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The nature of awe: Elicitors, appraisals, and effects on self-concept

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Awe has been defined as an emotional response to perceptually vast stimuli that overwhelm current mental structures, yet facilitate attempts at accommodation. Four studies are presented showing the information-focused nature of awe elicitors, documenting the self-diminishing effects of awe experience, and exploring the effects of awe on the content of the self-concept. Study 1 documented the information-focused, asocial nature of awe elicitors in participant narratives. Study 2 contrasted the stimulus-focused, self-diminishing nature of appraisals and feelings associated with a prototypical awe experience with the self-focused appraisals and feelings associated with pride. Study 3 found that dispositional awe-proneness, but not dispositional joy or pride, was associated with low Need for Cognitive Closure, and also documented a relationship between dispositional awe and increased emphasis on membership in "universal" categories in participants' self-concepts. Study 4 replicated the self-concept finding from Study 3 using experimentally elicited awe. Implications for future work on awe are discussed.

The most beautiful emotion we can experience is the mysterious. It is the power of all true art and science. He to whom this emotion is a stranger, who can no longer pause to wonder and stand rapt in awe, is as good as dead.

Albert Einstein.

Glorious sunsets, great works of art, intellectual epiphany, and the beauties of nature all evoke an intense emotional response (Frijda, 1986; Lazarus, 1991; LeDoux, 1996). It has proved difficult for psychologists to

agree on a description of this emotion, in part because the elicitors are so diverse, and the emotion's function unclear (Lazarus, 1991). Art, music, natural wonders, panoramic views, and other things of beauty can evoke many feelings, but the response common to all of these may best be labelled "awe" (Keltner & Haidt, 2003).

Within sociology, philosophy, and religion, there has been an abiding interest in awe, linking this emotion to aesthetic response, political change, and religious transformation (Burke, 1990; Keltner & Haidt, 2003; Weber, 1947). Among psychologists, attention has been more diffuse. Ekman posits that awe may be a distinct emotion (1992). Lazarus describes awe as an "ambiguous" state with emotional qualities, that can be experienced as positive or negative depending on the situation (1991, p. 83). Frijda (1986) treats wonder as a passive, receptive mode of attention in the presence of something unexpected. Although several theorists have attempted to define awe and related states, empirical studies of awe are almost non-existent. Recent work has documented a distinct facial expression for awe (Shiota, Campos, & Keltner, 2003), and has provided preliminary data on the personality variables associated with dispositional awe-proneness (Shiota, Keltner, & John, 2006). Otherwise, remarkably little is known about this emotion. The four studies reported here provide an initial, empirically derived, description of the elicitors of awe, and of the effects of awe on particular social cognitive outcomes—self-awareness and the content of the self-concept.

Awe: An epistemological positive emotion?

In a review of the theoretical literature on awe, Keltner and Haidt (2003) proposed that awe-eliciting stimuli are characterised by two features: perceptual vastness and need for accommodation. Although the term "vastness" implies great physical size, in this usage "vast" describes any stimulus that challenges one's accustomed frame of reference in some dimension. A stimulus may convey vastness in physical space, in time, in number, in complexity of detail, in ability, even in volume of human experience. Vastness may be implied by a stimulus, rather than physically inherent in the stimulus. For example, one may experience a sense of vastness in a mathematical equation, not because the equation is literally long, but because of the vast number of observed physical processes it is able to explain and predict. An individual may be vast in the sense of having great impact on others' lives. What is critical is that the stimulus dramatically expands the observer's usual frame of reference in some dimension or domain.

The expansion of one's frame of reference makes cognitive accommodation necessary. According to Piagetian theories of cognition people understand the world through mental representations of experience, or schemas, conserved in the face of continual changes in the environment (Piaget, 1970; Siegler, 1998). The process of assimilation involves interpreting present stimuli as additional cases of existing schemas. By contrast, in the process of accommodation, attention is focused on deviations of the present stimulus from existing schemas, and schemas are updated or created anew to take these deviations into account (Fiedler, 2001; Piaget, 1970, 1973). Based upon this distinction, assimilation has been described as "knowledge-driven" information processing, and accommodation as "stimulus-driven" processing (Fiedler, 2001, p. 86). According to Keltner and Haidt (2003), need for accommodation is the second core feature of stimuli that elicit awe.

