

## Awe, the Small Self, and Prosocial Behavior

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Awe is an emotional response to perceptually vast stimuli that transcend current frames of reference. Guided by conceptual analyses of awe as a collective emotion, across 5 studies ( $N = 2,078$ ) we tested the hypothesis that awe can result in a diminishment of the individual self and its concerns, and increase prosocial behavior. In a representative national sample (Study 1), dispositional tendencies to experience awe predicted greater generosity in an economic game above and beyond other prosocial emotions (e.g., compassion). In follow-up experiments, inductions of awe (relative to various control states) increased ethical decision-making (Study 2), generosity (Study 3), and prosocial values (Study 4). Finally, a naturalistic induction of awe in which participants stood in a grove of towering trees enhanced prosocial helping behavior and decreased entitlement compared to participants in a control condition (Study 5). Mediation data demonstrate that the effects of awe on prosociality are explained, in part, by feelings of a small self. These findings indicate that awe may help situate individuals within broader social contexts and enhance collective concern.

*Keywords:* awe, prosocial behavior, altruism, helping, small self

The saintly character is the character for which spiritual emotions are the habitual center of the personal energy. . . . They are these: A feeling of being in a wider life than that of this world's selfish little interests; and a conviction, not merely intellectual, but as it were sensible, of the existence of an Ideal Power. . . . An immense elation and freedom, as the outlines of the confining selfhood melt down. . . . A shifting of the emotional center toward loving and harmonious affections . . . [which brings] increase of charity, tenderness for fellow-creatures. (James, 1902/1985, pp. 219–221)

Calvin: Look at all the stars! The universe just goes out forever and ever!

Hobbes: It kind of makes you wonder why man considers himself such a big screaming deal. (Watterson, 2005, Vol. 3, p. 370)

Awe is a cherished and transformative experience that is at the center of many collective processes (Keltner & Haidt, 2003).

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We thank Yasmin Abbaszadeh, Christian Cazares, David Chen, Liana Gheorma, Millie Huckabee, Xiaoshan Li, Maia Menschik, Sally Ng, Matthew Nguyen, Oswaldo Rosales, Koji Takahashi, Nina Tian, and Stephanie Yu for their invaluable help with data collection. We would also like to thank E. J. Horberg, whose insights significantly strengthened this work. This research was supported in part by a grant from the John Templeton Foundation (24288) awarded to Dacher Keltner.

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Firsthand accounts of awe felt during experiences with religion and spirituality, nature, art, and music often center upon two themes: the feeling of being diminished in the presence of something greater than the self, and the motivation to be good to others (Emerson, 1836/1982; James, 1902/1985; Keltner & Haidt, 2003). From one perspective, this is surprising. Awe is an emotional response to perceptually vast stimuli that defy one's accustomed frame of reference in some domain (Keltner & Haidt, 2003; Shiota, Keltner, & Mossman, 2007). People typically experience awe in response to asocial stimuli like natural wonders, panoramic views, and beautiful art. Why, then, would awe produce the sense of a small self and more prosocial tendencies?

One answer to this question is found in treatments of awe as a collective emotion (e.g., Durkheim, 1887/1972; Horberg, Oveis, & Keltner, 2011; Keltner & Haidt, 1999, 2003; Spears et al., 2011). Within these analyses, it is claimed that awe produces specific cognitive and behavioral tendencies that enable individuals to fold into collaborative social groups, and engage in collective action. Action within collectives, including collaboration, cooperation, and coaction, requires a diminished emphasis on the self and its interests and a shift to attending to the larger entities one is a part of (e.g., small groups, social collectives, and humanity). Enhanced prosocial tendencies—inclinations to share, care, and assist—further enable individuals to function more effectively within social collectives (de Waal, 2008; Keltner, Kogan, Piff, & Saturn, 2014; Nowak, 2006; Sober & Wilson, 1998). Experiences of awe, this reasoning holds, enable individuals to be effective members of social collectives, through shifts in attention to the self and through prosocial behavior. It is perhaps for this reason that awe is central to experiences in religion, spirituality, and political engagement, all processes in which the individual engages in collective action

and derives a more acute sense of collective identity (e.g., Shariff & Norenzayan, 2007).

Guided by this theorizing, in the current research we investigate the influence of awe on different forms of prosociality. We predict that the experience of awe will increase prosocial behavior, and that these effects will be driven by what we refer to as the “small self”—a relatively diminished sense of self (i.e., feeling one’s being and goals to be less significant) vis-à-vis something deemed vaster than the individual.<sup>1</sup> In pursuing this line of inquiry, we provide the first experimental evidence that documents the effects of awe upon prosocial tendencies and that illuminates the mechanism underlying these effects, which to date have only been the subject of theoretical speculation.

### Awe, Vastness, Accommodation, and the Small Self

Social relationships are central to social life and vital to human survival (e.g., Baumeister & Leary, 1995; House, Landis, & Umberson, 1988; Piff, Stancato, Martinez, Kraus, & Keltner, 2012; Sober & Wilson, 1998). Decisions about where, when, and with whom to act in a prosocial fashion are critical to the formation and maintenance of relationships. On the one hand, prosocial behavior can enable social ties that are reciprocal and mutually beneficial (Keltner et al., 2014). On the other hand, prosocial behavior incurs many costs, and those who act prosocially risk their sacrifices being unreciprocated or even exploited.

This cost-benefit analysis of prosociality has prompted studies of the ways in which emotions guide how individuals negotiate this trade-off, which is sometimes referred to as the “trust problem” or the “commitment problem” (e.g., Frank, 1988). Research finds that what might be called more social emotions like gratitude, love, moral elevation, and compassion can prompt behaviors that benefit others, often at an expense to oneself (e.g., Bartlett & DeSteno, 2006; DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010; Gonzaga, Keltner, Londahl, & Smith, 2001; Schnall, Roper, & Fessler, 2010; Piff, Kraus, Côté, Cheng, & Keltner, 2010). Next to nothing is known about how awe, which is typically elicited by information-rich stimuli like panoramic nature views instead of social stimuli (Shiota et al., 2007), can likewise influence prosocial tendencies so vital to trust and commitment.

Awe involves positively valenced feelings of wonder and amazement. Awe arises via appraisals of stimuli that are vast, that transcend current frames of reference, and that require new schemata to accommodate what is being perceived (Keltner & Haidt, 2003). Although many stimuli can inspire awe, from beautiful buildings to elegant equations, the prototypical awe experience, at least in Western cultures, involves encounters with natural phenomena that are immense in size, scope, or complexity (e.g., the night sky, the ocean; Shiota, Campos, & Keltner, 2003; Shiota et al., 2007). However elicited, experiences of awe are unified by a core theme: perceptions of vastness that dramatically expand the observer’s usual frame of reference in some dimension or domain (Shiota et al., 2007).

Past studies have begun to document the influences of awe on social cognition, effects that can be understood in terms of how awe is based in perceived vastness that challenges one’s normal frame of reference. For example, awe can cause people to feel they have more available time, which can enhance their well-being

(Rudd et al., 2012). Some experiences of awe may also trigger a sense of uncertainty and motivate people to seek out order—for example, by perceiving intentionality in randomness (Valdesolo & Graham, 2014).

Awe has also been associated with a sense that one is a part of something larger than oneself, most typically larger categories such as a community, a culture, the human species, or nature. Shiota and colleagues (2007) found that people high in dispositional awe (but not pride or joy) were less likely to define themselves using individuated terms such as “special” or “one-of-a-kind” and more likely to emphasize their membership in larger categories, for example by describing themselves as “a person” or “an inhabitant of the Earth.” An induction of awe in which participants stood next to a full-sized replica of a *Tyrannosaurus Rex* skeleton—that elicited feelings of awe but not other positive emotions—similarly expanded participants’ self-definitions to include more universal social categories (Shiota et al., 2007). In a similar vein, Van Cappellen and Saroglou (2012) found that eliciting awe via a nature video caused participants to feel more connected to people in general on the Inclusion of the Other in the Self Scale (Aron, Aron, & Smollan, 1992).

