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'Awe'some Choice: An Expansion of the Broaden and Build Theory

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Abstract

According to Broaden and Build Theory, positive emotions expand the scope of attention, cognition, and actions, as evidenced by more creative and elaborate responses to problems. While some research suggests that awe, defined as the emotion that arises when one encounters something strikingly vast, may be an extension of positivity, it has not been tested within the context of Broaden and Build Theory. The current study was modeled after and utilized methods from previous research on how positive emotions affect decision-making and expanded on them to include materials demonstrated to inspire awe. Participants viewed emotion-eliciting videos, responded to writing prompts, suggested solutions to problems, and responded to measures of personality and attitudes. There were three conditions: neutral/control (no emotional content), positive manipulation condition, and awe manipulation condition. The hypothesis that those in the awe group would be most engaged in their tasks was supported; they spent more time on the tasks and wrote more words compared to the other groups. Those in the positive group were not more engaged than participants in the neutral conditions. The results imply that the awe manipulation had a greater and different effect on participants, and supports previous research suggesting that awe should be considered a different category within positive emotions.

‘Awe’some Choice: An Expansion of the Broaden and Build Theory

The definition of positive emotions has been debated with no clear, definite answer; however, it is associated with three distinct characteristics: positive emotions are adaptive, they involve approach/appetitive motivation, and they create a pleasant feeling (Smith et al., 2014). Research on positive emotions is a relatively recent phenomenon compared to the literature that is dominated by emotions we commonly think of as negative (e.g. fear and anger; Seligman & Csikszentmihalyi, 2000). One reason may be that positive emotions are more difficult to define and measure, both physiologically and functionally. In some cases, positive emotions have simply been defined as a “relief” from negative emotion (Fredrickson & Levenson, 1998; Lazarus, 1991). Fredrickson has proposed that, while negative emotions likely enhance fitness by promoting specific, narrowly defined action tendencies, positive emotions may enhance well-being by generating a larger set of opportunities for thought and action. According to Broaden and Build theory (Fredrickson 1998, Fredrickson 2004, Fredrickson & Branigan, 2005), positive emotions serve to broaden attention, expand our awareness of the environment and opportunities, and foster openness and flexibility about the actions we might take. Research suggests that positive emotions may promote the consideration of more information during a decision-making task (Fredrickson, 1998; Fredrickson, 2004; Fredrickson & Branigan, 2005). The current study explored the relationship between positive emotions generally, awe specifically, and corresponding thoughts and motivations, by measuring creativity, persistence, and response quality on problem solving tasks typical to college student life.

It took many years for interest in positive emotions to begin to grow into a common field of study, perhaps because psychologists had spent most of their time focused on negative emotions such as anger, fear, and depression (Seligman & Csikzentmihalyi, 2000). Negative

emotions have an alarm function that produce arousal and physiologically prepares the body to fight or flee (LeDoux, 1995). For example, fear fuels the urge to escape while anger drives the urge to attack; both emotions function to ensure survival. All animals display reflexes to protect themselves against potentially harmful stimuli and while the responses may differ (e.g. flying vs. running), the neurological foundations are similar across species (LeDoux, 1995). The action tendencies and neurological foundations of positive emotions are not as clear, may be less narrow in scope, and are described as nonspecific action tendencies (Fredrickson et al., 2000, Tugade et al., 2014). Positive emotions are known to aid in overall well-being, but there has been less empirical research on positive emotions (Fredrickson, 2004).

To further understand the extensiveness and purpose of positive emotions, a more general review of past literature is necessary. Several existing theories of emotions may be able to explain the functions and influence of positive emotions in particular, including the appraisal theory of emotions, the functional theory of emotions, how positive emotions influence decision-making tasks, and past research on the positive emotion of awe. It is important to have a more thorough understanding of past research and relevant literature in order to better understand the influence of emotions on cognition.

Review of Relevant Literature

The Appraisal Theory of Emotions

Most psychologists agree that emotions are multi-component response tendencies that happen rapidly and implicitly based on both real and perceived changes, threats, or opportunities in the world (Haidt, 2003). According to the appraisal theory, emotions and their corresponding responses are elicited by evaluations of the event or situation (Roseman & Smith, 2001). Appraisal theories define emotions as an orchestration of physiological processes, not specific

states or feelings; appraisals function to detect and assess the significance of a stimuli in the environment for their potential influence on well-being (Moors et al., 2013). The automatic emotional response, or appraisal reflex, serves to direct attention, initiate physiological responses, and prepare the body for action (Lerner et al., 2015). Stimuli are implicitly assessed for their potential to facilitate goals (the primary appraisal) and, if cognitive resources allow it and the observer is motivated to do it, a more conscious evaluation follows (secondary appraisal) during which the named "feelings" might be considered more thoroughly (Clore, et al., 2008; Lazarus, 1991; LeDoux, 1995).

Appraisal theory accounts for individual differences in interpretation of the emotions by considering the influence of culture, how the emotion is experienced, and the environmental context. Smith et al. (2014) and Barrett (2017) describe how appraisals and corresponding emotions are shaped by the individuals' needs, goals, and abilities. Different motivations and circumstances lead to different types of responses for the same stimuli; fear can be expressed through crying, screaming/yelling, fleeing, or even stunned immobilization. The same sound of a door slam elicits a different response in the middle of the night than it would during an argument. Barrett (2017) explains that emotions are "goal-based concepts"; how an emotion is experienced and expressed depends on the context of the present situation. Context and motivations of the situation are important because emotions can easily create biases that influence decision choices as well in interpretations of the situation.

Research on dispositional and situational affect demonstrates evidence for a carry-over effect in that incidental emotions, implicitly or without awareness, can create decision biases (Lerner et al., 2015). For example, Schwarz and Clore (1983) found that ambient weather influenced people's self-reported life satisfaction. The participants had a greater sense of

happiness and satisfaction in life when it was sunny out versus gloomy. Other studies show that people in good moods make more optimistic judgements while people in bad moods make more pessimistic judgements. In one representative study, Johnson and Tversky (1983) asked participants to read newspaper stories that were designed to induce positive or negative moods and then estimate the fatality frequencies for various potential causes of death. The researchers found that participants in the negative mood group were more pessimistic and predicted higher numbers of fatalities than the participants in the positive mood group. The results suggest that emotions can carry over from one situation to the next and unknowingly influence current perspective.

A large body of research suggests that past experience with stimuli, even passive or unconscious experience, also carries over from one situation to another, and impacts emotional response. Zajonc (2001) found that repeated exposures to stimuli increases positive affect, hypothesized that repeated exposures in the absence of harm or other negative outcomes is a signal that the stimuli are safe, and it is safety that increases positive affect. Zajonc's (2001) hypothesis is demonstrated by research that indicates the difference between self-reported interest over caution in the face of something new and complex is influenced by appraisals of coping potential and goals related to learning, comprehension, and understanding (Silvia, 2005). Similarly, Ellsworth and Smith (1988) found that participants described surprise, not fear, when the experience included an appraisal of personal control and value. The interaction between an individual's motivation and information processing is at the center of appraisal theory, which offers an explanation for one way that emotion likely influences cognitive processes (Moors et al., 2013). From an evolutionary perspective, appraisals and the associated emotions contributed

to the success of human civilization by guiding the allocation of cognitive and physical resources.