The definition of awe proposed by Keltner and Haidt (2003) suggests several hypotheses regarding the elicitors of awe and the effects of awe on self-awareness and the content of the self-concept. These hypotheses highlight key differences between awe and other, more frequently studied, varieties of positive emotion. First, awe should be elicited by information-rich stimuli rather than the anticipation of material or social reward. When asked to describe a time they felt "happiness" or "joy", the most commonly studied positive emotions, participants typically describe material rewards, personal successes, or pleasurable social interactions as the elicitors (e.g., Ekman & Friesen, 1971; Smith & Ellsworth, 1985, 1988). Although the Keltner and Haidt (2003) definition proposes that vastness and need for accommodation are core features of awe-inspiring stimuli, empirical data testing this proposal have not yet been presented.

Second, the thoughts and feelings accompanying prototypical awe experiences should be stimulus-focused and self-diminishing, emphasising the perception of greatness outside the self, rather than self-focused and self-enhancing. Previous studies have typically found that experimentally induced happiness increases self-focused attention (e.g., Salovey, 1992; Silvia & Abele, 2002). If Keltner and Haidt (2003) are correct in proposing that awe is a response to vastness and need for accommodation, however, awe should lead to decreased self-focused attention.

Third, if the state experience of awe is associated with state need for cognitive accommodation, then individuals who experience awe relatively often and/or intensely should also show greater than average schema change. Dispositional awe-proneness should thus be associated with other measures of willingness to modify mental structures, whereas disposition to experience other positive emotions should not show this association.

Fourth, by decreasing attention to the self and emphasising processes greater than the self, awe should promote representation of large group

identification in the self-concept. These four hypotheses are tested in the present investigation.

STUDY 1: AWE ELICITORS AND OUTCOMES IN PERSONAL NARRATIVES

Study 1 explored the basic features of awe—what kinds of stimuli elicit awe, and what kinds of behaviours are facilitated by awe—as described in the personal narratives of undergraduate participants. In this study we sought to distinguish the features of awe from those of "happiness", the positive affect that has been the focus of most empirical research on emotion (e.g., Bless, Clore, Schwarz, Golisano, Rabe, & Wölk, 1996; Bless, Hamilton, & Mackie, 1992; Davidson, 1993; Ekman et al., 1987; Isen, Niedenthal, & Cantor, 1992).

Studies of happiness as an emotion state (as distinct from global life satisfaction, another use of the term) have uncovered consistent character-istics. First, happiness is typically elicited during pleasurable interactions with loved ones—when asked to describe a time they felt happy, participants typically describe a reunion with loved ones, a party, or some other enjoyable social event (e.g., Ekman & Friesen, 1971; Smith & Ellsworth, 1985, 1988). Second, people smile when they are happy. Happiness is distinctively accompanied by the Duchenne smile, which includes contraction of the muscles surrounding the eyes as well as movement of the lip corners upward (Ekman et al., 1987). The Duchenne smile is also associated by participants worldwide with reunion with loved ones (Ekman & Friesen, 1971). Both findings point to the highly social nature of happiness. One major function of smiling is to attract social interaction partners; observers typically find smiling people more attractive than deadpan ones, and smiling is associated with positive social outcomes throughout adulthood (Harker & Keltner, 2001; LaFrance & Hecht, 1995; Reis et al., 1990). Smiling indicates to the interaction partner, and felt happiness to the agent, that a relationship is valued and worthy of investment (Gonzaga, Keltner, Londahl, & Smith, 2001; Shiota, Campos, Keltner, & Hertenstein, 2004).

The theory of awe proposed in the introduction led to two specific hypotheses for the contrast with happiness. First, if awe serves primarily cognitive functions, it should be elicited by perceptually or conceptually complex, information-rich stimuli such as panoramic nature views and works of music and art rather than familiar interaction partners or material rewards. Thus awe should be less social than happiness, with respect to both the situations in which it is elicited and the behaviours that it facilitates. Second, given this de-emphasis on social interaction, awe should be less likely to involve open smiling.

Methods

Sample.   Participants were 60 undergraduates enrolled in courses in the Department of Psychology at a large West Coast university. Of the participants, 59% were female, 53% Asian or Asian American, 33% European American, 7% Latino/Latina, 2% African American, and 5% of another ethnicity. Mean age was 19.6 years. All participants received course credit in exchange for their participation.

Measures.   Participants were asked to describe a particular, recent event in which they felt either awe or happiness, as though they were writing for "a totally non-emotional being, like Spock on *Star Trek*, who does not understand human feelings". Subsequent questions prompted participants to describe: the eliciting situation; their emotions during the experience; what they were thinking about during the experience; and what they would do during the hour following the study if they could do anything they wanted.

Procedure.   Participants completed the study in groups of 8–14, and were randomly assigned to emotion condition via a change in the wording of the questionnaire.

