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ELICITORS AND EFFECTS OF AN AWE EXPERIENCE

A THESIS APPROVED FOR THE
DEPARTMENT OF PSYCHOLOGY

BY

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Abstract

While efforts have been made to define the nature and effects of experiencing awe (e.g., Keltner & Haidt, 2003; Shiota, Keltner, & Mossman, 2007), there is still much about the emotion which remains unexplored. One of the biggest challenges in studying awe is that, by virtue of being a reaction to the sublime, it is a difficult emotion to create. This research presents and validates a standard awe elicitor, as well as using that elicitor to examine the characteristics and outcomes of an awe experience. Study 1 presented seven different emotional slideshows to participants (3 awe, 2 calm, and 2 excitement) who were asked to evaluate the emotional qualities of each slideshow. Analyses revealed that while the slideshows elicited the intended emotions, there was a significant amount of overlap in emotion created by each slideshow, particularly awe. Study 2 presented four emotional slideshows (2 awe, 1 calm, and 1 excitement) which were revised from participant feedback in Study 1. Participants were again asked to rate the emotional qualities of each slideshow and also completed measures of unethical decision making. Analyses revealed that the slideshows created the intended emotions, this time with little overlap. However, there were no differences on the measures of unethical decision making between conditions. Deeper analyses of emotional ratings provided evidence to support the idea that awe is primarily perceived as a positive emotion, but there was no consensus about whether awe is a high or low-arousal emotion. Limitations and future directions for this research are discussed.

KEYWORDS: Awe, Emotions, Ethics

Introduction

The ability to experience emotion is one of the most fundamentally human qualities. Consequently, a vast amount of effort has been expended trying to define the concept of emotions. What are they? When and how do we feel them, and what purpose do they serve? While many emotions, such as happiness, anger, and fear, are well defined, there are some which are relatively unexplored. One such emotion is awe.

The Nature of Awe

While philosophers, religious leaders, and other professions have discussed emotional reactions to the sublime for centuries, it wasn't until the last two decades that awe was approached and examined from a psychological perspective (Keltner & Haidt, 2003). Awe, as a psychological construct, is generally defined as a positive emotion with two key perceptual elements: vastness and accommodation.

Vastness, as it relates to awe, is simply the perception that something is large. It is important to note that perceptual vastness applies to many different kinds of stimuli. Something can be perceived as physically vast (such as the Grand Canyon), emotionally vast (such as a confession of love), or mentally vast (such as a theory which redefines a field). As with many psychological effects, perceptions of vastness can vary widely from individual to individual. As an example: a person who is ignorant in politics may not understand the wide-ranging ramifications of a surprising election, thus they would not perceive the outcome as vast, while someone who is more informed will be able to understand how important such an event truly is. Knowledge about a subject is not the only factor which can influence perceptions of vastness. Interest in a particular matter may also affect whether an individual perceives it to be vast. For example, while many

people might understand the effects of a star NBA player moving from one team to another (one team gets better, the other worse), only those who are invested in professional basketball might perceive the event as vast.

Accommodation, on the other hand, is a reconsideration or reordering of pre-existing mental schemata (Piaget, 1954). Accommodation is a response to stimuli which surprise an individual, or defy expectations in some way. In the case of awe, something could cause accommodation because it is perceptually vast (larger than expected, or larger than anything an individual has experienced). Alternatively, some other feature of a vast stimulus could create accommodation, with the two effects together creating a feeling of awe. To provide a practical example: if the president were to give a policy speech in front of a crowd of thousands (e.g. "We choose to go to the moon," or "Tear down this wall!"), the speech could create awe purely because the crowd gathered is physically vast enough to surprise, or it could be a combination of the size of the spectacle and the weight of the speech's content (especially when the speech marks a change in policy) that create the effect. Much like perceptions of vastness, individuals will vary in terms of what causes accommodation. The surprising election result mentioned earlier might not be surprising to a political insider who has seen the polls tightening in the days leading up to the event. Similarly, someone who has little interest in politics would likely not understand that the result was something to be surprised about.

Taking the prerequisites for awe into consideration, there is a near limitless amount of potential stimuli which could elicit an emotional awe reaction. This, in fact, poses a problem for researchers interested in awe experiences. If there is a nearly

limitless amount of potential stimuli, and the amount of awe that any particular stimulus elicits varies greatly by individual, how can the effects of awe be observed with any manner of consistency?

Fortunately, some stimuli have a predisposition to elicit particular emotions or affective states. This finding is wide-ranging and holds true across many different emotions. Öhman (1986) suggests that some stimuli are inherently linked to particular emotions due to the evolutionary history of the human species. In particular, reptilian and bestial features are far more likely to elicit a fear response than other stimuli. Anderson, Benjamin, and Bartholow (1998) found that simply being in the presence of a gun increased levels of aggression. Much as a smiling face has a propensity to make most individuals happy, or viewing a reptile has the propensity to make most individuals frightened, some stimuli have the propensity to elicit awe. Keltner and Haidt (2003), along with providing the modern definition of awe, proposed several different prototypical elicitors. These stimuli range from scenes of large natural features (mountain ranges, the grand canyon, oceans), to twist endings in works of fiction (Darth Vader is Luke's father), and large gatherings of people (crowds at a protest, sports venue, or other event). Each of these stimuli is undoubtedly distinct from the others in content, yet each of them contain the perceptual elements necessary to evoke an awe experience.

The fact that there are many different potential prototypical awe elicitors opens the possibility that different elicitors could create different "kinds" of awe. In other words, the experience of awe brought about by viewing the Grand Canyon might be meaningfully different from the experience of awe brought about by viewing images of

faraway galaxies. There has been very little research comparing the awe experience and effects created by different prototypical elicitors, however, there is some preliminary evidence suggesting that awe can take different forms and, in fact, even be negatively valenced. Gordon et al. (2016) found that priming participants with perceptually vast, but intrinsically threatening stimuli produced an awe experience different from the commonly researched positive side of awe.

Gordon's work, along with the variety of stimuli associated with an awe experience, raises questions of the nature of awe as an emotion. The precise definition of what constitutes an emotion has been debated by psychologists for decades, and philosophers for millennia. Recent pushes toward empiricism in the field of emotional research have yielded tools that, while not defining emotion as a broad topic, allow one to specifically pinpoint the nature of any one emotion in particular. One of the simplest, yet most useful, of these tools is the Valence-Arousal Circumplex (Russell, 1980; Larsen & Diener, 1992; Posner, Russell, & Peterson, 2005; Tsai, Knutson, & Fung, 2006). The circumplex model of affect claims that each unique emotion or affective state can be represented by two dimensions: valence and arousal (or activation, used interchangeably from here on). Valence, defined in this context, refers to the inherent pleasantness or unpleasantness of a particular emotion while arousal level refers to an individual's level of alertness. All emotions can, theoretically, be defined based off of their unique positioning on these two dimensions. For example, excitement would constitute a high-arousal, positively-valenced emotion, while calm would constitute a low-arousal positively-valenced emotion. Additionally, all emotions can be "mapped" visually using the circumplex model by representing the circumplex as a graph with

arousal as the Y axis and valence as the X axis (for a visual depiction of the Circumplex, see Figure 1).

However, when one tries to define awe using the circumplex model, issues begin to present themselves. First, it is uncertain what the arousal level of awe actually is. Shiota, Neufeld, Yeung, Moser, and Perea (2011) found mixed results when examining the potential arousal level of awe using several different physiological measures. For example, heart rate did not significant differ between awe conditions and neutral-affect conditions, indicating a neutral or low arousal affective state. However, respiration rate did increase significantly for participants experiencing awe versus participants in a neutral affective state, a finding that would seem to indicate that awe is a high-arousal emotion. In addition to somewhat muddled findings, the awe-stimuli used by Shiota et al. (2011) are limited in that they only represented one facet of an awe experience (one which is positively-valenced), leaving open the possibility that the arousal level of an awe experience varies depending on its valence. Indeed, Gordon et al. (2016) did find some preliminary evidence to support this conjecture.

As previously mentioned, there is evidence indicating that awe is not inherently a positive or negative experience. Indeed, it appears that awe, as an emotion, may not be limited to one type of valence. It is possible that awe may be positvely-valenced *or* negatively-valenced depending on the stimuli which elicits the emotion. Keltner and Haidt (2003) acknowledge that awe could be elicited by negatively-valenced stimuli such as destructive natural forces, yet they insist on viewing awe primarily through the lens of positive psychology. Consequently, much of the research focused on awe treats the experience as positive, which has led to a tacit acceptance that awe must be a

positively-valenced experience. However, Gordon et al. (2016) present evidence that awe experiences can be tinged with fear, and their findings support Keltner and Haidt's (2003) notion that awe can be created with negatively-valenced stimuli. The issue that this creates in the definition of awe is obvious. If awe is *sometimes* positive and *sometimes* negative, then where is one to place it on the circumplex?

There are a few possible answers to this question. The first is that the "positive awe" which most researchers have examined is in fact a different emotion from the "negative awe" that was observed by Gordon et al. (2016). This answer is difficult to accept without further evidence, as the current body of research has not established whether positive and negative awe experiences have different outcomes and cognitive appraisals, and there is relatively little research on negative awe experiences in general. The second possibility is that awe experiences are often simply *accompanied* by a variety of separate, distinctive emotions, and these emotions depend upon the stimulus which created the awe experience. Thus, those who experience a positive awe experience are feeling awe in combination with other positive emotions, and those who experience negative awe are feeling awe in combination with other negative emotions. In this case, awe is likely to fall close to the center (or neutral) on the valence dimension of the Circumplex, as the valence of an awe experience seems to be easily contaminated by the valence of its accompanying emotions. The third possible explanation is similar to the second. Rather than awe being a fairly neutral emotion, it is possible that awe is not an emotion at all, but something more akin to a cognitive process. This idea proposes that awe is more of a psychological mechanism which produces several cognitive outcomes (discussed more in-depth later). The first stage of this process

forces a person to pause, while the second broadens one's frame of reference, allowing a person to reconsider preconceived notions. After, or perhaps during, this process, the person in the awe experience will feel emotions that match the valence of the awe elicitor. From this perspective, an awe experience is not an emotion itself, but a combination of already-identified emotions and a unique cognitive process.

