a Novel Measure of Self-Focused Attention

The central premise in the link between awe and depressive symptoms is the potential to shift maladaptive self-focus to a more adaptive interdependent focus. As such, assessing for different types of self-focus is a priority for research. Like Pennebaker and colleagues (2003) noted, how people express themselves linguistically can indicate different kinds of information about themselves, the circumstances they are in, as well as the social and psychological worlds they live in. Examining the words that people use may give clues to the degree in which they engage in self-referential thought.

Assessing for personal pronouns, particularly first-person singular pronouns (e.g., I, me, myself), has been the most common method of detecting levels of self-focus. One of the first studies to examine these variables was done by Davis and Brock (1975). Testing Duval and

Wicklund's (1972) theory of objective self-awareness, they manipulated attentional focus across two studies – in the first, individuals were randomly assigned to a room with a television camera (either facing toward or away from them) and given positive, negative, or no feedback on a certain task; in the second, individuals were seated at a table with or without a mirror facing them and given positive or negative feedback on the same task. Davis and Brock (1975) found that individuals who faced the camera or mirror were more likely to engage in greater levels of self-focus, measured by the number of first-person singular pronouns (e.g., "I," "me," or "myself"), when determining which English pronouns corresponded to foreign language pronouns in a series of sentences. Subsequent studies have captured self-focus via first-person singular pronoun usage in a variety of ways. These methods include written narratives (e.g., essays, journal entries), recorded interviews, projective tests, as well as thought-listing or sentence completion tasks (Bucci & Freedman, 1981; Edwards & Holtzman, 2017; Tackman et al., 2019; Wegner & Giuliano, 1980; Weintraub, 1981; Wood et al., 1990).

Language Use in Depression

Individuals with depression appear to utilize more first-person singular pronouns. This notion has been supported across studies examining spontaneous speech (Bucci & Freedman, 1981), asking people to talk about a personal topic for 10 minutes (Weintraub, 1981), as well as writing an essay about their "deepest thoughts and feelings about coming to college" (Rude et al., 2004). Further, one archival study that examined the works of suicidal and non-suicidal poets revealed that those with suicidal ideation used more first-person singular pronouns than first-person plural pronouns (e.g., we, us) (Stirman & Pennebaker, 2001). Given these findings, Pennebaker and colleagues (2003) proposed that language use could be "an attractive as well as subtle diagnostic marker" (p. 560) of psychopathology.

More recently, a meta-analysis found a small, but robust correlation (r = .13) between first-person singular pronoun usage and depression among the literature on linguistic markers of individual differences (Edwards & Holtzman, 2017). Similar results were revealed by Tackman and colleagues (2019) who synthesized data from 11 samples from six different labs to get a more accurate estimate of the effect size between depression and "I-talk." These findings suggest that depressed individuals who frequently use self-referential language may be more susceptible to experiencing symptoms of depression.

Language Use in Awe

Although limited, there have been a small number of studies related to awe that have investigated word use. In a study that examined narrative descriptions of religious and spiritual experiences, it was found that people who scored high on having mystical experiences – a type of self-transcendent experience that can involve intense feelings of awe (Yaden et al., 2017) – used more inclusive language such as "and," "with," and "we" (Yaden et al., 2016). Another study found that descriptions of awe contained more first-person plural pronouns than first-person singular pronouns compared to descriptions of awe and happiness (Darbor et al., 2016). Additionally, with evidence suggesting that some awe experiences may involve threat appraisals (Gordon et al., 2017), experiencing shared tragedies (e.g., death of Princess Diana, September 11 attacks) have led individuals to use more "we" words and less "I" words (Gortner & Pennebaker, 2003; Stone & Pennebaker, 2002). These findings indicate that people who have awe-filled experiences tend to use words that are more collective in nature, suggesting that awe could broaden self-focus by integrating others into one's self-concept. It is possible that awe has implications for softening the rigidity and diminishing the disproportionate amounts of self-focused attention that is commonly seen in depression.

The Present Study

The present investigation consisted of an experimental study examining associations between self-focused attention, depressive symptoms, and dispositional levels of awe at the trait level, as well as manipulate feelings of awe (compared to amusement) to test whether these feelings influence individuals' levels of self-focused attention and "small self" feelings. Depressive symptoms were not measured at post-manipulation given that these symptoms were not expected to change much from pre- to post-manipulation.

Hypotheses

Hypothesis 1: Self-focus will positively correlate with depressive symptoms.

Hypothesis 2: Self-focus will negatively correlate with awe.

Hypothesis 3: Awe will negatively correlate with depressive symptoms.

Hypothesis 4: Awe will attenuate the direct, positive relationship between self-focus and depressive symptoms such that at higher levels of dispositional awe, the relationship between self-focus and depressive symptoms will be weaker.

Hypothesis 5: Awe will positively correlate with "small self" feelings.

Hypothesis 6: Self-focus will negatively correlate with "small self" feelings.

Hypothesis 7: Individuals in the awe condition will score lower on self-focus compared to those in the amusement condition.

Hypothesis 8: Individuals in the awe condition will score higher on "small self" feelings compared to those in the amusement condition.

CHAPTER 2: METHODS

Power Analysis

An a priori power analysis was performed with G*Power 3.1.9.7 (Erdfelder et al, 1996) which indicated a sample of 114 participants to detect a small effect ($f^2 = 0.1$) at 80% power ($\alpha = .05$) for linear multiple regression analyses with one predictor variable (i.e., self-focused attention), one moderator variable (i.e., awe), and one interaction variable (i.e., interaction effect between self-focus and awe). If this sample size could not be obtained, then a sample of 48 participants was indicated to detect a medium effect ($f^2 = 0.25$) at 80% power ($\alpha = .05$) with the same number of predictors. When considering additional predictors or covariates, having more participants would be necessary. If five predictors were examined, then a sample of 134 participants would be needed to detect a small effect ($f^2 = 0.1$) at 80% power ($\alpha = .05$). Similarly, if eight predictors were examined, a sample of 159 participants would be needed to detect a small effect ($f^2 = 0.1$) at 80% power ($\alpha = .05$). As such, the study was set to obtain around 150-200 participants to allow for additional predictors or covariates if needed. Effect sizes were determined by converting the conventions for Cohen's *d* (i.e., 0.15, 0.2, 0.35 for small, medium, and large effect sizes, respectively) to f^2 (i.e., 0.1, 0.25, 0.4 for small, medium, and large effect sizes, respectively) (Ruscio, 2008; Cohen, 1988; Rosenthal, 1994).

Participants and Procedure

The sample consisted of 304 undergraduate students recruited from a psychology department research pool at a large public university in the Rocky Mountain region. There were 17 participants excluded due to failed attention checks which left 286 participants in the final

sample (ages 18-29, $M = 19.2$, $SD = 1.4$). The sample largely identified as White (78.0%) and female (65.0%). See Table 1 for demographic information.

Table 1

Demographic Information (n = 286)

	n	%
Sex		
Female	186	65.0
Male	96	33.6
Do not wish to respond	4	1.4
Gender		
Cisgender woman	164	57.3
Cisgender man	87	30.4
Non-binary	8	2.8
Other	5	1.7
Do not wish to respond	22	7.7
Race		
Asian or Asian American	11	3.8
Black or African American	7	2.4
Hispanic or Latinx	31	10.8
White	223	78.0
Other	13	4.5
Do not wish to respond	1	0.3
Household Income		
100,000 and above	108	36.0
80,000 - 99,999	37	13.0
65,000 - 79,999	38	4.5
50,000-64,999	49	17.1
35,000-49,999	24	8.4
Other	27	9.4
Do not wish to answer	3	1.0

After participants electronically signed an informed consent document that describes the study and outlines potential risks and benefits for participating (see Appendix A), individuals were asked to complete a series of questionnaires that included an international, short-form version of the Positive Affect Negative Affect Schedule (I-PANAS-SF), Dispositional Positive Emotions Scale (DPES), Rumination Response Scale (RRS), a sentence completion task, the

depression subscale of the Depression Anxiety Stress Scale (DASS-21), as well as a demographic form (see Appendix B.1 and Figure 1).

One week later, an email was sent to participants to ask them to fill out a second set of questionnaires. Upon clicking a link to direct participants to the online survey, they were randomly assigned to watch an awe-eliciting video or an amusement-eliciting video (see Appendix C). After watching the video, participants were asked to fill out the I-PANAS-SF, "small self" measure, Brief State Rumination Inventory (BSRI), Awe Experiences Scale (AWE-S), and the sentence completion task (see Appendix B.2 and Figure 1). Participants were then debriefed on the purpose of the study (see Appendix D). All surveys took take place on Qualtrics. Participant responses were also de-identified.

Measures

Pre-Manipulation Measures

Self-Focus. Two separate measures of self-focus were used. First, a sentence completion task devised by Wegner and Giuliano (1980) was used. This task contained a list of 20 sentences that each contained blank word. Each blank provided an option to choose one of three words to fill in the blank. There were 15 sentences that acted as "fillers" in which participants choose a noun, pronoun, adjective, or adverb. For purposes of this study, five "filler" sentences were used to reduce participant burden. Five other sentences were "critical items" that required participants to choose among a set of pronouns. These sentences were "After spreading fertilizer liberally over the flower bed, (I, she, we) watered the flowers;" "Although (their, our, my) personal library consists of only few books, some of them are classics;" "Please don't do this to (me, her, us), it is just not fair;" "At first it didn't seem to make any difference, but by later that night the noise from the part was entirely too loud to allow (us, her, me) to sleep;" and "It isn't easy to get

lost in this town, but somehow (I, we, they) managed it." Greater use of first-person singular pronouns (e.g., I, me) indicated higher levels of self-focus. On the other hand, greater use of first-person plural pronouns (e.g., we, us) indicated higher levels of interdependent focus.

Second, the Rumination Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991) was used as a trait measure of maladaptive self-focus. This was a 22-item scale that measured the tendency to focus one's attention on their negative mood (e.g., "Why do I always react this way?"), as well as the causes and consequences of their negative mood (e.g., "I won't be able to do my job if I don't snap out of this"). Participants indicated the extent to which they agree with the items from 1 ("almost never") to 4 ("almost always"). Past studies have shown good internal consistency ($\alpha = 0.89$; Nolen-Hoeksema & Morrow, 1991) and test-retest reliability ($r = 0.8$; Nolen-Hoeksema et al., 1994).

Depressive Symptoms. Depressive symptoms were gathered using the depression subscale in the Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). This was a seven-item scale that asked whether participants have endorsed symptoms of depression over the past week. Example items include "I couldn't seem to experience any positive feeling at all," "I found it difficult to work up the initiative to do things," and "I felt that I had nothing to look forward to." Participants rated the applicability of these items from 0 ("did not apply to me at all") to 3 ("applied to me very much"). Psychometric properties of the depression subscale indicated convergent reliability with the Beck Depression Inventory (Norton, 2007), good internal consistency among a non-clinical sample of adults ($\alpha = 0.88$; Henry & Crawford, 2005), as well as adequate construct validity (Henry & Crawford, 2005).