Analyses.   Narratives were coded using a non-mutually exclusive system by two condition- and hypothesis-blind research assistants. Narratives were coded for: (1) type of stimulus event; (2) explicit reports of smiling during the experience; and (3) what participants would do during the next hour. Twenty-five percent of narratives were coded by both research assistants. Percent agreement was 92% for stimulus events, and 89% for next-hour activities. Only analyses for responses given by 5% or more of participants are reported here. For stimulus events these were: being in nature; art/music; another's accomplishment; social interaction; and one's own accomplishment. For "next-hour activities" these were: spend time outdoors; creative activity; sleep/relax; contact loved ones; and play sports. Chi-squared tests were used to test the significance of differences in code frequencies between the "awe" and "happiness" conditions.

Results

Eliciting events.   Frequencies of eliciting events in each condition are presented in Table 1. Participants in the awe condition were significantly more likely than those in the happiness condition to report being in nature (most of these involved panoramic views, 27% vs. 7%), and exposure to art/music (20% vs. 3%) as the eliciting stimulus event, and were marginally

TABLE 1
Study 1: Frequencies of stimulus events, thoughts/feelings, and ideal next-hour
activities in relived awe vs. happiness

	Awe	Happiness	χ^2
N for condition	30	30	
Stimulus event			
Nature	**8**	2	4.82*
Art or music	**6**	1	4.43*
Another's accomplishment	**3**	0	3.38⁺
Social interaction	5	**20**	13.78**
Personal accomplishment	6	8	
Expressive behaviour			
Smiling	4	**13**	5.84*
Next-hour activity			
Spend time in nature	**10**	3	5.43*
Creative activity	**5**	1	3.27⁺
Sleep	9	10	
Contact loved ones	9	11	
Play sports	3	3	

Note: ⁺$p < .10$; *$p < .05$; **$p < .01$. All tests of significance are two-tailed, with $df = 1$.

more likely to report another's accomplishment (10% vs. 0%) as the elicitor. Participants in the happiness condition were more likely than those in the awe condition to describe social events such as parties, reunions, and family events as elicitors (67% vs. 17%). Participants in the awe and happiness conditions were equally likely to describe their own accomplishment as the elicitor (20% and 27%, respectively).

Expressive behaviour: Smiling. Frequencies of self-reported smiling during the target experience are also reported in Table 1. Participants in the happiness condition were significantly more likely to report smiling than those in the awe condition.

Activities during the next hour. Frequencies of the most common "next-hour" activities are reported in Table 1. The most commonly reported ideal activity during the next hour was sleeping/relaxing. Sleeping/relaxing, contacting loved ones, and playing sports were reported with equal frequency in both conditions. Participants in the awe condition were significantly more likely than those in the happiness condition to describe ideal next-hour activities involving nature (e.g., going for a hike) and were marginally more likely to describe creative activities (e.g., creative writing or playing a musical instrument). One possible interpretation is that the descriptive task primed participants to want to repeat the target

activity. This was not always the case, however. Only half of the awe participants who described being in nature as a desired next-hour activity had described being in nature as the target awe experience, and fewer than half of the awe participants who wanted to do a creative activity in the next hour had described exposure to art or music as their target experience.

Discussion

The results from Study 1 attest to the relatively asocial nature of awe, relative to the emotion happiness. As expected, awe was elicited by information-rich stimuli, particularly panoramic nature views and novel art and music, and reliving awe experiences made participants want to be in such environments again. Happiness was experienced in overwhelmingly social contexts, and was three times as likely to involve smiling—a social display. The few social events reported as awe elicitors involved a major life transition for another person, such as a marriage or a death; in these descriptions participants placed less emphasis on the relationship, and more on the transition. The remarkable accomplishments of other people were also described as inducing awe, consistent with Keltner and Haidt's (2003) suggestion that awe helps facilitate the identification of community leaders. This range of elicitors supports our suggestion that experiences that challenge an individual's normal frame of reference, or way of thinking about the world, will tend to evoke awe.

One striking feature of the awe-eliciting events described by participants is that all were interpreted as positive. The Keltner and Haidt (2003) definition leaves room for awe to be inspired by negative, threatening stimuli not accounted for by current knowledge structures, such as natural disasters, but such elicitors were not described by our participants. This might suggest that positive awe and negative horror are fundamentally different types of experience, with awe being inherently positive. One possibility is that appraisals of threat or loss override appraisals that would otherwise elicit awe; another is that horror is a blend of awe and fear. More research is needed to explore the relationship between these two emotion constructs.

