

AWESOME IMPLICATIONS: ENHANCING MEANING IN LIFE  
THROUGH AWE EXPERIENCES

by

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## ABSTRACT

Research has consistently demonstrated that perceptions of life's meaningfulness are positively linked to psychological health and well-being. Further, studies have revealed the critical role positive mood and emotional states play in heightening perceptions of meaning. Building from this work, my thesis explored whether emotional experiences of *awe* uniquely impact meaning in life. Though recent investigations involving awe offer theoretical reasons why awe might affect meaning, no published research has specifically tested this relationship. I hypothesized that an awe-eliciting nature video, relative to a neutral video, would enhance meaning both directly and indirectly via increased perceptions of social connectedness and spiritual-transcendence. Further, since research has demonstrated a connection between positive affect and my dependent measures, I hypothesized that these awe effects would arise when controlling for positive affect (e.g., happiness). I tested my hypotheses through an online study using previously validated methods. Though the manipulation elicited differences in self-reported awe, it did not significantly alter my dependent variables. However, when I statistically controlled for self-reported happiness, the awe manipulation decreased ratings of meaning in life directly and indirectly via decreased social connectedness. As such, I discuss how complexities in the experience of awe and specific dispositional traits may account for these findings, and outline possible future directions.



## INTRODUCTION

“He who can no longer pause to wonder and stand rapt in awe, is as good as dead; his eyes are closed.” – Albert Einstein (*The World as I See It*, 1949)

The belief that one’s life is meaningful is an important piece to leading a satisfying existence. For example, meaning in life (MIL) positively predicts life satisfaction, self-esteem, and overall psychological health and well-being (Steger, Frazier, Oishi, & Kaler, 2006; Zika & Chamberlain, 1992), and an extensive amount of research focuses on the ways that meaning is constructed and maintained (Heine, Proulx, & Vohs, 2006; Hicks, Schlegel, & King, 2010; King & Hicks, 2009a; Schlegel, Hicks, Arndt, & King, 2009; Steger & Kashdan, 2006; Vess, Routledge, Landau, & Arndt, 2009). Research has also identified how discrete emotional experiences (i.e., nostalgia; Routledge et al., 2011) and general positive affect (King, Hicks, Krull, & Del Gaiso, 2006) can influence people’s perceptions of MIL. For instance, feelings of nostalgia positively impact the perception that life is meaningful. Yet, while research has examined how general positive affect and certain discrete emotions contribute to meaning, questions about the importance of previously unconsidered emotions remain. In particular, research (to my knowledge) has yet to consider how the experience of awe affects MIL, a notable gap given emerging evidence that awe is linked to a number of psychological processes relevant to meaning (e.g., spirituality, religiosity accommodation; Keltner & Haidt, 2003). Assessing the link between awe and meaning is thus important because it will provide new information about how emotions contribute to

MIL and how awe experiences specifically contribute to psychological health and well-being. I attempted to address this issue in my thesis by testing the specific hypothesis that awe experiences enhance perceptions of MIL.

### Emotions and Meaning in Life

MIL is defined as the extent to which people perceive that their lives are coherent, valuable, and self-directed toward an ultimate goal (Heine et al., 2006; Steger & Kashdan, 2013). In other words, a meaningful life is one that makes subjective sense, and is experienced as significant and purposeful. Considerable research indicates that MIL is a central aspect of both psychological and physical health. For instance, individuals who report greater MIL tend to be more hopeful and optimistic (e.g., Mascaro & Rosen, 2005; Steger & Frazier, 2005; Steger et al., 2006), and are more likely to utilize healthier forms of coping during challenges (Edwards & Holden, 2001). Additionally, MIL is linked with life satisfaction and self-worth (e.g., Steger & Frazier, 2005; Steger et al., 2006; Steger & Kashdan, 2006; Zika & Chamberlain, 1992), general positive affect (e.g., King et al., 2006; Steger et al., 2006; Steger, Kashdan, Sullivan, & Lorentz, 2008), and global happiness (e.g., Ryff & Keyes, 1995; Steger, Kawabata, Shimai, & Otake, 2008), all of which are positive indicators of well-being. MIL is also negatively associated with anxiety (Mascaro & Rosen, 2005; Thompson, Coker, Krause, & Henry, 2003), depression (Mascaro & Rosen, 2005; Mascaro, Rosen, & Morey, 2004; Steger et al., 2006), substance abuse (Harlow, Newcomb, & Bentler, 1986; Newcomb & Harlow, 1986) and decreased longevity for older adults (Boyle, Barnes, Buchman, & Bennett, 2009).

Given that MIL is clearly an important contributor to psychological well-being, research has examined factors that might contribute to meaning. Much of this research has considered how factors such as religious faith (Emmons, 2005; Silberman, 2005; Steger & Frazier, 2005), goals (Klinger, 1998; Emmons, 2003), and social bonds (Hicks, Schlegel, et al., 2010; Ryff & Singer, 1998) affect perceptions of MIL. However, other research has revealed how affective experiences can color people's judgments of their life's meaning. Specifically, King et al. (2006) found that general positive affect enhanced ratings of meaning, regardless of whether the affect was induced (Study 4, 5) or reported (Study 2). In one study, for example, King et al. had participants fixate on a + that appeared in the center of a computer screen, followed by either positive (e.g., *happy, content, pleased*) or neutral (e.g., *binder, table, hubcap*) words on either the right or left side of the screen. Participants were instructed to indicate which side the stimulus appeared. Each word was displayed for 2 ms and immediately masked by a string of X's to insure the words were not read. King and colleagues (2006) demonstrated that implicitly priming positive vs neutral mood concepts successfully augmented perceptions of MIL. However, other studies have suggested that positive affect's relation to MIL may be more complex. For example, Hicks and King (2008) found that religious commitment moderated the relation between positive affect and MIL: Positive affect predicted MIL only at low levels of religiosity, but not at high levels of religiosity or when positive religious primes were introduced. In a separate study, Hicks and colleagues (2010) revealed that participants utilized feelings of positive affect to bolster MIL when another source of MIL (e.g., social connectedness) was threatened. Altogether, these findings

support the notion that general feelings of positive affect directly contribute to perceptions of MIL.

In addition to general positive affect, research has also examined how the discrete affective experience of nostalgia contributes to MIL. *The New Oxford Dictionary of English* (1998) defines nostalgia as “a sentimental longing or wistful affection for the past”, and nostalgic moments usually involve past life events that are mostly happy, but tinged with sadness (see Sedikides, Wildschut, Arndt, & Routledge, 2008). Recent research has demonstrated that nostalgic experiences also contribute to well-being. For example, Wildschut et al. (2006) revealed across several studies that instructing participants to reflect on a nostalgic autobiographical event led to increased positive affect, social connectedness, and self-esteem. Researchers have since replicated these results (Wildschut, Sedikides, Routledge, Arndt, & Cordaro, 2010), while others have further demonstrated nostalgia’s role as a contributor to meaning (Routledge et al., 2011; Routledge, Wildschut, Sedikides, Juhl, & Arndt, 2012). For instance, Routledge et al. (2012) found that thinking about nostalgic moments (as compared to desired-future or past positive moments) augmented participants’ presence of MIL (Study 1, 2). In addition, Routledge and colleagues’ final experiment (Study 3) showed that nostalgia helped participants maintain MIL after experiencing a meaning threat (i.e., explaining absurd art).

Recent studies demonstrating that general positive affect and discrete emotional experiences (e.g., nostalgia) contribute to perceptions of MIL emphasize the important role emotional states play in maintaining perceptions of well-being, especially when

alternative sources of meaning are undermined (Hicks, Schlegel, et al., 2010). It is therefore pertinent to explore other emotional experiences that may uniquely serve as facilitators of meaning. Recent investigations into the experience of *awe* suggest that it may also function as a distinct contributor to MIL, due mainly to its effects on the self-concept and relation to spiritual concepts. However, no research has yet reported a direct relation between awe experiences and meaning. Thus, the current study was developed to address this “gap” by assessing the link between awe and MIL.