Dispositional Positive Emotions. Participants rated their disposition towards feeling joy (e.g., "I often feel bursts of joy"), contentment (e.g., "I am generally a contented person"), pride

(e.g., “I feel good about myself”), love (e.g., “Other people are generally trustworthy”), compassion (e.g., “It’s important to take care of people who are vulnerable”), amusement (e.g., “I find humor in almost everything), and awe (e.g., “I often feel awe”) using the Dispositional Positive Emotions Scale (DPES; Shiota et al., 2006). This was a 38-item measure with seven subscales that contain five or six items each. Participants rated their agreement with the items using a seven-point Likert-type scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Internal consistencies for each scale range from acceptable to high with a diverse sample of undergraduate students (joy, $\alpha = 0.82$; contentment, $\alpha = 0.92$; pride, $\alpha = 0.80$; love, $\alpha = 0.80$; compassion, $\alpha = 0.80$; amusement, $\alpha = 0.75$; awe, $\alpha = 0.78$; Shiota et al., 2006).

Positive and Negative Affect. An international, short-form version of the Positive Affect and Negative Affect Schedule (I-PANAS-SF; Thompson, 2007) was used to assess for positive and negative mood. This was a 10-item measure that contained adjectives (i.e., upset, hostile, alert, ashamed, inspired, nervous, determined, attentive, afraid, active) to describe what participants generally feel. Individuals chose how often they experience these moods from 1 (“never”) to 5 (“always”). Among 1,789 individuals from more than 47 different countries, internal consistency for this scale was determined to be adequate ($\alpha = 0.76$; Thompson, 2007). Test-retest reliability was also determined to be acceptable (0.84, $p < 0.01$; Thompson, 2007).

Attention Check. Random attention checks were dispersed throughout the survey to ensure participant engagement. Example items included asking participants to select a specific response (e.g., please select “Moderately Agree”) or asking what the current year is. Participants who failed two or more attention checks were removed from analysis.

Demographics. Descriptive information about the participants were gathered. This included age, sex, gender identity, preferred pronouns, race/ethnicity, and household income.

Manipulation

Emotion Manipulation. The awe-eliciting video was a five-minute trailer of BBC's *Planet Earth* which portrayed sweeping views of natural landscapes such as oceans, deserts, forests, mountains, and the night sky with music by Sigor Rós. The amusement-eliciting video was a five-minute clip of BBC's *A Walk on the Wild Side* that showed animals in the wild conversing but dubbed with actors having humorous exchanges with one another. Both videos have reliably elicited awe or amusement in previous studies (Bai et al., 2017; Bai et al., 2021; Piff et al., 2015; Rivera et al., 2019; Valdesolo & Graham, 2014).

Post-Manipulation Measures

Manipulation Check. Participants reported the degree to which they felt various emotions (i.e., amusement, awe, anger, sadness, pride, and fear) on a seven-point Likert-type scale from 1 ("not at all") to 7 ("extremely") to determine whether the videos elicited the intended emotions.

Attention Check. The same attention checks from Study 1 were used. In addition, to verify whether participants have watched their assigned video, a one-item attention check was administered after the video ended. Participants were asked to confirm whether certain sceneries or entities (e.g., the ocean, an animal) were present in the video.

State Awe. To reduce participant burden, a short-form version of the Awe Experiences Scale (AWE-S; Yaden et al., 2019) was administered. The original scale is a 30-item measure with 6 subscales that captures various elements of awe: self-diminishment ($\alpha = 0.91$), altered time perception ($\alpha = 0.89$), feelings of connectedness ($\alpha = 0.87$), sense of vastness ($\alpha = 0.85$), physical sensations ($\alpha = 0.81$), and need for accommodation ($\alpha = 0.8$). This total measure indicated high internal validity ($\alpha = 0.93$; Yaden et al., 2019). Among an ethnically diverse

sample of undergraduate students, the AWE-S also revealed high internal validity (α = 0.92; Gabriel et al., 2020).

To narrow down the AWE-S, the two highest loading items from each subscale of the factor analyses were chosen, thus creating a 12-item short-form version of the AWE-S. The shortened version contained the following items: "I sensed things momentary slow down" (α = 0.86) and "I noticed time slowing" (α = 0.86) from the altered time perception subscale; "I felt that my sense of self was diminished" (α = 0.79) and "I felt my sense of self shrink" (α =0.76) from the self-diminishment subscale; "I had the sense of being connected to everything" (α = 0.77) and "I felt a sense of communion with all living things" (α = 0.73) from the connectedness subscale; "I felt that I was in the presence of something grand" (α = 0.76) and "I experienced something greater than myself" (α = 0.75) from the vastness subscale; "I felt my jaw drop" (α = 0.79) and "I had goosebumps" (α = 0.66) from the physical sensations subscale; and finally, "I felt challenged to mentally process what I was experiencing" (α = 0.74) and "I found it hard to comprehend the experience in full" (α = 0.68). Participants rated their agreement with these items on a seven-point Likert-type scale from 1 ("strongly disagree") to 7 ("strongly agree").

Small Self. A scale adapted from Tyson and colleagues (2021) was used to provide operational clarity of the "small self" construct. The scale measured three distinct constructs of the "small self" which were vastness related to the self, self-size, and self-perspective. However, given that the AWE-S already measured self-diminishment and vastness, only the self-perspective subscale was used ($r = 0.57$, $p < 0.001$) to reduce participation burden. The two items on this scale were "I feel part of some greater entity" and "I feel the presence of something greater than myself." Individuals indicated their agreement with these items from 1 ("strongly disagree") to 7 ("strongly agree").

Self-Focus. The Brief State Rumination Inventory (BSRI; Marchetti et al., 2018) was used to measure maladaptive self-focus after the emotion manipulation. This was an eight-item scale with items such as "Right now, I wonder why I can't respond in a better way," "Right now, it is hard for me to shut off negative thoughts about myself," and "Right now, I wonder why I always feel the way I do." Individuals rated the extent to which they agree with the items with a Visual Analogue Scale (VAS) ranging from 0 ("completely disagree") to 100 ("completely agree"). The scale had revealed good internal consistency pre- ($\alpha = 0.89$) and post-experimental manipulation ($\alpha = 0.91$; Marchetti et al., 2018) among three samples of English-speaking and Dutch-speaking individuals.

Positive and Negative Affect. The same measure from the pre-manipulation survey were used. Time instructions were adapted from the original, 20-item Positive Affect and Negative Affect Schedule (PANAS; Watson et al., 1988) to capture the extent to which individuals experienced the listed adjectives in the moment (i.e., "you feel this way, that is, at the present moment").

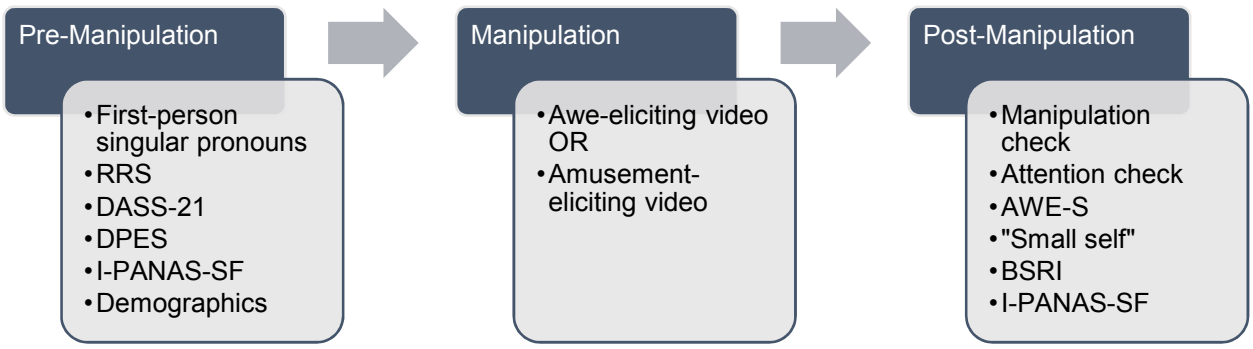

Figure 1

Note. Diagram of measures administered throughout the study.

Analysis Plan

All statistical analyses were performed using the "R" software program (Version 2022.07.0; R Core Team, 2018).

Pre-Manipulation

When examining direct effects (*Hypotheses 1-3*), bivariate correlational analyses were conducted. When examining indirect effects (*Hypothesis 4*), linear regression analyses were conducted. All variables were scored on a continuous scale.

Prior to running bivariate correlational analyses (*Hypothesis 1-3*) and linear regression analyses (*Hypotheses 4*), preliminary analyses were conducted to check for univariate outliers and assess normality of distributions using recommendations by Tabachnick and Fidell (2013). None of the scores of any measures were ≥ 3.29 *SD* ($p < .001$) which meant that no outliers were detected. Variables were also determined to be relatively normally distributed as skewness and kurtosis scores were close to 0 and 3, respectively.

In the regression models, predictor variables were mean-centered prior to performing analyses in order to reduce multicollinearity and aid interpretation of values. Regression assumptions were also examined. First, the assumption of linearity was met as there were linear relationships between the predictor variables and outcome variable. Second, the assumption of normality was met as residual points were normally distributed. Third, the assumption of homogeneity of variance (i.e., equal variance across groups) was not met. Variability of residual points increased with the value of the fitted outcome variable which suggested heteroscedasticity (i.e., non-constant variances). This was examined by investigating influential cases. Three cases were found to be multivariate outliers via a Cook's distance plot and were subsequently removed from analyses. As such, the final sample in the regression models was 283. Since removing

influential cases continued to indicate heteroscedasticity, robust standard errors were utilized in the regression models.

Post-Manipulation

When examining direct effects (*Hypotheses 5-6*), the same statistical analyses from the pre-manipulation were performed. With respect to the experimental manipulation (*Hypotheses 7-8*), direct effects were examined using an independent *t*-test. Preliminary analyses were conducted prior to running correlational (for *Hypotheses 5-8*) to check for univariate outliers and assess normality of distributions. One outlying value was identified for state rumination (≥ 3.29 *SD*, $p < .001$). This case was subsequently removed from analysis. Variables were also determined to be relatively normally distributed as skewness and kurtosis scores were close to 0 and 3, respectively.

Manipulation Check

When checking whether the awe and amusement conditions successfully elicited their respective emotions, an independent *t*-test was conducted. To further check if awe and amusement inductions increased from pre- to post-manipulation, a paired *t*-test was conducted. However, only 189 participants were available to examine due to issues in linking participants with their data from pre- to post-manipulation.

Exploratory Analyses

There were additional analyses that were performed for exploratory purposes. These included bivariate correlational analyses, linear regression analyses, as well as a model-building approach (i.e., increasing model complexity in steps) to examine the effects of awe sequentially.