One difficulty with Study 1 was its reliance on emotion terms as prompts. With this approach, one can never be entirely certain that participants are providing data about the state of interest (Haidt & Keltner, 1999). For example, two participants in the "happiness" condition described experiences with nature, and several participants in the awe condition described personal accomplishments, as the eliciting events. To obtain a more "pure" picture of awe, we asked Study 2 participants to describe

experiences with a prototypical awe elicitor identified in Study 1: a panoramic scene of natural beauty. We then asked participants to rate their awareness of specific stimulus-focused versus self-focused thoughts and emotions during that experience.

STUDY 2: SENSE OF VASTNESS AND SELF-DIMINISHMENT IN PROTOTYPICAL AWE

We have described awe as an emotion elicited by a sense of vastness, and promoting accommodative, stimulus-driven information processing. Perhaps the most common experience of awe for people in egalitarian, Western societies (as for our sample in Study 1) is in response to massive natural entities, such as mountains, vistas, storms, and oceans, or to naturally occurring objects, like waves or fractals, with infinitely repeating patterns. Across cultures people express a preference for natural environments over man-made ones (Kaplan, 1992; Kaplan & Kaplan, 1989; Kuo, Bacaicoa, & Sullivan, 1998; Orians & Heerwagen, 1992). More specifically, people prefer nature scenes with certain characteristics, including: the presence of trees and water; an element of "mystery", such as a winding path or an obscured area, that encourages exploration; the presence of repeated elements; and the presence of distinctive, internally uniform regions, such as clusters of trees or shrubs (e.g., Kaplan, 1992; Kuo, Bacaicoa, & Sullivan, 1998). These universal preferences may reflect both a need to determine which habitats will provide the most food and water, and a need to comprehend and explore our surroundings (Kaplan & Kaplan, 1989). Our favoured nature views are the original information-rich stimuli.

In Study 2 we asked whether exposure to natural beauty consistently elicits awe, and whether the appraisal themes distinctly associated with such experiences reflect a sense of vastness and self-diminishment. People experiencing awe should be particularly attuned to and focused on their surroundings, and less than usually aware of the self. In Study 2, prototypical experiences of awe were compared with experiences of another positive emotion: pride. Pride has been defined as the emotion felt when one succeeds in a socially valued endeavour, likely to raise one's social status (Shiota et al., 2004; Tiedens, Ellsworth, & Mesquita, 2000). Earlier research has shown that pride involves strong appraisals of personal control, positive evaluation of the self relative to others, and an actual or implicit audience to one's achievement (Seidner, Stipek, & Feshbach, 1988; Smith & Ellsworth, 1985).

Participants described either a time they saw "a natural scene [the participant] felt was beautiful" or a personal accomplishment that elicited pride. They then rated the extent to which they experienced 10 different

emotions and several self- vs. stimulus-focused thoughts during the target experience. It was hypothesised that nature scenes would elicit strong awe accompanied by other externally focused emotions, such as love and rapture, and thoughts/appraisals involving self-diminishment and intense stimulus-focused attention. These included a feeling of smallness, being in the presence of something greater than the self, inattention to one's personal day-to-day concerns, connection with the surrounding world, and wanting to prolong or memorise the experience. By contrast, personal accomplishments should be accompanied by self-focused emotions such as pride, excitement, and fear, and self-focused thoughts/appraisals such as a sense of challenge, feeling tired (awareness of one's own body), and awareness of personal values.

Methods

Sample.   Participants were 60 undergraduates enrolled in classes in the Department of Psychology at a large West Coast university. Of the participants, 58% were female, 45% European American, 32% Asian or Asian American, 10% African American, 5% Latino/Latina, and 8% of another ethnicity. Mean age was 20.1 years. Participants received course credit in exchange for participating in the study.

Measures.   Participants were prompted to remember a specific event using instructions similar to those given in Study 1. After describing the experience, participants were asked to rate the appropriateness of the following words, on a scale from 1 (*not appropriate at all*) to 7 (*very appropriate*) for describing their emotions during the target experience: Awe, Contentment, Excitement, Fear, Joy, Love, Pride, Rapture, Sadness, and Surprise. Participants were asked to rate how intense, personally meaningful, novel, challenging, and tiring the target experience was on a scale from 1 to 7. Finally, participants were asked to rate the extent to which they remembered having several appraisals of the target experience, using a scale from 1 (*not true at all*) to 7 (*very true*). These were: "I felt small or insignificant"; "I felt the presence of something greater than myself"; "I was unaware of my day-to-day concerns"; "I felt closely connected to the world around me"; "I did not want the experience to end"; "I was aware of my personal values"; and "I felt closely connected to my culture".