### The Nature of Awe and Its Psychological Consequences

From an evolutionary-function approach, emotional states operate as neurological catalysts that activate adaptive cognitions and behavior toward a fitness-related opportunity or threat (Griskevicius et al., 2009). Following this perspective, Keltner and Haidt (2003) proposed that primordial awe originally evolved as the intense biological reaction to a powerful leader; awe aided in solidifying social hierarchies and communities by motivating members of a group to dismiss their own self-interests and commit to the will of a superior. The authors further suggested that humans remain sensitive to awe-inducing stimuli to this day (e.g., large stature and displays of confidence, power, and strength) and proposed two features that essentially define any prototypical awe experience: Vastness and the need for accommodation. Vastness refers to the experiencing of items in the world that “feel” larger than the self, be they physical (i.e. mountains), mental (i.e. mathematical formulas), or in the case of primordial awe, social (i.e. fame or prestige). Feelings of vastness coincide with the need for accommodation

(Piaget & Inhelder, 1966/1969), a process wherein currently held mental structures are expanded or renovated to comprehend new experiences. For example, the vast complexity and size of a mountain likely defies the schematic knowledge (e.g., images on postcards) of someone standing at the base for the first time. Thus, in an attempt to understand this overwhelming experience, the person will strive to develop new schemata to accommodate and understand what they are witnessing. This striving to accommodate may not always be successful however, which relates to whether the experience of awe feels frightening (when one fails to accommodate) or elating (when one succeeds). Further, Keltner and Haidt (2003) noted that though other situational aspects may lead to different “flavors” of awe (e.g., elements of fear, aesthetic pleasure, perceptions of ability or virtue, supernatural causality), vastness and accommodation are required components unique only to awe experiences

Overall, research has supported Keltner and Haidt’s (2003) proposal that awe is distinct from other types of affective states. For instance, as with many discrete emotions, humans utilize specific patterns of vocalization (Simon-Thomas, Keltner, Sauter, Sinicropi-Yao, & Abramson, 2009) and facial muscle movements (Shiota, Campos, & Keltner, 2003) to convey awe. Recent findings even suggest that awe is associated with a specific physiological signature related to autonomic nervous system activation (Shiota, Neufeld, Yeung, Moser, & Perea, 2011). Multiple studies have also demonstrated that the general subjective experience of awe is distinct from other positive emotions like contentment, pride, and gratitude (Campos, Shiota, Keltner, Gonzaga, & Goetz, 2013; Shiota, Keltner, & John, 2006), and this is especially relevant for effects on the self-

concept (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015; Shiota, Keltner, & Mossman, 2007). Lastly, research has shown that awe arises from stimuli that are informationally vast and challenge the viewer's expectations or frame of reference (Shiota et al., 2007; Valdesolo & Graham, 2013), supporting Keltner and Haidt's suggestion that vastness and accommodation underlie prototypical awe.

Researchers have utilized Keltner and Haidt's (2003) conceptualization of awe to identify a variety of awe elicitors. For instance, Bonner and Friedman (2011) found that people typically report feeling awe when in the presence of natural environments and entities (e.g., mountains, oceans). These reports corroborate Keltner and Haidt's definition of awe, as natural settings tend to be both immensely complex with detail and larger than the self in scale. In one study, Valdesolo and Graham (2013) instructed participants to watch either a video intended to elicit awe (natural landscapes set to an uplifting song), amusement (BBC's *Walk on the Wild Side*), or general neutral affect (news interview) and then rate the degree to which they felt a series of emotions. Across five experiments, the authors found that simply watching a video of nature scenes successfully elicited greater awe than comparison videos. Multiple studies have since verified and extended this particular method (Piff, Dietze, Feinberg, Stancato, & Keltner, 2015; Saroglou, Buxant, & Tilquin, 2008; Van Cappellen & Saroglou, 2012, Study 2). For example, Piff and colleagues (2015) successfully induced awe through videos of threatening natural phenomena (e.g., tornados, volcanos), and simply asking participants to reflect on memorable experiences in nature also leads to increased awe (Shiota et al., 2007; Van Cappellen & Saroglou, 2012, Study 1).

However, other triggers of awe are unrelated to nature scenes. For instance, Piff and colleagues (2015) elicited awe via a video depicting droplets of colored water falling into a bowl of milk in slow motion, and multiple studies have enhanced awe through exposure to enormous structures that are atypical in daily life (Bonner & Friedman, 2011; Shiota et al., 2007). Shiota, Keltner, and Mossman (2007) had participants view either a full-sized *Tyrannosaurus rex* skeleton or an empty hallway before assessing their current emotions, and found, as predicted, that only those in the former condition reported feeling awe. Piff and colleagues (2015) conceptually replicated this study by demonstrating that awe did not arise when participants viewed tall buildings that participants frequently experienced (i.e., tall apartment buildings near campus; Study 5). Additionally, awe seems to be tied to powerful life moments and religious/spiritual experiences (Bonner & Friedman, 2011). Van Cappellen and Saroglou (2012) demonstrated that watching a video featuring important stages of childbirth (e.g., first sonogram to mother holding her baby) elicited awe, especially for those who held religious or spiritual beliefs. Overall, these research findings show that the diverse elicitors of awe do share important similarities: All involve stimuli that are informationally rich (i.e., vast) and unlikely to be encountered frequently, prompting the need for accommodation processes.

In their review, Keltner and Haidt (2003) proposed that triggers of awe motivate the individual to further explore and more deeply process what is currently unfolding before them, while also attenuating self-directed attention. Research has supported Keltner and Haidt's predictions. During awe moments, people express that they feel diminished and insignificant (Bonner & Friedman, 2011; Campos et al., 2013; Piff et al.,



2015; Shiota et al., 2007), a sensation recently termed as the “small self” (Piff et al., 2015). The “small self” effect has a variety of implications for social cognition, as it consistently leads individuals to feel more united with larger communities of the world (e.g., the universe, humanity, God). However, the feelings associated with the “small self” may not necessarily be pleasant for everyone, especially for those people who find facing schematically challenging information uncomfortable. For instance, Valdesolo and Graham (2013) demonstrated that the experience of awe increased intolerance of uncertainty, which prompted participants to interpret random events as driven by a purposeful and/or supernatural agent. These findings coincide with research demonstrating that awe-proneness is associated with schematic revision and openness to experience (Shiota et al., 2006, 2007). Thus, for those who prefer cognitive stability and consistency, awe experiences may instead bring thoughts of uncertainty to the forefront of attention.

Alternatively, Shiota and colleagues (2007) found that participants rated high in dispositional awe (relative to those low in dispositional awe) were less likely to describe their self-concept using individuated words (e.g., “I am special”), but instead used more universal descriptors (e.g., “I am an inhabitant of Earth”; “I am human”). Similar findings occurred in a subsequent experiment wherein participants experienced awe by viewing a *Tyrannosaurus rex* skeleton. Saroglou et al. (2008) also demonstrated that viewing an awe inducing video increased participants’ ratings of spirituality, a concept deeply involving transcendence of the self and unity with larger entities. More recent research has demonstrated that the effects of the “small self” manifest in positive behavior as well.

After reflecting on previous awe experiences, people were more likely to enact pro-social behavior (e.g., helping another person pick up dropped items, Piff et al., 2015) and commit to religious and spiritual activities (Van Cappellen & Saroglou, 2012). However, certain research has indicated that there are also nuanced differences between religiousness and spirituality that moderate the effects of awe experiences. While both concepts do share dimensions that relate to awe (e.g., the transcendence of life and interconnection of the self and world overall), spirituality involves a more personal approach towards these dimensions, whereas religiousness emphasizes adherence to formalized traditions and institutions (Meraviglia, 1999; Saroglou et al., 2008). These differences can influence awe-related outcomes, and some research has evinced a weakened effect of awe on religiousness ratings (Saroglou et al., 2008). Additionally, Van Cappellen and Saroglou (2012) demonstrated that awe at childbirth, as compared to awe of nature, predicted feelings of oneness with proximal targets (e.g. friends) only for those who rated themselves high on the spirituality dimension prioritizing relationships with specific, close, others. In contrast, awe of nature predicted feelings of oneness with broad entities (e.g. humanity) only for those rated high on the dimension of universal connection. Van Cappellen and Saroglou interpreted these findings as demonstrating the complex interaction between emotional contexts and individual differences in spirituality. Thus, while awe's simultaneous diminishment and expansion of the self-concept can promote beneficial behavior within social communities, nuanced contextual differences may influence awe-related outcomes.