Outcomes of Awe Experiences

One outcome of interest associated with awe experiences is an increase in prosocial behavior. The link between awe, the self, and prosocial behavior has been established over the past decade and a half. Awe was originally conceived of as a "collective emotion" that has the effect of minimizing focus on the self, or in other words, shifting focus onto others or group memberships (Keltner & Haidt, 2003). Experimental evidence for this effect has manifested in a variety of ways. Participants who are prone to awe, or who have recently experienced awe, make more statements about membership in a universal group on a Twenty Statements Test (TST), a tool which asks participants to generate twenty statements about the self (Shiota, Keltner, & Mossman, 2007). Similarly, participants who have been exposed to an awe manipulation report higher feelings of "oneness" with the world and others (Van Cappellen & Saroglou, 2012). This connection to others extends into a willingness to lend a hand if necessary. Those experiencing awe have higher well-being and are more likely to volunteer their time to help others (Rudd, Vohs, and Aaker, 2012). However, this effect is partially contingent on awe's time-dilation effects, meaning that participants were more willing to sacrifice their time for another simply because they perceived that they had more time to give. This finding reflects some classic prosocial

behavior paradigms regarding willingness to help and perception of available time, however, it doesn't support a link between awe and prosocial behavior by means of changes in the self (Darley & Batson, 1973).

In addition to time dilation, awe's shifting of focus from the self can also affect someone's propensity to behave prosocially. Piff et al (2015) found significant associations between awe and prosocial behavior that were partially mediated by awe's "small self" effects. Those who are dispositionally prone to experience awe, as well as those who have recently been exposed to an awe manipulation are more likely to engage in prosocial behaviors. The manifestation of this prosocial effect is not limited to one particular measure. Not only is awe linked to greater generosity (as measured by allotment in an economic game), but to more ethical decision-making, and a higher emphasis on prosocial values as well.

The present research aims to contribute to the growing body of literature examining the link between awe and ethical behavior. This research varies from others in that not only will participants' own willingness to violate ethical norms be studied, but participants' beliefs about *others*' willingness to violate these norms will be measured as well.

Eliciting Awe

Previous studies that attempt to create a sense of awe have relied primarily on narrative techniques. Participants are given a brief description of awe, along with its prototypical attributes, and asked to write about a memory of a time where they experienced that emotion. The memory of the emotion experience is treated as a mood manipulation (Shiota, Keltner, & Mossman, 2007; Griskevicius, Shiota, & Neufeld,

2010; Piff et al., 2015). Despite its wide use, this type of manipulation presents a number of potential issues. First, each participant will have his or her own distinct memory and thus own distinct manipulation. Second, what each individual participant thinks of as "awe" will likely vary from participant to participant. This problem is exacerbated by the fact that awe is such a relatively "new" emotion.

Some studies have used different manipulations for awe, including exposing participants to large natural features, videos of fantastic imagery, music, and, in one case, a museum of natural history (Shiota, Keltner, & Mossman, 2007; Rudd, Vohs, & Aaker, 2012; Piff et al., 2015; Pilgrim, Norris, & Hackathorn, 2017). However, these studies presented their own sets of problems. The first is one of practicality. It is difficult enough to get participants to come to a lab on time. Taking every participant in an awe study to a natural history museum or a grove of trees only adds to the time and cost of performing awe research. The second concern is that the content of the manipulations is tainted by constructs beyond what the researchers intended to study. Previous video manipulations used in awe research were created by marketing firms with the intent of selling a product, and thus could prime many constructs aside from the emotion of awe (i.e. consumerism, greed, or anything associated with the depicted product).

The Present Research

The current research has three primary goals. The first is to create manipulations of awe that could be easily shared and used across different laboratories and environments (Studies 1 and 2). The second is to compare different potential awe elicitors, both for the purpose of determining what the *strongest* elicitor is, and for the

purpose of determining whether different elicitors will display meaningful differences in outcomes associated with an awe experience (Study 2). Finally, this research attempts to further address the question of awe's placement on the Valence-Arousal Circumplex and whether awe can be experienced as either a positively or negatively valenced emotion depending on the elicitor (Study 2).

In order to address issues associated with previous experimental manipulations of awe, a new awe manipulation needed to be constructed that was consistent for all participants, and could be administered in any setting without requiring stringent setup. For this study, several different slideshows comprising images of traditional awe elicitors and accompanying music were created. These slideshows were piloted in Study 1 and subsequently curated using participant feedback for final validation in Study 2. A similar technique for eliciting awe was utilized by Gordon et al. (2016), however, the researchers only created a single slideshow designed to elicit a threat-based awe experience. The present research offers multiple different awe manipulations, as well as similarly designed manipulations for exciting and calming experiences to be used for comparison purposes.

Once these new manipulations have been validated, they can begin to be used as tools for examining different outcomes of an awe experience. Study 2 aims to take a first step down this path by examining the effects of different awe elicitors on ethical behavior outcomes. Rather than focus on measures of generosity or helping, Study 2 measure participants' self-rated likelihood of violating ethical rules. This research differs from what has previously been tested (e.g., Rudd et al., 2012; Piff et al., 2015) in that not only is the willingness of a participant to violate ethical norms measured, but

participants' perceptions of how *permissible* violations of ethical norms are captured as well.

Study 1

The purpose of this study was to pilot the new awe manipulations created for this experiment, along with manipulations for two other positive emotions (excitement and calm) created for comparison purposes. Previous research on awe has used a variety of different emotions as comparisons for awe, including pride, joy, and amusement (Shiota, Keltner, & Mossman, 2007; Shiota et al., 2011; Piff et al., 2015). Excitement and calm were chosen as comparisons for this research as they allow us to include both a high-arousal positively-valenced emotion and a low-arousal positively-valenced emotion respectively. These conditions allowed us to examine the arousal level of awe by examining how participants between conditions perceived these emotions similarly and differently.

It was predicted that participants viewing a slideshow designed to elicit awe would have significantly higher awe mood ratings than participants viewing calm and excitement slideshows. Similarly, it was predicted that participants viewing a calm slideshow would rate themselves as calmer than participants viewing awe or excitement slideshows, and participants viewing an excitement slideshow would rate themselves as more excited than participants viewing awe or calm slideshows. In addition to mood ratings, it was predicted that participants in the awe conditions would rate significantly higher on measures designed to capture effects previously found to be associated with an awe experience. Specifically, it was predicted that participants in an awe condition

would score higher on perceived vastness of their experience watching the slideshow, and that these participants would also score higher on a scale measuring time dilation.

Study 1 Methods

Participants

210 participants were recruited from the Psychology Research Subject Pool at the University of Oklahoma. Of that original number, 7 participants were excluded from analyses either due to a lack of recorded data (5 participants) or participants not following instructions (2 participants). The remaining 203 participants (122 female, 80 male, 1 unidentified) were used as the basis for all data analysis. Participants ranged in age from 17 to 40 years old (M = 19.29, SD = 1.88). 141 participants identified as White, non-Hispanic, 20 as Asian, 14 as Black or African American, 12 as American Indian, 10 as Hispanic or Latino/a, 4 as Other, 1 as Native Hawiian or Pacific Islander, and 1 declined to identify. All participants were recruited through psychology department's online research management system (sona-systems.com, or *SONA*) and received class credit for their participation. After signing up through *SONA*, participants were redirected to a Qualtrics program which contained the data collection instruments used in this study.

Creation of Manipulations

In order to create slideshows that would be pure manipulations for each of the three emotions, several potential slides and musical selections were gathered that were deemed reflective of each emotion. Slides were gathered from online sources ranging from stock photograph websites, travel blogs, personal photo portfolios, and more. Two raters evaluated each potential slide and musical selection, and only those which were

agreed upon as representative of a target emotion by both were included in the final manipulations. An excess of potential awe elicitors resulted in a decision to create three different awe manipulations, each focused on a different potential elicitor (one on nature images, one on space images, and one on nature and man-made structure images). Similarly, an excess of potential slides for calm and excitement manipulations resulted in the creation of two different slideshows for those emotions as well. Musical selections were sampled from movie soundtracks and classical compositions. Once slides for each manipulation had been finalized, musical tracks were selected. All musical selections evaluated were free of vocal performances and lyrics in order to reduce any unwanted constructs from being primed. Several different candidate musical tracks were attached to each slideshow, and the assembled manipulations were again evaluated by two raters (see Appendix A for example slides). Finally, four songs were agreed upon by raters as eliciting the desired emotions (1 calm, 1 excitement, and 2 awe). The songs were paired to their appropriate slides, producing the final seven manipulations used in Study 1.

Three different slideshows were created to attempt to elicit awe from participants, each focusing on different prototypical awe elicitors. One slideshow depicted pictures of large features of nature (such as mountains and waterfalls), while another consisted of nature images with the addition of large man-made structures (such as the Golden Gate Bridge). The final awe slideshow comprised six images of objects associated with outer space (such as galaxies, nebulae, and fields of stars).

Two different slideshows were designed to elicit the emotion of excitement from participants. Each slideshow contained images of groups of people displaying highly

recognizable markers of positive affect (e.g., Duchenne smiles and raised arms). The images were accompanied by energetic music with a rapid tempo and string instrumentals. The two slideshows varied in the sizes of the groups of people contained in the images. One slideshow contained primarily images of large groups, which were defined as crowds of ten or more people. The other slideshow contained only images of small groups, which were defined as nine or fewer people.

In addition to the awe and excitement slideshows, two different slideshows were designed to elicit the emotion of calm from participants. Each slideshow contained scenes of natural beauty. However, these scenes differed from the awe manipulations in that they contained only mundane natural features that most people could easily find on a daily basis (e.g., gardens, streams, and wooded paths). These scenes were also much smaller in nature, compared to the vast stimuli used for the awe slideshow (for example, a backyard garden versus a mountain range). The two slideshows did not significant differ from each other in content, but simply contained different slides with the same subject matter.

Measures

Affective Valuation Index (AVI). The AVI asks participants to rate the extent to which they are experiencing thirty different emotions or did experience those emotions over a period of time. The purpose of the instrument is to provide a number of emotions from each of the four quadrants of the Valence-Arousal Circumplex (Tsai, Knutson, & Fung, 2006). For the purposes of this research, the AVI was modified to ask about participants' moods during the slideshow. One additional emotional words ("awe") was

add to the AVI in place of ("satisfied") in order to measure the effectiveness of the awe manipulations. Satisfied was chosen for replacement as it was classified as a positively valenced emotion that is neutral in arousal level, a description consistent with how the extant literature treats awe.

In order to determine if each of the created conditions actually elicited the intended mood, composites were made for each of the three target emotions (awe, calm, and excitement) using relevant items from the AVI.

The awe composite consisted of participants' ratings on the "awe" and "astonished" items of the AVI. Astonishment was added to the "awe" item for two purposes. First, the awe item illustrated a very strong positive correlation with the astonishment item ($r = .60$, $p < .01$). Second, astonishment, by definition, accurately captures both the vastness and accommodation elements of awe. While a term such as "surprise" only captures the accommodation element, "astonished" conveys a sense of grandeur which implies a surprising stimulus that was perceptually vast. The combined awe AVI composite illustrated satisfactory reliability (Cronbach's alpha = .75).