Procedures.   Participants completed the instrument in groups of 8–14, and were randomly assigned to the Nature or Accomplishment condition. Nature participants read: "Start now by thinking of a time, fairly recently, when you encountered a natural scene that was really beautiful to you. This might have been a sunset, a view from a high place, or any other time you

were in a natural setting that you felt was beautiful''. Pride participants read: "Start now by thinking of a time, fairly recently, when you felt pride''. Although this did not explicitly instruct participants to describe a personal accomplishment, all but four participants in this condition did so, typically describing academic accomplishments such as being accepted to university, getting a high grade on an exam or in a class, or becoming valedictorian or salutatorian of their high-school class.

Results

Emotion label ratings.   Mean emotion word ratings for each condition are presented in Table 2. Participants in the Nature condition rated the words "Awe", "Rapture", "Love", and "Contentment" as more appropriate than did participants in the Accomplishment condition. Participants in the Accomplishment condition rated "Pride", "Excitement", "Fear", and

TABLE 2
Study 2: Emotion label and appraisal endorsements for target experiences

	Nature	*Accomplishment*	*t*
Rating of emotion label appropriateness			
Awe	**6.07**	4.27	4.01**
Love	**4.57**	3.20	2.58*
Rapture	**5.21**	3.36	3.73**
Contentment	**6.33**	5.00	3.47**
Pride	2.87	**6.57**	−9.40**
Surprise	2.57	**4.47**	−3.77**
Fear	1.77	**2.86**	−2.48*
Excitement	4.97	**6.10**	−2.75**
Joy	6.20	6.03	
Sadness	1.73	1.93	
Thoughts/appraisals during target experience			
Felt small or insignificant	**3.47**	1.70	3.40**
Felt presence of something greater than self	**5.77**	4.37	2.56*
Unaware of day-to-day concerns	**6.30**	4.77	3.49**
Felt connected with the world around me	**5.40**	3.83	3.49**
Did not want the experience to end	**5.90**	3.80	4.34**
Challenging	2.57	**4.40**	−3.55**
Tiring	2.13	**3.43**	−2.69**
Felt connected with my personal values	4.37	**5.30**	−1.92+
Felt connected with my culture	2.27	**3.17**	−1.82+
Intense	5.43	5.50	
Meaningful	5.50	5.83	
Novel	4.67	4.87	

Note: $^+p < .10$; *$p < .05$; **$p < .01$. All independent sample *t*-tests of significance are two-tailed, with $df = 58$.

"Surprise" as more appropriate emotion labels for their feelings during the target experience than did Nature condition participants. Participants in both conditions gave high ratings for the appropriateness of "Joy" and low ratings for "Sadness".

Thoughts/appraisals during the target experience.   Mean endorsements of thoughts/appraisals during the target experience are presented in Table 2. Participants in both conditions rated their target experience as highly intense and meaningful, and both groups rated novelty above the midline. Participants in the Nature condition gave higher ratings than those in the Accomplishment condition for "I felt small or insignificant", "I felt the presence of something greater than myself", "I felt connected with the world around me", "I was unaware of my day-to-day concerns", and "I did not want the experience to end". Participants describing accomplishments rated the target experience as more challenging and tiring than those describing experiences with natural beauty. They also gave marginally higher endorsements of the statements "I was aware of my personal values" and "I felt closely connected to my culture".

Discussion

As hypothesised, the themes endorsed by participants describing proto-typical awe experiences were consistent with the definition of awe proposed by Keltner and Haidt (2003). The statements "I felt small or insignificant" and "I felt the presence of something greater than myself" convey a sense of vastness, and the statements "I felt connected with the world around me" and "I was unaware of my day-to-day concerns" convey disengagement from the self and attentional focus on the present environment. By contrast, experiences with accomplishment typically evoked more self- and perfor-mance-related affect, greater awareness of internal feelings such as tiredness and a sense of challenge, and greater awareness of personal values. Participants describing accomplishments also reported feeling more con-nected with their cultures, perhaps because cultural values provide the standards by which we measure our own performance.

In Study 3, we moved from asking participants to describe a previous experience with awe to asking how dispositionally awe-prone people think about the world and about themselves. Specifically, are awe-prone people indeed more comfortable with revising their mental structures or creating new ones? If so, is this association distinctive to awe-proneness, or is it a general characteristic of dispositional positive emotionality? Also, given that awe facilitates a sense of self-diminishment, how do awe-prone people define

themselves when specifically asked to do so? These questions were addressed in Study 3.