Experiences of awe also shift attention away from daily concerns and toward the present moment. Like the “small self”, this redirecting of attention toward the here and now has beneficial consequences. For instance, research has shown that awe experiences lead people to be more mindful of incoming information. That is, of six positive emotions, only awe (i.e., viewing natural landscapes) and compassion (i.e., viewing a vulnerable child) cause people to utilize more systematic, rather than heuristic, processing of weak persuasive arguments (Griskevicius, Shiota, & Neufeld, 2010). Griskevicius and colleagues reasoned that this effect is due to both awe and compassion being emotions that evolved to increase attention toward events that necessitate augmenting informational resources. Additionally, people often describe awe moments as enduring and “timeless”(Shiota et al., 2007), and this feeling of timelessness counteracts the phenomenon of “time famine”, the feeling that there is not enough time to do all things one wishes to do (Perlow, 1999). Further, Rudd and colleagues (2012) found that by lessening time famine, awe indirectly led participants to perform positive social behavior and donate more time toward experiences (e.g., watching a movie with a loved one), rather than material goods.

Research has demonstrated that these specific outcomes (e.g., pro-social behavior and the pursuit of experiential goods) augment feelings of life satisfaction, an important contributor to well-being (Van Boven & Gilovich, 2003). However, although both life satisfaction and MIL are long-term contributors to overall well-being (Steger & Kashdan, 2006), they are distinct concepts. Life satisfaction is an underlying component of subjective well-being, which relates to the pursuit of experiences that elicit happiness and

positive affect, while also avoiding sources of negativity. In contrast, MIL is associated with psychological well-being and “eudaimonia,” which emphasizes the role of personal values in daily activities as necessary for optimal human functioning (see Ryan & Deci, 2001 for review). Thus, whereas life satisfaction relates to the happiness associated with striving for and/or attaining important life goals (Baumeister, Vohs, Aaker, & Garbinsky, 2013; Emmons, 1986), meaning is more contingent on whether the pursuit of those goals harmonizes with personal values and volitions. In short, MIL derives from experiences that accord with a person’s true self, and not merely from positive affect or basic needs satisfaction. Thus, although these findings do suggest that awe experiences relate to subjective well-being, the question of whether awe contributes to aspects of well-being beyond life-satisfaction is an open one.

## THE PRESENT STUDY: DO AWE EXPERIENCES ENHANCE MEANING IN LIFE

From an evolutionary perspective, many positive emotions evolved to influence human behavior toward opportunities of personal and social benefit (Griskevicius, Shiota, & Nowlis, 2010). However, research suggests that primordial emotions become elaborated over time to represent culturally relevant meanings, practices, and norms (Keltner & Haidt, 1999). Primordial disgust, for example, has developed into a social emotion that is sensitive to the “impure” behavior of others. Positive emotions are no exception, as research has consistently demonstrated that general positive affect (Hicks, Schlegel, et al., 2010; King et al., 2006) and certain discrete emotions (nostalgia, Routledge et al., 2012) contribute to judgements of life’s meaningfulness. These findings suggest that both general and specific forms of positive emotions contribute to important aspects of well-being. However, the consideration of other discrete emotions is needed. Thus, I seek to extend both emotion and meaning research by proposing that experiences of awe positively contribute to judgements of life’s meaningfulness.

There are several reasons why awe may affect MIL, most of which are present in Keltner and Haidt’s (2003) review of awe experiences. For instance, the authors describe prototypical awe as the emotional experience of something so informationally vast that it challenges currently held schema and worldviews. Proponents of the Meaning Maintenance Model (MMM, Heine et al., 2006) assert that when individuals face threats to meaning-making structures (e.g., schemas), they will actively turn to other sources of meaning. Research supports this idea, as experiences that challenge meaning frameworks are linked to the development of more robust and complex meaning-making systems

(King & Hicks, 2009). For example, witnessing a beautiful vista that challenges schemas may lead people to reaffirm their beliefs about a greater order to the world or their intimate connection with God. Thus, rather than simply providing MIL directly, feelings of awe may instead prompt the construction of meaning via other sources. Given past research findings, I specifically propose that awe will enhance feelings of social connectedness and spiritual-transcendence (ST), which in turn will enhance MIL.

### Awe and Social Connectedness

Multiple studies have demonstrated that awe experiences lead people to perceive increased unity amongst themselves and humanity (Piff et al., 2015; Shiota et al., 2007; Van Cappellen & Saroglou, 2012). These findings concur with Keltner and Haidt's (2003) proposal that awe's primordial function was to motivate individuals to realign their personal desires with the goals of a community led by a powerful leader. Additionally, awe transforms perceptions of the self and binds individual members to the intentions of the entire social group, which has relevant implications for MIL. Specifically, research has shown that having strong social bonds is associated with greater MIL ratings (Steger, Kashdan, Sullivan, & Lorentz, 2008). In addition, accessibility to information relevant to one's social relationships positively contributes to MIL (Hicks & King, 2009; Hicks, Schlegel, et al., 2010). Although elaborated forms of awe may not necessarily involve a social aspect, the effects of self-diminishment and communal unity appear to still activate. Thus, it is possible that during moments of awe,

information about one's connection with others becomes more accessible, leading to momentarily increased life meaning.

### Awe and Spiritual-Transcendence

As noted earlier, spiritual and religious beliefs are important contributors to meaning. For many, these beliefs are sacred and play an integral role in deriving meaning from daily activities and future goals (Park, 2010; Silberman, 2005). Not surprisingly, high levels of religiousness predict the presence of meaning (Hicks & King, 2008) and MIL mediates the relation between religiosity and psychological benefits (e.g., self-esteem, optimism, daily positive affect; Steger & Frazier, 2005). Fry (2000) also demonstrated that spiritual practices (e.g., meditation and private prayer) predict psychological wellbeing for institutionalized and community-residing elder adults. Some have argued (Piedmont, 2001; Frankl, 1988) that the underlying mechanism involved in these beliefs involves ST, or the capability of any individual to stand outside of their immediate sense of time and place, and perceive their existence as part of a larger, fundamental unity. Toward that end, research specifically testing ST has linked it with increased feelings of self-actualization and purpose in life (Piedmont, 2001), both of which relate to well-being and meaning. Critical to my study, however, is research connecting awe experiences with feelings of ST. For instance, when asked to describe their awe experiences, people will often use descriptors that share a strong association with religious and spiritual life moments (Bonner & Friedman, 2011; Keltner & Haidt, 2003). Multiple studies have also shown that awe experiences lead people to feel more

connected to the divine or universe, which in turn increases motivation to engage in religious and spiritual behavior (Saroglou et al., 2008; Van Cappellen & Saroglou, 2012). In addition, Shiota, Keltner, & Mossman (2007) demonstrated that an awe condition, relative to a neutral condition, led participants to describe their self-concepts with more universal and self-transcendent descriptors. In total, these findings suggest that awe experiences might contribute to MIL by enhancing ST.

### Overview

The goal of this study was to provide initial evidence that awe enhances MIL. In addition, the study proposed and examined specific mechanisms that might mediate this effect. Participants watched either an awe-eliciting (Nature) or neutral (Control) video and then rated their current perceptions of MIL. Participants indicated the intensity of emotions (e.g., awe, happiness, sadness) that they felt, and then completed validated measures of ST and social connectedness. I hypothesized that participants in the awe condition would demonstrate increased judgments of MIL compared to those in the neutral condition when controlling for positive affect (i.e., self-reported happiness). In addition, I hypothesized that increased feelings of ST and social connectedness would mediate the enhanced judgments of meaning for participants in the awe condition, also controlling for happiness. It was important to control for happiness so that the effects of awe, above and beyond more general experiences of positive affect, could be assessed.