The calm composite consisted of participants' ratings on the "calm," "peaceful," "relaxed," and "quiet," items on the AVI. Each of these items was significantly correlated with the "calm" item at a level of .7 or higher (see Table 1 for full correlation matrix). The combined "calm" composite measure exhibited very satisfactory reliability (Cronbach's alpha = .93).

The excitement composite consisted of participants' ratings on the "excited" and "enthusiastic" items on the AVI. These two items were significantly positively

correlated ($r = .86$, $p < .01$). The combined "excitement" composite measure exhibited very satisfactory reliability (Cronbach's alpha = .92).

Vastness Items. As a further measure of the effectiveness of the awe manipulations, several items from Shiota, Keltner, and Mossman's (2007) work measuring awe's anticipated "small self" or "vastness" effects were included. Example items from this scale include "I felt small or insignificant," and "I felt the presence of something greater than myself." Only the first five items of the original seven were used in this analysis, as these items most directly measured the vastness component of an awe experience. Additionally, Shiota, Keltner, and Mossman (2007) found the strongest association between an awe experience and high ratings on these items compared to the other items in the scale. A composite was made from the five small-self items in order to create one "vastness" measure. Reliability for the combined scale was satisfactory (Cronbach's alpha = .75).

Time Dilation Items. As a final manipulation check, participants' ratings of time-dilation, or the extent to which they felt like they had a lot of time available, were measured and compared across conditions. The four time-dilation items used in this study are identical to the items used in Rudd, Vohs, and Aaker (2012). A single time-dilation score was computed by taking the mean of the four items used, as the scale exhibited satisfactory reliability (Cronbach's alpha = .73).

Procedure

In Qualtrics, participants viewed a video slideshow consisting of six slides and accompanying orchestral music. The slideshows lasted approximately four minutes in total, with minor variations in length between slideshows in order to match the timing

of the accompanying musical selection. Each slide was shown for approximately 20 seconds. After two minutes, the slideshow repeated, along with the accompanying music. An audio fade effect was applied to the music in order to make the loop as unnoticeable as possible. Seven different slideshows were piloted (three designed to elicit awe, two to elicit calm, and two to elicit excitement).

After viewing a slideshow, participants rated their mood during the slideshow using the AVI, as well as their cognitive state during the slideshow using the small-self and time-dilation items.

Study 1 Results

AVI. All conditions were compared using three different one-way ANOVAs, one for each different target emotion (awe, calm, and excitement). The composites created for each emotion were entered as the DVs, with condition (slideshow viewed) used as the grouping variable.

When analyzing the slideshows for the amount of awe elicited in participants, there was a significant effect of slideshow viewed, $F(6, 196) = 10.46$, $p < .01$, $\eta^2 = .24$. Multiple comparisons analyses using *t* Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 3, with selected results reported here. These results indicate no significant differences between the awe nature condition ($M = 3.84$, $SD = 1.11$), awe nature and buildings condition ($M = 3.72$, $SD = 0.85$), and awe space condition ($M = 3.64$, $SD = 1.16$). However, all awe slideshows elicited significantly more awe than the second calm slideshow ($M = 2.50$, $SD = 0.89$), and small-group excitement slideshow ($M = 2.28$, $SD = 1.12$). Only the nature-focused awe slideshow exhibited significantly more awe than the first calm slideshow ($M =$

2.88, *SD* = 1.05), possibly due to nature's status as a prototypical awe elicitor. Along the same lines, the large-group excitement slideshow (*M* = 3.10, *SD* = 1.03) did not elicit significantly different levels of awe from any of the three awe slideshows.

When analyzing the slideshows for the amount of calm elicited, there was a significant effect of slideshow viewed, $F(6, 196) = 26.35$, $p < .01$, $\eta^2 = .45$. Multiple comparisons were conducted using *t* Tests with a Bonferroni correction. Full results of these analyses are presented in Table 4, with selected results reported here. While there was no significant difference between the first calm slideshow (*M* = 4.59, *SD* = 0.63) and second calm slideshow (*M* = 4.47, *SD* = 0.60), both calm conditions significantly differed from all other conditions apart from the nature-focused awe slideshow (*M* = 3.84, *SD* = 1.07). This is perhaps due to similarity of content between slideshows, as both the calm slideshows and nature-focused awe slideshow contained pictures of natural beauty.

When analyzing the slideshows for the amount of excitement elicited, there was a significant effect of slideshow viewed, $F(6, 196) = 21.32$, $p < .01$, $\eta^2 = .40$. Multiple comparisons were conducted using *t* Tests with a Bonferroni correction. Full results of these analyses are presented in Table 5, with selected results reported here. While there was no significant difference between the large group excitement condition (*M* = 4.45, *SD* = 0.72) and small group excitement condition (*M* = 4.15, *SD* = 0.94), both excitement slideshows elicited significantly more excitement than the first (*M* = 2.06, *SD* = 1.09) and second calm slideshows (*M* = 2.22, *SD* = 1.18), but not significantly more excitement than the nature-focused (*M* = 3.66, *SD* = 1.07) and nature and building-focused awe slideshows (*M* = 3.68, *SD* = 1.23). In the case of the large group-

focused excitement slideshow, there was no significant difference between the excitement slideshow and any awe slideshow. There *was* a significant difference in amount of excitement elicited between the small group-focused excitement slideshow and space-focused awe slideshow ($M = 3.57$, $SD = 1.12$).

Vastness Items. An ANOVA was run to determine if there was any difference in vastness scores depending on slideshow viewed, revealing a significant effect, $F(6, 196) = 4.95$, $p < .01$, $\eta^2 = .13$. Multiple comparisons were conducted using *t* Tests with a Bonferroni correction. Full results of these analyses are presented in Table 6, with selected results reported here. Those who watched the large group-focused excitement slideshow ($M = 3.43$, $SD = 1.16$) scored significantly lower on the measure of vastness compared to those who viewed the nature and building-focused awe slideshow ($M = 4.44$, $SD = 1.38$). Those who viewed the small-group focused slideshow ($M = 3.03$, $SD = 1.06$) scored significantly lower than those who viewed the nature-focused ($M = 4.39$, $SD = 1.51$) or nature and building-focused awe slideshows, as well as the second calm slideshow ($M = 4.07$, $SD = 1.20$). There were no significant differences between any calm or awe conditions.

Time-Dilation Items. An ANOVA was run to determine if there was any difference in time-dilation scores depending on slideshow viewed, revealing a significant effect, $F(6, 196) = 3.95$, $p = .01$, $\eta^2 = .11$. Multiple comparisons were conducted using *t* Tests with a Bonferroni correction. Full results of these analyses are presented in Table 7, with selected results reported here. Only the small group-focused excitement slideshow ($M = 2.86$, $SD = 1.28$) showed significant differences from any other slideshow, as participants who viewed that slideshow subsequently had

significantly lower time-dilation scores than participants who viewed the awe nature (M = 4.19, SD = 1.38) awe nature and building (M = 4.18, SD = 1.05) and awe space (M = 4.05, SD = 1.25) slideshows.

Study 1 Discussion

Taken as a whole, the results of Study 1 provide some support for its hypotheses. The three awe conditions were rated highest in perceptions of awe by participants, and were significantly different from all other emotional slideshows apart from the first calm slideshow. The two calm conditions were rated highest in perceptions of calmness by participants, and were significantly different from all other emotional slideshows apart from the nature-focused slideshow. Finally, the excitement slideshows were rated highest in perceptions of excitement by participants, and were significantly different from both calm slideshows. These results provide a good amount of support for the predictions regarding each slideshow eliciting the emotion it was intended to.

The vastness and time dilation items yielded somewhat different results, which provide little support for their respective hypotheses. While two of the three awe conditions were rated highest in perceived vastness by participants, there were few significant differences between conditions. The time dilation scale tells a similar story, with all three awe conditions being rated highest in perceptions of time dilation. However, as with the vastness items, there were few significant differences between conditions, even when comparing slideshows designed to elicit different emotions. Ultimately, these results do not support the predictions that awe conditions would score

significantly higher than other conditions on both vastness items and time dilation items.

While Study 1 provides some support for the hypothesis that the slideshows would create the emotions intended (awe, calm, and excitement), it is not without limitations. The first limitation was that there seems to be some overlap between conditions in emotion created. This was not considered an issue with the awe slideshows, as part of the reason that the comparison conditions were created was to examine the extent to which the behavior of participants in high-arousal and low-arousal positive affect conditions compared to those in an awe condition. However, the comparison conditions, particularly the large group-focused excitement condition and calm conditions, also seemed to create an unanticipated level of awe. The similarities between awe conditions and the calm conditions is likely due to nature's status as a prototypical awe elicitor. Despite the fact that the nature slideshows were designed to depict more mundane scenes, the beauty of the slides might be fantastic enough to elicit some amount of awe. Similarities between the large group-focused excitement slideshow and awe slideshows may be due to the vast nature of the excitement stimulus, as it depicts only large groups of people (i.e., crowds), which accounts for the vast component of an awe experience. Additionally, the rapid strings used in the excitement condition might have conveyed a sense of surprise to participants, which, when combined with the vast crowd stimuli, resulted in an exciting experience that was tinged with awe.

The results of the vastness analyses are not particularly surprising when viewed in the context of the original Shiota, Keltner, and Mossman study. The "awe" condition

consisted of participants writing about a recent time that they perceived nature to be beautiful, while the "non-awe" condition consisted of participants writing about a recent time that they felt pride. Therefore, it isn't surprising that no significant differences were found between the awe slideshows and the calm slideshows, considering that both stimuli rely on images of nature (excluding the space-focused awe slideshow). In the case of the large group-focused excitement condition, this is likely another indication that solely focusing on large-groups tinged the exciting experience of the slideshow with elements of awe. Mean scores for the vastness items were also highest in the two awe conditions that included nature stimuli, possibly indicating that, at the very least, while nature might have a natural element of vastness, there is something about an awe experience beyond the nature component which is associated with a feeling of vastness.

The results of the time-dilation analysis seem to present further evidence that both the calm and large group-focused slideshows were eliciting at least some amount of awe from participants who viewed them. This was not necessarily a detriment, as comparison slideshows which elicit some, but significantly less amounts of awe allow for "dosage" comparisons, meaning that outcomes on an awe experience could be compared across participants who received large "doses" of awe (the awe slideshows) versus medium "doses" of awe (the calm slideshows) and small "doses" of awe (the excitement slideshows). Nevertheless, such comparisons were not the original intent of this research, and thus the slideshows were adjusted prior to the beginning of study 2 in order to address concerns from both researchers and participants, including the possibility that the comparison conditions were eliciting levels of awe.

An additional consideration that must be taken into account when interpreting the results of Study 1 is the relative lack of control over the experimental conditions. As all manipulations were presented, and all scales completed, online, it is impossible to know the extent to which participants were properly paying attention to the study instruments. There is a potentially endless number of distractions that could diminish or otherwise influence the effects of the manipulations being tested. In order to account for these distractions, all procedures for Study 2 were moved to a laboratory environment.