Functional Theory of Emotion

The functional theory of emotion suggests that to have evolutionary value, humans' emotions must facilitate more than physical survival. According to Keltner et al. (2006), to be evolutionarily advantageous, emotions would also have to serve a communication function, a social coordination function, and a personal adjustment or coping function. Emotions serve a communication function by sending interpersonal signals regarding motivation, behavioral intent, and willingness to interact with others. The social coordination function is demonstrated by the role of emotions in creating social bonds that generate group loyalty and cohesion, which in turn function to keep human civilization successful (Keltner et al., 2006). While the survival of most animals depends on cooperation and social bonds with genetically similar relatives (Campbell, 1983), humans make more complex decisions that involve long-term social consequences. As early as Darwin (1872), researchers have speculated that emotions play a role in human cooperation. As humans evolved, so did their emotions in order to be able to process and facilitate a response that matches the social environment.

The adjustment or personal coping function of emotions is focused on resilience. Adjustment serves to help the individual distribute limited resources in ways that are more productive. For example, repeated failure might eventually prompt a reassessment of the goal's value in light of required investment. It was the coping function that drove early interest in positive emotions, which was focused on relief from pain. Researchers interested in positive emotions hypothesized that positive emotions would function to encourage a person to "bounce back" from negative emotional experiences and improve the ability to adapt, improvise, and

recover more quickly (Tugade & Fredrickson, 2004). Negative emotions can generate physiological effects that build up over time and cause damage to people's health, so it was thought that positive emotions served a regulatory function to offset negative emotions and optimize well-being (Fredrickson et al., 2000).

According to the undoing effect, positive emotions have a quieting function (Fredrickson & Levenson, 1998). Their role is to undo the arousal that was generated by negative emotions and bring physiological levels back to normal (Fredrickson & Levenson, 1998; Fredrickson et al., 2000; Tugade & Fredrickson, 2004). For example, Fredrickson et al., (2000) found that college students' cardiovascular recovery from a stress manipulation (e.g. being given 60s to prepare a recorded speech for peer evaluation) was improved by watching contentment-eliciting or amusing films, compared to those who watched neutral or sad films, who recovered from the stress manipulation more slowly. This type of work contributed to the expansion of emotion research and a shift in in the direction of positive psychology.

Seligman and colleagues were among the first in the field to strongly advocate for an expansion of the study of positive emotions. Seligman and Csikszentmihalyi (2000) reasoned that psychologists knew very little about what makes life worth living and how normal people thrive in nonthreatening conditions. The authors proposed a new direction for the field, called for a shift away from singular focus on emotional pathology, and directed attention toward the study of positive emotions that foster, among other things, originality, future-mindedness, citizenship, insight, tolerance, and work ethic. They noted that psychologists should balance the subject of studies in the field and that researchers should start to study human strengths and virtues, not just pains and weaknesses. By 2005, positive psychology had flourished and was considered an umbrella term for the study of positive emotions, positive character traits, and enabling

institutions (Seligman, et al., 2005). Furthermore, with this knowledge of how the study of positive emotions evolved (Seligman & Csikszentmihalyi, 2000; Seligmen et al., 2005), it is crucial to understand how it has influenced cognitive abilities in a contemporary context.

The Effects of Positive Emotions on Decision-Making

Decision-making research confirms that logic and rationality do not always dominate choices. For example, people are more sensitive to suggestions of loss than they are to the mention of gains (Kahneman, 2003), and the effect is stronger when losses may be borne by the self or close relatives (Wang et al., 2001). Emotional factors such as motivation, social impact, morality, and perceived threat impact choices and the evaluation of alternatives. The effects of emotions can be pervasive, predictable, and sometimes harmful for decision-making (Lerner et al., 2015). For example, Shiv et al. (2005) found that patients with damage to emotion regions of their brain performed better on investment decisions; they were unaffected by the success or failure of previous rounds of investments that they made and made each decision based only on the current available information. Patients with brain damage unrelated to emotion and healthy controls were less likely to invest following a loss on a previous round and were more likely to invest after a recent gain, resulting in their portfolios suffering. Quantifiable drawbacks in emotional decision-making have led many researchers to argue for a combination of interventions to teach formal analytic processes and "choice architecture" that maximizes the odds that decision makers will make wise choices, given known decision biases (Benartzi et al., 2017; Milkman et al., 2009; Moore et al., 2010).

There is also evidence that intuitive processes improve decision-making and that emotional processes are not the enemy of good decision-making. For example, in a series of five studies, Dijksterhuis (2004) found that "gut feeling" decisions led to more holistic view of the

problems and better choices. Seo and Barrett (2007) found that for experienced investors, emotional intensity improved financial decisions. According to Seo and Barrett (2007), the most successful investors recognized their emotions and treated them as a source of information. Their findings support Damasio (1994; as cited in Seo & Barrett, 2007), who argued that emotions facilitate judgement by helping decision makers quickly generate and select options by providing basic information about the valence of potential outcomes. According to Dijksterhuis and Nordgren (2006), intuitive processes, primary appraisals, and emotional evaluations enhance associative processes and expand the decision maker's capacity for information processing.

The effects of positive emotion on decision making are the particular focus of the current project. In their study of dispositional emotions and decision making, Staw and Barsade (1993) found that MBA students with high positive affect scores were more accurate in their decisions. Those who scored higher in dispositional positivity got more of the in-basket items correct, requested more information when they needed it, recognized the relationships between decisions, and made greater use of the data provided in the exercise. The authors concluded that "positive affect provided an energizing function that enables people to delve more deeply into decision tasks" (Staw & Barsade, 1993, p. 320). Isen and Means (1983) used an experimental approach to study the effects of positive affect on decision-making. The researchers praised some participants (they were told that they had performed at the 97th percentile on the perceptual-motor battery on earlier perceptual-motor tasks), while others received no feedback. Afterwards, participants were asked to decide which fictitious car they would buy, based on given information (e.g. fuel, economy, maintenance cost, safety record, handling, riding, comfort, roominess, resale value, purchase price, and styling). Participants in the positive feedback condition were more efficient decision-makers; they were faster at making their decision, used fewer dimensions to aid them in

their decision, and were less likely to go back over information that they looked at previously. The authors suggested, like Staw and Barsade (1993), that positive emotions promoted more efficiency in decision-making tasks. More support comes from three studies by Murray et al. (1990), who found that people in pleasant moods identified more similarities and differences between stimuli and were more flexible and creative in their approach to a categorization task.