Most relevant to our theorizing, awe appears to also trigger an almost metaphorical sense of smallness of the self. In one study, participants who recalled an experience of awe recounted feeling small relative to the environment (Campos, Shiota, Keltner, Gonzaga, & Goetz, 2013). In other research, participants primed to recall a past personal experience of awe reported perceptions of something greater than themselves, feeling smaller and less significant, and a sense that their attention was less focused on personal day-to-day concerns (Shiota et al., 2007).<sup>2</sup> Taken together, these studies suggest that awe directs attention to entities vaster than the self and more collective dimensions of personal identity, and reduces the significance the individual attaches to personal concerns and goals. We note, though, that much of this evidence involves narrative data in which the individual recalls salient themes of a past experience of awe; clearly, more experimental work is needed to show that awe causes such shifts in self-representation.

These lines of research on awe, self-categorization, and feelings of smallness indicate that awe can significantly alter the self-concept, in ways that reflect a shift in attention toward larger entities and diminishment of the individual self—a shift that is vital to the collaboration and cooperation required of social groups (e.g., Keltner et al., 2014; Nowak, 2006; Sober & Wilson, 1998). Guided by these results and our conceptual analysis, we examine how awe, beyond influencing self-construal, also influences whether individuals behave in ways that prioritize the self versus others in the social environment. We test the overarching hypoth-

<sup>1</sup> “Small self” may have many instantiations that one would derive from the study of the self, including reduced self-awareness, less self-conscious emotions, and decreased emphasis given to self-relevant goals. Here we conceptualize the small self as a relative diminishment of the individual self and its interests vis-à-vis something perceived to be more vast and powerful than oneself.

<sup>2</sup> We conceptualize these self-related appraisals as related to but distinct from perceptions of vastness per se, which refer to the sense that one has encountered something immense in size, scope, number, or complexity and do not directly or necessarily implicate the self.

esis that awe should enhance prosociality by causing people to be more willing to forego self-interest in favor of others' welfare.

### **Awe and Prosocial Behavior**

Although there is no direct evidence linking awe to prosocial behavior, several lines of research lend credence to our hypothesis that awe will increase prosocial tendencies via a sense of a small self. A first is a literature indicating that processes that diminish attention to the individual self and its interests can increase prosocial tendencies. In one study, individuals who reported decreased feelings of self-importance donated more to a collective resource and were more selfless in their relationships (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004). Similarly, narcissism—a trait reflecting an inflated evaluation of the self—is associated with a disregard for others' needs (McGregor, Nail, Kocalar, & Haji, 2013; Wink, 1991). In the study of values, self-transcendence values, which emphasize diminished self-importance and increased attention to others and nature, are positively related to prosocial tendencies and empathy; self-enhancement values, which include an increased valuation of power and achievement, correlate negatively with these outcomes (Boer & Fischer, 2013; Caprara, Alessandri, & Eisenberg, 2012). Finally, those individuals who report feeling part of a greater entity, such as humanity, nature, or a spiritual force tend to report increased gratitude and empathy—emotions tightly linked to prosociality (McCullough, Emmons, & Tsang, 2002). Together, these findings indicate that placing less significance on the self and self-interest vis-à-vis something vaster than the self can increase prosociality. To the extent that awe triggers feelings that one's being and goals are less significant relative to something vaster than the self, it should also increase prosocial tendencies.

A second literature that sets the stage for our hypothesis involves studies of the social effects of nature—a primary elicitor of awe (e.g., Davis & Gatersleben, 2013; Griskevicius, Shiota, & Neufeld, 2010; Shiota et al., 2007). Nature broadly refers to areas, from parks to pristine wilderness, containing elements of living systems, such as plants and nonhuman animals (Bratman, Hamilton, & Daily, 2012). Weinstein, Przybylski, and Ryan (2009) found that exposure to nature versus urban environments can differentially influence sociality, as evident in the self-reported importance people place on social relationships and their levels of generosity. In investigations in this realm, participants behaved more generously when in a room with plants as opposed to a plant-free room (Weinstein et al., 2009). After being exposed to more beautiful as opposed to less beautiful nature, participants offered more help to an experimenter by folding Japanese paper cranes for victims of a tsunami, tendencies that were driven by heightened positive affect (Zhang, Piff, Iyer, Koleva, & Keltner, 2014). Our research diverges from this prior work in several critical ways, by focusing on awe rather than on nature or beauty, by ascertaining whether nonnature-based awe triggers prosociality, and by disentangling these effects from other positive emotions and more general positive mood (for distinctions between awe and beauty, see Burke, 1757/1990; Cohen, Gruber, & Keltner, 2010; Keltner & Haidt, 2003). Nonetheless, these prior studies indicate that experiences of awe toward nature may increase prosocial behavior.

Our conceptual analysis of awe as well as the empirical findings we have just described lay the groundwork for this investigation. None of the studies we have reviewed offer direct evidence for how experiences of awe increase prosocial tendencies. To test this possibility, awe needs to be both measured and manipulated, and contrasted with other prosocial emotions, in controlled interactions in which prosocial behavior is directly assessed. These considerations guided the present investigation.

### **The Present Research**

Following others, we reason that the experience of awe is self-diminishing vis-à-vis something vaster than the individual, and reduces emphasis on the desires and concerns of the self (e.g., Campos et al., 2013; Shiota et al., 2007). We hypothesize that the experience of awe will trigger a sense of a small self and, in turn, lead to greater prosocial behavior. The five studies reported here directly examined this hypothesis, testing the effects of awe upon several kinds of prosociality, including generosity, helping, and ethicality. In Study 1, we tested whether dispositional (or trait) tendencies to experience awe predicted generosity in an economic game. In follow-up experiments, we investigated whether manipulations of awe increased ethical decision-making (Study 2), generosity (Study 3), and prosocial values (Study 4), and whether a sense of a small self mediated these effects. Finally, in Study 5, we immersed participants in an awe-inspiring environment to test its effects on entitlement, ethical decision-making, and prosocial helping behavior. In light of recent concerns about biases in college samples (e.g., Henrich, Heine, & Norenzayan, 2010), we took pains to ensure that our studies were demographically diverse, incorporating nationally representative and online samples, as well as student samples. Moreover, we captured the experience of awe at the trait and state level, and through varied manipulations of awe, including narrative recall, compelling videos, and in vivo experience amid tall trees. Our investigation also examined nature-related awe and awe produced by nonnature stimuli.

We also tested alternative explanations of the hypothesized association between awe and prosociality. Most importantly, positive emotions can lead to increases in prosocial behavior (e.g., George & Brief, 1992; Isen, 1987; Lyubomirsky, King, & Diener, 2005). This empirical literature raises the question of whether the hypothesized influences of awe upon prosociality are unique to awe or simply part of the more general tendency for positive states to increase prosociality. In light of this concern, in Study 1 we controlled for other positive prosocial states (e.g., love, compassion), in Study 2 we pitted awe against pride, in Study 3 we pitted awe against amusement, and in Study 4 we pitted a negative induction of awe against a positive one, all means by which we sought to establish the specific contribution of awe to prosociality.

#### **Study 1: Dispositional Levels of Awe Predict Generosity in an Economic Game**

In Study 1 we tested whether awe is associated with increased prosocial behavior in a nationally representative sample. Participants reported their dispositional tendencies to experience several distinct positive emotions, including awe (Shiota, Keltner, & John, 2006; Stellar, Manzo, Kraus, & Keltner, 2012). Participants also completed a version of the "dictator game"—a widely used single



trial economic game that assesses prosocial sharing (Forsythe, Horowitz, Savin, & Sefton, 1994), and is predictive of “real world” prosociality (e.g., returning a misdirected letter containing money; Benz & Meier, 2008; Franzen & Pointner, 2013; Stoop, 2014). Measuring dispositional tendencies to experience positive emotions other than awe, such as love and compassion, allowed us to ascertain the unique contribution of awe to prosocial behavior.