CHAPTER 3: RESULTS

Pre-Manipulation

See Table 2 for descriptive statistics.

Primary Analyses

Hypotheses 1-3. Bivariate correlational analyses were conducted to analyze the relationships between each measure of self-focus and depressive symptoms, each measure of self-focus and trait awe, as well as trait awe and depressive symptoms (see Table 3).

Results indicated that *Hypothesis 1* received mixed support. While self-focus was positively correlated with depressive symptoms using the measure of self-focus words (i.e., frequency of first-person singular pronouns), the magnitude of this effect was trivial and not significant ($r = .08$, $p = .18$). On the other hand, self-focus was positively and significantly correlated with depressive symptoms using the measure of trait rumination (i.e., RRS); the magnitude of this effect was large ($r = .69$, $p < .001$).

Table 2

Descriptive Statistics at Pre-Manipulation (n = 286)

	M	*SD*
Positive affect	3.2	(0.8)
Negative affect	2.1	(0.6)
Self-focus words	2.7	(1.1)
Rumination	2.0	(0.6)
Brooding	2.0	(0.7)
Reflection	2.1	(0.7)
Depressive symptoms	3.9	(1.7)
Joy	4.7	(1.0)
Contentment	4.6	(1.2)
Pride	5.0	(1.0)
Love	4.7	(1.0)
Awe	4.9	(0.9)
Amusement	5.1	(0.9)

In addition, *Hypothesis 2* was not supported. Self-focus was negatively, but not significantly correlated with trait awe using the measure of self-focus words; the magnitude of this effect was also trivial (r = -.03, p = .60). Self-focus was also negatively, but not significantly correlated with trait awe using the measure of trait rumination; the magnitude of this effect was also trivial (r = -.08, p = .19).

Hypothesis 3 was supported. Trait awe was significantly and negatively correlated with depressive symptoms; the magnitude of this effect was also medium (r = -.27, p < .001).

Table 3

Correlations at Pre-Manipulation

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Positive affect	-												
2. Negative affect	-.17**	-											
3. Self-focus words	.04	.08	-										
4. Trait rumination	-.27***	.62***	.08	-									
5. Brooding	-.25***	.56***	.02	.89***	-								
6. Reflection	-0.11	.39***	.09	.80***	.61***	-							
7. Depressive symptoms	-.38***	.58***	.08	.69***	.61***	.48***	-						
8. Joy	.52***	-.33***	-.14*	-.38***	-.31***	-.22***	-.52***	-					
9. Contentment	.53***	-.47***	-.09	-.52***	-.48***	-.30***	-.61***	.73***	-				
10. Pride	.54***	-.45***	-.05	-.46***	-.38***	-.30***	-.51***	.60***	.70***	-			
11. Love	.18**	-.23**	-.01	-.17**	-.16**	-.11	-.31***	.41***	.44***	.36***	-		
12. Amusement	.22***	-.07	-.02	-.01	-.01	.01	-.10	.37***	.32***	.29***	.30***	-	
13. Awe	.44***	-.17**	-.08	-.08	-.11	.09	-.27***	.53***	.50***	.49***	.36***	.35***	-

*$p < .05$. **$p < .01$. ***$p < .001$

Hypothesis 4. Linear regression analyses were used to test the moderation hypothesis that trait awe will attenuate the direct, positive relationship between self-focus and depressive symptoms such that at higher levels of trait awe, the relationship between self-focus and depressive symptoms will weaken. Analyses were performed for each self-focus measure (see Table 4).

An initial main effects model was conducted in which depressive symptoms were regressed on trait awe and self-focus words. This model was significant and explained a small proportion of variance ($F(2, 274) = 14.46$, $p < .001$, $R^2 = .09$). Given this finding, an interaction model was performed which was also significant and explained a small proportion of variance ($F(2, 273) = 10.92$, $p < .001$, $R^2 = .10$). However, the trait awe x self-focus words interaction effect was not significant ($\beta = -0.10$, $p = .13$). Thus, the hypothesis that trait awe will moderate the direct, positive relationship between self-focus and depressive symptoms was not supported using the measure of self-focus words.

An initial main effects model was conducted in which depressive symptoms were regressed on trait awe and trait rumination. This model was significant and explained a large proportion of variance ($F(2, 260) = 148.9$, $p < .001$, $R^2 = .51$). As such, an interaction model was conducted. Contrary to the previous analyses with self-focus words, the interaction model was significant and explained a large proportion of variance ($F(2, 259) = 103.4$, $p < .001$, $R^2 = .54$). In addition, the trait awe x trait rumination interaction effect was small but significant ($\beta = -.10$, $p = 0.003$).

Table 4

Regression Results at Pre-Manipulation

	R^2	*b*	*β*	*SE*
(Intercept)		3.52***	-	.10
Trait awe	.09***	-.53***	-.30***	.11
Self-focus words		.11	.08	.09
(Intercept)		3.53***	-	.27
Trait awe	.10***	-.08	-.30	.32
Self-focus words		.11	.08	.09
Trait awe x Self-focus words		-.17	-.10	.11
(Intercept)		3.85	-	.07
Trait awe	.53***	-.36***	-.21***	.08
Trait rumination		1.78***	.68***	.10
(Intercept)		3.83	-	.07
Trait awe	.54***	-.38***	-.21***	.08
Trait rumination		1.76***	.67***	.10
Trait awe x Trait rumination		-.30**	-.10**	.10

*$p < .05$. **$p < .01$. ***$p < .001$

An examination of simple slopes (see Figure 2) indicated that the relationship between trait rumination and depressive symptoms was conditional on trait awe such that at low levels of trait awe (-1 *SD* below the mean, $b = 2.03$, $p < .001$), trait rumination was positively associated with depressive symptoms. This effect was attenuated as levels of trait awe increased (+1 *SD* above the mean, $b = 1.48$, $p < .001$). Thus, the hypothesis that trait awe will moderate the direct, positive relationship between self-focus and depressive symptoms was supported using the measure of trait rumination. In total, these results indicated that *Hypothesis 4* received mixed support.

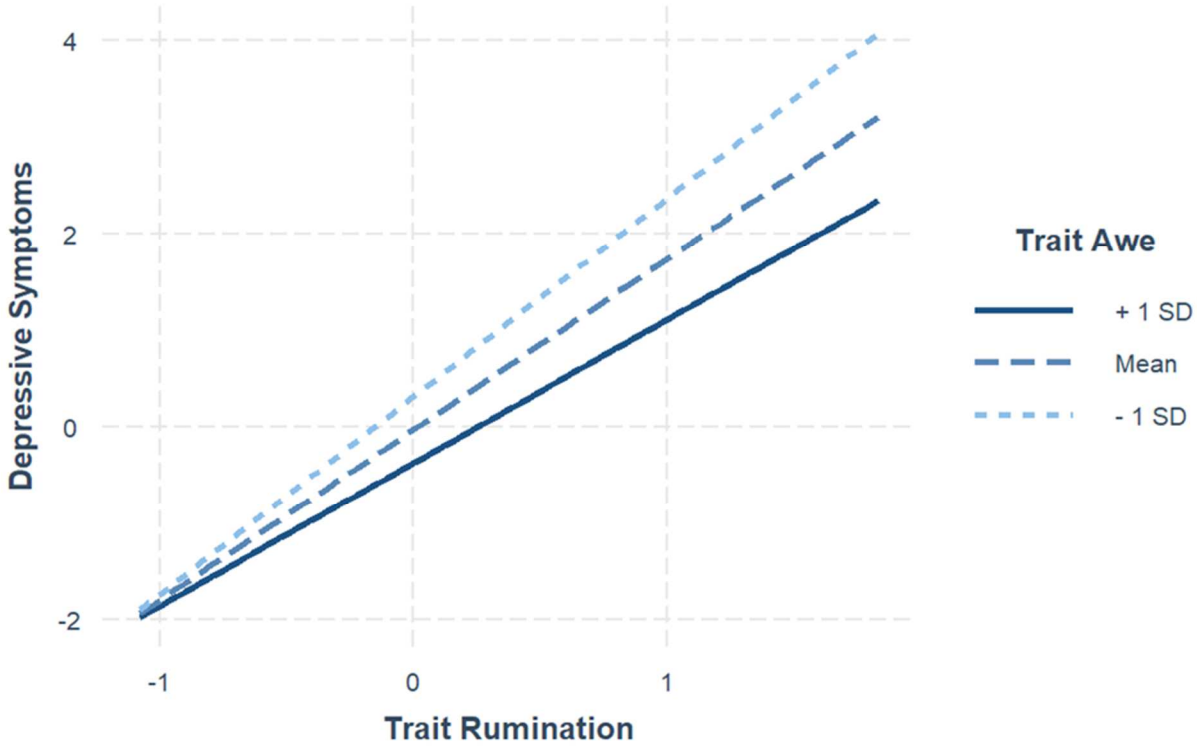

Figure 2

Note. Trait rumination and depressive symptoms at high and low levels of trait awe.

Post-Manipulation

There were 24 participants who were lost to follow-up which resulted in of 262 participants at post-manipulation (due to data-linking issues from pre- to post-manipulation, systematic observations in missing data could not be analyzed). Additionally, 14 participants were excluded as a result of failed attention checks which left a total sample of 248 at post-manipulation. For the awe and amusement condition, 123 and 125 participants were included, respectively (see Table 5).

Preliminary Analyses

Due to errors in preparing for survey administration in Qualtrics, only one self-focus measure (state rumination) was used. As such, post-manipulation hypotheses regarding self-focus will only refer to the measure of state rumination, rather than both measures of self-focus words and state rumination. However, to check whether there was convergent validity between self-focus words and trait rumination from the pre-manipulation, bivariate linear correlational analysis was conducted. This revealed a positive, but non-significant correlation between the two measures; the magnitude of this effect was also trivial ($r = .08$, $p = .17$) (see Table 3).

Table 5

Descriptive Statistics by Condition and Between-Group Differences at Post-Manipulation

	Awe Condition (n = 123)		Amusement Condition (n = 125)			
	M	*SD*	*M*	*SD*	*t*	*d*
Amusement[a]	4.6	(1.6)	4.9	(1.6)	1.38	-.09
Awe[a]	5.4	(1.7)	3.0	(1.8)	-10.69***	.57
Pride[a]	4.1	(1.7)	2.0	(1.4)	-	-
Fear[a]	1.9	(1.3)	1.3	(0.9)	-	-
Sadness[a]	2.6	(1.6)	1.3	(0.9)	-	-
Anger[a]	1.8	(1.3)	1.3	(0.9)	-	-
Positive affect	2.6	(0.8)	2.3	(0.8)	-	-
Negative affect	1.5	(0.7)	1.5	(0.6)	-	-
State awe	3.9	(1.0)	2.9	(1.0)	-	-
State rumination	29.6	(18.4)	28.7	(20.5)	-.30	.02
"Small self" feelings	4.3	(0.9)	3.3	(1.0)	-8.70***	.49

[a] Participants were asked the extent to which they experienced several different states using single items as a manipulation check; between-group differences were only examined with awe and amusement. *$p < .05$. **$p < .01$. ***$p < .001$

Manipulation check. A manipulation check using an independent *t*-test was performed to determine whether the videos in each condition (i.e., amusement, awe) elicited the intended emotions. Assumptions for an independent *t*-test were initially examined. First, the assumption of independence of cases was met given that participations were only assigned to one condition.