In another study conducted by Isen et al. (1991), a positive mood was induced by giving medical student participants positive feedback after an anagram task in which they generated as many words as they could by using the same five letters. Those in the positive mood were told that they had performed in the top 3% of all graduate students worldwide. Participants in the control group did not do the task, instead, they were asked to judge how difficult it would be to do the anagrams and were given no feedback. Afterwards, all participants reviewed six hypothetical patient charts that showed evidence of a solitary pulmonary nodule, and then decided which one of the patients most likely had lung cancer. Isen et al. (1991) found that medical students exposed to a positive mood condition completed the primary task more efficiently than the control group and offered more information; they diagnosed accurately in less time than the control group, and then engaged in additional diagnostic tasks that were not required by the experimenters; they wrote comments, recommended additional tests, and considered supplementary treatment plans for patients. The authors concluded that participants who were in a positive mood manipulation were more involved and efficient in their given tasks. However, like Staw and Barsade (1993) found, their participants were not just better decision-makers, they also appeared to be more energized. They did more than was asked and were more immersed in the task.

The decision-making studies by Isen and collegues led Fredrickson and her collaborators to investigate how emotion, specifically positive emotions, might serve to influence the thought process. Isen et al. (1987) suggested that positive emotions help with seeing the big picture and coming up with creative solutions. For example, in an experiment by Isen et al. (1987), participants had to try to light a candle on a wall, but in a way so that the wax would not drip onto the table. They were given a candle, a box of tacks, and a book of matches. Before completing the task, the researchers had two out of four conditions watch films. Participants in the positive emotion group watched a 5-minute comedy film that was previously found to induce positive affect (Isen & Gorgoglione, 1983). Participants in the neutral film control group watched a 5-minute segment from a math film that was also previously used. Participants in the third condition had no emotional affect and were just asked to perform the task. Participants in the fourth condition had no emotional affect, however, the items were arranged in a different way; they had the candle, book of matches, and a pile of tacks next to the empty box. Isen et al. (1987) found that participants who were the neutral group had more trouble and often did not finish the task, which the authors suggested represented "functional fixedness," or the inability to consider alternative uses for the all of the objects that were given to them (Duncker, 1945, as cited in Isen et al., 1987). In contrast, the majority of those in the positive emotion group did complete the candle task. They were able to see an alternative function for the box that the items were in. According to the authors, positive mood allowed participants to access positive materials in memory and open their minds to a larger and more diverse set of cognitive material. The results helped influence Fredrickson's Broaden and Build theory of positive emotions: while negative emotions narrow an individuals' momentary thought-action repertoire by initiating specific action tendencies (e.g. fight, flee), positive emotions broaden the individuals'

momentary thought-action repertoire by pursuing a greater range of thoughts and actions (e.g. play, explore; Fredrickson, 2001; Fredrickson, 2004; Fredrickson & Branigan, 2005). Fredrickson's Broaden and Build theory also suggests that positive emotions have a personal adjustment or adaptive value, perhaps facilitating both creativity, and quick consideration of solutions.

In two studies designed to test Broaden and Build theory, Fredrickson and Branigan (2005) asked participants to watch videos (chosen for their ability to elicit emotion) and perform tasks. The two videos that elicited positive emotions were: "Penguins" (shows penguins waddling, swimming, and jumping around to elicit amusement) and "Nature" (shows fields, streams, mountains, and a sunny day to elicit serenity/contentment). The two negative emotion eliciting videos were: "Witness" (shows a group of men taunting a group of Amish people on the streets to elicit anger and disgust) and "Cliffhanger" (shows a mountain climbing accident to elicit anxiety and fear). The neutral video, "Sticks" showed a pile of sticks piling up. In Study 1, the authors used global-local visual processing task to measure breadth of attention. In this task, participants' choice of matching items reflected an attention to detail (local) or to configural (global) aspects of the items. In Study 2, the dependent measure was an open-ended Twenty Statements Test (TST), each of which began with, "I would like to___." Participants were asked to fill out as many lines as they could and received a point for each completed line. Participants in the positive manipulation conditions in Study 1 displayed a broader sense of thought-action repertoire; they demonstrated a global bias on visual processing task and in Study 2, the positive groups shared higher on the TST. They reported increased desires to be active and outdoors, and to be more outgoing, social, and happy. Participants in the negative manipulation group had a narrowed-thought-action repertoire; in Study 1 they demonstrated a local bias on the visual

processing task, and in Study 2, they gave simple worded answers on the TST. They gave less detailed responses, used fewer action words, and reported less interest, desire to plan ahead, and motivation. The results supported the authors' hypothesis that emotions can influence attention and thought-action repertoire. Fredrickson and Branigan (2005) discuss the outcome from the perspective of coping and well-being. The authors discuss how feeling amusement and contentment contribute to the cognitive reappraisal of events, problems, decisions choices, and contribute to better coping skills. In the face of adversity, cognitive reappraisal may fuel the undoing effects of positive emotion, speed physiological recovery from stress, and contribute to long term well-being. The authors suggest that although the positive emotions interventions simulated were short-lived and induced through simple stimuli, the results are evidence of a carry-over effect that has longer lasting effects on people's subsequent thoughts, actions, and responses, and provide support for the study of emotion from the perspective of strength and resilience.

Past Research on Awe

Early work on awe, as with other emotions, sometimes focused on negative appraisals linked to fight or flight. For example, Lazarus (1991) defined awe as a negative and threat-based experience that combines fright and amazement (i.e. thunderstorms). Threat-based awe can be felt in multiple contexts, generally when appraisals of self-control and outcome certainty are low, which generate fear responses and preparation for flight. Similar to other negative emotions, threat-based awe is described as having an alarm function that produces arousal in the body. For example, Gordon et al. (2017) found that participants who felt threat-based awe in response to a video of the earth, space and solar system (presented with ominous music) had greater sympathetic autonomic arousals (i.e. increased heart rates), reported less self-control and less

certainty. Threat-based awe may generate responses related to flight, however other definitions of awe suggest that responses are less specific and may also align with functions generally assigned to positive emotions. Many studies have demonstrated that experimentally induced awe tends to elicit positive effects that are high and comparable to other positive emotions, with low levels of negative emotions (Danvers & Shiota, 2017; Griskevicius et al., 2010; Shiota et al., 2007). Frijda (1986), focused on the positive aspects of awe, including amazement and surprise. Like other positive emotions, amazement and surprise would be linked to a sense of personal control and value. Indeed, Allen (2014) suggests that awe can create a diminished sense of self that improves mood, expands the sense of time, and decreases materialism.

Evolutionary psychologists suggest that awe serves a functional purpose in that it inhibits biases learned from past experience, and allows for more flexible interpretations of available information (Keltner & Haidt, 2003; Shiota et al., 2007). Awe may serve a communication function by opening the mind to increase receptive modes of attention, and awareness of specific surrounding details and serves a social coordination function by dramatically expanding the usual frame of reference (Shiota et al., 2007). For example, research suggests that people who experience awe are kinder and more generous to others as they are more likely to go out of their way to do acts of kindness such as volunteering to help charity (Allen, 2014). Keltner and Haidt (2003) and Allen (2014) emphasized two central themes of awe: perceived vastness and need for accommodation, both of which serve a personal adjustment function. Vastness, defined as anything that is experienced as being larger than the self, physically and socially, encourages self-awareness, acceptance of self-concept, and a diminished sense of self ("the small self"), which in turn gives people the sense that they have more available time, increases feelings of connectedness, increases critical thinking, increases positive mood, and decreases materialism

(Allen, 2014). Accommodation, the process of adjusting to assimilate a new experience, often involves feelings of enlightenment, broadened horizons and novelty. Previously learned information can then be combined with new learning to adjust to the new situation.