## Method

**Participants.** There were 1,519 participants (752 male, 767 female) who were drawn from a Knowledge Networks nationally representative panel and paid to complete the study (see Skitka & Sargis, 2006). Participants ranged in age from 24 to 93 years ( $M = 50.19$ ,  $SD = 16.72$ ). Seventy-two percent were European American, 12% were Latino/a, 10% were African American, 2% identified as mixed race, and 4% indicated “other.” Participants represented all 50 U.S. states with ~11% living in California, 8% in Texas, 6% in Florida, 6% in New York, and 5% in Pennsylvania, and the remaining states each representing under 5% of the sample.

**Materials and procedure.** As part of a larger survey examining individual differences in morality (<http://kenan.ethics.duke.edu/attitudes/resources/measuring-morality>), participants completed a series of demographic questions. Participants also completed an abbreviated version of the revised Dispositional Positive Emotions Scale, a well-validated measure of individual differences in dispositional tendencies to experience seven distinct positive emotions, including awe (DPES-r; Shiota et al., 2006). The questionnaire contained seven subscales, each consisting of three items, to assess amusement (e.g., “There is a lot of humor in my life”;  $\alpha = .85$ ;  $M = 5.05$ ,  $SD = 1.13$ ), awe (e.g., “I often feel awe”;  $\alpha = .83$ ;  $M = 4.62$ ,  $SD = 1.16$ ), compassion (e.g., “I am a very compassionate person”;  $\alpha = .78$ ;  $M = 5.27$ ,  $SD = 1.02$ ), contentment (e.g., “When I think about my life I experience a deep feeling of contentment”;  $\alpha = .83$ ;  $M = 5.02$ ,  $SD = 1.10$ ), enthusiasm (e.g., “I get great pleasure from pursuing my goals”;  $\alpha = .63$ ;  $M = 5.27$ ,  $SD = .90$ ), love (e.g., “I grow to love people who are kind to me”;  $\alpha = .77$ ;  $M = 5.24$ ,  $SD = .97$ ), and pride (“It feels good to know that people look up to me”;  $\alpha = .78$ ;  $M = 5.50$ ,  $SD = .89$ ). Participants responded to each item on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Participants could also select -1 (refuse to answer); 13 participants (less than 1%) selected this response and their data were treated as missing.

Participants were then randomly assigned to complete one of two versions of the dictator game (e.g., Bolton, Katok, & Zwick, 1998). For both versions, participants learned that they would play as a “decider” in a distribution task. As deciders, participants were told they would receive 10 raffle tickets that were theirs to keep. Depending on the version, these 10 raffle tickets were each worth one entry into a drawing for either \$10 or \$500. Participants in both conditions then decided how many of the 10 raffle tickets, if any, they wanted to share with another participant they had been paired with that had been randomly assigned to the role of a “receiver,” who did not have any raffle tickets to start with and would receive any tickets they decided to transfer to him or her. Participants could also select -1 (refuse to answer); 21 participants (1.4%) chose this response and their data were treated as missing. The average number of tickets given to the partner across both dictator games was  $M = 4.24$  ( $SD = 2.49$ )—a level of

generosity comparable with that observed in similar studies (e.g., Fowler & Kam, 2007; Piff et al., 2010). Upon conclusion of the study, participants were entered into the raffle on the basis of the number of tickets they had kept and winners were selected.

## Results and Discussion

### Is dispositional awe associated with increased generosity?

We first tested the zero-order correlations between each of the DPES-r subscales and dictator game giving. These correlations are displayed in Table 1. As the table clearly shows, increased tendencies to experience awe were positively and significantly associated with generosity in both the \$10 and \$500 versions of the dictator game as well as with a composite of the two (to which each participant contributed one score). Other emotions were also associated with generosity, including compassion and love.

### Does awe predict generosity over and above other positive emotions?

We next tested whether the positive correlation between awe and generosity might be confounded by other variables. For instance, this relationship could be accounted for by the overlap between awe and other positive emotions or by a demographic variable (e.g., age, gender) that might covary with both awe and generosity. We tested this in the context of a regression analysis in which we examined the association between awe and generosity while controlling for each of the other positive emotion subscales, as well as age, gender (1 = male, 2 = female), and ethnicity (0 = non-White, 1 = White). We present the results of these regression analyses in Table 2. As Table 2 shows, individual differences in dispositional awe tended to predict prosocial giving in the dictator game even when controlling for other positive emotions and demographic variables. Of interest to the authors, though in the expected direction, awe was not a statistically significant predictor of giving in the \$10 raffle. However, awe did significantly predict increased generosity in the higher payoff \$500 raffle. Considering that the greater stakes of the second raffle may outweigh social desirability or impression management concerns, behavior in this raffle may represent a more authentic type of prosociality (see also Andersen, Ertac, Gneezy, Hoffman, & List, 2011). Nonetheless, when giving in the \$10 and \$500 dictator games were combined into a single measure of generosity, shown in the rightmost column of Table 2, awe was a significant predictor. It is important to note that other emotions were also indepen-

Table 1  
*Zero-Order Correlations Between Subscales of DPES-R and Generosity in the \$10- and \$500-Lottery Payout Versions of the Dictator Game as Well as the Two Games Combined*

	\$10 dictator game	\$500 dictator game	Combined
Amusement	0.019	0.018	.018
Awe	0.099**	0.151***	.123***
Compassion	0.132***	0.116**	.119***
Contentment	0.100**	0.148***	.123***
Enthusiasm	0.029	0.003	.014
Love	0.072*	0.063	.064*
Pride	0.037	-0.016	.010

Note. DPES-r = Dispositional Positive Emotions Scale.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
*Predicting Prosocial Giving From Age, Gender (1 = Male, 2 = Female), Ethnicity (0 = Non-White, 1 = White), and All Positive Emotion Subscales of DPES-r*

	\$10 dictator game	\$500 dictator game	Combined
Age	0.009 (0.064)	0.006 (0.038)	0.009 (0.058)*
Gender	0.093 (0.019)	0.183 (0.037)	0.106 (0.021)
Ethnicity	-0.369 (-0.068)	0.340 (0.061)	-0.051 (-0.009)
Amusement	-0.040 (-0.019)	-0.204 (-0.094)*	-0.109 (-0.050)*
Awe	0.096 (0.046)	0.238 (0.111)*	0.167 (0.078)*
Compassion	0.301 (0.126)*	0.264 (0.107)†	0.260 (0.107)**
Contentment	0.088 (0.039)	0.328 (0.146)**	0.204 (0.090)*
Enthusiasm	-0.096 (-0.034)	-0.120 (-0.045)	-0.125 (-0.045)
Love	0.032 (0.013)	0.089 (0.034)	0.067 (0.026)
Pride	-0.132 (-0.049)	-0.419 (-0.148)**	-0.249 (-0.089)*

*Note.* Unstandardized and standardized regression weights (in parentheses) are shown. DPES-r = Dispositional Positive Emotions Scale.

†  $p = .05$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

dently associated with generosity (such as compassion and contentment), suggesting unique pathways from these emotions to prosocial behavior.

These results support our hypothesis that awe is associated with increased prosociality. Though the size of this effect was modest, it held when controlling for dispositional tendencies to experience other positive emotions, including love and compassion—emotions that have well-documented and robust influences on prosocial responding (Eisenberg & Miller, 1987; Kogan et al., 2010). Moreover, these findings emerged in a demographically diverse sample of participants, who ranged considerably in geography, age, and ethnicity, indicating that the association between awe and prosociality may be generalizable. However, the correlational nature of the current results constrains their interpretability. Thus, in Studies 2 through 5 we turn our focus to experimental inductions of awe so as to test their causal effects on prosocial behavior.