Second, the assumption of homogeneity of variance was met. This was based on a *F*-test used to compare variances between the two groups which was not significant for both feelings of awe ($F(120, 122) = 1.22$, $p = .28$) and feelings of amusement ($F(123, 120) = 1.02$, $p = .93$). Third, the assumption of normality was not met as the Shapiro-Wilk normality test was significant for both the awe condition ($W = .84$, $p < 0.01$) and amusement condition ($W = .86$, $p < 0.01$). However, given that skewness and kurtosis scores were close to 0 and 3, respectively, for both awe and amusement feelings during preliminary analyses, an independent *t*-test was still performed.

Awe condition. Feelings of awe were greater in the awe condition ($M = 5.4$, $SD = 1.7$) than that of the amusement condition ($M = 3.0$, $SD = 1.8$). Based on the independent *t*-test, the amounts of awe elicited in each condition was significantly different from each other; this analysis also indicated a medium effect size ($t(-10.69)$, $p < .001$, $d = .57$) (see Table 5). To further check whether the manipulation worked from pre- to post-manipulation, a paired *t*-test was conducted. While this revealed that trait levels of awe and state levels of awe were significantly different from each other and produced a small effect size ($t(4.99)$, $p = < .001$, $d = .43$), awe feelings were greater at pre-manipulation ($M = 4.9$, $SD = 0.9$) than at post-manipulation ($M = 4.2$, $SD = 2.1$). As such, the awe induction did not successfully produce higher levels of awe at post-manipulation as intended.

Amusement condition. Feelings of amusement were greater in the amusement condition ($M = 4.9$, $SD = 1.6$) than that of the awe condition ($M = 4.6$, $SD = 1.6$). However, based on the independent *t*-test, the amounts of amusement elicited in each condition were not significantly different from each other; this analysis also indicated a trivial effect size ($M = 4.6$, $SD = 1.6$) ($t(1.38)$, $p = .17$, $d = -.09$) (see Table 5). As a result, the amusement condition did not successfully evoke amusement as intended. To further check whether levels of amusement

differed from pre-manipulation to post-manipulation, a paired *t*-test was conducted. While this revealed that trait levels of amusement and state levels of amusement were significantly different from each other and produced a small effect size ($t(3.56)$, $p < .001$, $d = .31$), amusement feelings were greater at pre-manipulation ($M = 5.1$, $SD = 0.9$) than at post-manipulation ($M = 4.7$, $SD = 1.6$). As such, the amusement induction did not successfully produce higher levels of amusement at post-manipulation as intended.

Primary Analyses

Hypotheses 5-6. Bivariate correlational analysis was conducted to analyze the relationship between state awe and "small self" feelings, as well as state rumination and "small self" feelings. While not hypothesized, the relationship between state awe and state rumination was also analyzed given that this were examined at the trait level (*Hypothesis 2*) (see Table 6).

Results indicated that *Hypothesis 5* was supported. State awe was positively and significantly correlated with "small self" feelings; the magnitude of this effect was also large ($r = .82$, $p < .001$). However, *Hypothesis 6* was not supported. State rumination was positively and significantly correlated with "small self" feelings which was opposite of the hypothesized direction; the magnitude of this effect was also medium ($r = .25$, $p < .001$).

Analysis of the relationship between state awe and state rumination revealed that state awe was positively and significantly correlated with state rumination; the magnitude of this effect was also medium ($r = .20$, $p = .01$). This finding was also found to be opposite of the hypothesized direction at the trait level.

Hypothesis 7. An independent t-test was conducted to analyze whether levels of state rumination will be lower in the awe condition compared to the amusement condition (see Table 5). Prior to this, assumptions for an independent *t*-test were examined. First, the assumption of

independence of cases was met given that participations were only assigned to one condition. Second, the assumption of homogeneity of variance was met. This was based on a *F*-test used to compare variances between the two groups which was not significant ($F(95, 105) = 1.18$, $p = .40$). Third, the assumption of normality was not met as the Shapiro-Wilk normality test was significant for both the awe condition ($W = .94$, $p < .001$) and amusement condition ($W = .93$, $p < .001$). However, given that skewness and kurtosis scores were close to 0 and 3, respectively, for state rumination during preliminary analyses, an independent *t*-test was still performed.

Levels of state rumination ($M = 29.6$, $SD = 18.4$) were greater in the awe condition compared to that of the amusement condition ($M = 28.7$, $SD = 20.5$). Results of the independent *t*-test revealed that levels of state rumination in each condition were not significantly different from each other; this analysis also indicated a trivial effect size ($t(-.30)$, $p = .76$, $d = .02$). Therefore, *Hypothesis 7* was not supported.

Table 6

Correlations at Post-Manipulation

	1	2	3	4	5
1. Positive affect	-				
2. Negative affect	.17**	-			
3. State rumination	.03	.53***	-		
4. State awe	.25***	.18**	.20*	-	
5. "Small self" feelings	.22**	.19**	.25***	.82***	-

*$p < .05$. **$p < .01$. ***$p < .001$

Hypothesis 8. An independent t-test was conducted to analyze whether "small self" feelings will be greater in the awe condition compared to the amusement condition (see Table 5). Prior to this, assumptions for an independent *t*-test were examined. First, the assumption of independence of cases was met given that participations were only assigned to one condition.

Second, the assumption of homogeneity of variance was met. This was based on a *F*-test used to compare variances between the two groups which was not significant ($F(123, 122) = 1.25$, $p = .22$). Third, the assumption of normality was not met as the Shapiro-Wilk normality test was significant for both the awe condition ($W = .96$, $p = .002$) and amusement condition ($W = .96$, $p = .001$). However, given that skewness and kurtosis scores were close to 0 and 3, respectively, for "small self" feelings during preliminary analyses, an independent *t*-test was still performed.

Amounts of "small self" feelings were greater in the awe condition (M = 4.6, SD = 1.1) were greater than that of the amusement condition (M = 4.1, SD = 1.2). Results of the independent *t*-test revealed that amounts of "small self" feelings elicited from each condition were significantly different from each other; this analysis also indicated a small effect size ($t(-3.32)$, $p = .001$, $d = .21$). Therefore, *Hypothesis 8* was supported.

Exploratory Analyses

Exploratory analyses were conducted to further understand the nature of awe's effects of rumination and depressive symptoms. These analyses were done by investigating the relationships between awe and the sub-characteristics of rumination, awe's functional difference between other positive emotions, uniqueness of awe's protective effects over and above other positive emotions, as well as the effects of the awe induction on the relationship between the "small self" and rumination.

Correlations Between Awe and the Facets of Rumination

Awe was examined with each of facet of rumination – brooding and reflection – to determine whether awe had different relationships to certain aspects of rumination. This analysis was examined at the trait level as the measure for trait rumination (RRS) contained the subscales of brooding and reflection, whereas the measure for state rumination (BSRI) did not. This

analysis was also examined despite the finding that the hypothesized, negative relationship between trait awe and trait rumination was not significant (although the relationship was trending towards the expected direction). Bivariate linear correlational analyses revealed that awe had small, non-significant correlations with brooding (r = -.11, p = .06) and reflection (r = .09, p = .13), though both findings were trending toward the hypothesized directions (see Table 3).

Functional Differences Between Awe and Other Positive Emotions

Based on the results that awe buffered the effects of rumination on depressive symptoms (*Hypothesis 4*), linear regression analyses were conducted for general positive affect, as well as each trait-level positive emotion to determine whether there was an effect of rumination on depressive symptoms through other positive emotions as well. Only the measure of trait rumination was utilized in the following models given that only the trait awe x trait rumination interaction effect was significant (and not the trait awe x self-focus words interaction effect) in the regression models during the primary analyses.

Positive affect. An initial main effects model was conducted in which depressive symptoms were regressed on positive affect and rumination. This model was significant and explained a large proportion of variance (F(2, 259) = 142.5, p < .001, R^2 = .52). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance (F(2, 258) = 97.81, p < .001, R^2 = .53). In addition, the positive affect x rumination interaction effect was large and significant (β = -.36, p = 0.03) (see Table 7). An examination of simple slopes indicated that the relationship between rumination and depressive symptoms was conditional on positive affect (see Figure 3). At low levels of positive affect (-1 *SD* below the mean, b = 1.94, p < .001), rumination was positively associated with depressive symptoms. This

effect was attenuated as levels of positive affect increased (+1 *SD* above the mean, $b = 1.48$, $p < .001$).

Table 7

Regression Results for Functional Differences between Awe and Positive Affect at the Trait Level

	R^2	*b*	*β*	*SE*
(Intercept)	.52***	5.06***	-	.30
Positive affect		-.38***	-.18***	.09
Rumination		1.73***	.65***	.12
(Intercept)	.53***	5.05***	-	.30
Positive affect		-.39***	-.19***	.09
Rumination		2.65***	1.00***	.44
Positive affect x Rumination		-.29*	-.36*	.14

*$p < .05$. **$p < .01$. ***$p < .001$

Amusement. An initial main effects model was conducted in which depressive symptoms were regressed on amusement and rumination (see Table 8). This model was significant and explained a large proportion of variance ($F(2, 261) = 131.4$, $p < .001$, $R^2 = .50$). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance ($F(3, 260) = 89.47$, $p < .001$, $R^2 = .50$). However, while the size of the amusement x rumination interaction effect was large, it was not significant ($\beta = -.43$, $p = 0.07$).