STUDY 3: DISPOSITIONAL AWE, NEED FOR COGNITIVE CLOSURE, AND THE SELF-CONCEPT

The results of Studies 1 and 2 demonstrated the information-focused, self-diminishing nature of awe in the context of specific awe experiences. What implications does this have for dispositionally awe-prone people? How do awe-prone people think about the world and about themselves?

First, if the experience of awe does promote accommodative, stimulus-driven cognition, then awe-prone people should be more comfortable revising their own schemas, and creating new ones when necessary. Although we are not aware of a regularly used self-report measure of this trait, there is an excellent measure of its inverse—Need for Cognitive Closure. Individuals high on Need for Cognitive Closure are uncomfortable with ambiguity, prefer continuity in their surroundings and in what is expected of them, and dislike situations that do not have a "correct" answer or response. Thus, we expected Need for Cognitive Closure to correlate negatively with dispositional awe-proneness. However, we did not expect Need for Cognitive Closure to predict dispositional experience of joy and pride.

Study 3 also addressed the content of the self-concepts of dispositionally awe-prone individuals, and asked whether awe differed from joy and pride in predicting this social cognitive outcome. The results of Study 2 suggest that awe promotes self-diminishment, and the direction of attention away from the self. What effect does this have when participants are explicitly instructed to think about who they are? Earlier research has demonstrated that self-concept is somewhat malleable, and subject to state factors such as the priming of individualist vs. collectivist cultural paradigms (e.g., Brewer & Gardner, 1996; Gardner, Gabriel, & Hochschild, 2002; Gardner, Gabriel, & Lee, 1999). One study has also documented an effect of emotional experience on the structure of the self-concept, finding that participants who fell in love during the course of a 12-week testing period showed greater increases in diversity of self-concept domains than participants who had not fallen in love (Aron, Paris, & Aron, 1995).

In Study 2, participants describing awe experiences endorsed both the sense of being in the presence of something greater than the self and a feeling of being connected with their surroundings. Based upon this finding, we hypothesised that the self-concepts of awe-prone people should emphasise the junction between these two feelings—the self as part of

a greater whole, or universal category. This hypothesis was also tested in Study 3.

Methods

Sample.   Participants were 88 undergraduates enrolled at a large, West Coast university, who completed the study as part of a class exercise. Of the participants, 68% were female, 43% European American, 32% East Asian or Asian American, 16% Latino/Latina, and 9% South Asian. Mean age was 22.7 years ($SD = 3.6$).

Materials.   Participants completed three self-report instruments. First, participants completed the Awe, Joy, and Pride scales of the Dispositional Positive Emotion Scales (Shiota et al., 2006). The Awe scale consists of six items, such as "I often feel awe" and "I feel wonder almost every day". The Joy scale also consists of six items, such as "I often feel bursts of joy" and "On a typical day, many events make me happy". The Pride scale consists of five items, including "I am proud of myself and my accomplishments" and "Many people respect me". All items are phrased as statements about the self or about the world, and no items are reverse-scored. Participants report their level of agreement with each statement on a 7-point scale anchored at (1) "*strongly disagree*" and (7) "*strongly agree*".

A short form of the Need for Closure scale (Kruglanski & Webster, 1996), used in the present study, consists of eight items. Four of these items are direct-keyed, such as "I think that having clear rules and order at work is essential for success" and "I usually make important decisions quickly and confidently". Four items are reverse-scored, such as "When considering most conflict situations, I can usually see how both sides could be right". Cronbach's alpha in this sample was .59.

The Twenty Statements Test (TST; Rees & Nicholson, 1991) is an open-ended self-report instrument in which participants list elements of their self-concepts. Participants are provided with twenty blank lines, and are instructed to write a self-descriptor on each line: "In the space provided below, please give twenty different statements in answer to the question, "Who am I?" Give these answers as if you were giving them to yourself, not to somebody else. Move along fairly quickly". Following Rees and Nicholson (1991), TST responses were coded using McPartland's (1965) four referential frames. After excluding nonsense responses and those describing the immediate situation, each response was coded as either: (A) a *Physical* description of the self in time and space (e.g., "tall" or "dark-haired"); (B) a description of a specific *Social* role or relationship (e.g., "sister" or "student"); (C) a *Reflective* description of the participant's global traits (e.g., "friendly" or "sarcastic"); or (D) an *Oceanic* description

involving abstract, non-trait characteristics. Following Cousins (1989), the oceanic category was broken into three subcategories. The *Individuated* responses emphasised the participant's uniqueness (e.g., "special" or "one-of-a-kind"). *Universal* responses defined the participant as part of a larger group (e.g., "a person" or "an inhabitant of the Earth"). The third category included *Other* global, abstract descriptors not falling into either of the other two categories. Totals of each type of self-descriptor were summed for each participant, and then divided by the total number of self-descriptors to provide a percentage of responses in each category.