### Study 2: Awe Increases Ethicality via Feelings of a Small Self

In Study 2, we experimentally induced awe and control states (pride, neutral affect) by having participants recall a prototypical experience of a target emotion—a well-validated technique for inducing specific emotions (e.g., Griskevicius et al., 2010; Piff, Martinez, & Keltner, 2012). Contrasting the effects of awe, which is itself a positive emotion, with those of a different positive emotion, pride, allowed us to test the specific effects of awe above and beyond general positivity. We chose pride as a comparison for several reasons. Although both emotions are positive and arousing, awe differs from pride in terms of its elicitors and self-related appraisals: whereas awe is externally elicited (e.g., triggered by natural vistas, novel art) and diminishes the self, pride is internally focused on personal accomplishment or abilities and may lead to self-enhancement (e.g., Tracy & Robins, 2004). Thus, awe and pride implicate the self-concept in contrasting ways, which may lead to downstream differences in prosociality. Moreover, to the extent that pride enhances prosociality, as some evidence suggests, it does so by triggering achievement motivations (e.g., Cheng, Tracy, & Henrich, 2010; Tracy & Robins, 2004), suggesting a unique pathway that is distinct from the small self mechanism we propose and test as a mediator of the effects of awe on prosociality.

In light of these considerations, and given that pride is commonly used as a positive emotion with which to contrast the effects of awe (Shiota et al., 2007; Van Cappellen & Saroglou, 2012), we selected pride as our comparison positive emotion.

We also extended our prior findings by testing the influence of awe on a different facet of prosociality: ethical-decision making. Specifically, we assessed participants' willingness to behave in ways that prioritize self-interest over collective norms of conduct and the interests of others (Detert, Treviño, & Sweitzer, 2008; Piff, Stancato, Côté, Mendoza-Denton, & Keltner, 2012). Finally, we examined *why* awe might underlie ethicality by assessing our hypothesized mediator: the small self.

### Method

**Participants.** Seventy-five adults completed an online experiment via Amazon's Mechanical Turk. Demographics were collected in a second wave two days after the initial experiment. Of the participants who reported their demographics, 54.3% were male and 45.7% were female (age 18–51,  $M = 31.01$ ,  $SD = 9.37$ ). Seventy-eight percent of participants were European American, 7% were Asian American, and the remaining 15% were African American, Latino/a, Native American, or other ethnicity.

**Materials and procedure.** After giving consent, participants were randomly assigned to one of three narrative recall conditions that induced specific emotions by having participants recall and write about a time when they were in a situation that is a prototypical elicitor of the target emotion. We contrasted an awe induction with both a neutral induction and a pride induction. The specific instructions that participants received in each emotion condition are below (adapted from Griskevicius et al., 2010).

Awe: Please take a few minutes to think about a particular time, fairly recently, when you encountered a natural scene that caused you to feel awe. 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: Please take a few minutes to think about a particular time, fairly recently, when you felt pride. This might have been being accepted to a university, winning an event or competition, or any other time that you achieved a personal accomplishment.

Neutral: Please take a few minutes to think about something you did fairly recently. This might have been riding a bike, studying for a test, or any other thing that happened during your day.

All participants were then asked to write at least five sentences describing the experience, their accompanying emotions, and what they were thinking about during the experience, providing as much detail as they can. In a poststudy review of the written narratives, we ensured that all participants followed the instructions.

To verify that the emotion manipulations elicited the intended emotional states, we pretested the three manipulations with a separate sample of 46 participants. Each participant underwent one of the three writing tasks described above. After describing the experience, participants reported the extent to which they experienced several different states using single items (1 = *not at all*, 7 = *extremely*): Anger, Awe, Disgust, Fear, Pride, Sadness, and Happiness (to index general positivity). These results are presented in the leftmost columns of Table 3. The awe condition produced greater levels of awe than the pride and neutral conditions, whereas the pride condition produced higher levels of pride than the awe and neutral conditions. There were no differences in anger, disgust, or fear across conditions. Of interest to the authors, the awe condition produced lower levels of sadness than the neutral condition but not compared with the pride condition; however, an inspection of the means shows that these differences were driven by slightly elevated sadness in the neutral condition, and that sadness was nevertheless low in all conditions. Finally, general positivity (i.e., happiness) varied by condition, such that our awe and pride conditions produced significantly higher levels of happiness than our neutral control condition, but they did not differ from one another. These analyses suggest that the awe and pride conditions induced our target emotions but not other emotions, and they did not differ from one another in terms of general positivity.

Following the writing task, participants rated their agreement with a statement concerning the extent to which they felt “the presence of something greater than myself” (1 = *not at all true*, 7 = *very true*;  $M = 3.80$ ,  $SD = 1.59$ ). This item captures the general construct of the small self by assessing perceptions of something more vast and powerful than the individual (Shiota et al., 2007).

To minimize potential demand characteristics, participants were then informed that they would complete an unrelated study of their beliefs about themselves and the world, consisting of several filler tasks, followed by our measure of ethical decision-making (Detert et al., 2008). Participants were presented with eight hypothetical scenarios each describing a different self-interested act that violates accepted moral norms or standards of behavior. One of the scenarios reads, “You’ve waited in line for 10 min 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.” For each of these scenarios, participants were asked to rate how likely it would be that she or he would engage in the behavior described on a 7-point Likert scale (1 = *not at all likely*, 7 = *highly likely*). Thus, this measure assesses participants’ willingness to prioritize self-interest over collective norms and others’ interests. Responses to the eight scenarios were reverse scored, summed, and averaged to index ethical decision-making ( $M = 3.89$ ,  $SD = 1.16$ ,  $\alpha = .74$ ). This measure of ethical decision-

Table 3  
Mean Scores for Self-Reported Emotional States in Pilot Studies for Studies 2, 3, 4, and 5 (SDs in Parentheses)

	Study 2 (narrative recall) conditions			Study 3 (videos) conditions			Study 4 (videos) conditions			Study 5 (in-vivo) conditions		
	Awe (N = 17)	Pride (N = 16)	Control (N = 13)	Awe (N = 14)	Amusement (N = 15)	Control (N = 16)	Negative (N = 14)	Nonnature (N = 16)	Control (N = 15)	Trees (N = 25)	Building (N = 24)	
Amusement	—	—	—	—	—	—	—	—	—	—	—	
Anger	1.29 (0.96)	1.44 (1.50)	1.92 (1.32)	3.43 (2.07) <sup>b</sup> 1.50 (1.09)	5.67 (1.40) <sup>a,c</sup> 1.27 (0.59)	3.00 (1.97) <sup>b</sup> 1.06 (0.25) <sup>a</sup>	1.79 (1.63) 3.21 (2.29) <sup>b,c</sup>	1.38 (1.03) 1.63 (1.46) <sup>a</sup>	1.13 (0.52) 1.20 (0.78) <sup>a</sup>	4.44 (1.64) 1.00 (0.00) <sup>*</sup>	4.25 (1.85) 1.38 (0.58)	
Anxiety	—	—	—	—	—	—	—	—	—	—	—	
Awe	6.24 (1.09) <sup>b,c</sup>	3.75 (2.11) <sup>a</sup>	2.77 (1.83) <sup>a</sup>	5.14 (2.03) <sup>b,c</sup>	2.93 (1.53) <sup>a</sup>	2.56 (2.00) <sup>a</sup>	5.64 (1.60) <sup>c</sup>	5.38 (1.86) <sup>c</sup>	1.93 (1.82) <sup>a,b</sup>	5.40 (1.35) <sup>*</sup>	2.42 (1.41)	
Disgust	1.35 (1.22)	1.00 (0.00)	1.62 (1.19)	1.29 (0.83)	1.40 (1.06)	1.06 (0.25)	1.79 (1.63)	1.50 (1.41)	1.00 (0.00)	1.28 (0.74)	1.21 (0.51)	
Fear	1.29 (0.96)	1.06 (0.25)	1.38 (0.77)	1.57 (1.16)	1.60 (1.35)	1.00 (0.00)	3.43 (2.17) <sup>b,c</sup>	1.44 (1.21) <sup>a</sup>	1.47 (1.55) <sup>a</sup>	1.32 (0.69)	1.26 (0.54)	
Nervousness	—	—	—	—	—	—	3.21 (2.12) <sup>b,c</sup>	1.38 (1.03) <sup>a</sup>	1.13 (0.52) <sup>a</sup>	—	—	
Pride	3.88 (1.80) <sup>b</sup>	6.19 (1.22) <sup>a,c</sup>	4.00 (2.04) <sup>b</sup>	—	—	—	—	—	—	—	—	
Sadness	1.13 (0.34) <sup>c</sup>	1.31 (0.70)	2.15 (1.91) <sup>a</sup>	1.71 (1.27)	1.27 (0.59)	1.06 (0.25)	2.71 (1.90) <sup>c</sup>	1.75 (1.65)	1.00 (0.00) <sup>a</sup>	1.52 (1.16)	1.83 (0.92)	
Happiness	5.76 (1.56) <sup>c</sup>	6.50 (0.73) <sup>c</sup>	3.69 (2.10) <sup>a,b</sup>	5.00 (1.57) <sup>c</sup>	5.00 (1.81) <sup>c</sup>	2.94 (2.02) <sup>a,b</sup>	2.29 (1.68) <sup>b</sup>	5.19 (1.42) <sup>a,c</sup>	3.20 (2.08) <sup>b</sup>	5.12 (1.42) <sup>*</sup>	3.88 (1.54)	