Study 2

The purpose of this study was to refine the manipulations created in Study 1 and validate the final versions of the slideshows, as well as examine the characteristics and outcomes of an awe experience. Participants completed the same affective measures used in Study 1, however, this time results were analyzed by examining how strongly participants identified their affective state during the slideshow with each quadrant of the valence-arousal circumplex. Additionally, two measures of ethical decision-making were included in order to examine ethical outcomes associated with an awe experience using the slideshows as a manipulation.

In was predicted that, like Study 1, each slideshow would elicit the intended emotion in significantly greater amounts than the other slideshows. Additionally, it was predicted that the awe slideshows would score significantly higher on ratings of vastness than either the calm or excitement slideshow. For the scales of unethical decision making, it was predicted that participants in the awe conditions would rate themselves as significantly less likely to behave unethically. Along the same lines, it was predicted that participants in awe conditions would rate the unethical decisions of

others as significantly less permissible than participants in other conditions. Consistent with previous theoretical approaches to awe, it was predicted that participants in awe conditions would score highly on adjectives that were classified as high arousal positively valenced, and higher than other conditions on adjectives that were classified as high arousal negatively valenced. Additionally, it was predicted that participants in the calm condition would score significantly higher on a low-arousal positively valenced composite than any other condition. Finally, it was predicted that participants in the excitement condition would score significantly higher on a low-arousal positively valenced composite than any other condition.

Study 2 Methods

Participants

235 participants were recruited from the Psychology Research Subject Pool at the University of Oklahoma. Of that original number, 2 participants were excluded from analyses due to a lack of recorded data (2 participants). The remaining 233 participants (181 female, 51 male, 1 unidentified) were used as the basis for all data analysis. Participants ranged in age from 17 to 24 (M = 18.66, SD = 0.85). 175 participants identified as White, non-Hispanic, 21 as Asian, 13 as Black or African-American, 12 as Hispanic or Latino/a, 6 American Indian, 4 Other, 1 Native Haiwaiian or Pacific Islander, and 1 declined to identify. All participants were recruited through the *SONA* online research recruitment platform and received class credit for their participation. After signing up through *SONA*, participants were redirected to a Qualtrics program which contained the data collection instruments used in this study.

Modification of Manipulations

Results from Study 1 indicated that while the slideshows did seem to elicit the target emotions, some modifications were necessary in order to clearly differentiate them from each other. The two primary issues identified were: 1. the calm slideshows elicited too much awe, likely due to the beauty of their individual slides, and 2. the large group-focused excitement slideshow elicited too much awe, likely due to the sense of vastness elicited by its component slides.

In addition to results from Study 1, participant feedback from Study 1 was incorporated in order to improve effectiveness of the manipulations. A large amount of participant feedback was focused on the fact that the slideshows looped, noting that it was distracting. Additionally, many participants stated that they became bored seeing the same images a second time. In order to remedy this, new, non-looping slideshows were created for each emotion.

No significant differences were found on any measure between the nature-only awe slideshow and the we slideshow featuring both natural features and man-made construction. Thus, these two slideshows were combined in Study 2. In order to ensure that there were 12 unique images in the slideshow, some new slides had to be created, but all slides were similar in content to those presented in Study 1. Although no significant differences were found on any measure between the space-focused awe slideshow and the other two awe slideshows, the space slideshow was retained for the purposes of comparing possible difference in emotional valence and arousal between different awe elicitors in Study 2. Similar to the nature and building-focused slideshow, six new slides depicting images of space were added to the slides from Study 1 in order

to maintain the length of the slideshow without repeating or lengthening individual slides.

There were no significant differences found between the two excitement slideshows on any measure in Study 1. Thus, both excitement slideshows were combined to create one excitement stimulus for Study 2. This served the dual purpose of simplifying the design of the research, as well as addressing the issue of the large group-focused excitement slideshow inadvertently eliciting some awe from participants. By introducing many more images of small groups of people displaying markers of positive affect, the vast nature of the stimuli should become less salient. It follows that the combined excitement stimulus should elicit less awe than the large group-focused slideshow had individually. As with the other slideshows, new slides were added to the existing images from Study 1 in order to ensure that participants saw each slide only once.

There were no significant differences found between the two calm slideshows on any measure in Study 1. Thus, both calm slideshows were combined to create one calm stimulus for Study 2. This served the dual purpose of simplifying the design of the research, as well as addressing the issue of one of the calm slideshows inadvertently eliciting some awe from participants. It was theorized that one of the two calm slideshows featured nature imagery that, while theoretically something that could be found in daily life, was spectacular enough in its beauty and large enough in scope to inspire awe. By combining the two calm slideshows, the effects of the awe-inspiring slides were muted by the larger number of non-awe inspiring slides.

After modifying and combining the manipulations from Study 1, four distinct stimuli remained for use in Study 2. Two slideshows were designed to elicit awe; one featuring photos of large natural structures and man-made structures (e.g., the Grand Canyon, Denali, and the Golden Gate Bridge), and the other featuring photos of observable features of space (e.g., nebulae, star fields, and galaxies). Accompanying the awe-inspiring slideshow was a contemporary orchestral composition defined by strings and a piano that swell to a crescendo at the end of the slideshow.

One slideshow was designed to elicit excitement and featured large and small groups of people displaying recognizable markers of positive affect (e.g., Duchenne smiles and raised arms). Accompanying the exciting slideshow was a contemporary orchestral composition defined by a rapid tempo and high strings.

The final slideshow was designed to elicit calm and featured visually interesting scenes of natural beauty. However, in contrast to the nature and building-focused awe slideshow, the calming slideshow depicted scenes that could reasonably be experienced by the average person during the course of a typical day. Accompanying the calming slideshow was a classical orchestral composition defined by slow strings.

Measures

Affective Valuation Index. The same modified AVI from Study 1 was employed as a manipulation check in this study as well. The same three emotional composites from study 1 (awe, calm, excitement) were computed using the same adjectives as before. Each of the three composites once again displayed satisfactory reliability, Cronbach's alpha = .72 for awe, Cronbach's alpha = .85 for calm, and Cronbach's alpha = .90 for excitement respectively.

Vastness Items. The same items sourced from Shiota, Keltner, and Mossman (2007) presented in Study 1 were employed in this study. Once again, the goal of using this scale was to check the effectiveness of the slideshow manipulations by examining the "vastness" component of an awe experience. As with Study 1, only the first five items of the scale were analyzed, and these five items were averaged to create one vastness composite. The five-item scale exhibited somewhat satisfactory reliability, Cronbach's alpha = .66.

Unethical Decision-Making Scale. Two modified versions of the Unethical Decision-Making Scale (UDMS) developed by Detert, Trevino, and Sweitzer (2008) were used in Study 2. One version consisted of the original UDMS excluding both the first and last item of the scale. The decision was made to omit the first and last items of the scale as they were deemed too agreeable and disagreeable respectively (See Appendix E for full items). The second version of the UDMS (referred to henceforth as UDMS-O) was modified such that the subjects of the scenarios presented were depicted as other people rather than the participant taking the survey (i.e., "A student is preparing for the final exam…" versus "You are preparing for the final exam…"). Rather than asking how likely it was that an unethical behavior would occur, participants were instead asked to judge how permissible they deemed each of the behaviors to be on a seven-point scale. The two scales exhibited somewhat unsatisfactory reliability, UDMS Cronbach's alpha = .57, UDMS-O Cronbach's alpha = .64. However, these scales have been validated and used in previous research.

Procedure

Participants were assigned to a cubicle that had a single computer with headphones. The goal of this setting was to remove any distractions that may have influenced the results of Study 1 and to focus the participants' attention on the manipulations. Prior to the beginning of the experiment, instructions were presented both on-screen and verbally by an experimenter specifying when participants should put on and take off the headphones. After this instruction period, the experimenter initiated the computer program, and all further instructions were presented on-screen.

After being read a set of initial instructions, participants were exposed to one of the four slideshows modified from Study 1 (a nature and building-focused awe slideshow, a space-focused awe slideshow, a calm slideshow, and an excitement slideshow). Following the presentation of the slideshow, participants completed one of two versions of the UDMS. Whether participants completed the self-focused (UDMS) or other-focused (UDMS-O) measure was randomized.

Following the measures of unethical decision-making, participants were instructed to get the attention of the attending research assistant so that they could be moved to Part 2 of the study. After being attended by the RA, participants completed a set of filler tasks designed to remove the mood effects of the slideshows, and more importantly, any effects from the unethical decision making scales. Subsequently, participants viewed a shortened version of the same slideshow they viewed before (matched by condition). This procedure was done in order to re-establish, or boost, the original mood manipulation. Following the manipulation boost, participants answered the same vastness items from Study 1, along with the same modified AVI from Study 1.

Study 2 Results

Manipulation Checks. All conditions were compared using three different one-way ANOVAs, one for each different target emotion (awe, calm, and excitement). The AVI composites created for each emotion were entered as the DVs, with condition (slideshow viewed) used as the grouping variable.

When analyzing the slideshows for the amount of awe elicited in participants, there was a significant effect of slideshow viewed, $F(3, 220) = 7.92$, $p < .001$, $\eta^2 = .10$. Multiple comparisons analyses using *t* Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 9, with selected results reported here. There was no significant difference between the awe nature and building ($M = 3.39$, $SD = 1.30$) and awe space ($M = 3.19$, $SD = 1.30$) conditions, however, both awe conditions were significantly different from the calm ($M = 2.54$, $SD = 1.01$) and excitement ($M = 2.54$, $SD = 1.07$) conditions on amount of awe elicited. There was no significant difference between the calm and excitement slideshow on amount of awe elicited.

When analyzing the slideshows for the amount of calm elicited in participants, there was a significant effect of slideshow viewed, $F(3, 221) = 28.51$, $p < .01$, $\eta^2 = .28$. Multiple comparisons analyses using *t* Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 10, with selected results reported here. There was no significant difference between the calm condition ($M = 4.37$, $SD = 0.74$) and the nature-focused awe condition ($M = 4.04$, $SD = 0.88$) on amount of calm elicited. However, there was a significant difference in amount of calm

elicited between the calm condition and space-focused awe condition (M = 3.89, SD = 0.93), as well as the calm condition and excitement condition (M = 3.01 SD = 0.78).

When analyzing the slideshows for the amount of excitement elicited in participants, there was a significant effect of slideshow viewed, $F(3, 221) = 13.59$, $p < .01$, $\eta^2 = .16$. Multiple comparisons analyses using t Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 11, with selected results reported here. There was no significant difference between the nature-focused awe slideshow (M = 3.52, SD = 1.15) and the excitement slideshow (M = 3.82, SD = 1.16). However, there was a significant difference in amount of excitement reported between participants who viewed the excitement slideshow and those who viewed the space-focused slideshow (M = 3.25, SD = 1.21). Similarly, there was a significant difference in amount of excitement reported between participants who viewed the excitement slideshow and those who viewed the calm slideshow (M = 2.51, SD = 1.10).