With regard to decision-making, research has linked awe to increased systematic processing, and reduced reliance on cognitive shortcuts or heuristics (Danvers & Shiota, 2017). Heuristic processing is associated with using minimal cognitive ability and relies on judgement and easily accessible information, such as the source's identity and non-context clues, which is also known as cognitive shortcuts (Chaiken, 1980). By contrast, systematic processing requires more cognitive effort by actively comprehending and evaluating the given task (Chaiken, 1980). Although positive mood is an indication of a safe and predictable situation in which heuristics may be relied on, functional theories suggest that awe inspires systematic processing because it is an indication that stimuli are too big to process superficially, are not easily understood, and challenge basic assumptions (Danvers & Shiota, 2017). In two studies, Griskevicius et al. (2010) demonstrated that awe was matched only by nurturant love in its ability to stimulate systematic processing. The researchers induced emotions (i.e. happiness, attachment love, amusement, awe, anticipatory enthusiasm, contentment, nurturant love, and neutral) by having participants write about a relevant personal experience. Researchers asked those in the awe condition to describe a panoramic view that they had experienced. In the subsequent persuasive message activities, weak arguments were dismissed by those in the awe condition. Only those in the nurturant love condition responded similarly. Those induced to feel other positive emotions (amusement, contentment, anticipatory excitement, attachment love) were persuaded by both strong and weak arguments. The studies reveal another aspect of awe that differentiates it from many other positive emotions.

Danvers and Shiota (2017) suggest that it is both the suppression of heuristics and the increase in systematic processing that makes awe of particular interest. In a study that builds on previous findings, the authors conducted three studies that assessed whether elicited awe reduced reliance on scripts. In the first study, participants watched films to inspire awe (watching an Olympian figure skater unexpectedly win a gold metal) or neutral states (instructions on how to build a cinderblock). In the second study, researchers contrasted awe with three specific positive emotions: enthusiasm, pride, and contentment as well as a neutral state condition. Participants were asked to describe an event when they felt a particular emotion. For example, for awe, participants were asked to describe an event with a panoramic view for the first time, such as the Grand Canyon. In the third study, participants watched a video of 12 photographs of panoramic nature scenes (awe), dangerous natural phenomena (threat-based awe), or other positive (baby animals), or neutral (bus stops) scenes. After the emotion manipulation, participants in all three studies listened to a 5-minute short story about a couple going on a romantic dinner before completing a series of true/false questions about the date. In all three studies, Danvers and Shiota (2017) found consistent results that participants in all of the awe conditions were less reliant on the heuristic date script and accurately remembered more specific details compared to the other conditions. The authors concluded that awe, compared to other general positive emotions, affects people differently.

Silvia et al. (2015) tested the relationship between openness to experience and awe; they showed awe-inspiring experiences in photos and had participants listen to transcendental music. The authors had participants complete personality and emotion scales (NEO, FFI, and DPES) before viewing images of the sky and space. After each photo was presented, all participants reported their emotional reaction to the image. In the second part, participants listened to the

song “Hoppípolla” by the Icelandic band, Sigur Rós, and reported their emotional experience to the song. The authors found that participants who scored high in openness to experience reported stronger emotional responses to the pictures of space and the song. The authors also found a significant correlation between self-reported awe and openness to experience. The results demonstrate how individual differences in personality and experience may influence the intensity of the awe experience, the inclination or motivation to experience awe, or the degree to which it inspires related emotions, such as the many aspects of generally associated with awe, including connectedness to the surroundings and interest in new experiences. For example, in their studies of awe-inspiring experiences, Nelson-Coffey et al., (2019) found that awe was accompanied by increased self-transcendent emotions such as compassion, gratitude, love, optimism, connectedness, and self-relevant thoughts. These results contribute to the growing body of research on awe, however, there is still a lot more to know about it.

The Present Study

This interaction between an individual’s motivation and information processing is particularly relevant to the current project. The appraisal theory offers an explanation for one way that emotion likely influences cognitive processes (Moors et al., 2013), including decision-making (Fredrickson, 1998). The functional theory describes how emotions function in order to help with communication, social coordination, and a personal adjustment or coping function (Keltner et al., 2006). Past research has focused mainly on negative emotions, some on positive emotions, and very little has focused on awe, particularly the effects of awe on decision-making. This study aimed to fill the gap in the literature by evaluating awe in the context of Fredrickson’s Broaden and Build theory and Danvers and Shiota’s (2017) proposition of awe as being a useful tool for attention related tasks. The project expanded on Fredrickson’s theory and Isen and

colleagues' work, by using similar methods from previous research and examining a different emotion that has been linked to expanded cognition: awe. The results have implications for the study of emotion, particularly awe, and for research on how to broaden decision-making perspectives and stimulate abstract thoughts.

Overview of Method and Hypotheses

Participants were assigned to one of three mood manipulations. Those in the positive group watched "Penguins" (penguins falling, waddling, slipping), those in the awe group watched "Space" (photos of space from the NASA photo gallery) and in the neutral group, participants watched "Everyday Objects" (printing paper, shutting off the light, sharpening a pencil, etc.). Participants responded to prompts about students who wanted advice about typical difficulties and decisions that college students face (roommate challenges, commuting, decisions about traveling abroad), future selves prompt where participants listed their hopes and fears for their future, and completed a survey packet that included demographics, a personality measure, and attitude scales used as filler material.

Hypothesis 1: Participants in the awe condition will be more engaged in their tasks than the neutral or positive groups. Based on suggestions that awe creates a diminished sense of self, inspires individuals to be kinder to others, increase attention to detail, and be less reliant on cognitive shortcuts, it was expected that all participants in the awe condition would be the most engaged in all of their tasks (Danvers & Shiota, 2017). The awe manipulation was expected to improve motivation, as indicated by the amount of time spent on each task and the number of words or phrases written in their responses compared to the positive emotion or neutral conditions.

Hypothesis 2: Participants in the positive emotion condition will be more engaged in their tasks than those in the neutral group. It was expected that participants in a positive mood would be more engaged than those in the neutral conditions, as positive affect has been demonstrated to provide an "energizing function" that helps individuals to delve deeply into given material in problem solving tasks (Staw & Barsade, 1993). As suggested by past research, including Isen, et al., (1987), participants exposed to a positive mood manipulation were expected to spend more time elaborating on the advice task, a reflection of their desire to be helpful and share their knowledge and experience.

Hypothesis 3: Openness to experience will be correlated with engagement. In alignment with previous findings, individual differences in personality and experience was expected to influence the intensity of the awe experience, in part because they may be more inclined or motivated to experience awe and inspire related emotions, such as connectedness to the surroundings and interest in new experiences (Silvia et al., 2015).

Method

Participants

One hundred fifteen undergraduate students (M_{age} = 19.24, SD = 3.12) took part in this research study in exchange for course credit. Participants were recruited from the Bridgewater State University Psychology department's SONA software system, which enables universities to manage research and recruit participants. Most participants identified themselves as Freshman (67.9%), while others were Sophomores (19.3%), Juniors (7.3%), and Seniors (5.5%). The majority of the sample consisted of Caucasian individuals (67.9%). Others identified as African American/Black (16.5%), Latino/Hispanic (8.3%), Asian/Pacific Island (1.8%), Native American/American Indian (0.9%), and Other (4.6%).