Note. All responses were made using single items and 7-point scales, with higher values indicating greater emotion intensity. For Study 2: <sup>a</sup> These means are significantly different from those in the awe induction condition ( $p < .05$ ); <sup>b</sup> These means are significantly different from those in the pride induction condition ( $p < .05$ ); <sup>c</sup> These means are significantly different from those in the control condition ( $p < .05$ ). For Study 3: <sup>a</sup> These means are significantly different from those in the awe induction condition ( $p < .05$ ); <sup>b</sup> These means are significantly different from those in the amusement induction condition ( $p < .05$ ); <sup>c</sup> These means are significantly different from those in the control condition ( $p < .05$ ). For Study 4: <sup>a</sup> These means are significantly different from those in the negative awe condition ( $p < .05$ ); <sup>b</sup> These means are significantly different from those in the non nature-based awe condition ( $p < .05$ ); <sup>c</sup> These means are significantly different from those in the control condition ( $p < .05$ ). For Study 5: Asterisks indicate significant differences from the control condition ( $p < .05$ ).



making has been validated extensively in past research. For instance, Detert et al. (2008) found that individuals with higher scores on the measure were more likely to keep \$8 that they were mailed, ostensibly by mistake, for completing a survey that they had not completed, relative to those with lower scores. After completing the assessment of ethical decision-making, participants were thanked and debriefed.

## Results and Discussion

**Does awe influence the small self?** We first examined the influence of emotion condition on the small self. A one-way analysis of variance (ANOVA) yielded a significant pattern of differences across conditions,  $F(2, 68) = 6.21, p = .003$ . We next conducted planned comparisons to test whether small self ratings were significantly higher in the awe condition ( $M = 5.27, SD = 1.95$ ), relative to the pride ( $M = 3.27, SD = 2.14$ ) and neutral conditions ( $M = 4.11, SD = 2.08$ ). Two orthogonal contrasts were used (paralleling Horberg, Kraus, & Keltner, 2013). The first contrast (“awe contrast”) compares the awe condition to the neutral and pride conditions (coded as awe = 2, neutral = -1, pride = -1) and tests whether awe heightens perceptions of a small self. The second contrast (“control contrast”) tested the residual difference between the neutral and pride conditions (coded as awe = 0, neutral = 1, pride = -1). As expected, the awe contrast was significant,  $F(1, 68) = 10.30, p = .002$ , but the control contrast was not,  $F(1, 68) = 1.69, p = .20$ . The awe induction increased small self ratings compared with the pride and neutral inductions.

**Do awe and pride influence ethical decision-making in different ways?** We next tested whether emotion condition influenced ethicality. A one-way ANOVA showed marginally significant differences in ethical decision-making across emotion conditions,  $F(2, 68) = 2.73, p = .073$ . Turning to our central analysis, we used the orthogonal contrasts described above to test whether ethical decision-making was higher in the awe condition ( $M = 4.24, SD = 1.02$ ) than in the pride ( $M = 3.60, SD = 1.01$ ) or neutral conditions ( $M = 3.60, SD = 1.43$ ). As expected, the awe contrast was significant,  $F(1, 68) = 5.44, p = .023$ , but the control contrast was not  $F(1, 68) = 0.00, p = .99$ . The awe condition increased ethicality relative to the pride and neutral control conditions.

**Mediation analysis.** As reported above, the awe condition led to significant increases in small self ratings and ethical decision-making. Moreover, the small self was positively associated with ethicality,  $r = .27, p = .017$ . Thus, we performed a mediation analysis to test whether the awe induction increased ethicality via the small self. Figure 1 illustrates the mediation model and provides path coefficients. As shown, the positive association between the awe induction (in contrast to the pride and neutral inductions) and ethical decision-making dropped to nonsignificant when feelings of a small self were included in the model. We tested the proposed mediating effect using a bootstrapping procedure for mediator models recommended by Preacher and Hayes (2004, 2008). We conducted this analysis with the PROCESS macro for SPSS (Hayes, 2013) using 10,000 bootstrap samples. This technique yielded a 95% bias-corrected confidence interval that did not include zero (.01 to .19), suggesting that the small self mediated the effect of the awe induction on ethical decision-making.

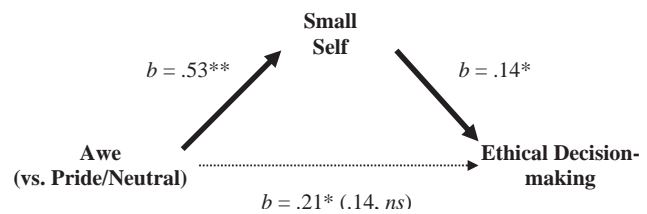


Figure 1. Mediation model for Study 2. Note: The predictor variable contrasts the awe condition against the pride and neutral conditions (awe = 2, pride = -1, neutral = -1). Analyses control for the orthogonal control contrast (awe = 0, pride = -1, neutral = 1). Unstandardized coefficients are displayed. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Study 2 provides experimental evidence that awe is specifically related to prosociality. Reminding participants of a time when they experienced awe, relative to pride or a neutral condition, increased their tendencies to endorse ethical decisions across a variety of scenarios. The awe induction also triggered a sense of something greater than oneself, which indicates a relative diminishment of the concepts and concerns attached to the individual self, paralleling prior research (Campos et al., 2013; Shiota et al., 2007). Moreover, the sense of a small self accounted for the effects of awe on ethicality.

Study 2 is limited in certain ways. First, participants wrote about a time when they had experienced a target emotion such as awe, and it is possible that participants’ memories of the events, and not the experience of awe itself, influenced their ethical tendencies. Moreover, we assessed our mediator with a single item that, though implying a sense of a small self by assessing feelings of something greater than oneself, does not specifically reference feeling diminished. We designed Study 3 to address these issues.

## Study 3: Awe Increases Generosity via the Small Self

In Study 3 we induced awe in situ by exposing participants to awe-inspiring stimuli. Participants watched a video of nature imagery that induced awe, a video of nature imagery that elicited amusement, or a neutral control video. Participants also completed a revised measure of the small self to test whether it mediates the effects of awe on prosociality. Finally, participants completed a behavioral measure of generosity.

We chose amusement as a comparison positive emotion for several reasons. Amusement is a commonly employed method for inducing general positivity, can be reliably elicited with video clips (e.g., Algoe & Haidt, 2009; Bartlett & DeSteno, 2006), and has been used in prior research as a positive emotion with which to contrast the effects of awe (e.g., Valdesolo & Graham, 2014; Van Cappellen & Saroglou, 2012). Moreover, like awe, amusement is elicited by an incongruity between one’s expectations (or default schema) and experience (Morreall, 1989). Finally, both the amusement and awe conditions depicted images of nature (e.g., natural landscapes, plants, and nonhuman animals), which enabled us to ascertain the specific effects of awe—beyond exposure to nature more generally—on prosocial behavior.

## Method

**Participants.** There were 264 students (180 female, 80 male, and 4 unreported) from a large public university who received

partial course credit for their participation. Ten participants were excluded because of substantial missing data or experimental error (stimuli failing to load); their data were not analyzed. This left 254 participants in the final sample (age 18–41,  $M = 20.95$ ,  $SD = 3.29$ ). Twenty-four percent of participants were European American, 46% were Asian American, and 30% were African American, Latino/a, Native American, or other ethnicity (one unreported).