When analyzing the slideshows for amount of perceived vastness, there was a significant effect of slideshow viewed, $F(3,221) = 7.37$, $p < .01$, $\eta^2 = .09$. Multiple comparisons analyses using t Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 12, with selected results reported here. There was no significant difference in reported vastness between participants who viewed the nature and building awe slideshow (M = 4.53, SD = 1.27) and those who viewed the space awe slideshow (M = 4.27, SD = 1.25). Similarly, there was no significant difference in reported vastness between participants who viewed either of the awe slideshows and those who viewed the calm slideshow (M = 4.02, SD = 1.20).

However, there *were* significant differences in reported vastness between participants who viewed either awe slideshow and those who viewed the excitement slideshow (M = 3.61, SD = 1.01).

Unethical Decision Making Scales. Two different one-way ANOVAs were conducted to examine differences between conditions on participants' ratings of their own likelihood to behave unethically, as well as how permissible they believed it would be for others to behave unethically.

When analyzing differences between slideshows on ratings of the UDMS, there was no significant effect of slideshow viewed, $F = 1.10$, $p = .35$, $\eta^2 = .03$.

Similarly, when analyzing differences between slideshows on ratings of the UDMS-O, there was no significant effect of slideshow viewed, $F = 0.98$, $p = .41$, $\eta^2 = .03$

Valence and Arousal Level Analysis. Consistent with previous research using the circumplex model of emotion, scores were calculated for each of the four quadrants of the valence-arousal circumplex for all slideshows using composites of AVI adjectives (for a list of means for all composites and adjectives used, see Table 13. Four one-way ANOVAs were run to examine potential differences between conditions on ratings of each of the four quadrants of the valence-arousal circumplex.

There was a significant effect of slideshow viewed on participant ratings of high-arousal, positively-valenced emotions, $F(3,221) = 12.42$, $p < .01$, $\eta^2 = .14$. Multiple comparisons analyses using t Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 14, with selected results reported here. The calm slideshow (M = 2.52, SD = 0.92) was rated significantly lower

on high-arousal positive affect adjectives than the nature awe slideshow (M = 3.45, SD = 1.10), the space awe slideshow (M = 3.29, SD = 0.96), and the excitement slideshow (M = 3.57, SD = 1.00). No other comparison between slideshows yielded a significant difference.

There was a significant effect of slideshow viewed on participant ratings of low-arousal, positively-valenced emotions, $F(3,221) = 21.88$, $p < .01$, $\eta^2 = .23$. Multiple comparisons analyses using t Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 15, with selected results reported here. The excitement condition (M = 3.19, SD = 0.86) was rated significantly lower on low-arousal positive affect adjectives than the awe nature and building slideshow (M = 4.11, SD = 0.88), the awe space slideshow (M = 3.98, SD = 0.91) and the calm slideshow (M = 4.34, SD = 0.70). No other comparison between slideshows yielded a significant difference.

There was not a significant effect of slideshow viewed on participant ratings of high-arousal, negatively-valenced emotions, $F(3,221) = 1.52$, $p = .21$, $\eta^2 = .02$.

There was a significant effect of slideshow viewed on participant ratings of low-arousal, negatively-valenced emotions, $F(3,221) = 8.00$, $p < .01$, $\eta^2 = .10$. Multiple comparisons analyses using t Tests with a Bonferroni correction revealed significant differences between conditions as reported in Table 16, with selected results reported here. The calm slideshow (M = 2.91, SD = 0.99) was rated significantly higher on low-arousal negative affect than the awe nature and building slideshow (M = 2.00, SD = 0.95), awe space slideshow (M = 2.13, SD = 1.03), and excitement slideshow (M = 2.17, SD = 1.02). No other comparison between slideshows yielded a significant difference.

Study 2 Discussion

The results of the comparisons of each condition using the awe, calm, and excitement composites provide strong support for the predictions of Study 2. The awe conditions scored highest on the awe composite, and were significantly higher than either the calm or excitement condition, supporting the prediction that participants in the awe condition would feel significantly more awe than participants in the other two conditions. The calm condition scored highest on the calm composite, and was significantly higher than either the space-focused awe condition or excitement condition, supporting the prediction that participants in the calm condition would score significantly higher than participants in other conditions. Finally, the excitement condition was rated highest on the excitement composite, and was significantly higher than either the space-focused awe condition or the calm condition, supporting the prediction that participants in the excitement condition would feel significantly more excitement than the other conditions.

The results of Study 2's manipulation checks largely reflect the findings of Study 1. In each case, the slideshow that was designed to elicit a particular emotion was rated as the highest in an AVI composite capturing that particular emotion. Most importantly, both awe conditions significantly differed from the calm and excitement slideshows in ratings of how much awe they elicited, indicating that, at the very least, the two awe slideshows *did* elicit awe, and enough awe that they could be meaningfully compared to the calm and exciting slideshows on any number of outcome variables.

An interesting, and somewhat unexpected, result of the manipulation checks centers around the emotions elicited by the awe slideshows--particularly the nature-

focused awe slideshow. The nature-focused slideshow elicited similar levels of calm as the calm slideshow did, according to participant reports. However, the nature-focused slideshow *also* elicited similar levels of excitement as the excitement slideshow did. This finding is strange, as it would seem to indicate that the nature-focused slideshow is eliciting *both* high-arousal *and* low-arousal positive affect. This finding was mirrored by the valence-arousal analyses done using the AVI, but expanded to include both awe slideshows. While the calm slideshow and excitement slideshow both seemed to rate highly on their appropriate quadrant of the circumplex (low-arousal positive and high-arousal positive respectively), the awe slideshows rated highly on *both* low and high arousal positive affect. There are two ways to interpret this finding, both of which are potentially interesting. The first is that people in an awe experience are simultaneously feeling both aroused and at rest, perhaps in different ways. For example, someone feeling awe might feel their heart rate increase, or the hair on the back of their neck stand on end, akin to a fight-or-flight response. However, at the same time, that person might feel a sense of serenity as they stop and attend to the sublime beauty or other awe-inspiring stimulus. The second interpretation is that people who are feeling awe feel different arousal-cues at different times during an awe experience. For example, when seeing an image of the grand canyon, there might be an initial high-arousal response to the vast nature of the stimulus, perhaps due to an unconscious threat-response. However, as the stimulus is evaluated, feelings of threat are reduced, resulting in a calming sensation. This interpretation proposes that awe experiences generally trigger a high-arousal response that then diminishes throughout the experience before

ending in a state of relatively low-arousal. Which of these interpretations is correct, and whether threat plays a role, is unclear from the present research.

When comparing the two awe slideshows to each other using the valence-arousal analyses, no significant differences materialized. Despite the different stimuli used in each slideshow, it appears that participants did not react to them in any significantly different way. Neither of the slideshows rated particularly high on measures of high and low-arousal *negative* affect, which is evidence against the prediction that the awe slideshows would score relatively highly on high-arousal negatively valenced composites, and seems to lend support to the idea that awe is an inherently positive emotion. However, the work of Gordon et al. (2016) indicates that perhaps the stimuli used in this particular experiment were simply not threatening enough. The findings of this study do not contradict those of Gordon and colleagues. However, they offer no further support for the idea that awe can be negatively valenced, and do seem to support the idea that the *typical* awe experience is interpreted positively by individuals.

Examinations of the two comparison conditions using the valence-arousal analysis from the AVI reveal support for the predictions of Study 2 regarding the valence-arousal ratings of the comparison conditions. The calm condition was rated highest on the low-arousal positive composite, and was significantly higher than the space-focused awe condition and excitement condition. The excitement condition, while not being rated the highest on the high-arousal positive composite, was rated as significantly higher than the calm condition. The excitement condition's lower rating on

the high-arousal positive composite than the awe conditions might be an indication that awe is an extremely high-arousal emotion.

The results of Study 2 indicate that there is no relationship between awe and ethical decision-making, which stands in contrast to findings in previous research (e.g., Rudd et al., 2012; Piff et al., 2015). There are a variety of potential explanations for this finding. The first is that the slideshows did not appropriately elicit awe, however, the results of Study 2's manipulation checks, in conjunction with Study 1's results, indicate that this explanation is unlikely. Another explanation is simply that awe does not affect decision-making anymore than another positive emotion. Along with that theory comes the assertion that previous findings linking awe to prosocial or ethical behavior are just the results of a positivity effect. However, this too is unlikely, as the referenced studies include positive emotion comparison conditions (generally pairing awe against a pride boost). A third explanation is that awe does not have any effect on an individual's ethical decision-making or prosocial behavior. Again, this explanation is unlikely due to previous findings in the field that contradict such a claim.

A final explanation is that there was something about the parameters of this particular study which caused there to be no effect. This is perhaps the most plausible explanation, as the conditions under which participants in previous awe and prosocial behavior studies were observed vary in any number of ways from the conditions under which they were observed in this study. The two most likely differences that could account for a lack of finding are the manipulations used and response scales used. The manipulations used in this study varied compared to Rudd et al. (2012) in that they featured only images set to music, whereas the videos used by Rudd and colleagues

were advertisements which could have potentially primed any number of constructs aside from awe. Piff et al. (2015) used both a writing prompt and a clip from a nature documentary. However, both of these manipulations suffer from issues outlined in the introduction of this thesis, namely that they are subjective and prone to misconception (in the case of the writing prompt) or potentially prime unintended constructs (in the case of the the documentary video). It is possible that the findings of the previous studies were merely the result of primed constructs other than awe, and that the "pure" awe manipulation of this study reveals that there is no relationship between awe and behaving prosocially.

Along the same lines, it is certainly worth noting that the outcome variables in this study meaningfully differ from those used in previous studies linking awe to ethical or prosocial behavior. While previous studies have focused on prosocial behavior (i.e., taking a moral action), the current study focuses on unethical decision-making (i.e., *not* taking an immoral action). These two constructs, although similar, are not the same. Additionally, while Piff et al. (2015) did use the same measure of unethical decision making used in this research, the researchers in that study only employed this measure in conjunction with a recall-based awe manipulation. While previous studies may have rightfully concluded that there is an association between feeling awe in certain contexts and behaving prosocially, and the current study may have rightfully concluded that there is *no* association between feeling awe evoked by natural and space-based imagery and choosing not to behave unethically, these results are not necessarily in conflict.

General Discussion

Taken together, the results of these studies indicate a successful validation of the manipulations created, at least within the settings of these studies. The data collected indicate that each of the slideshows elicited their target emotions, and supports the idea that these manipulations can be used to make comparisons between awe and other positive emotions in the future. More work is required to fully validate these manipulations across a variety of experimental settings with a variety of populations. However, the current research gives a promising sign that these manipulations can be useful for awe researchers in the future.