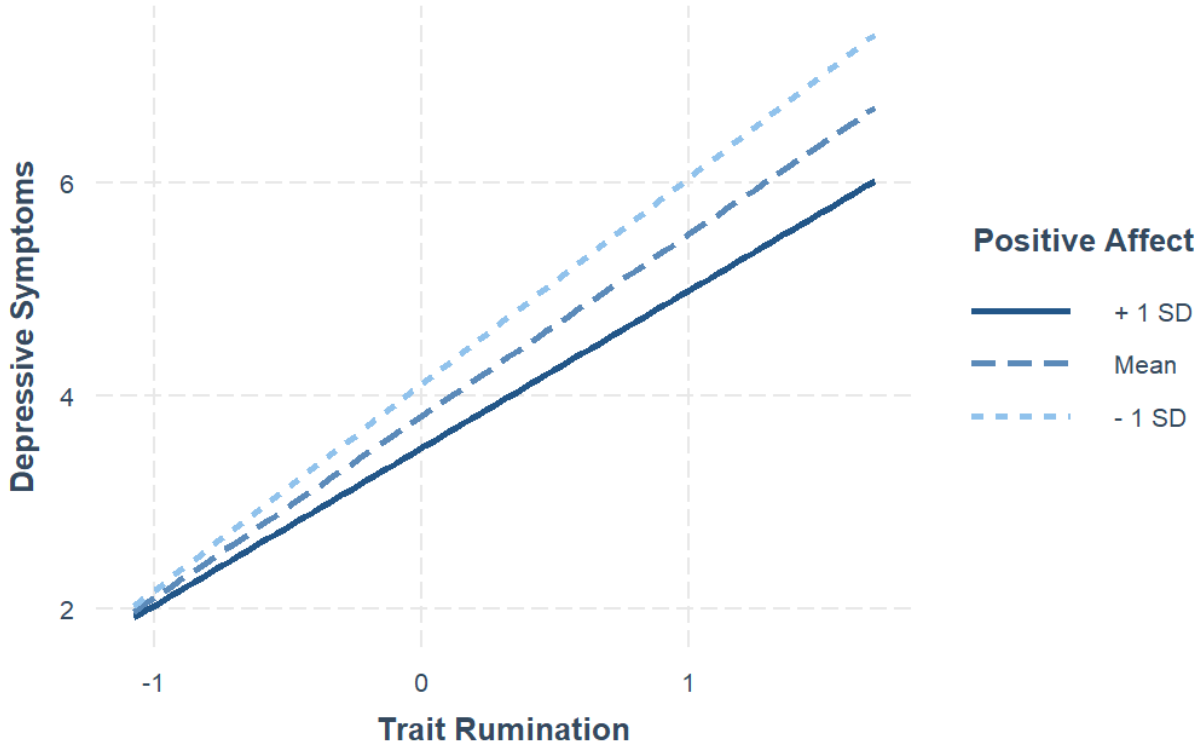

Figure 3

Note. Association between trait rumination and depressive symptoms at high and low levels of positive affect.

Joy. An initial main effects model was conducted in which depressive symptoms were regressed on joy and rumination (see Table 8). This model was significant and explained a large proportion of variance ($F(2, 261) = 169.2$, $p < .001$, $R^2 = .56$). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance ($F(3, 260) = 119.6$, $p < .001$, $R^2 = .57$). In addition, the joy x rumination interaction effect was large and significant ($\beta = -.55$, $p = .002$). An examination of simple slopes indicated that the relationship between rumination and depressive symptoms was conditional on joy (see Figure 4). At low levels of positive affect (-1 *SD* below the mean, $b = 1.85$, $p < .001$), rumination was

positively associated with depressive symptoms. This effect was attenuated as levels of joy increased (+1 *SD* above the mean, $b = 1.25$, $p < .001$).

Contentment. An initial main effects model was conducted in which depressive symptoms were regressed on contentment and rumination (see Table 8). This model was significant and explained a large proportion of variance ($F(2, 261) = 165.5$, $p < .001$, $R^2 = .56$). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance ($F(3, 260) = 115$, $p < .001$, $R^2 = .57$). In addition, the contentment x rumination interaction effect was large and significant ($\beta = -.38$, $p = .01$). An examination of simple slopes indicated that the relationship between rumination and depressive symptoms was conditional on contentment (see Figure 5). At low levels of contentment (-1 *SD* below the mean, $b = 1.67$, $p < .001$), rumination was positively associated with depressive symptoms. This effect was attenuated as levels of contentment increased (+1 *SD* above the mean, $b = 1.14$, $p < .001$).

Pride. An initial main effects model was conducted in which depressive symptoms were regressed on pride and rumination (see Table 8). This model was significant and explained a large proportion of variance ($F(2, 261) = 156.9$, $p < .001$, $R^2 = .54$). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance ($F(3, 260) = 105.2$, $p < .001$, $R^2 = .54$). However, while the pride x rumination interaction effect was medium, it was not significant ($\beta = -.21$, $p = .26$).

Love. An initial main effects model was conducted in which depressive symptoms were regressed on love and rumination (see Table 8). This model was significant and explained a large proportion of variance ($F(2, 262) = 143.7$, $p < .001$, $R^2 = .52$). Therefore, an interaction model was conducted which was also significant and explained a large proportion of variance ($F(3,$

261) = 97.42, $p < .001$, $R^2 = .52$). However, while the size of the love x rumination interaction effect was medium, it was not significant ($\beta = -.36$, $p = .09$).

Table 8

Regression Results for Functional Differences between Awe and Other Positive Emotions

	R^2	*b*	*β*	*SE*
(Intercept)	.50***	4.54***	-	.40
Amusement		-.13	-.07	.08
Rumination		1.85***	.70***	.11
(Intercept)	.50***	4.52***	-	.40
Amusement		-.13	-.08	.07
Rumination		2.97***	1.13***	.62
Amusement x Rumination		-.22	-.43	.12
(Intercept)	.56***	6.05***	-	.35
Joy		-.47***	-.28***	.07
Rumination		1.57***	.60***	.12
(Intercept)	.57***	5.75***	-	.36
Joy		-.42***	-.25***	.07
Rumination		3.02***	1.15***	.48
Joy x Rumination		-.31**	-.55**	.10
(Intercept)	.56***	5.70***	-	.30
Contentment		-.40***	-.30***	.06
Rumination		1.42***	.54***	.13
(Intercept)	.56***	5.49***	-	.31
Contentment		-.37***	-.28***	.06
Rumination		2.42***	.92***	.41
Contentment x Rumination		-.22*	-.38*	.08
(Intercept)	.54***	5.86***	-	.38
Pride		-.40***	-.25***	.07
Rumination		1.55***	.59***	.12
(Intercept)	.54***	5.72***	-	.40
Pride		-.38***	-.24***	.08
Rumination		2.09***	.80***	.50
Pride x Rumination		-.11	-.21	.10
(Intercept)	.52***	5.14***	-	.33
Love		-.27***	-.17***	.07
Rumination		1.78***	.67***	.11
(Intercept)	.52***	5.08***	-	.33
Love		-.27***	-.17***	.07
Rumination		2.70***	1.03***	.56
Love x Rumination		-.20	-.36	.12

*$p < .05$. **$p < .01$. ***$p < .001$

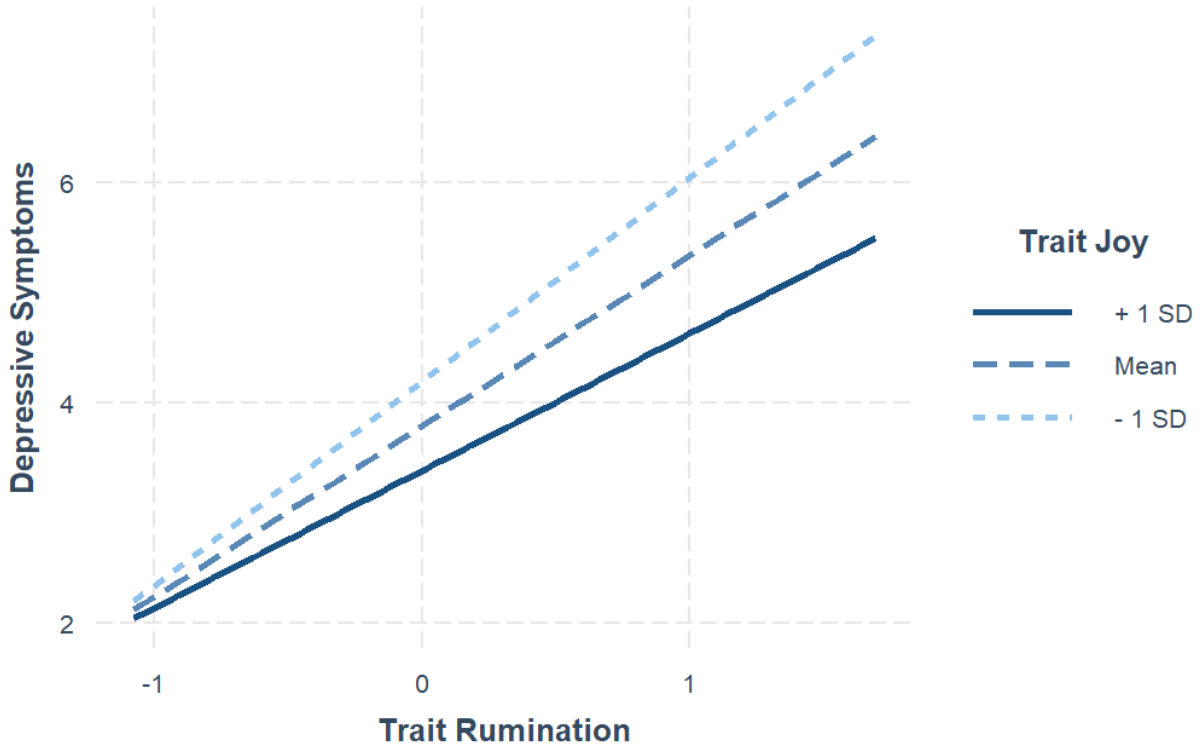

Figure 4

Note. Association between trait rumination and depressive symptoms at high and low levels of trait joy.