Only those who self-identified as female were eligible to participate. Although the previously mentioned studies did not restrict participation, research indicates that women are often more expressive (Kring & Gordon, 1998) and report feeling more comfortable expressing their feelings than men (Simon & Nath, 2004). Women also report being more aware of their feelings (Barrett et al., 2000), and experiencing more intense emotions than men (Fujita et al.,1991), and may perform better on emotion-related tasks (Barrett et al., 2000). Finally, the majority of the BSU subject pool identified as female, so it was unlikely that the study would enroll enough males for analysis. Therefore, with a short amount of time and to reduce error variance due to individual differences in emotionality between males and females and to expedite the data collection, only females were allowed to participate.

Materials and Measures

Videos. There were three video clips. One video was chosen to induce positive affect. It was a video from YouTube titled, "Penguins Fail Best Bloopers from Penguins Spy in the Huddle (Waddle all the Way)" (Penguins). It included footage of penguins falling, sliding into each other, and hopping around. This footage was very similar to what was used in Fredrickson and Branigan's (2005) study on positive emotions. The second video was chosen to inspire positive awe. It was a compilation of images from outer space taken from the NASA photo gallery (Space), similar to Nelson-Coffey et al. (2019)**.** This video was made by the researcher using photos from the NASA website and had pictures of outer space with no captions or sounds. The last video was for the neutral group. It was a video compilation of everyday things such as water running, lighting a burning, paper printing, etc. (everyday items, which is similar to many previous studies; Fredrickson & Branigan, 2005). It was also made by the researcher and was

taken from the internet with no captions or sounds. All of the videos were one minute and thirty seconds long.

Writing Prompts. Materials were presented in separate folders in order to distinguish between different tasks that participants completed during the experiment. Each folder contained one item, (i.e. a writing prompt, brief survey, video evaluation, or other target or filler item). All writing prompts were pencil and paper, similar to previous studies (Fredrickson & Branigan, 2005, Isen et al., 1987). All three of the target prompts appear in the Appendix.

In the awe group, participants saw a travel prompt first. This travel prompt was about a student who requested advice about studying abroad. The student asked questions such as what they should do to prepare, who to go to for help, and what responsibilities the student would have abroad.

In the positive mood group, participants saw the student advice prompt first. The prompt had two parts: the first part asked for advice about having trouble with a roommate on campus and what they should do about it. The second prompt was from a separate student asking for advice about commuting to campus and any tips participants had for them.

To compare mood manipulation participant responses directly to a control group, participants in the neutral groups saw either the same folder order as the awe group (travel prompt first), or the same order as the positive mood group (student advice prompt first).

Although the writing prompts were designed by the researcher, they were guided by previous literature on the topics. Both the awe and the positive prompts took some inspiration from Isen et al.'s (1991) study in which medical students diagnosed patient symptoms, but the "patients" in this case were other students, and the "symptoms" were typical undergraduate concerns. In the case of awe, the idea to ask participants to help a student with travel questions

was inspired by previous associations awe had with increased desires to be outside, openness to new experiences, and a diminished sense of self (Allen, 2014; Fredrickson & Branigan, 2005). The student advice writing prompt was also based on Isen et al.'s (1991) diagnostic task and was designed to reflect familiar problems about which undergraduates should have some level of expertise.

All participants also completed a third writing prompt of interest to the current study: the future selves writing prompt. It was a writing prompt from Cross and Markus (1991) designed to capture cognitions about the person the participant thought they could become, would like to become, or feared becoming. Across many studies Markus and colleagues have found evidence that possible selves' function as motivations for future behavior (selves to be approached or avoided) and as context for evaluating current behavior (an adjustment function). Hoyle and Sherrill (2006) suggest they serve as mechanisms for both personal (adjustment) and interpersonal self-regulation (social coordination function). Markus and Nurius (1986) argue that possible selves reveal a form of self-knowledge that is dynamic; they are a measure of the cognitive aspects of personality that is sensitive to changes in the environment (in this case a mood manipulation). Number of possible selves has also been used as a predictive measure. For example, Dunkel (2000), found that individuals who were actively exploring their future options but had not yet made a commitment, endorsed more possible selves compared to other groups; more possible selves predicted openness to exploration. Markus and Nurius (1986) have demonstrated the validity of the possible self-measures, and Markus (1987) reported reliabilities between .72 and .95. In the current study, the possible selves prompt was included as a measure of interest in identity exploration (Dunkel, 2000; Kerpelman & Pittman, 2001).

The Positive and Negative Affect Schedule (PANAS). The PANAS is a 20-item scale developed by Watson et al. (1988) and was used to measure positive affect. For the purpose of this study, PANAS was divided into two parts to record a before and after video manipulation measure (PANAS I and PANAS II). Participants were asked to rate, from 1 to 5 (1 being "Very slightly or not at all", 2 being "A little", 3 being "Moderately", 4 being "Quite a bit", and 5 being "Extremely"), the degree they would rate their emotions. Some emotions listed were irritable, ashamed, active, and jittery (Watson et al., 1988). The PANAS has been used for more than 20 years and was determined as a valid (α = 0.85 to 0.89) and reliable measure for its constructs as the test-retest correlations ranged from 0.31 to 0.71 (Crawford & Henry, 2004). Cronbach's alpha reliabilities for the current study appear in Table 1.

The Big-Five Inventory (BFI-K). The BFI-K was adapted into a shorter, 10-item version by Rammstedt & John (2005). This test is a self-report inventory used to measure the big five personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Constantin et al., 2010). Participants rated ten statements on a 5-point scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Examples include, "I see myself as someone who… is reserved…has few artistic interests…is generally trusting" (Rammstedt & John, 2005). The BFI-K was considered reliable (α = 0.70 to 0.80) in cross-cultural samples (Benet-Martínez & John, 1998; Worrell & Cross, 2004). For the current study, Cronbach's alpha reliabilities, which appear in Table 1, were much lower compared to previous studies.

Other Materials. There was a brief survey that included demographics, some attitude scales, questions about the video, as well as the participant's personal opinions and experiences with traveling. These materials were not included to test any hypotheses. They were included to break up the writing tasks and to convince participants that their ratings of the video and

individual differences in attitudes and opinions were of interest to the experimenter. These additional materials were also used in order to provide pilot data for future projects.

Procedure

The experimental room was set up in advance. Six colored folders (blue, green, yellow, purple, red, and orange) were ordered according to condition with each colored folder containing a specific task. The use of colored folders served two purposes, one of which was to help researchers arrange the materials, in order, by condition. Positive and Neutral/Positive groups saw their folders in the same order while the Awe group and Neutral/Awe group saw their assignments in the same order. This was done to account for counter balancing effects so that the groups would be able to be compared directly to one another. The folder stacks were placed on a large table to assign seats in a room equipped with cameras and recording equipment. Video cameras were positioned to record the desk area in front of each participant. The second purpose of the colored folders was to enable researchers to later review times spent on folders, as described below.