Results

Need for Cognitive Closure. Correlations between Need for Cognitive Closure scores and the Awe, Joy, and Pride scales are reported in Table 3. The DPES Awe scale, but not the Joy or Pride scale, was significantly negatively associated with Need for Cognitive Closure ($r = -.39$, $p < .01$).

Content of self-concept. Correlations between the TST scores and the Awe, Joy, and Pride scales are also presented in Table 3. None of the three DPES scales significantly predicted proportion of TST responses emphasising physical, social, or reflective characteristics. All three DPES scales did, however, significantly predict proportion of TST responses coded as Oceanic characteristics (for Awe, $r = .38$, $p < .01$; for Joy, $r = .26$, $p < .05$; for Pride, $r = .27$, $p < .05$). Looking at the subcategories of the Oceanic responses, all three DPES scales significantly predicted proportion of TST responses emphasising unique, individuating characteristics (for Awe, $r = .36$, $p < .01$; for Joy, $r = .39$, $p < .01$; for Pride, $r = .33$, $p < .01$). However, only DPES Awe

TABLE 3
Study 3: Correlations of dispositional Awe, Joy, and Pride with Need for Cognitive Closure and TST self-descriptor proportions

	Awe	Joy	Pride
Need for cognitive closure	−.39**	−.09	−.01
TST: Physical characteristics	−.15	.00	−.15
TST: Social relationships	−.06	.04	−.03
TST: Reflective traits	−.01	−.13	.05
TST: Oceanic	.38**	.26*	.27*
Individuated	.36**	.39**	.33**
Universal	.25*	.18	.01
Other	.25*	.12	.18

Note: *$p < .05$; **$p < .10$. All tests of significance are two-tailed, with $N = 88$, $df = 86$.

scores significantly predicted proportion of TST responses emphasising membership in a universal group ($r = .25$, $p < .05$) or another global, abstract self-descriptor ($r = .25$, $p < .05$).

Discussion

In Study 3, dispositional experience of the emotion awe was associated with low Need for Cognitive Closure. This supports our hypothesis, derived from Keltner and Haidt's (2003) proposed definition of awe, that awe-prone individuals should be especially comfortable revising their own mental structures, or acknowledging that currently held mental structures are not adequate to the occasion. This effect cannot be attributed to general effects of positive emotion, since Need for Cognitive Closure was not associated with dispositional Joy or Pride.

Also as hypothesised, dispositional awe-proneness was associated with greater representation of "universals", or statements about membership in very large categories, in participants' self-concepts. All three positive emotion dispositions were associated with greater representation of Oceanic self-descriptors in the self-concept, but for dispositional Joy and Pride this was due exclusively to statements about being special or unique. It appears that only dispositional awe-proneness facilitates definition of the self as part of something greater than the self.

However, a correlation between self-reported dispositional awe-proneness and self-concept as measured using the TST does not allow us to conclude that the experience of awe triggers this change in self-concept. Thus, in Study 4, we examined the relationship between the content of the self-concept and experimentally elicited awe.

STUDY 4: EFFECTS OF EXPERIMENTALLY ELICITED AWE ON THE SELF-CONCEPT

Methods

Sample. Participants were 50 undergraduates enrolled in Psychology courses at a large, West Coast university. Of the participants, 66% were female. Asians and Asian Americans constituted 68% of the sample, European Americans, 20%, Latinos/Latinas, 6%, African Americans, 2%, and 4% another ethnicity. Due to a clerical error, data regarding age were not collected. However, samples from this population typically average 19–20 years of age.

Materials.   Participants completed the Twenty Statements Test, described in Study 3.

Procedure.   Participants met the experimenter at a pre-designated site on campus, and were randomly assigned to the awe or control condition. All participants were told they were participating in a study of environment and cognition. Participants were instructed not to speak with other participants or with any acquaintances they might meet en route to the study location. Participants in the awe condition were then led into the adjoining building, and through a series of hallways to a full-sized replica of a *Tyrannosaurus rex* skeleton. The skeleton is about 12 feet high at the hip, about 25 feet long, and weighs approximately 5 tons. Participants were asked to look at the statue for one minute, and then to begin completing the TST and distractor tasks using a clipboard and pen. Control participants were led into the same building, but were asked to complete the TST and distractor tasks after looking at an empty hallway for one minute.