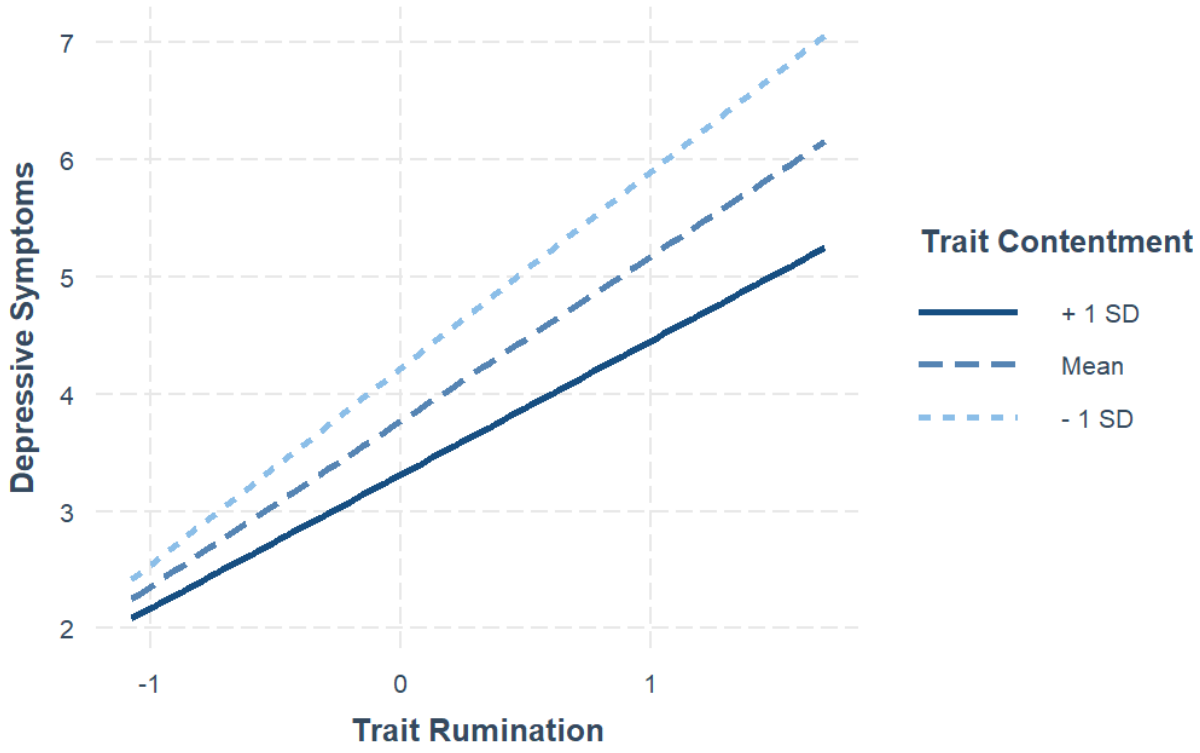

Figure 5

Note. Association between trait rumination and depressive symptoms at high and low levels of trait contentment.

Incremental Validity of Awe

Given the findings of the above exploratory analyses, linear regression analyses were conducted to further examine whether awe has a unique, buffering effect on the relationship between trait rumination and depressive symptoms above and beyond positive affect and other positive emotions. Positive affect was entered separately in a regression model, and then other positive emotions (i.e., amusement, joy, contentment, pride, love) were entered simultaneously in another regression model.

Positive affect. After controlling for positive affect, the regression model (depressive symptoms regressed on rumination, awe, positive affect, and awe x rumination) was significant

and explained a large amount of variance ($F(4, 255) = 78.46$, $p < .001$, $R^2 = .54$). In addition, the awe x rumination interaction effect was small and remained significant ($\beta = -.10$, $p = .02$) (see Table 9).

Other positive emotions. After controlling for all other positive emotions, the regression model was significant and explained a large amount of variance ($F(8, 250) = 45.86$, $p < .001$, $R^2 = .58$). However, the size of the awe x rumination interaction effect was small and it did not remain significant ($\beta = -.08$, $p = .06$). In addition, out of the positive emotions, only joy stood out as significantly associated with depressive symptoms; the magnitude of this effect was also small ($\beta = -14$, $p = .03$) (see Table 9).

Table 9

Regression Results for Incremental Validity of Awe (Controlling for Positive Affect and Other Positive Emotions Separately)

	R^2	*b*	*β*	*SE*
(Intercept)		4.52***	-	.32
Awe		-.30***	-.17***	.08
Positive affect	.54**	-.22*	.10*	.10
Rumination		1.7***	.65***	.12
Trait awe x Rumination		-.29*	-.10*	.12
(Intercept)		5.88***	-	.60
Awe		-.14	-.08	.09
Amusement		.12	.07	.08
Joy		-.23*	-.14*	.10
Contentment	.58***	-.15	-.11	.10
Pride		-.09	-.06	.10
Love		-.10	-.06	.07
Rumination		1.41***	.54***	.13
Trait awe x Rumination		-.22	-.08	.11

*$p < .05$. **$p < .01$. ***$p < .001$

Uniqueness of Awe Relative to Other Positive Emotions

Several findings were notable in the previous exploratory analyses when considering the role of other positive emotions in the relationship between trait rumination and depressive symptoms. First, an investigation of the functional differences between awe and other positive emotions revealed that, similar to awe, joy and contentment also attenuated the relationship between rumination and depressive symptoms. Second, an investigation of the incremental validity of awe revealed that joy stood out beyond other positive emotions in being significantly correlated with depressive symptoms. Based on these findings, further exploratory analyses were performed to determine whether awe plays a unique role beyond joy and contentment in relation to rumination and depressive symptoms by exploring all direct and interaction effects. Regression analyses were conducted using a model-building approach (see Table 10).

In the first step, depressive symptoms were regressed on rumination which became the base model. This model was significant and explained a large proportion of significance ($F(1, 263) = 257.3$, $p < .001$, $R^2_{total} = .49$). In the second step, awe, joy, and contentment were added into the model simultaneously. These additions significantly improved model fit ($F(4, 256) = 86.67$, $p < .001$, $R^2_{change} = .08$, $R^2_{total} = .57$). In the third step, an awe x rumination interaction term was added into the model. This addition maintained a significant model, but neither improved nor worsened the model fit ($F(4, 256) = 86.67$, $p < .001$, $R^2_{change} = .00$, $R^2_{total} = .57$). There was also a small and significant awe x rumination interaction effect in this model ($\beta = -.09$, $p = .03$). In the fourth and final step, joy x rumination and contentment x rumination terms were added into the model simultaneously. These additions significantly improved model fit ($F(7, 253) = 52.36$, $p < .001$, $R^2_{change} = .01$, $R^2_{total} = .58$). However, the awe x rumination interaction effect was trivial and not significant ($\beta = -.02$, $p = .76$); the contentment x rumination

interaction effect was also trivial and not significant (β = -.03, p = .90); and the joy x rumination interaction effect was large but not significant (β = -.51, p = .07).

Table 10

Regression Results for Uniqueness of Awe Relative to Other Positive Emotions

	R^2	*b*	*β*	*SE*
Step 1				
(Intercept)	.49***	3.86***	-	.07
Rumination		1.85***	.70***	.12
Step 2				
(Intercept)		5.90***	-	.44
Awe		-.12	-.07	.09
Joy	.57***	-.25*	-.15*	.10
Contentment		-.19*	-.14*	.09
Rumination		1.47***	.56***	.13
Step 3				
(Intercept)		5.79***	-	.44
Awe		-.14	-.08	.09
Joy	.57***	-.23*	-.14*	.10
Contentment		-.19*	-.14*	.09
Rumination		1.46***	.56***	.13
Awe x Rumination		-.24*	-.09*	.11
Step 4				
(Intercept)		5.54***	-	.45
Awe		-.15	-.08	.09
Joy		-.19	-.12	.10
Contentment	.58***	-.19*	-.14*	.09
Rumination		2.85***	1.09***	.62
Awe x Rumination		-.04	-.02	.14
Joy x Rumination		-.28	-.51	.16
Contentment x Rumination		-.01	-.03	.12

*p < .05. **p < .01. ***p < .001

Effects of the Awe Induction on the "Small Self" and Rumination

Given that depressive symptoms were not measured at post-manipulation, as well as the fact that state awe, "small self" feelings, and state rumination had unexpected positive associations with each other, linear regression analyses were conducted to examine the effects of the experimental condition (1 = awe, 0 = amusement) on the relationship between "small self" feelings and state rumination.

An initial main effects model was conducted in which state rumination was regressed on "small self" feelings and condition. This model was significant and explained a small proportion of variance ($F(2, 194) = 7.64$, $p < .001$, $R^2 = .06$). Therefore, an interaction model was conducted which was also significant and explained a small proportion of variance ($F(3, 193) = 6.42$, $p < .001$, $R^2 = .08$). The "small self" feelings x awe condition interaction effect was large, but only approached significance ($\beta = -.65$, $p = 0.05$) (see Table 11). As such, the strength of the relationship between "small self" feelings and state rumination did not appear to differ whether they were in the awe condition or not, though the effects of the awe condition marginally buffered the impact of "small self" feelings on state rumination compared to that of the amusement condition (Figure 6).

Table 11

Regression Results for the Effects of Awe Induction on Rumination and the "Small Self"

	R^2	*b*	*β*	*SE*
(Intercept)		9.35	-	5.38
"Small self" feelings	.06***	5.72***	.30***	1.47
Awe condition		-4.42	-.11	3.03
(Intercept)		-.44	-	7.35
"Small self" feelings	.08***	8.58***	.45***	2.07
Awe condition		17.42	.44	11.65
"Small self" x Awe condition		-5.65	-.65	2.91

Note. Amusement condition was entered as 0, while awe induction was entered as 1. *$p < .05$. **$p < .01$. ***$p < .001$

Figure 6

Note. Marginal indirect effects of condition on "small self" feelings and state rumination. 0 represents the amusement condition, while 1 represents the awe condition.

CHAPTER 4: DISCUSSION

The purpose of this study was to examine the direct and indirect associations between self-focused attention, depressive symptoms, and awe at the trait level, as well as these same associations and variables at the state level via an experimental induction of awe. Self-focused attention was also examined with these associations using different measures: the frequency of first-person singular pronouns and rumination.

Frequency of First-Person Singular Pronouns as a Measure of Self-Focused Attention

Hypotheses that utilized the frequency of first-person singular pronouns resulted in null findings and trivial effect sizes, indicating that self-focus words (i.e., I, me, my) may not have been a reliable measure of self-focused attention. There were two additional indicators that suggested this measure was not reliable. First, self-focus words and trait rumination should demonstrate convergent reliability as they both represent the construct of self-focused attention. However, they were not well-correlated in the present study. Second, the clinical literature on depression indicates that self-focused attention is particularly salient in individuals with symptoms of depression (e.g., Greenberg & Pyszczynski, 1986; Ingram, 1990; Mor & Winquist, 2002; Ruscio et al., 2015). As such, self-focused attention should be positively and significantly correlated with depressive symptoms. This relationship was strongly exhibited in the present study when using the measure of trait rumination. However, this relationship was not shown when using the measure of self-focus words.

These findings may call into question the notion of using an implicit measure of self-focused attention such as the frequency of first-person singular pronouns as a marker of depressive symptoms. Although this measure has been commonly used in past studies when

assessing language use for individuals with depression (e.g., Bucci & Freedman, 1981; Rude et al., 2004; Stirman & Pennebaker, 2001; Weintraub, 1981), there has also been evidence suggesting that implicit measures, broadly speaking, often have considerable variation in reliability, thus impacting replicability of these measures (LeBel & Paunonen, 2011). Further, while a meta-analysis revealed a small, but robust correlation between "I-talk" and depression, this effect was largely reduced after controlling for negative affectivity (Tackman et al., 2019). As such, the role of self-focused attention in depression may be better captured using more reliable, non-implicit measures such as rumination.