## METHODS

### Participants

Adults ( $N = 161$ ; 62 females, 99 males) living in the United States were recruited from Amazon Mechanical Turk (MTurk; Buhrmester, Kwang, & Gosling, 2011) and compensated \$0.40 for completing the online study. This sample size used for primary analysis is appropriate based on G\*Power calculations (Faul et al., 2007) using an effect size of  $\eta_p^2 = .06$  (see Valdesolo & Graham, 2013), an alpha level at .05, and a desired statistical power ( $1 - \beta$ ) set at .80, as has been recommended for proper research practice (Funder et al., 2013). Participants who reported their demographics ranged in age from 19 to 74 years ( $M = 34.64$ ,  $SD = 12.62$ ) and were predominantly Caucasian (76.3%; African American, 8.8%, Asian, 8.1%; Latino, 5.6%; Other, 1.3%).

### Materials

#### Need for Structure

The Personal Need for Structure Scale (Neuberg & Newsom, 1993; M.M. Thompson et al., 2001) assessed participants' dispositional preferences for structured, simple, and unambiguous information. Past research indicates that this scale is valid and reliable (Neuberg & Newsom, 1993), and this item has been used in psychological research on meaning (Vess et al., 2009). Example items on this 12 item scale include "I enjoy being spontaneous" and "I hate to be with people who are unpredictable", and

participants indicated their agreement with each statement on a 1 (*strongly disagree*) to 6 (*strongly agree*) scale ( $M = 3.94$ ,  $SD = .92$ ,  $\alpha = .91$ ).

### Awe Manipulation: Emotion Induction Videos

Following the initial personality measure, participants were randomly assigned to watch either a Nature (Awe) or Neutral (Control) video clip. The Nature video featured a montage of sweeping panoramic scenes of waterfalls, jungles, oceans and canyons set to an energetic piano soundtrack ([https://www.youtube.com/watch?v=RUp\\_P2g8sAc](https://www.youtube.com/watch?v=RUp_P2g8sAc)), whereas the Neutral video featured a short segment from a 1959 Mike Wallace interview (<https://www.youtube.com/watch?v=ouBZ-YqOnsU>). Both video clips have been used in previous awe-related research (Valdesolo & Graham, 2013) and have reliably induced differences in the experience of awe. In addition, Valdesolo & Graham (2013) also found that the Nature video elicited generally more positive emotions (i.e., happiness and gratitude) than the Neutral video, though only awe mediated the relationship between scenes of natural beauty and agency detection.

### Self-Reported Affect Ratings

A measure of affect immediately followed the emotion induction videos, and served two important functions. First, although past research has used this exact nature video to induce awe (Valdesolo & Graham, 2013), the affect measure allowed me to directly assess whether differences in specific emotional reactions (e.g., awe, happiness) emerged between conditions. Given the link between general positive affect and MIL (King et al., 2006), this measure also allowed me to isolate the anticipated effects on

meaning from more general positive affect (i.e., self-reported happiness). The affect measure, adapted from Saroglou et al. (2008) and Valdesolo and Graham (2013), first asked participants to rate the general intensity of the emotions that they currently felt via a 7-point Likert scale, 1 (*I feel no emotions at all*) to 7 (*I feel very intense emotions*). Subsequent questions asked participants to rate the intensity of 8 specific emotions that they may have felt during the video, all of which were analyzed individually. Responses to the items happiness, amusement, awe, fear, sadness, anger, gratitude, and disgust were each made on a 1 (*I was not at all feeling this emotion*) to 7 (*I felt this emotion intensely*) scale.

### Meaning in Life

The main dependent variable, perceptions of meaning in life, was assessed with the Meaning in Life Questionnaire (Steger et al., 2006). This measure contains two subscales that separately assess the presence of meaning in life (MLQ-P; “I have a good sense of what makes my life meaningful”) and the search for meaning in life (MLQ-S; “I am always looking to find my life’s purpose”) with 5 items per subscale. Because the present study was most interested in how awe-related emotions affect current feelings of meaningfulness, primary analysis focused solely on the MLQ-P subscale. Numerous studies have demonstrated that the MLQ is a valid and reliable measure of meaning in life (King et al., 2006; Routledge et al., 2011, 2012). Participants indicated their responses to each item on a 7-point Likert scale from 1 (*absolutely untrue*) to 7 (*absolutely true*), and these responses were averaged to create a single presence of meaning in life composite ( $M = 4.88$ ,  $SD = 1.53$ ,  $\alpha = .92$ ).

### Social Connectedness

Feelings of social connectedness were assessed via the Relatedness Needs Satisfaction (RNS) subscale of the Basic Psychological Needs Scale (Gagné, 2003). This measure was designed to assess feelings of connection with others, and has been used in past meaning-related studies (Hicks et al., 2010). Participants responded to the items of this subscale (e.g., “I really like the people I interact with”) via a 7-point Likert scale from 1 (*not at all*) to 7 (*very much*). These responses were averaged to create a relatedness needs satisfaction composite ( $M = 5.03$ ,  $SD = 1.10$ ,  $\alpha = .82$ ).

### Spiritual-Transcendence

Differences in spirituality were assessed using the Spiritual Transcendence Scale (STS, Piedmont, 1999). The STS is a 24-item assessment designed to determine participants’ perspective of a unifying and transcendent nature via three subscales: *Universality* (belief in unity among all things; 9 items), *Connectedness* (connection with close relationships, alive or dead, and humanity overall; 6 items), and *Prayer Fulfillment* (positive experiences associated with prayer or meditation; 9 items). However, given that I hypothesize ST will mediate the relationship between awe and perceptions of meaning, participants only completed the *Universality* and *Connectedness* subscales during the study. As noted by Saroglou and colleagues (2008), this allows for a broader examination of the spiritual, rather than religious, outcomes related to awe experiences. Sample items of these two subscales included: “All life is interconnected” (*Universality*); “I am concerned about those who will come after me in life” (*Connectedness*). Past research has demonstrated the validity of the STS for predicting feelings of ST (Piedmont, 1999), and

this finding extends across multiple religious and cultural contexts (Piedmont & Leach, 2002). Participants responded to items via a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Both subscales were reversed scored to match other measurements, averaged, and combined to create a ST composite score ( $M = 4.02$ ,  $SD = 1.31$ ,  $\alpha = .92$ ).

### Self-Esteem

Self-esteem was assessed using the Single-Item Self-Esteem Scale<sup>1</sup> (Robins, Hendin, & Trzesniewski, 2001), a one item scale that asks participants to respond to the statement “I have high self-esteem” via a 1 (*not very true of me*) to 7 (*very true of me*) Likert-type scale. Though this scale is greatly shortened relative to other similar types of self-esteem assessments, multiple studies using the SISE scale has demonstrated its validity (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002).

### Procedure

The present study recruited participants using MTurk, a web-based system that allows researchers to recruit diverse samples via online crowdsourcing. An advertisement on the MTurk website described the study as focused on personality traits and visual media. Participants accessed the study by following a link in the MTurk advertisement, and then completed an electronic consent form. Following this, participants completed a personality measure to bolster the validity of the cover story. Depending on random

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<sup>1</sup> This measure was included for exploratory purposes and was not part of the primary analyses

assignment, participants then viewed either an awe-inducing (Nature) or affectively neutral (Control) video. At this point, they were instructed to use headphones if there were available and to pay attention to what was happening in the video.

Following the emotion induction videos, participants completed the manipulation check that directly asked them to rate the intensity of their emotional experience and the specific emotions that they felt during the video. Next, participants completed a series of assessments that gauged social connectedness, ST and MIL. To reduce possible order effects, all items from each of these measures were presented to randomly. Following these assessments, participants responded to several demographic and suspicion-probing questions. Lastly, all participants read a debriefing statement on the true nature of the study, were thanked for their participation, and compensated \$0.40 for completing the study.

## RESULTS

Preliminary AnalysisDemographic Comparisons.