Analyses.   Coding of TST responses followed the protocol described in Study 3. Twenty percent of the responses were coded by two condition-blind coders. Percent agreement was 87%.

Pre-testing of the awe stimulus.   Pre-testing with a separate sample suggested that awe was the primary emotion elicited by the *T. rex* replica. Participants were approached as they walked by the replica, and asked, "Can you tell me what emotions, if any, you remember feeling the first time you saw this dinosaur?" Of 15 participants approached, 6 offered emotion words clearly in the awe family (awe, amazement, astonishment, impressed), 2 reported surprise, 2 interest/curiosity, 1 fear, and 4 no emotion or a non-emotional word (e.g., "neat", "cool").

Results

There were no significant differences between awe and control groups in the total number of self-descriptors, or in the proportion of physical, social, or reflective self-descriptors. The effect of experimental condition was only significant for the Oceanic type of self-descriptor, with participants in the awe condition giving an average of 1.8 such descriptors and those in the control condition an average of 0.6 such descriptors ($t = 2.49$, $df = 48$, $p < .05$). Follow-up analyses revealed that this was largely due to the Universal subtype ($t = 2.95$, $df = 48$, $p < .01$). Differences between the awe

and control conditions for Individuated and Other Oceanic responses were not significant.

Discussion

Results of Study 4 were consistent with those of Study 3, finding that experimentally elicited awe led to increased representation of membership in "universal" categories in the self-concept. This effect was not found for statements about personal value or uniqueness, suggesting that this aspect of the self-concept may be related to positive emotionality in general, rather than facilitated specifically by the experience of awe.

GENERAL DISCUSSION

We have presented four studies that outline the elicitors of awe, the appraisals and feelings associated with the experience of awe, and the effects of dispositional and experimentally elicited awe on the content of the self-concept. Findings from Study 1 suggest that awe is elicited by information-rich stimuli, rather than the opportunity for material reward or social engagement. Study 3 suggested that awe-prone people are particularly comfortable with revising their mental representations of the world. Findings from Study 2 suggest that the experience of awe is associated with a sense of the smallness of the self and the presence of something greater than the self, as well as some disengagement from awareness of the self. Studies 3 and 4 suggested that awe does, however, have an impact on the content of the self-concept, increasing one's sense of the self as part of a greater whole—a self-concept that de-emphasises the individual self.

The idea that emotion influences cognition is far from new (Isen, 2000; Martin & Clore, 2001). However, most prior research on the affect–cognition relationship has addressed valence of mood as the independent variable, rather than specific emotions (Isen, 2000). Findings from several previous studies suggest that positive mood facilitates knowledge-driven information processing, relative to neutral or negative mood (e.g., Bless et al., 1996a; Bless, Mackie & Schwarz, 1992; Bless, Schwarz, & Wieland, 1996b; Bodenhausen, Kramer, & Süsser, 1994; Fiedler, 2001; Forgas, 1998). Most studies of the association between positive mood and cognition have manipulated positive affect through elicitors such as small gifts, praise on previous tasks, and remembered happy events (e.g., Bless et al., 1996a, 1996b; Bodenhausen et al., 1994; Forgas, 1998; Isen et al., 1992). Such manipulations elicit varieties of positive emotion that emphasise material or social reward, and assimilation in such situations might facilitate

the use of existing knowledge to build material and interpersonal resources (Bless et al., 1996a; Bless & Fiedler, 1995; Fiedler, 2001; Fredrickson, 1998).

Keltner and Haidt's (2003) proposal that awe facilitates accommodation clearly diverges from this trend. However, the present findings suggest that awe is experienced when one is presented with an opportunity to build informational resources, rather than material or social ones. In such situations, cognitive accommodation is clearly more functional than assimilation. The present findings also suggest that, unlike other varieties of positive emotion, awe tends to direct attention away from the self and toward the environment. The present findings offer an initial step in empirical research on awe. Limitations of the present studies leave many questions yet to be answered. The present findings do not explicitly test the hypothesis that awe facilitates accommodative cognition; rather, they support hypotheses about the elicitors of awe, appraisal themes associated with awe, cognitive characteristics of awe-prone people, and effects of awe on self-concept that are suggested by the Keltner and Haidt (2003) definition. Does experimentally induced awe lead to increased stimulus-focused attention? If so, then awe should decrease reliance on such heuristics as stereotypes and scripts in interpreting novel people and situations. Given exposure to a stimulus that defies currently available mental structures, what determines whether an individual experiences awe, rather than experiencing anxiety or simply ignoring the stimulus? We hope to address these questions in future work.

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