When examining the two awe slideshows for meaningful differences, no clear patterns emerged. While the nature-based awe slideshow (in Study 1) and the nature and building-based awe slideshow (in Study 2) did receive higher awe ratings than the space-based awe slideshows, these differences were non-significant. Similarly, there were no significant differences between the awe slideshows on any outcomes of interest. While this can be interpreted as evidence that nature is the strongest awe elicitor, the statistical evidence for this interpretation is weak at best and non-existent at worst. Ultimately, both finalized awe slideshows created significantly more awe than the comparison conditions, but did not differ from each other in amount of awe created. This indicates that space, nature, and structural imagery are all equally strong and valid elicitors of awe.

While the findings of Study 2 do provide some very interesting discussion about the arousal-level of an awe experience, they are by no means the end of the debate on this topic. The issue now seems even cloudier than before, as the data collected in Study

2 indicate that individuals feeling awe perceive themselves as both aroused and *not* aroused. Whether their perception is simultaneous, or the result of different arousal levels throughout an awe experience is a question that remains unanswered, and presents another avenue of future research on this topic.

Similarly, this research does not provide any evidence to support the findings of Gordon et al. (2016) that awe can be threat-based and negatively valenced. Although two different awe stimuli were formulated for this study, it appears that both of them were perceived as positively valenced by the individuals who were exposed to them. This provides support for the tacit assumption found in the vast majority of previous awe studies that awe is inherently positive. However, it also does not provide any evidence contrary to the findings of Gordon and colleagues. It is possible that the stimuli used in this study elicit awe that is positively valenced, and other stimuli (not included in this study) can elicit negatively valenced awe. Indeed, it is worth noting that there was no overlap in the type of stimuli used by Gordon et al. (2016) (mostly storm and natural-disaster based imagery) and the stimuli used in this study. Thus, while the findings of Study 2 indicate that the awe elicited by space and nature-based imagery is positively valenced, it does not preclude the possibility that other elicitors can create negatively valenced awe.

Perhaps the most surprising finding of this research is that there was no relationship between feeling awe and behaving ethically. The connection between awe and prosocial or ethical behavior in existing literature is admitted sparse, but recent evidence *has* indicated that there is some connection between the two. While the results of this research seem to indicate that feeling awe does not impact one's propensity to

behave ethically (or their perceptions of the permissibility of ethical violations), it is possible that this is simply an artifact of the manipulations and measures used in this study. Another explanation for this finding is that the measure used in Study 2 focuses on ethical violations that are not interpersonal in nature, thus giving the appearance that each of the scenarios represents a "victimless crime". It is perhaps possible that awe enhances an individual's propensity to behave ethically and prosocially only towards other individuals. In this case, the results of this research merely illustrate that awe does not impact a person's ethical decision-making as it relates to behavior towards formless entities (such as corporations and other organizations), without addressing how awe impacts decision-making as it relates to other individuals. It is also possible that awe *does* enhance prosocial behavior, but has no preventative effect on someone's propensity to behave unethically. So, while someone feeling awe might be more inclined to donate time or resources to another person, they might not be any less likely to steal resources from their workplace.

Limitations of this research revolve mainly around its instruments. As mentioned, only one facet of morality and ethical behavior was examined in these studies—that of unethical decision making. While this examination does add to the literature around awe and morality, it is by no means a complete picture of how these two psychological constructs interact. Future research that follows this project should focus on testing many more aspects of morality and ethical behavior, such as generosity, altruism, empathy, and many more.

Similarly, this research is, by necessity, limited by the manipulations used in the experiment. While the goal of this research was, in part, to create a standardized set of

awe manipulations which can be deployed in a wide-variety of environments, and that goal was largely successful, there is undoubtedly a meaningful difference between an awe experience that is elicited by viewing a video on a relatively small computer screen versus experiencing a vast scene of natural beauty in person (or any other kind of awe elicitor for that matter). Future research on awe should make use of the manipulations created in this research, however, it should not be limited by them. In order to fully understand the characteristics and outcomes of an awe experience, it must be examined how different awe elicitors create different kinds of experiences. While the slideshows in this study offer one kind of awe experience, it will be important to examine how that experience is both similar and different from an experience generated in a more natural environment.

Regardless, it is clear that more research is necessary to explore these phenomena. The research examining the nature of awe and its effects is still in its infancy. While the current studies provide some valuable insight into the valence and arousal-level of an awe experience, as well as awe's relationship with ethical behavior, they are only another step in the path. There is still much that is unknown about awe, and more research will be needed to answer the questions raised by this research.

Table 1:
Correlations for Calm Composite Items

Item	1	2	3	4
1. Calm	—			
2. Peaceful	.78	—		
3. Relaxed	.88	.85	—	
4. Quiet	.70	.65	.69	—

Table 2:
Study 1 ANOVAs

	Awe Nature		Awe Nature & Bldg		Awe Space		Calm 1		Calm 2		Excitement Large		Excitement Small			
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	F	η^2
Awe	3.84	0.20	3.72	0.19	3.64	0.19	2.89	0.20	2.50	0.19	3.10	0.19	2.29	0.19	10.46*	0.24
Calm	3.84	0.18	3.44	0.17	3.24	0.17	4.59	0.18	4.47	0.17	2.57	0.17	2.26	0.17	22.35*	0.45
Excitement	3.67	0.20	3.69	0.19	3.57	0.20	2.06	0.21	2.22	0.19	4.45	0.19	4.15	0.19	21.32*	0.40
Vastness	4.39	0.24	4.44	0.23	3.99	0.23	3.66	0.25	4.07	0.23	3.43	0.23	3.03	0.23	4.95*	0.13
Time	4.19	0.24	4.18	0.23	4.05	0.24	3.90	0.25	3.76	0.23	3.58	0.23	2.86	0.23	3.93*	0.10

Table 3:
Study 1 Awe Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature	Awe Nature & Bldg	0.12	0.27	1.000
	Awe Space	0.20	0.27	1.000
	Calm 1	0.95	0.28	.017
	Calm 2	1.34	0.27	.000
	Excitement Large	0.74	0.27	.147
	Excitement Small	1.56	0.27	.000
Awe Nature & Bldg	Awe Nature	-0.12	0.27	1.000
	Awe Space	0.08	0.27	1.000
	Calm 1	0.83	0.28	.063
	Calm 2	1.22	0.27	.000
	Excitement Large	0.62	0.27	.457
	Excitement Small	1.43	0.27	.000
Awe Space	Awe Nature	-0.20	0.27	1.000
	Awe Nature & Bldg	-0.08	0.27	1.000
	Calm 1	0.75	0.28	.158
	Calm 2	1.14	0.27	.001
	Excitement Large	0.54	0.27	.984
	Excitement Small	1.35	0.27	.000
Calm 1	Awe Nature	-0.95	0.28	.017
	Awe Nature & Bldg	-0.83	0.28	.063
	Awe Space	-0.75	0.28	.158
	Calm 2	0.38	0.28	1.000
	Excitement Large	-0.22	0.28	1.000
	Excitement Small	0.60	0.28	.650
Calm 2	Awe Nature	-1.34	0.27	.000
	Awe Nature & Bldg	-1.22	0.27	.000

	Awe Space	-1.14	0.27	.001
	Calm 1	-0.38	0.28	1.000
	Excitement Large	0.60	0.27	.536
	Excitement Small	0.22	0.27	1.000
Excitement Large	Awe Nature	-0.74	0.27	.147
	Awe Nature & Bldg	-0.62	0.27	.457
	Awe Space	-0.54	0.27	.684
	Calm 1	0.22	0.28	1.000
	Calm 2	0.60	0.27	.536
	Excitement Small	0.82	0.27	.053
Excitement Small	Awe Nature	-1.56	0.27	.000
	Awe Nature & Bldg	-1.43	0.27	.000
	Awe Space	-1.35	0.27	.000
	Calm 1	-0.60	0.28	.650
	Calm 2	-0.22	0.27	1.000
	Excitement Large	-0.82	0.27	.053

Table 4:
Study 1 Calm Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature	Awe Nature & Bldg	0.40	0.24	1.000
	Awe Space	0.60	0.25	.324
	Calm 1	-0.75	0.25	.073
	Calm 2	-0.63	0.24	.227
	Excitement Large	1.27	0.24	.000
	Excitement Small	1.58	0.24	.000
Awe Nature & Bldg	Awe Nature	-0.40	0.24	1.000
	Awe Space	0.20	0.24	1.000
	Calm 1	-1.15	0.25	.000
	Calm 2	-1.03	0.24	.001
	Excitement Large	0.87	0.24	.007
	Excitement Small	1.18	0.24	.000
Awe Space	Awe Nature	-0.60	0.25	.324
	Awe Nature & Bldg	-0.20	0.24	1.000
	Calm 1	-1.35	0.25	.000
	Calm 2	-1.23	0.24	.000
	Excitement Large	0.67	0.24	.125
	Excitement Small	0.98	0.24	.002
Calm 1	Awe Nature	0.75	0.25	.073
	Awe Nature & Bldg	1.15	0.25	.000
	Awe Space	1.35	0.25	.000
	Calm 2	0.12	0.25	1.000
	Excitement Large	2.02	0.25	.000
	Excitement Small	2.33	0.25	.000
Calm 2	Awe Nature	0.63	0.24	.227
	Awe Nature & Bldg	1.03	0.24	.001

	Awe Space	1.23	0.24	.000
	Calm 1	-0.12	0.25	1.000
	Excitement Large	1.90	0.24	.000
	Excitement Small	2.21	0.24	.000
Excitement Large	Awe Nature	-1.27	0.24	.000
	Awe Nature & Bldg	-0.87	0.24	.007
	Awe Space	-0.67	0.24	.125
	Calm 1	-2.02	0.25	.000
	Calm 2	-1.90	0.24	.000
	Excitement Small	0.31	0.24	1.000
Excitement Small	Awe Nature	-1.58	0.24	.000
	Awe Nature & Bldg	-1.18	0.24	.000
	Awe Space	-0.98	0.24	.002
	Calm 1	-2.33	0.25	.000
	Calm 2	-2.21	0.24	.000
	Excitement Large	-0.31	0.24	1.000