Upon arrival to the lab, participants checked in with the student researcher, read, and signed the consent form. There were up to four participants per study session. Participants were randomly assigned to a condition (Positive, Awe, Neutral/Positive and Neutral/Awe) when the participant log indicated conditions were equal. Otherwise, participants were placed in conditions with fewest numbers of participants to avoid uneven conditions. The positive group saw the ‘Penguin’ video. The awe group saw the ‘Space’ video. The Neutral/Awe and Neutral/Positive groups watched the ‘Everyday Items’ video.

When participants entered the experimental room, they were directed to sit in a seat where there were folders (to ensure that the cameras would be able to capture the participants on

film). Participants first completed PANAS I and then direct their attention to the television screen in the front of the room. They were told that the video footage was going to play during the entire session, but to pay close attention for one minute. The researcher timed exactly a minute before instructing participants to complete PANAS II and then to work through the folders in order. Each participant worked through the study materials independently and did not interact with others during the tasks. When participants completed the folders, they were individually debriefed and thanked.

After all participants finished in each study session, the researcher stopped the video recording in the camera room. The researcher then reviewed the recording and marked the times in a log of when each participant started and ended each colored folder. When the researcher finished recording the times for each participant, they deleted the video footage.

Results

Two aggregate measures of "engagement" were created. The overall engagement measure included the total amount of time participants spent on their tasks, as well as their involvement in their tasks, indicated by the number of words participants wrote for each prompt, and the number of possible selves listed (similar to Dunkel, 2000). Because the "scales" for each of these measures are so different, as were the means and distributions, each was converted to a standardized (z-distribution) score first. The engagement scores were then calculated as the mean of aggregated z-scores.

An analysis of variance (ANOVA) indicated that overall engagement across the entire study (all activities, including surveys and other filler scales) differed by condition, $F(3,110) = 3.55$ $p = 0.017$, $\eta^2 = .09$. Post-hoc comparisons indicated that engagement was significantly

higher in the awe condition than in the positive and neutral positive and marginally significantly higher than the neutral awe condition (p = .051; see Table 2 for details).

There were no hypotheses regarding specific writing prompts or individual tasks within the study, however the three target writing tasks (student problems, travel advice, and possible selves) were expected to reflect most of the differences in engagement inspired by the manipulation (over a demographic survey, and attitude scales, for example). Therefore, a separate analysis of those three target prompts was performed.

Engagement for the three target prompts (student problems, travel advice, and possible selves) was calculated as described above, but only the time spent and words used, or possible selves listed for those three target tasks was included. There was a significant effect for the awe condition ($F(3,110) = 4.20$, $p = 0.008$, $\eta_2 = .10$). Post-hoc comparisons revealed that engagement was higher in the awe condition than the positive or neutral positive conditions, but the difference between the awe and neutral awe conditions did not reach significance (p = .073; see Table 2 for details).

The raw and standardized means appear in Table 2, which shows aggregated means for overall and target prompt engagement, as well as means for the three target activities, by condition. No hypotheses were proposed for individual prompts, so the means for each activity are shown only for descriptive clarification.

The hypothesis that those in the positive emotion condition would be more engaged than those in the neutral groups was not supported at the overall level or for the three target prompts.

Engagement was not significantly correlated with individual differences in personality traits, including openness to experience, which was expected to be positively correlated with engagement (see Table 1). However, the relationship between engagement and one trait,

agreeableness, differed by condition. Agreeableness was significantly positively correlated with engagement in the awe condition (r = .67, p < .001), but was significantly negatively correlated with engagement in the positive (r =-.57, p = .004) and the neutral conditions (r =-.32, p = .02).

Discussion

The current study examined three hypotheses about the effects of positive emotions, particularly awe, on decision-making tasks. The prediction that participants in the awe condition would be more engaged in their tasks was supported. This particularly true for overall engagement. The outcome supports previous research on the positive effect of awe on decision-making (e.g. Danvers & Shiota, 2017; Keltner & Haidt, 2003). The results also suggest support for previous research on the effect of awe on interest in exploration and openness to new experience (e.g. Silvia et al., 2015), such as travel and future situations or conditions. The hypothesis that participants in the positive emotion condition would be more engaged compared to the neutral condition was not supported. Previous research suggested that positive affect increases motivation to do work and engage in given tasks (Isen & Means, 1983; Isen et al., 1991; Moors et al., 2013; Staw & Barsade, 1993), but those findings were not replicated in this study. This could be because of error within the study; the video shown in the positive emotion condition was similar to those used in other research but could have elicited other feelings instead of the desired emotions. It could have not been a strong enough manipulation to influence the participants' positive mood. Emotions can be difficult to manipulate, especially in a lab setting. The hypothesis that personality would predict engagement was also not supported. Although there was some indication that agreeableness may have differentially influenced engagement in the awe condition, there was no evidence that the personality trait of particular interest, openness to experience, was linked to participant's motivation or interest in any of the

activities. Personalities were not expected to be changed by the manipulation, but those who scored higher in openness to experience were expected to be particularly moved by the awe manipulation. Positive awe has been previously associated with characteristics such as wonder, connectedness to surroundings, and openness to new experience.

Engagement Levels in Awe Conditions

The participants in the awe condition had higher levels of engagement compared to other participants. In this study, engagement was measured by the word count, amount of time spent on each task, and number of future selves listed. The results are similar to Danvers and Shiota's (2017) findings that awe participants were less reliant on just the information given to them, instead they put more effort in the tasks given to them, sought out more information, asked more questions, considered more aspects or future possibilities, and gave more detailed responses. The increased time participants spent on activities may reflect less reliance on the given information and more cognitive effort in order to come up with solutions or helpful advice. If awe is evaluated as a positive experience, the results support Isen and Mean's (1983) findings that positive mood increased participants' motivations to work on and complete tasks. Like Isen et al.'s (1991) medical student participants, undergraduate students in the current study also spent more time on tasks and wrote more words in response to the writing prompts.

Participants in the awe condition who scored higher in the personality trait of agreeableness were more engaged in their tasks. It was hypothesized that openness to experience would predict engagement, but perhaps it was the agreeableness subscale that better reflected receptiveness to the awe mood manipulation, and to the subsequent "energizing" effects of awe. Less agreeable individuals might be less susceptible to any mood manipulation. This interpretation aligns with the appraisal theory, as emotions are interpreted by individual

differences in motivations and personal values. For example, Smith et al. (2014) describes how appraisals and corresponding interpretations for emotions are based on the individuals' needs, goals, and abilities.

The levels of engagement in the awe condition supports Seo and Barrett's (2007) findings that participants who felt awe seemed more aware of their emotions. Perhaps, as suggested by Seo and Barrett (2007), the positive aspects of awe motivated participants to use their emotions as a source of information and helped them to generate and select options while answering the writing prompts. The results also support the communication purpose of emotions, as mentioned in functional theory, as they suggest that awe increased motivation, decreased reliance on cognitive shortcuts, and created a diminished sense of self and instead focus on others more (Keltner et al., 2006).