Direct and Indirect Associations at the Trait Level

The present study also revealed that awe was negatively associated with depressive symptoms. Given that self-focused attention plays a salient role in depression, it should also be expected that awe would be negatively associated with self-focus; however, this was not found with the self-focus measure of rumination. Despite this finding, the present study revealed that, importantly, awe attenuated the relationship between self-focus (specifically rumination) and depressive symptoms such that at higher levels of awe, the relationship between rumination and depressive symptoms weakened. No studies appeared to have tested the buffering effect of awe on rumination and depressive symptoms even though researchers have put forth the theory that awe could potentially protect against depression (e.g., Chirico & Gaggioli, 2021; Paulson et al., 2021). As such, the present study may be the first to support the notion that those who are more prone to experiencing awe are at less risk of developing depression.

Since awe had a moderating effect on rumination and depressive symptoms, several exploratory analyses were conducted which yielded interesting findings. Positive affect and other positive emotions, specifically joy and contentment (but not amusement, love, or pride), also

buffered against rumination and depressive symptoms. When controlling for positive affect, awe continued to weaken the relationship between rumination and depressive symptoms – in other words, awe still protected against the impact of rumination on depressive symptoms beyond just "feeling good." However, when examining the uniqueness of awe compared to joy and contentment in a regression model-building approach, adding in the awe x rumination interaction term after including awe, joy, and contentment did not improve nor worsen the model fit. At least in the present study, there did not appear to be a clear distinction between these three emotions in the rumination-depression link.

Direct and Indirect Associations at the State Level

The present study found that awe was positively associated with "small self" feelings which was further corroborated by the fact that the awe induction significantly elicited more "small self" feelings than the amusement induction. These findings are consistent with evidence that awe generates a sense of self-diminishment (Bai et al., 2017; Bai et al., 2021; Nelson-Coffey et al., 2019; Piff et al., 2015; Rivera et al., 2019; Shiota et al., 2007).

There were also several unexpected findings. The self-focus measure of rumination was positively associated with "small self" feelings, rather that negatively associated like hypothesized. Similarly, rumination was positively associated with awe, rather than negatively associated like expected. Indeed, rumination was higher for those induced to feel awe compared to those induced to feel amusement, though this was not a statistically significant difference.

An explanation for these findings is that the awe induction may have produced ruminative thinking because awe facilitates a reflection about the self in the context of the world a person live in. There has been evidence to suggest that awe is associated with a construct that Tyson and colleagues (2021) named "self-perspective" which includes items such as "I feel my

own day to day concerns are relatively trivial" and "In the grand scheme of things, my own issues and concerns do not matter as much." As such, awe may be promoting an expansion of a person's self-concept to broaden or widen their perspectives beyond themselves – a process that may, paradoxically, involve self-referential thinking. Indeed, the aforementioned statements still include an "I." Since one of the subscales of trait rumination tapped into the construct of reflection, an exploratory investigation was conducted to examine the association between this subscale and awe; however, this did not yield a significant finding (although the association was trending towards the positive direction and had a small effect size). In addition, further exploratory investigations found that, although marginally, the awe induction appeared to weaken the effects of the "small self" on state rumination. This result appears to contradict the finding that state awe and state rumination are positively correlated with each other. While this study is the first to examine the relationships between state awe, the "small self," and state rumination, further investigations on the clarifying the "small self" construct and its relation to awe and rumination would be a worthwhile endeavor given that researchers have proposed that awe reduces self-focus via the "small self" (e.g., Chirico & Gaggioli, 2021; Monroy & Keltner, 2022; Paulson et al., 2020).

Limitations and Future Directions

There are several limitations to consider. While the amusement condition was able to produce more amusement compared to that of the awe condition, it was not a statistically significant difference. While past studies have successfully used amusement as a comparison condition to awe (Bai et al., 2017; Bai et al., 2021; Piff et al., 2015; Rivera et al., 2019; Valdesolo & Graham, 2014), the present study was not able to replicate this manipulation. As such, the amusement condition likely acted as a neutral mood induction, rather than a positive

emotion induction. Future studies may consider using more "amusing" elicitors to further disentangle the effects of different positive emotion inductions.

In addition, while the experimental manipulations were successful at the between-subjects level (i.e., awe and amusement inductions were able to elicit their respective emotions that were significantly different from each other at post-manipulation), they were not successful at the within-subjects level (i.e., awe and amusement inductions were not able to significantly increase their respective emotions from pre- to post-manipulation). This finding suggests that using videos to induce awe or amusement may not be potent enough to produce meaningful change. However, this likely supports the decision of not measuring depressive symptoms at post-manipulation given that the symptoms would have remained largely stable. Other awe inductions to consider would be in vivo exposures (e.g., overlooking a vast landscape) or the use of virtual reality which past studies have successfully utilized (Bai et al., 2017; Chirico et al., 2017; Kahn & Cargile, 2021; Nelson-Coffey et al., 2019; Piff et al., 2015; Quesnel & Riecke, 2018). The experimental manipulation was also conducted online in the present study which limited the ways to check for participant compliance (e.g., paying attention to the video) although an attention check was included. However, using the aforementioned methods of inducing awe would likely strengthen feelings of awe and ensure participant compliance.

Importantly, due to issues in linking participants' data from pre- to post-manipulation, missing data analyses could not be conducted to examine whether the 24 participants that were lost to follow-up were systematically missing or not. In addition, analyses to investigate pre-to-post changes (e.g., manipulation check using paired *t*-test) should be interpreted with caution as only 189 participants were available to examine from pre- to post-manipulation. However, a

sample size of 189 is still sufficiently powered in the current study given the a priori power analysis that was conducted.

The results of the present study were also restricted to a college-aged, predominantly White sample which limited the study's generalizability. While young adults between the ages of 18-25 have the highest prevalence of a major depressive episode in 2019 (NIHM, 2021; SAMHSA, 2020), it is still important to understand the utility of awe across the lifespan as depression continues to impact millions of adults in the U.S. Future research should also incorporate more diverse samples with respect to ethnic identity and social class as studies have indicated that there are cultural variations of awe (Bat et al., 2017; Piff et al., 2018), as well as recruit larger samples to investigate the replicability of the present study's results.

Although experimental studies allow researchers to draw causal inferences, future studies should also examine the role of awe on self-focused attention and depressive symptoms in a longitudinal fashion to examine the long-term effects of experiencing awe. One longitudinal study found that an eight-week "awe walk" intervention did not significantly change the amount of depressive symptoms compared to a control group, although participants who were in the awe-eliciting intervention reported more joy and prosocial positive emotions by the end of eight weeks (Sturm et al., 2020).

Further, regarding findings that feeling awe was linked to greater levels of rumination at the state level, additional research should examine this peculiar relationship. Perhaps the awe-rumination relationship could produce negative emotionality for certain people. As such, the affective and cognitive consequences of awe (and for whom this could be beneficial or detrimental for) would be worth exploring. These relationships should be investigated before utilizing awe-related interventions in clinical populations.

Eventually, future research could examine whether the protective effects of awe extend beyond depression. While maladaptive self-focus is commonly seen in depression, it is not exclusive to this mental health issue. Studies have demonstrated that the tendency to engage in heightened levels of self-focus is present in other internalizing mental health issues such as anxiety (Brockmeyer et al., 2015; Clark & Wells, 1995; Harrington & Blankenship, 2002; Mor & Winquist, 2002; Mor et al., 2010) and disordered eating (Kornacka et al., 2021; Rawal et al., 2010). Indeed, maladaptive self-focused attention has been identified as a transdiagnostic mechanism that cuts across and reinforces various psychopathologies (Aldao & Nolen-Hoeksema, 2010; Mansell et al., 2008). Therefore, awe may be relevant in buffering against other internalizing symptoms besides depressive symptoms.

Clinical Implications

The present study adds to the existing literature on awe by highlighting awe's properties in reducing self-focus which have been theorized as having a potentially therapeutic role in depression. Specifically, the study appears to be the first in showing that greater levels of dispositional levels of awe is protective against the link between rumination and depressive symptoms, suggesting that an emotion such as awe may inhibit maladaptive cognitive processes that are characteristic of depression. While awe alone is likely not enough to elicit long-term changes in depressive symptoms, the findings of the study can inform existing mental health interventions.

Indeed, there are several mental health interventions for depression that attempt to promote cognitive flexibility by broadening one's focus beyond the self. Cognitive Behavioral Therapy, for instance, aims to challenge cognitive distortions that tend to be self-referential such as overgeneralization (e.g., "I failed my math test today – I'm never going to succeed in math")

or personalization (e.g., "A group of people were laughing as I passed by them – they must be making fun or talking badly about me") by reframing attributions of a negative event that are stable, global, or less internal. Similarly, Acceptance and Commitment Therapy encourages a person to defuse from or de-identify with their negative thoughts (e.g., "I'm useless" to "I'm noticing that I'm having a thought 'I'm useless'") as a way to distance themselves from negative emotions elicited from negative thoughts.

Awe can also inform alternative, novel treatments for depression such as psychedelic-assisted psychotherapies. Given recent evidence showing that psychedelic-assisted treatments show promising reductions in depressive symptoms (Carhart-Harris et al., 2016; Carhart-Harris et al., 2018; Osório et al., 2015; Sanches et al., 2016), feelings of awe have been proposed as a one of several psychological mechanisms that explain these changes. Hendricks (2018) suggested that awe shares many features with mystical experiences which often contain feelings of unity, ineffability, as well as alterations in time and space perception. These are experiences that are commonly elicited by psychedelic-assisted psychotherapies and have been shown to drive therapeutic changes in individuals seeking mental health treatment (Johnson et al., 2019; Yaden & Griffiths, 2021).

Overall, findings from the present study provide a step forward in understanding awe's effects on self-focused attention in relation to depressive symptoms at the person-level and in-the-moment. Understanding the nature of awe's elicitation of the "small self" also provide an avenue for informing treatments that target perseverative self-focus that is commonly seen across many mental health conditions. While the evidence for awe's benefits are preliminary, it is a worthwhile endeavor to continue investigating the processes of this complex emotion on our health and well-being.

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APPENDICES: APPENDIX A

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY
Personality, Emotions, and Mental Health

PRINCIPAL INVESTIGATOR
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CO-PRINCIPAL INVESTIGATOR
Angelina Sung, M.A.
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WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH?
You are being asked to participate in this study because you are currently enrolled at Colorado State University and we are interested in learning more about the relationships between personality, emotions, and mental health, as well as how certain videos impact emotions and mental health.

WHO IS DOING THE STUDY?
The study is being conducted by a graduate student, Angelina Sung, under the guidance of her advisor, Michael Steger.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this study is to understand the relationships between different personality traits, emotions, and mental health.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
You will be asked to complete the study online at a time and place that is convenient for you. Participation will initially take approximately half an hour of your time.

WHAT WILL I BE ASKED TO DO?
There are two parts to this study. You will be asked to fill out a series of questionnaires related to your personality, emotions, mental health, and other demographic information. One week later, you will be asked to fill out another series of questionnaires similar to the first. You are welcome to skip any questions you do not wish to answer.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY?