Initial statistical analyses indicated no significant differences in reported race,  $\chi^2(4, N = 160) = 3.50, p = .48$ , or gender,  $\chi^2(1, N = 161) = 1.59, p = .48$ , between conditions. Similarly, participant age did not differ between conditions  $t(159) = -0.09, p = .93$ . However, some gender and race differences on ST and social connectedness did emerge. Specifically, women reported higher ST ( $M = 4.29, SD = 1.40$ ) relative to men ( $M = 3.87, SD = 1.24$ ),  $t(158) = 2.00, p = .05, d = 0.32$ , and higher social connectedness ( $M = 5.35, SD = 0.91$ ) relative to men ( $M = 4.82, SD = 1.16$ ),  $t(158) = 3.06, p = .003, d = 0.51$ . In addition, a one-way analysis of variance (ANOVA) revealed that reported race significantly accounted for variance in the social connectedness measure,  $F(4, 154) = 3.01, p = .02$ . A Tukey HSD post-hoc test further showed that the connectedness ratings for Asian participants ( $M = 4.10, SD = 1.06$ ) was significantly different from White participants' ratings ( $M = 5.14, SD = 1.13$ ) only. However, this result should be interpreted with caution, as the samples used in the analysis vary widely (Asian,  $N = 13$ ; White,  $N = 121$ ).

Effect of Manipulation on Self-Reported Affect Ratings.

I initially performed an independent samples  $t$ -test to assess differences in awe between the awe-eliciting and neutral manipulation videos. Replicating past research (Valdesolo & Graham, 2013; Piff et al., 2015), participants who viewed the awe video

reported significantly more awe ( $M = 5.62$ ,  $SD = 1.73$ ) than did participants who viewed the neutral video ( $M = 2.81$ ,  $SD = 1.77$ ),  $t(162) = 10.26$ ,  $p < .001$ ,  $d = 1.61$ . The manipulation was effective at eliciting differences in self-reported awe.

Additional analysis via a between-subjects MANOVA also revealed differences in other emotions between conditions (see Table 1). Specifically, viewing the awe video increased ratings of happiness, amusement, and gratitude relative to viewing the neutral video. In contrast, viewing the awe video decreased ratings of anger and disgust relative to the neutral video. No differences between conditions were detected for fear or sadness. Overall, these effects on self-reported emotions relate closely to past research using the same manipulation. Valdesolo and Graham (2013) found that the awe-condition video (vs. the neutral video) consistently elicited greater feelings of awe, happiness, and gratitude across two experiments. However, these authors also found the condition effect on anger, disgust, and amusement to be inconsistent across two additional studies.

### Bivariate Correlations.

Table 2 shows the bivariate correlations between critical study variables. First, self-reported awe was positively associated with other positive emotions (i.e., happiness, amusement, gratitude), substantiating past findings regarding awe's positive valence (Bonner & Friedman, 2011; Shiota et al., 2003). However, awe was also positively associated with ratings of fear and marginally related to sadness, suggesting that awe may



Table 1  
*Mean Scores for Self-Reported Emotional States and Dependent Measures*

Dependent Variable	Awe Condition	Neutral Condition	<i>F</i>	<i>p</i>	$\eta_p^2$
	<i>M (SD)</i>	<i>M (SD)</i>			
Awe	5.60 (1.73)	2.79 (1.79)	102.21	<0.001	0.39
Amusement	4.60 (1.81)	3.53 (1.76)	14.50	< 0.001	0.08
Happiness	5.15 (1.57)	2.79 (1.59)	90.07	< 0.001	0.36
Gratitude	4.67 (1.97)	2.45 (1.71)	57.80	< 0.001	0.27
Anger	1.45 (0.97)	2.18 (1.71)	11.62	0.001	0.07
Disgust	1.39 (1.07)	2.29 (1.73)	16.20	< 0.001	0.09
Fear	1.80 (1.25)	1.75 (1.31)	0.06	0.81	0.00
Sadness	1.98 (1.45)	2.00 (1.46)	0.01	0.92	0.00

Note: Standard deviations are shown in parentheses. For all items, responses were made using 7-point values, with higher values indicating greater intensity of emotion.

Table 2  
*Correlations Among and Descriptive Statistics For Affect and Dependent Measures*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Happiness											
2. Amusement	.64**										
3. Awe	.84**	.52**									
4. Fear	.12	.05	.20*								
5. Sadness	.08	-.03	.15 †	.64**							
6. Anger	-.17*	-.26*	-.16*	.56**	.60**						
7. Gratitude	.77**	.55**	.72**	.16**	.10	-.06					
8. Disgust	-.27**	-.26*	-.27**	.45**	.44**	.71**	-.15				
9. Meaning in Life	.20*	.21*	.09	-.02	-.02	.03	.13	.06	(.92)		
10. RNS	.20*	.18*	.13	-.06	-.02	-.02	.08	-.08	.44**	(.82)	
11. Transcendence	.08	.05	.08	-.08	.12	.11	.06	.05	.06	.28**	(.92)
<i>M</i>	4.02	4.07	4.28	1.80	2.02	1.81	3.60	1.83	4.88	5.03	4.02
<i>SD</i>	1.95	1.87	2.24	1.29	1.47	1.42	2.15	1.49	1.53	1.10	1.31

Note: Cronbach's alpha scale reliability estimates are shown in parentheses. †  $p < .10$ , \*  $p < .05$ , \*\*  $p < .001$

be a more ambivalent emotional experience compared to the other measured positive emotions (Keltner & Haidt, 2003). In addition, and more critical to my hypotheses, self-reported awe was not associated with measures of relatedness needs satisfaction or ST transcendence. Consistent with past research (King et al., 2006; Hicks et al., 2010), self-reported ratings of happiness and amusement were positively associated with MIL. Similarly, RNS ratings were also positively associated with MIL, replicating previous research findings (Hicks & King, 2009; Hicks, Schlegel et al., 2010). Moreover, although the measure for ST did positively correlate with the RNS measure, it was not associated with MIL.

### Primary Analysis

#### Effect of Awe on Meaning.

Following the preliminary analyses, I tested my primary hypotheses using a series of independent samples *t*-test with Bonferroni adjusted alpha levels of .017 (.05/3). As noted above, I predicted that participants exposed to an awe inducing video would report higher levels of MIL relative to participants exposed to a neutral video. An independent samples *t*-test revealed no significant difference in MIL between the awe ( $M = 4.76$ ,  $SD = 1.65$ ) and neutral ( $M = 5.01$ ,  $SD = 1.38$ ) condition,  $t(160) = -1.03$ ,  $p = .31$ ,  $d = -0.16$ . Thus, my main hypothesis that the awe manipulation would enhance feelings of MIL was unsupported.

Though the awe manipulation did not directly augment MIL, it is possible that the awe manipulation enhanced meaning indirectly by augmenting participants' feelings of

social connectedness. The hypothesis that spiritual transcendence would mediate an indirect effect of the manipulation on meaning was already ruled out given that ST did not correlate with MIL. Social connectedness was, however, positively associated with meaning and the decision to test for an indirect effect of awe on meaning through social connectedness was appropriate given previous suggestions that indirect effects may still occur in the absence of overall effects (Hayes, 2009). As an initial step, I conducted an independent samples *t*-test to assess whether the awe manipulation significantly influenced social connectedness. No significant differences in social connection between the awe ( $M = 5.00, SD = 1.18$ ) and neutral ( $M = 5.06, SD = 1.01$ ) conditions emerged,  $t(160) = -.36, p = .72, d = -0.05$ . Thus, there is no evidence to support the predicted indirect effects of the awe manipulation on MIL.

#### Effect of Awe on Meaning Controlling for Happiness.

Past research has consistently demonstrated that video inductions featuring sweeping panoramic scenes of nature increase both feelings of awe and other positive emotions, including happiness (Piff et al., 2015; Saroglou et al., 2008; Valdesolo & Graham, 2013; Van Cappellen & Saroglou, 2012). Although this helps support the notion of awe being a positive emotional experience, it may obscure the unique effects of awe on meaning in life. After all, past research indicates that general positive affect influences ratings of MIL. Thus, I tested the effect of awe while controlling for the effects of happiness to isolate the awe effects that may have been suppressed by the effects of happiness. Initially, I tested whether the affect manipulation enhanced self-reported awe when self-reported happiness was statistically controlled. A univariate analysis of

covariance (ANCOVA) revealed a significant difference in self-reported awe between the awe ( $M = 4.68, SD = .14$ ) and neutral ( $M = 3.84, SD = .15$ ) conditions when controlling for happiness ratings,  $F(1, 161) = 13.77, p < .001, \eta_p^2 = 0.08$ . Not surprisingly, self-reported happiness accounted for a significant amount of variance in awe ratings,  $F(1, 161) = 205.72, p < .001, \eta_p^2 = 0.60$ . These findings indicate that the awe manipulation elicited greater feelings of awe above and beyond the influence of another positive emotion, happiness.