**Materials and procedure.** Participants were seated at computers in private cubicles and gave consent and completed demographics. Participants then put on headphones and were randomly assigned to watch one of three videos: a 5-min neutral clip, in which a man describes construction of a kitchen countertop; a 5-min clip that elicited amusement, consisting of a montage of nature clips from the BBC's comedic series, *Walk on the Wild Side*, composed of animals in their natural habitats acting in ways that are funny; or a 5-min clip inducing awe, consisting of nature clips from the BBC's *Planet Earth* series composed of grand, sweeping shots of scenic vistas, mountains, plains, forests, and canyons. The awe and amusement clips have been validated by prior research (Valdesolo & Graham, 2014).

We conducted a separate pilot study to ensure that the three conditions induced the desired emotions. Forty-five participants viewed the awe, amusement, or neutral video and indicated the extent to which they experienced Amusement, Anger, Awe, Disgust, Fear, Sadness, and Happiness using single items (1 = *not at all*, 7 = *extremely*). These results are presented in the middle-left columns of Table 3. As expected, the awe condition produced greater levels of awe compared with the amusement and neutral conditions, and the amusement condition produced higher levels of amusement than the awe or neutral conditions. Anger, disgust, fear, or sadness did not vary across conditions. Finally, general positivity (happiness) varied by condition, such that the awe condition and the amusement condition produced higher levels of happiness than did the neutral control condition, but they did not differ from one another. These results suggest that the awe and amusement conditions successfully elicited our target emotions but not other emotions, and they did not differ from one another in terms of positivity.

After the video, participants rated their agreement with four statements (1 = *not at all true*, 7 = *very true*): "I feel small or insignificant," "I feel the presence of something greater than myself," "I feel part of some greater entity," and "I feel like I am in the presence of something grand" (Huta & Ryan, 2010; Shiota et al., 2007). These items tapped perceptions of vastness vis-à-vis the self and the accompanying sense of smallness, and they formed a reliable measure of the small self ( $\alpha = .82$ ,  $M = 3.80$ ,  $SD = 1.59$ ).

Participants then completed a version of the dictator game in which they were told they had been randomly paired with a participant taking part in a different session. Participants were given a 10-point endowment and ask to decide how many of their 10 points (if any) they would like to give to their anonymous partner, who had not received any points to start with. Participants were told that upon completion of the study, a raffle for a \$100 gift certificate toward an online retailer would be conducted, and that each point they had remaining at the end of the exercise would be counted as one entry of their name into the raffle. In the current sample, 24 participants (9.4%) gave 0 points and 23 participants (9.1%) gave all 10 points away, and the modal number of points

given was 5 (114 participants; 44.9%). Average generosity in this study was  $M = 4.67$  ( $SD = 2.58$ ). After completing the task, participants were debriefed and thanked.

## Results and Discussion

**Does awe create the sense of a small self?** We examined the influence of emotion induction condition on the small self. A one-way ANOVA showed significant condition differences in the small self,  $F(2, 246) = 32.95$ ,  $p < .001$ . We conducted planned comparisons to test whether the awe induction led to enhanced feelings of a small self ( $M = 4.72$ ,  $SD = 1.40$ ), relative to the amusement ( $M = 3.65$ ,  $SD = 1.39$ ) and neutral conditions ( $M = 3.01$ ,  $SD = 1.46$ ). Our "awe contrast" compared the awe condition to the neutral and amusement conditions (coded as awe = 2, neutral = -1, amusement = -1), whereas the "control contrast" tested the residual difference between the neutral and amusement conditions (coded as awe = 0, neutral = 1, amusement = -1). The awe contrast was significant,  $F(1, 246) = 57.67$ ,  $p < .001$ , such that small self ratings were higher in the awe condition compared with the amusement and neutral conditions. The control contrast was also significant,  $F(1, 246) = 8.38$ ,  $p = .004$ , indicating that small self ratings were higher in the amusement condition than in the neutral condition. However, an independent samples  $t$  test verified that feelings of a small self were higher in the awe condition than the amusement condition,  $t(163) = 5.28$ ,  $p < .001$ ,  $d = 0.83$ . The awe condition led to greater small self ratings than did the amusement or neutral conditions.

**Does awe influence generosity?** We next tested the influence of emotion-induction condition on generosity in the dictator game. A one-way ANOVA showed significant condition differences in generosity across conditions,  $F(2, 250) = 4.08$ ,  $p = .018$ . We tested whether participants who viewed the awe-eliciting video engaged in more generosity ( $M = 5.21$ ,  $SD = 2.71$ ) compared with participants in the amusement ( $M = 4.50$ ,  $SD = 2.39$ ) and neutral conditions ( $M = 4.31$ ,  $SD = 2.57$ ), using the orthogonal contrast codes described above. The awe contrast was significant,  $F(1, 250) = 7.90$ ,  $p = .005$ , whereas the control contrast was not ( $F(1, 250) = 0.28$ ,  $p = .60$ ). Thus, the awe induction increased generosity relative to the amusement and neutral conditions.

**Does the small self mediate the effects of awe upon generosity?** As reported above, the awe induction led to increased small self ratings and generosity. In addition, the small self was positively correlated with generosity in the dictator task,  $r = .20$ ,  $p = .002$ . We performed a mediation analysis to test whether the awe induction increased generosity via the small self. Figure 2 illustrates the mediation model and provides path coefficients. As shown, the positive association between the awe induction (in contrast to the amusement and neutral inductions) and generosity became nonsignificant when feelings of a small self were included in the model. The bootstrapping procedure for mediator models (Preacher & Hayes, 2004, 2008) with 10,000 bootstrap iterations yielded a 95% bias-corrected confidence interval that did not include zero (.01 to .26). This analysis indicates that awe leads to increased generosity via the small self.

The results of Study 3 are noteworthy in several ways. Eliciting awe using awe-inspiring images of nature increased generosity in contrast to another positive emotion—amusement—also elicited by exposure to nature. This helps rule out the possibility that the



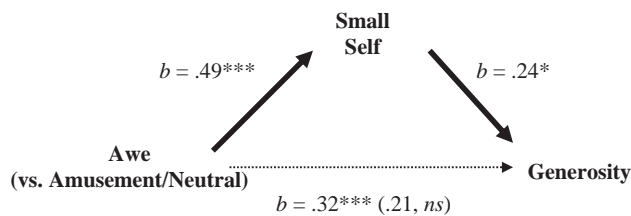


Figure 2. Mediation model for Study 3. Note: The predictor variable compares the awe condition with the amusement and neutral conditions (awe = 2, amusement = -1, neutral = -1). Analyses control for the orthogonal control contrast (awe = 0, amusement = -1, neutral = 1). Unstandardized coefficients are shown. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

effects of awe on prosociality are reducible to mere nature exposure, which prior work has found can increase prosociality (e.g., Weinstein et al., 2009), or to positive emotion more generally. Moreover, the awe condition also gave rise to feelings of smallness of the self, which fully mediated the effects of awe on prosociality.

Still, important questions remain. Our manipulations of awe thus far have focused on nature environments. However, there are other significant elicitors of awe besides nature (Keltner & Haidt, 2003). This bias in our methodology leaves unexamined the question of whether awe experienced in nonnature environments can also increase prosocial tendencies. In a similar vein, our manipulations of awe have primarily been more positively valenced, which is true of the broader experimental literature on awe (e.g., Shiota et al., 2007; Van Cappellen & Saroglou, 2012). Again, conceptual analyses of the varieties of awe elicitors point to others that involve threat and uncertainty (e.g., Keltner & Haidt, 2003; Valdesolo & Graham, 2014), which raises the question of whether more “negative” experiences of awe also enhance prosociality. We designed Study 4 to explore these issues, as well as to bolster our mediational findings. Specifically, our measures of the small self thus far have assessed feelings of something greater than oneself (e.g., Study 2) alongside feelings of smallness (Study 3), which we have conceptualized and found are complementary facets of the small self construct (see also Shiota et al., 2007). However, these two facets may differentially relate to prosociality, and we have yet to ascertain their specific roles in driving our results—primarily because of the limitations of the measures we have used (e.g., single items). Thus, in Study 4 we extend and expand upon our prior mediational findings by using a more robust measure of the small self that contains multiple items to index vastness vis-à-vis the self and self-diminishment.