If you are not at least 18 years of age and currently enrolled in college courses, you are not eligible to participant in this study.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
There are no known risks or discomforts associated with this study.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY?
There are no direct benefits from your participation in this study, although it may help us to better understand how personality traits and tendency to experience certain emotions impact mental health.

DO I HAVE TO TAKE PART IN THE STUDY?
Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

WHO WILL SEE THE INFORMATION THAT I GIVE?
This study is anonymous. We are not obtaining your name or other identifiable data from you, so no one, not even members of the research team, will view your data as it is linked to you. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. We may publish the results of this study. You will not be identified in any of these written materials.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?
If you are taking this survey to fulfill a course requirement for a class in the Department of Psychology (PSY 100/PSY 210), you will receive 0.5 experimental credit for your participation. If you are taking this survey from an upper division class, you may receive points of extra credit.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the co-investigator, Angelina Sung, at Angelina.Sung@colostate.edu. If you have any questions about your rights as a volunteer in this research, contact CSU IRB at CSU_IRB@colostate.edu. You are free to print out a copy of this consent form to take with you for your records.

Please make sure you have about 15 minutes to complete these surveys since you will not be able to stop and come back to the surveys at a later time. If you have read and understood the above information and consent to participating in the study, please continue on to the survey. Otherwise close your browser now.

APPENDICES: APPENDIX B.1

The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) Question, Measure, and Item Order

Question: Thinking about yourself and how you normally feel, to what extent do you generally feel:
Items in order:

- Upset
- Hostile
- Alert
- Ashamed
- Inspired
- Nervous
- Determined
- Attentive
- Afraid
- Active

Interval measure: *never* 1 2 3 4 5 *always*

Dispositional Positive Emotions Scale (DPES)

Contentment

I am generally a contented person.
I am at peace with my life.
When I think about my life I experience a deep feeling of contentment.
I feel satisfied more often than most people.
My life is very fulfilling.

Pride

I feel good about myself.
I am proud of myself and my accomplishments.
Many people respect me.
I always stand up for what I believe.
People usually recognize my authority.

Love

Other people are generally trustworthy.
I develop strong feelings of closeness to people easily.
I find it easy to trust others.
I can depend on people when I need help.
People are usually considerate of my needs and feelings.
I love many people.

Joy

I often feel bursts of joy.
I am an intensely cheerful person.
I am often completely overjoyed when something good happens.
On a typical day, many events make me happy.
Good things happen to me all the time.
My life is always improving.

Compassion

It's important to take care of people who are vulnerable.
When I see someone hurt or in need, I feel a powerful urge to take care of them.
Taking care of others gives me a warm feeling inside.
I often notice people who need help.
I am a very compassionate person.

Amusement

I find humor in almost everything.
I really enjoy teasing people I care about.
I am very easily amused.
The people around me make a lot of jokes.
I make jokes about everything.

Awe

I often feel awe.
I see beauty all around me.
I feel wonder almost every day.
I often look for patterns in the objects around me.
I have many opportunities to see the beauty of nature.
I seek out experiences that challenge my understanding of the world.

Note: Administered on a 7-point Likert scale from (1) "strongly disagree" to (7) "strongly agree."

Rumination Response Scale (RRS)

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

1 almost never 2 sometimes 3 often 4 almost always

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

Depression Anxiety Stress Scale (DASS-21)

DASS21

Name: Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree or a good part of time
3 Applied to me very much or most of the time

1 (s)	I found it hard to wind down	0	1	2	3
2 (a)	I was aware of dryness of my mouth	0	1	2	3
3 (d)	I couldn't seem to experience any positive feeling at all	0	1	2	3
4 (a)	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5 (d)	I found it difficult to work up the initiative to do things	0	1	2	3
6 (s)	I tended to over-react to situations	0	1	2	3
7 (a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8 (s)	I felt that I was using a lot of nervous energy	0	1	2	3
9 (a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 (d)	I felt that I had nothing to look forward to	0	1	2	3
11 (s)	I found myself getting agitated	0	1	2	3
12 (s)	I found it difficult to relax	0	1	2	3
13 (d)	I felt down-hearted and blue	0	1	2	3
14 (s)	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 (a)	I felt I was close to panic	0	1	2	3
16 (d)	I was unable to become enthusiastic about anything	0	1	2	3
17 (d)	I felt I wasn't worth much as a person	0	1	2	3
18 (s)	I felt that I was rather touchy	0	1	2	3
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20 (a)	I felt scared without any good reason	0	1	2	3
21 (d)	I felt that life was meaningless	0	1	2	3

Note: Only the numbers that were labeled (d) were administered.

Sentence Completion Task

To collect some basic statistics on the redundancy of a series of standard sentences, please read the following sentences and choose one of the three listed words to fill in the blank. It is grammatically correct to use any of the three words, but one of them may be more likely to occur in the context of that sentence.

1. After spreading fertilizer liberally over the flower bed, (I, she, we) watered the flowers.
2. Although (their, our, my) personal library consists of only few books, some of them are classics.
3. Are you free? Let's head to the (building, shop, establishment).
4. The sun was shining (vividly, brightly, intensely) onto the patio through the trees.
5. Please don't do this to (me, her, us), it is just not fair.
6. At first it didn't seem to make any difference, but by later that night the noise from the part was entirely too loud to allow (us, her, me) to sleep.
7. Although I prepared all night for my interview, I still felt (nervous, shaky, giddy) when I walked into the conference room.
8. It isn't easy to get lost in this town, but somehow (I, we, they) managed it.
9. When did you complete these assignments? Was it (yesterday, today, tonight)?
10. The flying object floated (below, above, over) the bridge.

Note: Items 1, 2, 5, 6, and 8 are the "critical items."

Demographic Form

Please answer the following:

1. What is your age? _____
2. How do you define your race? Choose all that apply:
    a. American Indian or Alaskan Native
    b. Asian
    c. Black or African American
    d. Native Hawaiian or Other Pacific Islander
    e. White
    f. Hispanic or Latinx
    g. Another: _____
    h. Do not wish to respond
3. What is your sex?
    a. Male
    b. Female
    c. Other (specify): _____
    d. Prefer not to say
4. What is your gender identity? (Select all that applies)
    a. Transgender woman
    b. Transgender man
    c. Cisgender woman
    d. Cisgender man
    e. Woman

f. Man

g. Gender non-conforming or non-binary

h. Other (specify): _____

i. Prefer not to say

5. What was the annual household income you grew up in?

a. $19,999 or less

b. $20,000-34,999

c. $35,000-49,999

d. $50,000-64,999

e. $65,000-79,999

f. $80,000-99,999

g. $100,000 or above

APPENDICES: APPENDIX B.2

Videos

Awe condition

Amusement condition

Note: Videos were derived from YouTube.

Manipulation Check

To what degree do you feel the following emotions? Please use the following scale:

1 = not at all

2 = a little

3 = somewhat

4 = neutral

5 = quite a bit

6 = a lot

7 = extremely

1. Amusement
2. Awe
3. Anger
4. Sadness
5. Pride
6. Fear

Small Self Measure

Please answer using the following scale:

1 = Strongly Disagree

2 = Disagree

3 = Disagree Somewhat

4 = Neither Agree nor Disagree

5 = Agree Somewhat

6 = Agree

7 = Strongly Agree

1. I felt that that I was in the presence of something grand.
2. I feel the presence of something greater than myself.
3. I felt my sense of self was diminished.
4. I felt my sense of self shrink.
5. In the grand scheme of things, my own issues and concerns do not matter as much.
6. I feel like my own day to day concerns are relatively trivial.

Awe Experience Scale (AWE-S)

Please answer using the following scale:

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Neutral

5 = Slightly Agree

6 = Moderately Agree

7 = Strongly Agree

1. I sensed things momentarily slow down.
2. I noticed time slowing.
3. I felt my sense of self was diminished.
4. I felt my sense of self shrink.
5. I had the sense of being connected to everything.
6. I felt a sense of communion with all living things.
7. I felt that I was in the presence of something grand.
8. I experienced something greater than myself.
9. I felt my jaw drop.
10. I had goosebumps.
11. I felt challenged to mentally process what I was experiencing.
12. I found it hard to comprehend the experience in full.

Brief State Rumination Inventory (BSRI)

Please respond to the following items by referring to the way you feel or think right now. For each item, please mark a vertical line on the horizontal line to indicate the degree to which you agree or disagree with the statement.

0 10 20 30 40 50 60 70 80 90 100

---

1. Right now, I am reflecting about my mood.
2. Right now, I wonder why I react the way I do.
3. Right now, I wonder why I always feel the way I do.
4. Right now, I am thinking: “why do I have problems other people don't have?”
5. Right now, I am rehashing in my mind recent things I’ve said or done.
6. Right now, I am thinking: “why can’t I handle things better?”
7. Right now, it is hard for me to shut off negative thoughts about myself.
8. Right now, I wonder why I can’t respond in a better way.

The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) Question, Measure, and Item Order

Question: Thinking about yourself and how you normally feel, to what extent do you generally feel:
Items in order:

- Upset
- Hostile
- Alert
- Ashamed
- Inspired
- Nervous
- Determined
- Attentive
- Afraid
- Active

Interval measure: *never* 1 2 3 4 5 *always*

APPENDICES: APPENDIX C

Participant Debriefing Form

Personality, Emotions, and Mental Health

Objective of the Research

The purpose of this study is to further our understanding of how various personality factors and the tendencies to experience certain emotions impact mental health. We are particularly interested examining proneness to experiencing awe influence people's levels self-focus and depressive symptoms. We are also interested in whether eliciting feelings of awe in a video would impact individuals' degree of self-focus and depressive symptoms.

General Information

Your participation is greatly appreciated and will help psychologists better understand how aspects of personality and emotional experiences influence college students' mental health. If you would like to receive a report of this research when it is completed or a summary of the findings, please contact Angelina Sung at angelina.sung@colostate.edu. To learn more about this area of psychology, you can refer to Module 42, specifically the "Major Depressive Disorder and Bipolar Disorder" chapter in the Exploring Psychology in Modules (Eleventh Edition) textbook.

Safety

If your participation in this study has contributed to any emotional distress or significant discomfort, you may contact the CSU Counseling Center at 970-491-6053. In case of emergency or crisis, on-call counselors are also available 24/7 and can be reached at 970-491-7111. For a nationwide crisis hotline, please call 1-800-273-8255. Additional community resources include Touchstone Health Partners, who can be reached at 970-494-4300 and the Psychological Services Center on the CSU campus, who can be reached at 970-491-5212. Finally, please contact the research investigators directly for assistance and additional debriefing if you experience any distress as a result of this study: Angelina Sung at angelina.sung@colostate.edu. If you have any questions about your rights as a volunteer in this research, contact CSU IRB at CSU_IRB@colostate.edu.

Confidentiality

All information collected in today's study will be confidential and there will be no identifying information connected to your responses. This research will be focused on examining general patterns when the data are aggregated together.