Table 5:
Study 1 Excitement Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature	Awe Nature & Bldg	-0.02	0.28	1.000
	Awe Space	0.09	0.28	1.000
	Calm 1	1.60	0.29	.000
	Calm 2	1.44	0.28	.000
	Excitement Large	-0.79	0.28	.107
	Excitement Small	-0.49	0.28	1.000
Awe Nature & Bldg	Awe Nature	0.02	0.28	1.000
	Awe Space	0.11	0.28	1.000
	Calm 1	1.63	0.28	.000
	Calm 2	1.47	0.27	.000
	Excitement Large	-0.77	0.27	.118
	Excitement Small	-0.47	0.27	1.000
Awe Space	Awe Nature	-0.09	0.28	1.000
	Awe Nature & Bldg	-0.11	0.28	1.000
	Calm 1	1.51	0.29	.000
	Calm 2	1.35	0.28	.000
	Excitement Large	-0.88	0.28	.035
	Excitement Small	-0.58	0.28	.769
Calm 1	Awe Nature	-1.60	0.29	.000
	Awe Nature & Bldg	-1.63	0.28	.000
	Awe Space	-1.51	0.29	.000
	Calm 2	-0.16	0.28	1.000
	Excitement Large	-2.39	0.28	.000
	Excitement Small	-2.09	0.28	.000
Calm 2	Awe Nature	-1.44	0.28	.000
	Awe Nature & Bldg	-1.47	0.27	.000

	Awe Space	-1.35	0.28	.000
	Calm 1	0.16	0.28	1.000
	Excitement Large	-2.23	0.27	.000
	Excitement Small	-1.93	0.27	.000
Excitement Large	Awe Nature	0.79	0.28	.107
	Awe Nature & Bldg	0.77	0.27	.118
	Awe Space	0.88	0.28	.035
	Calm 1	2.39	0.28	.000
	Calm 2	2.23	0.27	.000
	Excitement Small	0.30	0.27	1.000
Excitement Small	Awe Nature	0.49	0.28	1.000
	Awe Nature & Bldg	0.47	0.27	1.00
	Awe Space	0.58	0.28	.769
	Calm 1	2.09	0.28	.000
	Calm 2	1.93	0.27	.000
	Excitement Large	-0.30	0.27	1.000

Table 6:
Study 1 Vastness Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature	Awe Nature & Bldg	-0.06	0.33	1.000
	Awe Space	0.39	0.33	1.000
	Calm 1	0.72	0.34	.747
	Calm 2	0.32	0.33	1.000
	Excitement Large	0.96	0.33	.086
	Excitement Small	1.35	0.33	.001
Awe Nature & Bldg	Awe Nature	0.06	0.33	1.000
	Awe Space	0.45	0.33	1.000
	Calm 1	0.78	0.34	.446
	Calm 2	0.38	0.32	1.000
	Excitement Large	1.02	0.32	.042
	Excitement Small	1.41	0.32	.000
Awe Space	Awe Nature	-0.39	0.33	1.000
	Awe Nature & Bldg	-0.45	0.33	1.000
	Calm 1	0.33	0.34	1.000
	Calm 2	-0.07	0.33	1.000
	Excitement Large	0.57	0.33	1.000
	Excitement Small	0.96	0.33	.079
Calm 1	Awe Nature	-0.72	0.34	.747
	Awe Nature & Bldg	-0.78	0.34	.446
	Awe Space	-0.33	0.34	1.000
	Calm 2	-0.41	0.34	1.000
	Excitement Large	0.23	0.34	1.000
	Excitement Small	0.63	0.34	1.000
Calm 2	Awe Nature	-0.32	0.33	1.000
	Awe Nature & Bldg	-0.38	0.32	1.000

	Awe Space	0.07	0.33	1.000
	Calm 1	0.41	0.34	1.000
	Excitement Large	0.64	0.32	1.000
	Excitement Small	1.03	0.32	.035
Excitement Large	Awe Nature	-0.96	0.33	.086
	Awe Nature & Bldg	-1.02	0.32	.042
	Awe Space	-0.57	0.33	1.000
	Calm 1	-0.23	0.34	1.000
	Calm 2	-0.64	0.32	1.000
	Excitement Small	0.39	0.32	1.000
Excitement Small	Awe Nature	-1.35	0.33	.001
	Awe Nature & Bldg	-1.41	0.32	.000
	Awe Space	-0.96	0.33	.079
	Calm 1	-0.63	0.34	1.000
	Calm 2	-1.03	0.32	.035
	Excitement Large	-0.39	0.32	1.000

Table 7:
Study 1 Time Dilation Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature	Awe Nature & Bldg	0.01	0.34	1.000
	Awe Space	0.14	0.34	1.000
	Calm 1	0.38	0.35	1.000
	Calm 2	0.43	0.34	1.000
	Excitement Large	0.60	0.34	1.000
	Excitement Small	1.33	0.34	.002
Awe Nature & Bldg	Awe Nature	-0.01	0.34	1.000
	Awe Space	0.12	0.33	1.000
	Calm 1	0.37	0.34	1.000
	Calm 2	0.42	0.33	1.000
	Excitement Large	0.59	0.33	1.000
	Excitement Small	1.32	0.33	.002
Awe Space	Awe Nature	-0.14	0.34	1.000
	Awe Nature & Bldg	-0.12	0.33	1.000
	Calm 1	0.15	0.35	1.000
	Calm 2	0.29	0.33	1.000
	Excitement Large	0.47	0.33	1.000
	Excitement Small	1.19	0.33	.009
Calm 1	Awe Nature	-0.28	0.35	1.000
	Awe Nature & Bldg	-0.27	0.34	1.000
	Awe Space	-0.15	0.35	1.000
	Calm 2	0.15	0.34	1.000
	Excitement Large	0.32	0.34	1.000
	Excitement Small	1.05	0.34	.054
Calm 2	Awe Nature	-0.43	0.34	1.000
	Awe Nature & Bldg	-0.42	0.33	1.000

	Awe Space	-0.29	0.33	1.000
	Calm 1	-0.15	0.34	1.000
	Excitement Large	0.18	0.33	1.000
	Excitement Small	0.90	0.33	.147
Excitement Large	Awe Nature	-0.60	0.34	1.000
	Awe Nature & Bldg	-0.59	0.33	1.000
	Awe Space	-0.47	0.33	1.000
	Calm 1	-0.32	0.34	1.000
	Calm 2	-0.18	0.33	1.000
	Excitement Small	0.73	0.33	.615
Excitement Small	Awe Nature	-1.33	0.34	.002
	Awe Nature & Bldg	-1.32	0.33	.002
	Awe Space	-1.19	0.33	.009
	Calm 1	-1.05	0.34	.054
	Calm 2	-0.90	0.33	.147
	Excitement Large	-0.73	0.33	.615

Table 8:
Study 2 ANOVAs

	Awe Nature & Bldg		Awe Space		Calm		Excitement			
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*F*	η^2
Awe	3.39	0.16	3.19	0.15	2.54	0.17	2.54	0.15	7.95*	.10
Calm	4.04	0.12	3.90	0.10	4.37	0.12	3.01	0.10	28.64*	.27
Excitement	3.52	0.16	3.25	0.14	2.51	0.16	3.82	0.14	12.93*	.15
Vastness	4.53	0.16	4.27	0.15	4.02	0.17	3.61	0.15	6.62*	.08
UDMS	4.56	0.19	4.13	0.19	4.50	0.20	4.55	0.18	1.13	.03
UDMS-O	4.15	0.21	4.10	0.17	3.92	0.21	3.72	0.18	1.12	.03
HAP	3.45	0.14	3.29	0.12	2.52	0.14	3.12	0.12	12.14*	.14
LAP	4.11	0.12	3.98	0.11	4.35	0.12	3.19	0.11	21.22*	.22
HAN	1.46	0.09	1.58	0.08	1.46	0.09	1.33	0.08	1.47	.02
LAN	2.00	0.14	2.13	0.12	2.91	0.14	2.17	0.12	8.78*	.10

Table 9:
Study 2 Awe Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.21	0.22	1.000
	Calm	0.86	0.23	.002
	Excitement	0.86	0.22	.001
Awe Space	Awe Nature & Bldg	-0.21	0.22	1.000
	Calm	0.65	0.22	.022
	Excitement	0.65	0.21	.012
Calm	Awe Nature & Bldg	-0.86	0.23	.002
	Awe Space	-0.65	0.22	.022
	Excitement	0.00	0.22	1.000
Excitement	Awe Nature & Bldg	-0.86	0.22	.001
	Awe Space	-0.65	0.21	.012
	Calm	0.00	0.22	1.000

Table 10:
Study 2 Calm Multiple Comparisons

		Mean Difference		
(I) Condition	(J) Condition	(I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.15	0.16	1.000
	Calm	-0.33	0.17	.294
	Excitement	1.03	0.16	.000
Awe Space	Awe Nature & Bldg	-0.15	0.16	1.000
	Calm	-0.48	0.16	.016
	Excitement	0.88	0.15	.000
Calm	Awe Nature & Bldg	0.33	0.17	.294
	Awe Space	0.48	0.16	.160
	Excitement	1.36	0.16	.000
Excitement	Awe Nature & Bldg	-1.03	0.16	.000
	Awe Space	-0.88	0.15	.000
	Calm	-1.36	0.16	.000

Table 11:
Study 2 Excitement Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.27	0.22	1.000
	Calm	1.01	0.23	.000
	Excitement	-0.30	0.22	.965
Awe Space	Awe Nature & Bldg	-0.27	0.22	1.000
	Calm	0.74	0.22	.004
	Excitement	-0.57	0.20	.034
Calm	Awe Nature & Bldg	-1.01	0.23	.000
	Awe Space	-0.74	0.21	.004
	Excitement	-1.31	0.21	.000
Excitement	Awe Nature & Bldg	0.30	0.22	.965
	Awe Space	0.57	0.20	.034
	Calm	1.31	0.22	.000

Table 12:
Study 2 Vastness Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.26	0.22	1.000
	Calm	0.52	0.23	.168
	Excitement	0.92	0.22	.000
Awe Space	Awe Nature & Bldg	-0.26	0.22	1.000
	Calm	0.26	0.22	1.000
	Excitement	0.66	0.21	.009
Calm	Awe Nature & Bldg	-0.51	0.23	.168
	Awe Space	-0.26	0.22	1.000
	Excitement	0.41	0.22	.391
Excitement	Awe Nature & Bldg	-0.92	0.22	.000
	Awe Space	-0.66	0.21	.009
	Calm	-0.41	0.22	.391

Table 13:
AVI Means

Composite	Items	Awe Nature & Bldg (*M*)	Awe Space (*M*)	Calm (*M*)	Excitement (*M*)
HAP	Enthusiastic, Excited, Strong, Elated	3.45	3.29	2.52	3.57
LAP	Calm, Relaxed, Peaceful, Sad	4.11	3.98	4.35	3.19
HAN	Fearful, Hostile, Nervous	1.46	1.58	1.46	1.33
LAN	Dull, Sleepy, Sluggish	2.00	2.13	2.91	2.17