Next, I tested the primary hypothesis that participants in the awe condition would report greater MIL than participants in the neutral condition when the effects of happiness were statistically controlled. An ANCOVA revealed that, consistent with past research, self-reported happiness accounted for significant variance in MIL ratings,  $F(1, 161) = 35.48, p < .001, \eta_p^2 = 0.10$ . The ANCOVA also revealed a significant difference in MIL ratings between the awe-eliciting ( $M = 4.42, SD = .18$ ) and neutral ( $M = 5.39, SD = .19$ ) conditions,  $F(1, 159) = 11.19, p = .001, \eta_p^2 = 0.07$ , when the effects of happiness were controlled. Contrary to hypotheses, however, the awe video led to lower MIL than the neutral video. This suggests that the association between awe and happiness may obscure an otherwise negative effect of awe on meaning in life. When that association is accounted for, awe decreases meaning.

I also analyzed my secondary hypothesis by testing whether the awe manipulation significantly influenced social connectedness and ST when controlling for self-reported happiness. An ANCOVA revealed no significant differences in ST ratings between the awe-eliciting ( $M = 3.95, SD = .16$ ) and neutral ( $M = 4.10, SD = .17$ ) conditions when

controlling for happiness,  $F(1, 159) = 0.36, p = .55$ . In contrast, RNS ratings were lower in the awe ( $M = 4.78, SD = .13$ ) condition, relative to the neutral condition ( $M = 5.31, SD = .14$ ), when controlling for happiness ratings,  $F(1, 159) = 6.33, p = .01, \eta_p^2 = 0.04$ . Self-reported happiness also accounted for significant variance in the RNS measure,  $F(1, 159) = 13.31, p < .001, \eta_p^2 = 0.08$ . Again, the effect of awe on RNS when happiness was statistically controlled was opposite of what I predicted. Nevertheless, because RNS was significantly associated with MIL and the awe manipulation affected RNS (when happiness was controlled), I tested the secondary hypothesis of an indirect effect of awe on meaning through RNS while controlling for happiness.

For this analysis, I utilized the PROCESS (Hayes, 2012) macro for SPSS, and entered manipulation video condition as the independent variable, RNS ratings as the mediator, and MIL as the dependent variable. I also included self-reported happiness as a covariate. As seen in Figure 1, support for an indirect effect of awe on meaning in life through RNS was obtained when happiness was statistically controlled. When controlling for happiness, the awe video (vs. neutral video) significantly decreased RNS, which, in turn, decreased feelings of meaning in life. It is worth noting that this indirect effect through RNS only partially mediated the direct effect of awe on MIL. That is, the direct effect of the awe video on meaning in life is still significant, and negative, even when the indirect effect via RNS is included in the model. Overall, these findings demonstrate that, when self-reported happiness was held constant, the awe video (vs. neutral video) decreased MIL both directly and indirectly by decreasing social connectedness.

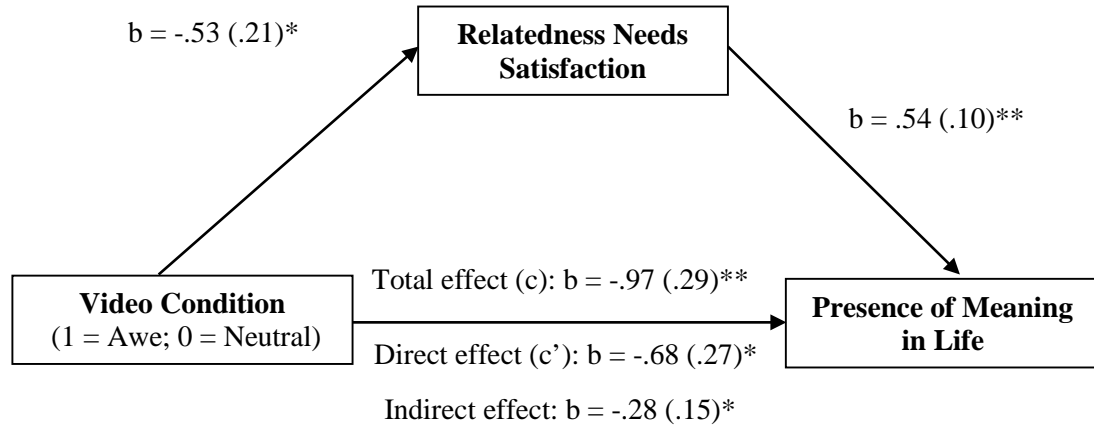


Figure 1. Analysis via PROCESS program (Hayes, 2012) indicates significant partial mediation via relatedness needs satisfaction (lower/upper confidence intervals =  $-.5933/-.0420$ ,  $p < .05$ ). \*  $p < .05$ . \*\*  $p < .01$ .

## GENERAL DISCUSSION

The primary aim of this study was to extend past emotion and meaning research by assessing whether awe experiences impact perceptions of MIL. I hypothesized that awe (relative to a neutral condition) would lead to enhanced MIL judgments. To test this hypothesis, I utilized an affect manipulation and multiple dependent measures employed in past studies. Consistent with previous research (Piff et al., 2015; Valdesolo & Graham, 2013), the affect manipulation successfully elicited differences in self-reported awe. However, when controlling for ratings of happiness, the awe condition significantly reduced participants' feelings of meaning relative to the neutral condition. Thus, in contrast to my primary hypothesis, the experience of awe actually diminished MIL when happiness was statistically controlled.

A secondary aim of the present study was to identify potential mechanisms that underlie how awe specifically affects MIL judgments. I hypothesized that awe would increase feelings of social connectedness and ST, which would in turn contribute to perceptions of MIL. As with the primary hypothesis, when controlling for ratings of happiness, the awe condition significantly reduced feelings of social connectedness. Further analysis revealed that the negative effect of awe on social connectedness (i.e., RNS ratings) partially mediated the negative effect of awe on MIL. In contrast, and unlike previous research (Saroglou et al., 2008), analyses did not reveal any effect of awe on ratings of ST. In total, these results indicate that awe negatively impacts feelings of social connectedness and MIL when the confounding influence of happiness is statistically controlled.



### Understanding the Negative Effect of Awe on Meaning

Although some research suggested that awe may directly promote meaning in life, my study indicates that an awe-eliciting nature video decreases meaning in life when happiness is controlled. This occurred despite the fact that the awe induction significantly increased feelings of happiness. Therefore, my study suggests that happiness related aspects of awe experiences mask what would otherwise be a negative effect of awe on meaning in life. Such an effect is consistent with the complex nature of awe experiences. For instance, people frequently report awe moments as profound and memorable experiences (Bonner & Friedman, 2011), and both my own data and previous findings indicate that awe occurs simultaneously with other positive emotions (e.g., happiness, joy, etc.; Piff et al., 2015; Saroglou et al., 2008). In contrast to this positive affective tone, awe experiences also actively challenge mental structures (Shiota et al., 2007; Keltner & Haidt, 2003), elicit sensitivity to uncertainty (Valdesolo & Graham, 2013), and evoke feelings of smallness and insignificance in the grand scheme of things (Piff et al., 2015). Together, these findings suggest that awe experiences may also involve some potential underlying negativity. My study supported this idea by demonstrating that awe negatively impacted feelings of MIL when the positive affect associated with awe (e.g., happiness) was statistically controlled. This finding is potentially interesting, as it suggests that positive affect associated with awe experiences may suppress negative meaning effects. Had I not controlled for positive affect, this negative effect would have gone unnoticed.