#### Study 4: Negative Awe and Nonnature Awe Increase Prosociality via the Small Self

In Study 4 we ascertained the generalizability of our effects by incorporating a nonnature-based induction of awe and a negative induction of awe. The nonnature-based induction of awe was an awe-inspiring video consisting entirely of nonnature imagery; it did not depict scenes of the natural environment (e.g., mountains, lakes, or forests) or living organisms (e.g., plants, nonhuman animals; Bratman et al., 2012). The negative induction of awe was an awe-inspiring video consisting of threatening nature stimuli. These conditions allowed us to test whether the effects of awe on

prosociality extend beyond positive experiences of awe toward nature. We also extended our prior results by using a new measure of prosociality that indexes prosocial values (Van Lange, De Bruin, Otten, & Joireman, 1997). Finally, we incorporated a measure of our mediator that assessed in a more rigorous fashion the vastness vis-à-vis the self and the self-diminishment facets of the small self construct.

#### Method

**Participants.** There were 130 participants (73 female, 57 male) who completed an online experiment via Amazon’s Mechanical Turk. Thirty participants were excluded for incorrectly answering an attention check; their data were not analyzed. Of the 100 participants in the final sample (age 18–67,  $M = 35.19$ ,  $SD = 12.41$ ), 74% were European American, 12% were African American, and the remaining 14% were Asian American, Latino/a, Native American, or other ethnicity (one unreported).

**Materials and procedure.** Participants provided consent before being randomly assigned to one of three conditions. In the neutral condition, participants watched a 3-min version of the neutral video used in Study 3 depicting the construction of a wooden countertop. In the negative awe condition, participants watched a 3-min video featuring a montage of threatening natural phenomena (e.g., tornados, volcanoes; Keltner & Haidt, 2003). In the nonnature-based awe condition, participants watched a 3-min video taken in a laboratory setting of droplets of colored water colliding with a bowl of milk. This footage was shot at 5,000 frames per second, 200 times slower than real-time (from the Web-based series *The Slow Mo Guys*)—minute and intricate patterns in liquid are shown that are invisible to the naked eye under normal circumstances. Critically, this video did not depict scenes of the natural environment or living systems (Bratman et al., 2012).

We conducted a separate pilot study to ensure that the three conditions induced the target emotions. Forty-five participants watched the negative awe, nonnature-based awe, or neutral video before reporting how much Anger, Anxiety, Awe, Disgust, Fear, Nervousness, Sadness, and Happiness they were feeling using single items (1 = *not at all*, 7 = *extremely*). As Table 3 shows, the negative and nonnature-based awe conditions produced high levels of awe that were significantly greater than the control condition. The negative awe condition also produced higher levels of anxiety, fear, and nervousness than both the nonnature-based awe or neutral conditions, and sadness was generally higher in the negative awe condition than the other conditions. There were no significant condition differences in anger or disgust. Finally, the nonnature-based awe condition produced greater happiness than both the negative awe and neutral conditions. These results suggest that the two awe conditions, though varied in content, produced similarly high levels of awe but divergent levels of negative emotion and general positivity.

After watching the video, participants completed a measure of the small self comprised of items tapping its two facets: a sense of vastness vis-à-vis the self and a sense of self-diminishment. To assess vastness vis-à-vis the self, participants indicated their agreement with three items from Study 3, “I feel the presence of something greater than myself,” “I feel part of some greater entity,” and “I feel like I am in the presence of something grand,”

as well as with two additional items: “I feel like I am a part of a greater whole” and “I feel the existence of things more powerful than myself.” To assess self-diminishment, participants rated their agreement with the item “I feel small or insignificant” from Study 3 and four additional items: “I feel like my own day-to-day concerns are relatively trivial,” “In the grand scheme of things, my own issues and concerns do not matter as much,” “I feel insignificant in the grand scheme of things,” and “I feel small relative to something more powerful than myself.” These 10 items formed a highly reliable index of the small self ( $\alpha = .89$ ) and were summed and averaged ( $M = 4.29$ ,  $SD = 1.36$ ). Items were presented in random order, and embedded among them was an attention check asking participants to select the third response option from the right.

Next we assessed participants’ prosocial tendencies using the Triple-Dominance Measure of Social Values (Van Lange et al., 1997), a gauge of general preferences for resource distributions between oneself and a hypothetical other. This measure involves a series of nine decomposed three-choice games in which participants must decide how to allocate points to themselves and an unknown other. For instance, in one of these games, individuals choose between Option A (480 points for self and 80 points for other), Option B (540 points for self and 280 points for other), and Option C (480 points for self and 480 points for other). In this example, Option C represents the prosocial choice because it provides an equal distribution of points and a larger joint outcome for both the self and the other. Options A and B are considered proself choices in that Option A maximizes the point differential between the self and the other (relative advantage) and Option B maximizes one’s own point allocation (absolute advantage). Although the points earned across the nine games do not translate into any kind of payout, the instructions inform participants, “Every point has value: The more points you receive, the better for you, and the more points ‘Other’ receives, the better for him/her.” This measure has been well-validated and is predictive of prosocial behavior, for instance the number of hours participants volunteered to a worthy cause (McClintock & Allison, 1989). Paralleling prior research (Piff et al., 2010; White, Kenrick, Neel, & Neuberg, 2013), the total number of trials that participants chose the prosocial (equal distribution) option served as our measure of prosociality, with higher scores indicating greater prosocial choices ( $\alpha = .98$ ,  $M = 5.43$ ,  $SD = 4.15$ ). After this task, participants were debriefed and thanked before exiting the study.

## Results and Discussion

**Does awe influence the small self?** We tested whether the negative awe and nonnature-based awe conditions significantly increased the small self compared with the neutral condition. A one-way ANOVA showed significant condition differences in the small self,  $F(2, 95) = 18.62$ ,  $p < .001$ . We next conducted planned comparisons using orthogonal contrast codes. Our “awe contrast” compared the negative awe condition and the nonnature-based awe condition to the neutral condition (coded as negative awe = 1, nonnature-based awe = 1, neutral = -2), whereas the “type of awe contrast” tested the residual difference between the two awe conditions (coded as negative awe = -1, nonnature-based awe = 1, neutral = 0). The awe contrast was significant,  $F(1, 95) = 35.39$ ,  $p < .001$ , suggesting that small self ratings were higher in

the negative awe condition ( $M = 4.93$ ,  $SD = 0.95$ ) and the nonnature-based awe condition ( $M = 4.57$ ,  $SD = 1.30$ ) compared with the neutral condition ( $M = 3.24$ ,  $SD = 1.21$ ). The type of awe contrast was not significant,  $F(1, 95) = 1.60$ ,  $p = .21$ . These findings indicate that the negative and nonnature-based awe conditions elicited similar increases in the small self that were significantly higher than the neutral condition.

**Does awe influence prosociality?** We examined whether prosociality, as indexed by the number of prosocial allocations made across the nine games, varied by condition. A one-way ANOVA indicated significant differences across conditions,  $F(2, 97) = 3.42$ ,  $p = .037$ . The awe contrast was significant,  $F(1, 97) = 6.59$ ,  $p = .012$ , such that prosociality was higher in the negative awe condition ( $M = 6.33$ ,  $SD = 4.05$ ) and the nonnature-based awe condition ( $M = 5.91$ ,  $SD = 3.88$ ) compared with the neutral condition ( $M = 3.87$ ,  $SD = 4.23$ ). The type of awe contrast was not significant,  $F(1, 97) = 0.19$ ,  $p = .67$ , indicating that prosocial tendencies were comparable across the awe conditions. The two awe conditions increased prosocial tendencies compared with the neutral condition.