Differences in engagement were driven by three writing prompts, one of which was future selves. Cross and Markus (1991) and Markus and Nurius (1986) found that possible selves' function as motivations for future behavior as well as context for evaluating current behavior. In the awe condition, participants were more engaged in the activity compared to neutral or positive conditions. They provided a higher number of possible selves and also spent more time on the prompt. Similar to Staw and Barsade's (1993), the results support previous findings of positive affect "energizing" participants. Participants were able to think more deeply about the tasks which is perhaps why they spent more time and effort in their responses. The increased engagement levels also support the social coordination component of the functional theory as awe appeared to increase critical thinking, allowed the mind to expand the usual frame of reference (Shiota et al., 2007) and give individuals' the sense of more available time to do given tasks (Allen, 2014).

Awe and Positive Emotions

In line with Danvers and Shiota's (2017) suggestions, the awe manipulation appeared to have a different effect on cognition than positive manipulation, suggesting that while awe may share some aspects with positive emotions, it may also be in a different category. Nelson-Coffey et al. (2019) found that awe was accompanied by other positive emotions and was linked to more systematic processing while doing tasks. Awe may encourage individuals to think more deeply about topics as well as promotes creative responses to problems. In the current study, participants in the awe condition took more time to think and respond to all of the writing tasks, particularly the targeted tasks. This could suggest that instead of using cognitive shortcuts, participants could have used more cognitive effort in order to answer their responses thoughtfully. In this way, the results support the functional theory of emotions generally, and the function of awe specifically; awe may help individuals simultaneously see the big picture and sift through the available options. For example, in Isen et al.'s (1987) participants were able to see an alternative function for the box that the items were in. In this study, participants in the awe condition may have written more because they were able to come up with different solutions, options or suggestions instead of giving simple and pat advice.

Fredrickson and Branigan (2005) and Silvia et al. (2015) found that participants in a positive mood had increased desires to be outside and explore. In this study, the results did not directly replicate previous findings but did offer some support because participants in the awe condition spent more time and used more words when doing the travel prompt compared to the other conditions. The results may also support Allen's (2014) findings that awe encouraged self-awareness, decreased materialism, and increased positive mood. Participants' engagement, particularly in response to the travel prompt, suggest that awe may have increased awareness of

the small self in comparison to the large world. However, further analyses would be required to examine the content and themes of responses. The results offer a different direction for the research on awe. Participants evaluated and responded to the writing prompts as would be predicted by a carry-over effect in incidental emotions (Lerner et al., 2015) and suggested that awe allowed for more flexible interpretations of available information (Keltner & Haidt, 2003; Shiota et al., 2007). The results support Danvers and Shiota's (2017) premise that awe belongs in a different category of positive emotions and has different functions than general positivity.

Openness to Experience and Awe

Previous research found that feeling awe may be influenced by personality traits, such as openness to experience. Silvia et al. (2015) found that individual differences in personality and experience may influence the intensity of the awe experience and that connectedness and openness to new experience may affect it. Number of possible selves has also been used as a predictive measure (Dunkel, 2000), particularly in individuals who were actively exploring their future options but had not yet made a commitment. Participants who endorsed more possible selves compared to other groups predicted openness to experience in Dunkel's (2000) previous study. Although personality is generally assumed to be a set of stable traits, and we did not expect personality to be subject to manipulation, researchers have demonstrated a relationship between emotions and personality traits (Silvia et al., 2015) and the emotion of awe was expected to evoke different types of responses from participants who were more open to experience. However, in the current study, the personality trait of openness to experience was not correlated with level of engagement, which was disappointing. This may have been in part because the measure used for personality was overly brief. A simplified, 10-item questionnaire was used and the reliability scores for the subscales (.22 to .53) were far lower than found in

previous studies. There are many "Big Five" scales and other measures of personality that might be able to reflect more a complex nature of openness to experience; there are also other aspects of personality that influence feelings of awe and motivation to feel connected to surroundings. In this study agreeableness was positively correlated with openness to experience. Perhaps the subscale for agreeableness, rather than the subscale for openness to experience, better reflected receptiveness the awe manipulation used in the current study. The results do not rule out the influence of personality on responses to emotional stimuli and subsequent allocation of cognitive and physical resources. However, more research would be required to test the hypothesis (suggested by previous research) that personality might influence participants' vulnerability to laboratory manipulations of emotion and subsequently impact cognitions and behaviors.

Limitations

Though the present study attempted to adapt methods from past research, it should be noted that the sample consisted of undergraduate female students, which may have limited generalizability. Previous research found that females are often more expressive (Kring & Gordon, 1998), report feeling more comfortable expressing their feelings than men (Simon & Nath, 2004), which may be why females perform better on emotion-related tasks (Barrett et al., 2000). Perhaps males would respond differently, and future research should include both genders. Positive affect did not consistently increase engagement in this study. This could be because of error within the study; the video shown in the positive emotion condition was similar to those used in other research but could have elicited other feelings or not been a strong enough to influence participants. Future research should try to use different methods of mood manipulation or a different video. Additionally, participants who were in the awe condition and the positive emotions condition saw folders in specific orders. This could have created an order

effect, which was only partially accounted for by including a neutral mood condition with materials in the same order. A completely counterbalanced study would not have been possible, but research is under way to address the problem more fully by changing the order of stimuli presentation and comparing the results. Furthermore, the quality of the responses was not addressed in this study. Participants could have easily written a lot of words and spent a lot of time in their tasks, but the quality of the responses could be low. Participants could have written responses that were not useful advice, were derogatory or otherwise negative, which could then contradict the claim that they were motivated and engaged in their work in a positive way. Work is under way to have multiple naïve raters score responses for their quality. Finally, openness to experience was not correlated with engagement in any condition. However, there were only 10 questions in the Big Five personality scale, which limits answers as well as the interpretation of results. Future research should also analyze the substance of what people wrote regarding travel interests for comparison by condition and to individual differences in personality (specifically openness).

Conclusion

The results address a gap in the literature and suggest that awe should be investigated as a new category within positive emotions. Awe was found to relate to the broaden and build theory as it appeared to encourage participants to have an open mindset and allow access to more cognitive resources while responding to tasks. The study provides further evidence for the broaden and build theory of positive emotions but extends it to an emotion that has not been tested within that context: awe. These findings could help researchers in the fields of decision making and motivation; future research should investigate thought-action repertoires linked to awe and appraise awe as a unique positive emotion.