### The Effect of Awe on Social Connectedness

The current study also revealed a potential mechanism through which awe had this negative effect on meaning. When controlling for happiness, awe decreased feelings of social connectedness, which in turn decreased MIL. This was not predicted a priori and raises a question about why awe would decrease feelings of connectedness? After all, awe reduces personal concerns, which increases prosocial behavior (Piff et al., 2015). Further, research has shown that activating concepts related to relationships and community also leads to prosocial behavior (Pavey, Greitemeyer, & Sparks, 2011) and that these perceptions of connection to others augment MIL (Hicks, Schlegel, et al., 2010; Steger et al., 2008). Thus, I conceptually inferred that awe would *enhance* social connectedness, which would then increase life meaning. In retrospect, however, there may be reasons to expect a negative effect of awe on social connectedness.

Research has shown that awe temporarily causes people to describe their self-concept with more universal, rather than individuated, descriptors (Shiota, Keltner, & Mossman, 2007), and people often describe feeling more united with larger communities of the world (e.g., humanity; Piff et al., 2015; Bonner & Friedman, 2011). Though, as I proposed, this effect would seemingly lead people to feel enhanced connectedness to others, it may have instead caused participants to feel less connected with the proximal relationships they experience on a daily basis. Since the items of the RNS measure are more centered on assessing a person's feelings of belonging with proximal social groups (e.g., "I really like the people I interact with"), awe experiences that cause an enhanced connection with the universe or humanity overall may also inadvertently undermine the

relevance of proximal relationships. Presumably, participants in a state of awe would feel a more universal connection in general, but report feeling more distant from the people closest to them. If this is indeed the case, then the RNS measure used in the current study might have hinted at the unique outcomes related to how awe affects feelings of globally or proximally connection. Regardless, because this is the first study to detect such an effect, and it was not predicted a priori, more research will be needed to establish its robustness and unpack its full meaning.

#### The Null Effect of Awe on Spiritual-Transcendence

The current study also revealed that the awe manipulation did not affect participant's feelings of ST, even when controlling for self-reported happiness. This null effect is surprising, as past research suggests that awe, relative to other positive emotions, evokes feelings of universal connection and self-transcendence (Van Cappellen & Saroglou, 2012; Shiota, Keltner, & Mossman, 2007). One study has even demonstrated that awe experiences directly increased ST and universal connection with world as a whole (Saroglou et al., 2008), even in a sample of people who were not overly religious. Why did I fail to detect such an effect in my study? One possible explanation for this null finding may involve my chosen methodology, which differs somewhat from previous awe-ST research (Saroglou et al., 2008; Van Cappellen & Saroglou, 2012). Specifically, I collected data from a broad online sample using Amazon's Mechanical Turk, a population that several past studies have found to evince awe-related effects (Piff et al., 2015; Prade & Saroglou, 2016; Valdesolo & Graham, 2013). However, no study has yet

used this specific data collection technique to assess awe-related effects on ST beliefs. It may be the case that feelings of ST arise when participants are able to consistently immerse themselves within the awe experience, something which could not be controlled using the current sample. Thus, while some participants may have felt increased ST during the video, others might have reported no such increase due to distraction or inattention, therefore leading to a null finding. Further, my decision to randomize the presentation of the items for the three critical outcome measures may have dampened the sensitivity of the ST measure to effectively capture the effect of awe on ST, especially if the proposed awe effect is already fleeting. For example, perhaps this effect depends on people using awe as information (cf., Schwarz & Clore, 1983) about their feelings of ST. Making these other constructs (e.g., meaning in life, RNS) accessible could have blurred the use of awe as the lone source of information for this judgment, therefore dampening the effect. It is obviously difficult to fully unpack the meaning of this null effect for a single study, making additional research testing potential boundary conditions of this effect important.

### The Potential Role of Individual Differences

#### Personal Need for Structure

Although the awe manipulation successfully elicited differences in self-reported awe, my analysis demonstrated that the experience of awe negatively impacted judgments of MIL when happiness was controlled. One potential implication of this result is that people who may be less likely to experience positivity in the context of an awe

experience may be vulnerable to the negative awe effects. Identifying such moderating variables could therefore refine our understanding of how awe impacts meaning. For instance, Armstrong and Detweiler-Bedwell (2008) proffered that people initially engage in awe-eliciting experiences with the goal to understand the vast scene unfolding before them. However, a person may experience awe differently depending on his/her ability to accommodate the vastness they are witnessing: Successful accommodation promotes the experience of elation and meaningfulness, whereas unsuccessful accommodation promotes terror and uncertainty (Keltner & Haidt, 2003). This suggests that people who are better able to accommodate the informational vastness may also garner a greater sense of meaning from awe experiences. One relevant variable in this regard is personal need for structure (PNS, Neuberg & Newsom, 1993).

PNS research stems from epistemology theories on how people construct and utilize abstract mental representations to organize, simplify, and navigate the world (Thompson, Naccarato, Parker, & Moskowitz, 2001). Mental representations form the basis for constructs such as schemas, prototypes, and attitudes, and thus allow for efficient (if not completely accurate) methods for understanding social and environmental experiences. For instance, when someone interacts with an unfamiliar person, they rely on mental structures (e.g., stereotypes, past experiences) to assess the nature of the interaction and inform their subsequent behavior. These mental structures are useful because they reduce the consumption of cognitive resources and contribute to a sense of preparedness and certainty throughout life experiences. However, Neuberg and Newsom proposed that people “differ in the extent to which they are dispositionally motivated to

cognitively structure their worlds in simple, unambiguous ways” (1993, p. 114). That is, PNS represents a dispositional propensity to use simple and organized mental structures, and form clear interpretations of information. Thus, high-PNS people may experience less positivity in the context of awe experiences and thus remain vulnerable to a direct negative effect of awe on meaning.

Because I included a measure of PNS as a filler measure in my study, I was able to test this possibility directly with my data. Specifically, I regressed MIL scores onto Awe-Condition (dummy-coded), PNS (mean-centered), and their interaction. The analyses revealed no significant main effects of Condition ( $\beta = -.08, p = .34$ ), PNS ( $\beta = .08, p = .50$ ) or the proposed Condition X PNS interaction ( $\beta = -.007, p = .95$ ), and similar null effects emerged even when controlling for self-reported happiness. Thus, while theory is consistent with the idea that PNS may be relevant in awe-eliciting contexts, individual differences in PNS do not appear to moderate the effect of awe on MIL judgments.

### Intuitive Processing

Another possible trait that may moderate the effect of awe on MIL stems from Cognitive Experiential Self Theory (CEST; Epstein, 1994), which proffers that the processing of information involves two distinct cognitive systems: A rational system that is active, conscious, and reason orientated (reflective processing), and an experiential system that is passive, preconscious, and affectively orientated (intuitive processing). Importantly, research has demonstrated that individual differences in faith in intuition, or the degree to which a person relies on the experiential system to form judgments (Pacini

& Epstein, 1999), interacts with positive affect to predict meaning-relevant outcomes (e.g., Cicero, Hicks, & King, 2015; Hicks, Cicero, Trent, Burton, & King, 2010; Trent & King, 2013). For instance, Hicks and colleagues (2010) demonstrated across multiple studies that PA and faith in intuition interacted to predict an enhanced sense of understanding of ambiguous texts (Study 1) and past negative life events (Study 2), and overall better accuracy in identifying coherent, rather than incoherent, semantic triads (Study 3). These findings thus suggest that individual differences in faith in intuition (intuitive processing) moderate the effect of positive emotions on outcomes relevant to people's sense of meaning.

They may be pertinent for understanding who may experience a positive effect of awe on meaning and who may experience a negative effect of awe on meaning. Specifically, people high in faith intuition may be especially likely to utilize positive affect to make meaning in the moment (Hicks et al., 2010). As such, people high in faith in intuition might most readily experience positive effects of awe on meaning due to the positivity inherent in awe-eliciting contexts. In contrast, people low in faith in intuition may not utilize positive affect for the construction of meaning. Because their meaning is less linked to positive affect, the potential negative effects of awe might decrease their meaning in life. The current study is not positioned to consider the role of faith in intuition in these effects, but given its relevance to emotions and meaning, future research should certainly consider it.