Table 14:
Study 2 High-Arousal Positive-Valence Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.16	0.19	1.000
	Calm	0.93	0.20	.000
	Excitement	-0.12	0.19	1.000
Awe Space	Awe Nature & Bldg	-0.16	0.19	1.000
	Calm	0.77	0.19	.000
	Excitement	-0.28	0.17	.663
Calm	Awe Nature & Bldg	-0.93	0.20	.000
	Awe Space	-0.77	0.19	.000
	Excitement	-1.05	0.19	.000
Excitement	Awe Nature & Bldg	0.12	0.19	1.000
	Awe Space	0.28	0.17	.663
	Calm	1.05	0.19	.000

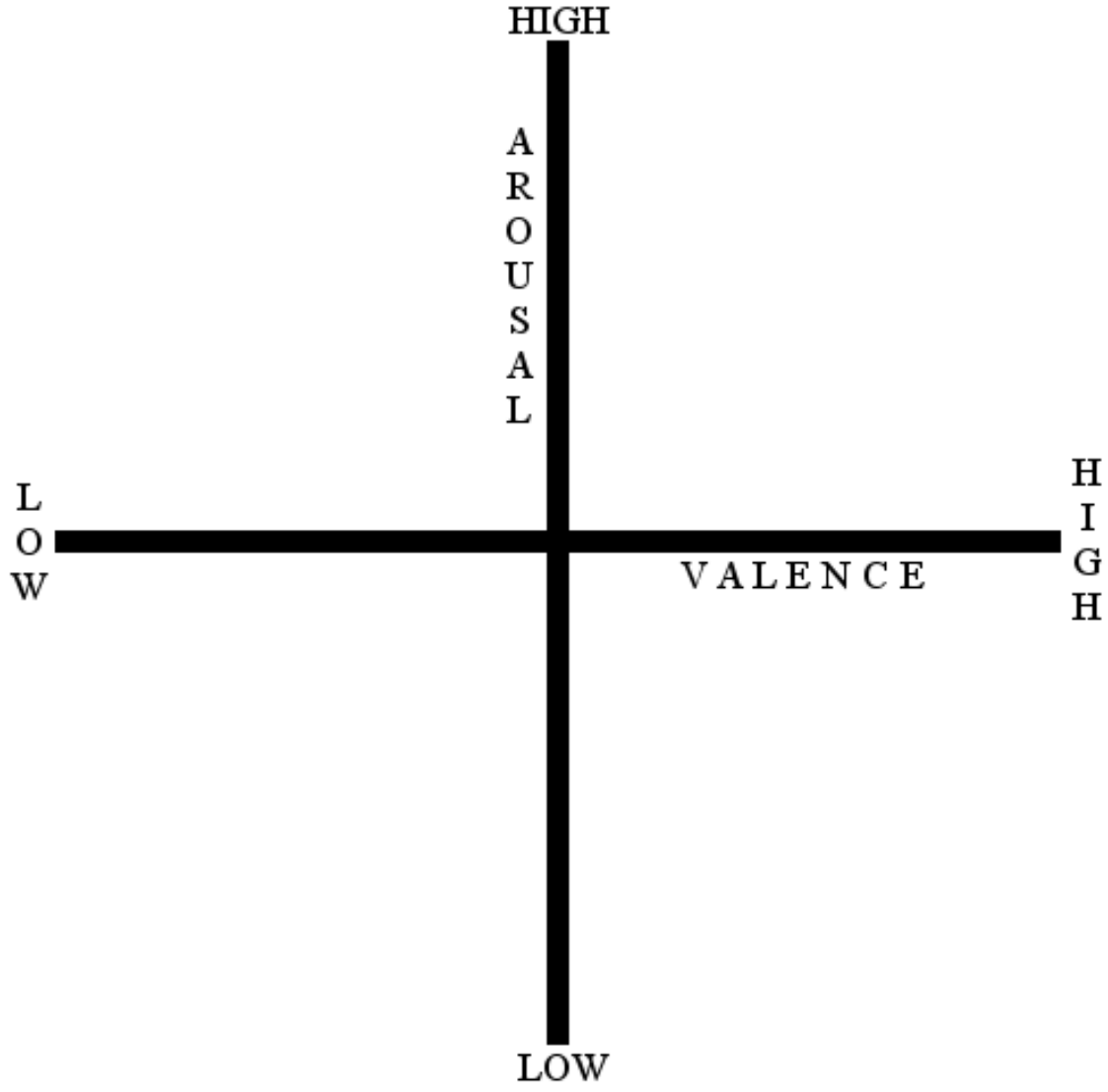
Table 15:
Study 2 Low-Arousal Positive-Valence Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	0.13	0.16	1.000
	Calm	-0.24	0.17	.941
	Excitement	0.92	0.16	.000
Awe Space	Awe Nature & Bldg	-0.13	0.16	1.000
	Calm	-0.37	0.16	.119
	Excitement	0.79	0.15	.000
Calm	Awe Nature & Bldg	0.24	0.17	.941
	Awe Space	0.37	0.16	.119
	Excitement	1.16	0.16	.000
Excitement	Awe Nature & Bldg	-0.92	0.16	.000
	Awe Space	-0.79	0.15	.000
	Calm	-1.16	0.16	.000

Table 16:
Study 2 Low-Arousal Negative-Valence Multiple Comparisons

(I) Condition	(J) Condition	Mean Difference (I-J)	SE	*p*
Awe Nature & Bldg	Awe Space	-0.13	0.19	1.000
	Calm	-0.91	0.20	.000
	Excitement	-0.17	0.19	1.000
Awe Space	Awe Nature & Bldg	0.13	0.19	1.000
	Calm	-0.78	0.19	.000
	Excitement	-0.04	0.18	1.000
Calm	Awe Nature & Bldg	0.91	0.20	.000
	Awe Space	0.78	0.19	.000
	Excitement	0.74	0.19	.001
Excitement	Awe Nature & Bldg	0.17	0.19	1.000
	Awe Space	0.04	0.18	1.000
	Calm	-0.74	0.19	.001

Figure 1:
Visual Representation of the Valence Arousal Circumplex



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Appendix A: Example Slides

Awe – Nature & Structures



Awe – Space



Calm



Note: Excitement slides were not included due to copyright protection

Appendix B: Affective Valuation Index

Listed below are a number of words the describe feelings. Please rate the extent to which you experienced each feeling during the slideshow from 1 (not at all) to 5 (very much).

Enthusiastic	Peaceful
Dull	Relaxed
Excited	Elated
Sleepy	Lonely
Strong	Content
Sluggish	Sad
Euphoric	Happy
Idle	Unhappy
Aroused	Serene
Rested	Nervous
Passive	Awed
Inactive	Astonished
Fearful	Quiet
Calm	Surprised
Hostile	Still

Appendix C: Thought Appraisal Questions

Rate the extent to which each of the following statements was true of you during the slideshow from 1 (not at all true) to 7 (very true).

1. I felt small or insignificant.
2. I felt the presence of something greater than myself.
3. I was unaware of my day-to-day concerns.
4. I felt closely connected to the world around me.
5. I did not want the experience to end.
6. I was aware of my personal values.
7. I felt closely connected to my culture.

Appendix D: Time Dilation Questions

1. I felt as if I had lots of time in which I could get things done.
2. I felt that time was slipping away.
3. I felt that time was expanded.
4. I felt that time was boundless.

Appendix E: The Unethical Decision Making Scale

How likely is it that you would engage in the behavior described on a scale from 0 (not at all likely) to 6 (highly likely)? Please note that there are no "incorrect answers." The survey will have value to yourself and others only if you give truthful responses, not those you think might seem more desirable. Your responses will be kept confidential, and will not be used to evaluate you personally in any way.

1. You work in a fast-food restaurant in downtown [City X]. It's against policy to eat food without paying for it. You came straight from classes and are therefore hungry. Your supervisor isn't around, so you make something for yourself and eat it without paying.
2. You work as an office assistant for a department at [University Y]. You're alone in the office making copies and realize you're out of copy paper at home. You therefore slip a ream of paper into your backpack.
3. You're preparing for the final exam in a class where the professor uses the same exam in both sections. Some of your friends somehow get a copy of the exam after the first section. They are now trying to memorize the right answers. You don't look at the exam, but just ask them what topics you should focus your studying on.
4. You've waited in line for 10 minutes to buy a coffee and muffin at Starbucks. When you're a couple of blocks away, you realize that the clerk gave you change for $20 rather than for the $10 you gave him. You savor your coffee, muffin and free $10.

5. You get the final exam back from your professor and you notice that he's marked correct three answers that you got wrong. Revealing his error would mean the difference between an A and a B. You say nothing.
6. Your accounting course requires you to purchase a software package that sells for $50. Your friend, who is also in the class, has already bought the software and offers to lend it to you. You take it and load it onto your computer.
7. Your boss at your summer job asks you to get confidential information about a competitor's product. You therefore pose as a student doing a research project on the competitor's company and ask for the information.
8. You are assigned a team project in one of your courses. Your team waits until the last minute to begin working. Several team members suggest using an old project out of their fraternity/sorority files. You go along with this plan.

Appendix F: The Unethical Decision-Making Scale (Other-Oriented)

Please read the following scenarios and imagine that they involve a fellow student. How permissible is it for someone to engage in the behavior described on a scale from 0 (not at all permissible) to 6 (highly permissible)? Please note that there are no "incorrect answers." The survey will have value to yourself and others only if you give truthful responses, not those you think might seem more desirable. Your responses will be kept confidential, and will not be used to evaluate you personally in any way.

1. A student works in a fast-food restaurant in downtown [City X]. It's against policy to eat food without paying for it. He came straight from classes and is therefore hungry. His supervisor isn't around, so he makes something for himself and eats it without paying.
2. A student works as an office assistant for a department at [University Y]. She's alone in the office making copies and realizes that she's out of copy paper at home. She therefore slips a ream of paper into her backpack.
3. A student is preparing for the final exam in a class where the professor uses the same exam in both sections. Some of his friends somehow get a copy of the exam after the first section. The friends are now trying to memorize the right answers. He doesn't look at the exam, but just asks his friends what topics to focus his studying on.
4. A student has waited in line for 10 minutes to buy a coffee and muffin at Starbucks. When she's a couple of blocks away, she realizes that the clerk gave her change for $20 rather than for the $10 she gave him. She savors her coffee, muffin and free $10.

5. A student gets the final exam back from his professor and notices that the professor marked correct three answers that were incorrect. Revealing the error would mean the difference between an A and a B. The student says nothing.
6. A student's accounting course requires her to purchase a software package that sells for $50. Her friend, who is also in the class, has already bought the software and offers to lend it to her. She takes it and load it onto her computer.
7. A student's boss at his summer job asks him to get confidential information about a competitor's product. He therefore poses as a student doing a research project on the competitor's company and asks for the information.
8. A student is assigned a team project in one of her courses. Her team waits until the last minute to begin working. Several team members suggest using an old project out of their fraternity/sorority files. She goes along with this plan.