Positive emotions are a relatively newer topic in the field of emotion research compared to negative emotions (Seligman & Csikszentmihalyi, 2000). Although it is difficult to define and measure the physiological and cognitive functions of positive emotions, theories such as the appraisal theory, the functional theory, and the undoing theory of emotions offer explanations for why emotions have persisted throughout evolutionary history, and interest in applying the theory to positive emotions has increased. Past literature found that positive emotions broaden the mind set and encourage more creative problem-solving skills. The present study aimed to add to the literature by focusing on awe. As the study of positive emotions continue to increase, there is still a lack in the literature concerning the emotion of awe. Past studies demonstrated that awe may elicit positive effects (Danvers & Shiota, 2017; Griskevicius et al., 2010; Shiota et al., 2007), create a diminished sense of self, encourage open mindedness, increase receptive modes of attention to surrounding details, and stimulate more cognitive effort compared to other positive effects (Allen, 2014; Danvers and Shiota, 2017; Shiota et al., 2007). Using the broaden and build theory, this study expanded the theory to awe in order to add to the literature concerning awe. The results supported the hypothesis that awe would increase engagement in tasks as participants felt more motivated to do their work and indicates that more study is warranted. Beyond the emotion research, the results indicate that emotions, such as awe, are much more complex than previously thought. It is also a strong emotion that could affect behavior, communication, and decision-making skills in more ways than positive emotions can. In everyday life, awe can be a difficult emotion to appreciate and distinguish from other positive emotions, especially if the individual tends to primarily describe or categorize emotions as positive or negative or defines positive emotions as equal in their strength or value. However, the current study suggests that in the context of contemporary western society, stumbling upon the feeling of awe, and actually

feeling inspired by it can be beneficial for mental health, well-being, and mood. The results also support idea that positive awe is an important emotion, one that has specific functions that can be differentiated from other positive emotions, and that it deserves further study.

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Table 1

Intercorrelations, Means, and Scale Reliabilities for Measures of Engagement, Mood, and Personality

Measure	1	2	3	4	5	6	7	8	9
1. Aggregated all task engagement									
2. Aggregated target prompt engagement	.97**								
3. Neuroticism	-.04	-.02							
4. Extraversion	.02	-.04	-.29**						
5. Openness to Experience	.09	.07	.01	-.08					
6 Agreeableness	.00	.02	.04	.22*	.19*				
7. Conscientiousness	-.04	-.02	.05	.09	.09	.22*			
8. PANAS positive mood	-.20	.00	.07	.15	-.06	.12*	-.06		
9. PANAS negative mood	-.14	-.14	-.04	.01	-.03	.00	-.28**	.28**	
M	0.0	0.0	7.12	6.66	7.02	7.68	6.85	2.39	1.45
Cronbach's Alpha (α)	.73	.79	.53	.52	.37	.22	.23	.81	.78

Note. Engagement means are for standardized scores; thus, the means are zero.
* $p < .05$, ** $p < .01$

Table 2

Means (and Standard Errors) for Aggregated Engagement and the Travel, Student Advice, and Future Selves Writing Prompts by Condition

	Condition			
Measure of Engagement	Awe (n = 28)	Positive (n = 31)	Neutral/Awe (n = 28)	Neutral/Positive (n = 27)
Standardized aggregate, all study tasks	.30 (.14)	-.08* (.10)	-.01† (.10)	-.19** (.09)
Standardized aggregate, three target prompts	.31 (.14)	-.10** (.10)	.03†† (.10)	-.22** (.09)
Student Advice Prompt				
Word Count	102.64 (9.15)	78.80 (5.79)	86.93 (7.91)	65.15 (4.21)
Time in Minutes	6.01 (.42)	5.21 (.35)	5.26 (.34)	4.49 (.24)
Travel Prompt				
Word Count	120.86 (11.63)	99.68 (8.21)	113.54 (6.94)	100.26 (6.09)
Time in Minutes	7.31 (.63)	5.93 (.45)	7.42 (.34)	5.78 (.36)
Possible Selves Prompt				
Number of Selves	9.07 (.57)	8.03 (.49)	8.14 (.59)	8.51 (.59)
Time in Minutes	3.32 (.25)	3.08 (.28)	2.71 (.16)	2.81 (.16)

Note. Group mean is lower than the awe mean, **p < .01, *p = .015, †p = .051, ††p = .078.

Appendix

Travel Writing Prompt

The idea of traveling for the first time provided prompted a wave of conflicting emotions. I don't know what to expect. I am not well traveled and am as green as they come. No one I know has ever done this before.

As I stood looking at the advertisement, I felt I had a big sign hung over my head that said, "I HAVE NO IDEA WHAT I'M DOING."

Vast Student Tours: A Travel Agency Exclusively for Students

Have you ever imagined yourself waking up to a view of the Eiffel Tower in France? Or maybe relaxing to the sounds of waterfalls in Brazil? We make traveling abroad easy! We're a travel agency that has 75+ affiliate locations around the globe as well as 40+ years of experience with student traveling.

Age: 20	Gender: Male	GPA: 3.1	Year: Junior
Job Occupation: Retail			
When do you work? Mostly weekends			
Commuter or living on campus: Off campus apartment			
Major? Business			

Try to help the student with his questions. For example, he is wondering:

How do I know whether travel is right for me? How can I find out where I should go? The paperwork must be overwhelming, how can I get help? How could I pay for it? What about my responsibilities here? Would travel delay my graduation? Where would I live? How would I get there? How would I get around when I got there?

Student Advice Writing Prompt # 1

Student #1: The Roommate

Age:	20
Gender:	Female
GPA:	3.5
Job Occupation:	Waitress
Prior Experience with Roommate:	Yes, I have had 3 roommates before
Sleep Schedule:	In bed by 11 PM, up by 7AM
Do you have people over often?	Yes
Going home every weekend or stay on campus:	I usually stay on campus
Room preference:	I prefer my room to be cold. I also don't clean my side that much. I also prefer to study with background noise, so I always have music or the TV on.

Imagine the fellow BSU student described above asked you for your advice about their roommate. They're having trouble communicating with their roommate. It's getting to the point where it's uncomfortable when they are both in the room. In the space below, write any advice you would give this student to help them.

Student Advice Prompt #2

Student #2: The Transfer Student

Age:	19
Gender:	Male
GPA:	3.5
Year:	Sophomore, I transferred from another school
Job Occupation:	Cashier
When do you work?	I work every day after classes. On Monday, Wednesday, and Friday, class ends at 2:15 PM so I work from 3 PM – 10 PM. On Tuesdays and Thursdays, I don't have classes, so I work 9 AM – 5 PM. On the weekend I work from 7 AM – 6 PM.
Commuter or living on campus:	Commuter
How long does it take to leave campus?	It usually takes me 15 minutes to walk across campus to my car. Then it takes 15-20 minutes to get out because of the traffic.

Imagine a fellow BSU student (the one listed above) asked you for your advice on class scheduling. They're having a tough time since they just transferred to the school. They are having trouble getting to classes on time because of the traffic and parking on campus. They are

also not doing well in classes but do not know much about the resources on campus. In the space below, write any advice you would give this student to help them.

Future Selves Writing Prompt

Probably everyone thinks about the future to some extent. When doing so, we usually think about the kinds of experiences that are in store for us and the kinds of people we might possibly become. Sometimes we think about what we probably *will* be like, other times about the ways we are *afraid* we might turn out to be, and other times about what we *hope* or *wish* we could be like.

One way of talking about this is to talk about *possible selves* -- selves we might possibly become. Some of these possible selves seem quite likely, others may be only vague thoughts or dreams about the future. We have some positive and hoped-for possible selves and possible selves that are feared or dreaded. Some of us may have a large number of possible selves in mind while others may have only a few.

In the space below, please list hoped-for possible selves that you currently imagine for yourself.