## FUTURE DIRECTIONS

Indeed, the present study provides a variety of possible avenues that future research could explore. In addition to those noted above, the most pressing issue may be to fully elucidate the complex effects of awe on meaning in life. The current research suggests that awe is an experience strongly associated with happiness. However, it also undermines meaning in life when this happiness is statistically controlled. I observed that this negative effect is partially mediated by an unexpected negative effect on social connectedness, but that a significant negative effect on meaning remains even when the role of social connectedness is accounted for. Thus, the reasons why awe negatively affects meaning when happiness is controlled has yet to be fully explained.

Past awe research may provide some possible answers to this issue. For instance, Valdesolo and Graham (2013) demonstrated that the experience of awe increased participants' intolerance of uncertainty and feelings of uncontrollability. Importantly, theory suggests that feelings of uncertainty undermine people's sense of life meaningfulness (Heine et al., 2006). Thus, applied to the current study, awe may negatively affect meaning by increasing uncertainty. Alternatively, awe also enhances feelings of the "small self", which relates to the experience of insignificance and reduced personal relevance. Though awe research has shown that the "small self" mediates the positive effect of awe on prosocial behavior (Piff et al., 2015), it also seems likely that feelings of smallness and insignificance may also convey an overall sense of meaninglessness. Indeed, feelings of significance are central to conceptualizations of meaning in life (King et al., 2006) and feelings of insignificance may therefore



undermine or challenge peoples' belief that they their life is ultimately purposeful and meaningful in a grand sense. A future study could investigate these mechanisms directly by including established measures of uncertainty sensitivity and the "small-self" from past awe studies. This potential study could initially test whether the indirect effect of awe on MIL through happiness is replicable, and also assess whether awe simultaneously indirectly reduces MIL via uncertainty and the "small-self". Importantly, this study could help reveal mechanisms that can explain how awe both positively and negatively affects MIL.

## CONCLUSION

Given the ubiquity of emotional experiences in people's life, it remains important to investigate how emotional states uniquely contribute to psychological and behavioral outcomes. My thesis served as an attempt to bridge and extend research showing that certain emotions (e.g., PA, nostalgia) can significantly impact feelings of life meaningfulness. Specifically, I tested whether experiences of awe, an emotion often tied to feelings of spirituality and universal connection, might also enhance MIL judgments. Given awe's generally positive valence, I also statistically controlled for ratings of happiness to assess the unique effect of awe above and beyond general positive affect. I predicted that people who experienced an awe-eliciting, rather than neutral video, would feel that their lives are more meaningful, and that enhanced feelings of social connectedness and ST would facilitate this effect. However, when controlling for ratings of happiness, analyses revealed an effect opposite of my prediction: Relative to the neutral condition, participants in the awe condition reported decreased social connectedness and MIL. These results suggest that awe experiences' influence on meaning judgments may be more complex than previously thought, and I proposed a possible future study that could explore whether awe experiences positively or negatively impact meaning judgment via different psychological mechanisms. Thus, understanding the complete effects of awe on life meaningfulness remains an open and exciting avenue for future research to explore.

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APPENDIX A

MEASURES AND ASSESSMENTS

Personal Need for Structure Scale

Read each of the following statements and decide how much you agree according to your attitudes, beliefs, and experiences. It is important for you to realize that there are no “right” or “wrong” answers to these questions. People are different, and we are interested in how you feel. Please respond according to the following 6-point scale:

- 1 = strongly disagree
- 2 = moderately disagree
- 3 = slightly disagree
- 4 = slightly agree
- 5 = moderately agree
- 6 = strongly agree

- \_\_\_ 1. It upsets me to go into a situation without knowing what I can expect from it.
- \_\_\_ 2. I'm not bothered by things that interrupt my daily routine.
- \_\_\_ 3. I enjoy having a clear and structured mode of life.
- \_\_\_ 4. I like to have a place for everything and everything in its place.
- \_\_\_ 5. I enjoy being spontaneous.
- \_\_\_ 6. I find that a well-ordered life with regular hours makes my life tedious.
- \_\_\_ 7. I don't like situations that are uncertain.
- \_\_\_ 8. I hate to change my plans at the last minute.
- \_\_\_ 9. I hate to be with people who are unpredictable.
- \_\_\_ 10. I find that a consistent routine enables me to enjoy life more.
- \_\_\_ 11. I enjoy the exhilaration of being in unpredictable situations.
- \_\_\_ 12. I become uncomfortable when the rules in a situation are not clear.

Emotion Induction VideosAwe: [https://www.youtube.com/watch?v=RUp\\_P2g8sAc](https://www.youtube.com/watch?v=RUp_P2g8sAc)Neutral: [https://www.youtube.com/watch?v=7ukJiBZ8\\_4k](https://www.youtube.com/watch?v=7ukJiBZ8_4k)Affect Manipulation Check

Using the scale below, please rate the emotional intensity you felt while viewing the video.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>I felt no emotions at all emotions</b>							<b>I felt very intense</b>

Below are a list of emotions you may have felt during the video. Using the scale below, please rate the intensity you felt for each emotion.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>I was not at all feeling this emotion intensely</b>							<b>I felt this emotion</b>

While watching the video I felt:

1. \_\_\_\_\_ Happiness.
2. \_\_\_\_\_ Amusement.
3. \_\_\_\_\_ Awe.
4. \_\_\_\_\_ Fear.
5. \_\_\_\_\_ Sadness.
6. \_\_\_\_\_ Anger.
7. \_\_\_\_\_ Gratitude.
8. \_\_\_\_\_ Disgust.

Meaning in Life Questionnaire

Please take a moment to think about what makes your life feel important to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

<b>Absolutely Untrue</b>	<b>Mostly Untrue</b>	<b>Somewhat Untrue</b>	<b>Can't Say True or False</b>	<b>Somewhat True</b>	<b>Mostly True</b>	<b>Absolutely True</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>

1. \_\_\_\_\_ I understand my life's meaning.
2. \_\_\_\_\_ I am looking for something that makes my life feel meaningful.
3. \_\_\_\_\_ I am always looking to find my life's purpose.
4. \_\_\_\_\_ My life has a clear sense of purpose.
5. \_\_\_\_\_ I have a good sense of what makes my life meaningful.
6. \_\_\_\_\_ I have discovered a satisfying life purpose.
7. \_\_\_\_\_ I am always searching for something that makes my life feel significant.
8. \_\_\_\_\_ I am seeking a purpose or mission for my life.
9. \_\_\_\_\_ My life has no clear purpose.
10. \_\_\_\_\_ I am searching for meaning in my life.

*Relatedness Needs Satisfaction Subscale*

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Not at all true</b>							<b>Very True</b>

1. I really like the people I interact with.
2. I get along with people I come into contact with.
3. I pretty much keep to myself and don't have a lot of social contacts.
4. People in my life care about me.
5. There are not many people that I am close to.
6. The people I interact with regularly do not seem to like me much.
7. People are generally pretty friendly towards me.

*Spiritual Transcendence Scale*

Please respond to each of the items below by clicking the one number that most closely describes the extent to which you agree or disagree with the following statements. Note that there are no “right” or “wrong” answers to these questions, so please respond as honestly as possible.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Strongly Agree</b>						<b>Strongly Disagree</b>

1. Although dead, images of some of my relatives continue to influence my current life.
4. I feel that on a higher level all of us share a common bond.
5. All life is interconnected.
6. There is a higher plane of consciousness or spirituality that binds all people.
7. It is important for me to give something back to my community.
8. I am a link in the chain of my family’s heritage, a bridge between past and future.
9. I am concerned about those who will come after me in life.
11. Although individual people may be difficult, I feel an emotional bond with all of  
humanity.
12. I still have strong emotional ties with someone who has died.
13. I believe that there is a larger meaning to life.
15. I believe that death is a doorway to another plane of existence.
16. I believe there is a larger plan to life.
22. Although there is good and bad in people, I believe that humanity as a whole is  
basically good.
23. There is an order to the universe that transcends human thinking.
24. I believe that on some level my life is intimately tied to all of humankind.