**Does the small self mediate the effects of awe upon prosociality?** Thus far we have seen that experiences of awe, elicited in viewing more threatening nature scenes or a nonnature scene, led to greater feelings of a small self and more prosocial choices, relative to the neutral condition. Moreover, the small self was significantly associated with prosociality,  $r = .30$ ,  $p < .002$ . Given these findings, we performed a mediation analysis to test whether the awe conditions influenced prosociality via the small self. As Figure 3 shows, the positive association between the awe inductions (in contrast to the neutral condition) and prosociality became nonsignificant when the small self was included in the model. The bootstrapping procedure for mediator models (Preacher & Hayes, 2004, 2008) with 10,000 bootstrap iterations yielded a 95% bias-corrected confidence interval that did not include zero (.04 to .77). This analysis indicates that awe leads to prosocial tendencies via the small self.

**What are the specific indirect effects of vastness vis-à-vis the self and self-diminishment on prosociality?** We also sought to separately examine the roles of vastness vis-à-vis the self and self-diminishment in driving our results. We conducted a factor analysis of the vastness and self-diminishment items to explore whether we would be justified in treating these facets separately. A principal-axis factor analysis using Varimax rotation of the 10

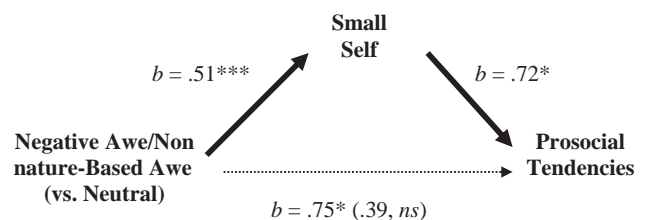


Figure 3. Mediation model for Study 4. Note: The predictor variable contrasts the two awe conditions against the neutral condition (negative awe = 1, nonnature-based awe = 1, neutral = -2). Analyses control for the orthogonal type of awe contrast (negative awe = -1, nonnature-based awe = 1, neutral = 0). Unstandardized coefficients are shown. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

items yielded two factors with eigenvalues above 1.0 (5.27 and 1.83) that accounted for 71% of the variance. The first rotated factor consisted of the five perceived vastness items, and it accounted for 41.6% of the variance. The second rotated factor consisted of the five small self items, and it accounted for 29.4% of the variance. All factor loadings exceeded 0.67. The factors were highly correlated,  $r = .47, p < .001$ , underscoring—as we have proposed—that vastness vis-à-vis the self and self-diminishment are overlapping. Nonetheless, the results of the factor analysis indicate that the two facets are empirically distinguishable and justify investigating their specific roles in explaining the effects of awe on prosociality.

We summed and averaged the five vastness vis-à-vis the self items ( $\alpha = .95, M = 4.71, SD = 1.67$ ) and the five self-diminishment items ( $\alpha = .82, M = 3.83, SD = 1.51$ ). We then performed a multiple mediation analysis (Preacher & Hayes, 2004, 2008) with 10,000 bootstrap iterations to ascertain the specific indirect effects of these two subscales on prosocial tendencies. Figure 4 illustrates the mediation model and provides path coefficients. Together, self-diminishment and vastness vis-à-vis the self mediated the effect of the awe inductions (in contrast to the neutral induction) on prosociality (95% CI = .14, 1.01). More important, when considering the specific indirect effect of either mediator, the indirect effect of self-diminishment was significant (95% CI = .11 to 1.04), whereas the indirect effect of vastness vis-à-vis the self was nonsignificant (95% CI =  $-.21, .23$ ). Although the aggregate measure of small self was a significant mediator, the self-diminishment facet of the small self may be a particularly significant driver of the effects of awe on prosocial tendencies.<sup>3</sup> One reason for this may be that the self-diminishment facet explicitly assesses the sense that one's being and goals are less important, which may more strongly predict a selfless orientation to others.

Taken together, the results from Study 4 advance an understanding of the relationship between awe and prosociality in several ways. Eliciting awe using nonnature based or negative stimuli similarly increased prosocial tendencies, suggesting that the effects of awe on prosociality are not limited to experiences in nature or purely positive experiences of awe. Moreover, these effects were driven by the small self, and in particular self-diminishment,

suggesting that awe may most strongly influence prosociality by triggering a sense that one's individual being and goals are relatively insignificant.<sup>4</sup> Notable, too, is that the nonnature-based induction of awe—consisting of a video of colored droplets colliding in slow motion—triggered the small self in much the same way that a video depicting the devastating power of nature did. These results converge with past work arguing that awe is not reducible to mere perceptions of things that are large (e.g., Keltner & Haidt, 2003), and indicate that the small self can be aroused by entities both large and small (e.g., those vast in complexity).

### Study 5: Awe and Prosocial Behavior Amid a Grove of Towering Trees

Thus far we have found that the dispositional tendency to experience awe is associated with increased generosity, and that experimental inductions of awe in the lab lead to increased prosocial responding. In our final experiment, we experimentally elicited awe by actually situating participants in an awe-inspiring nature setting.

Authors, artists, and naturalists have all observed that towering trees can inspire awe. For instance, in his travelogue *Travels with Charley*, John Steinbeck described the awe he felt at the redwoods of the Pacific coast, writing, “. . . [They] leave a mark or create a vision that stays with you always. . . . From them comes silence and awe” (Steinbeck, 1962). We designed the current study in part guided by these observations and given that awe is deeply connected to experiences in nature (e.g., Shiota et al., 2007). On the campus where this study was conducted, there is a grove of Tasmanian eucalyptus trees with heights exceeding 200 feet; it is the tallest stand of hardwood trees in North America (<http://strawberrycreek.berkeley.edu/tour/08eucalyptus.html>). We led participants to stand in this towering eucalyptus grove and asked

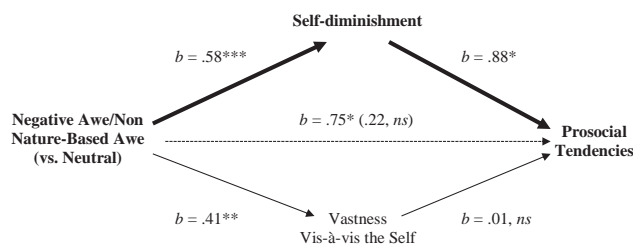


Figure 4. Multiple mediation model for Study 4 showing the specific indirect effects of the two facets of the small self—vastness vis-à-vis the self and self-diminishment—on prosociality. Note: The predictor variable contrasts the two awe conditions against the neutral condition (negative awe = 1, nonnature-based awe = 1, neutral =  $-2$ ). Analyses control for the orthogonal type of awe contrast (negative awe =  $-1$ , nonnature-based awe = 1, neutral = 0). Unstandardized regression coefficients are displayed. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

<sup>3</sup> Given that the two awe inductions (nonnature-based awe, negative awe) consisted of very different awe-producing phenomena, we separately tested whether the specific mediational effects of self-diminishment and vastness vis-à-vis the self were different between these two conditions. With respect to the nonnature awe condition (vs. control), the total indirect effect of self-diminishment and vastness vis-à-vis the self was significant (95% CI = .40, 3.16), but when considering the specific indirect effects of either mediator, self-diminishment was significant (95% CI = .35, 3.22), whereas vastness vis-à-vis the self was not (95% CI =  $-.67, .87$ ). These findings indicate that the effects of the nonnature awe condition on prosociality were specifically driven by the self-diminishment facet of the small self. With respect to the negative awe condition (vs. control), although the total indirect effect of self-diminishment and vastness vis-à-vis the self was marginally significant (90% CI = .03, 1.37), neither the indirect effect of self-diminishment (90% CI =  $-.10, 1.30$ ) nor of vastness vis-à-vis the self (90% CI =  $-.09, .40$ ) was significant. These results indicate that neither of the two subscales of the small self specifically drove the effect of the negative awe condition on prosocial values.

<sup>4</sup> This raises the question of why the feeling of “something greater than myself” mediated the effects of awe on ethicality in Study 2 but not of awe on prosocial values in Study 4, when vastness vis-à-vis the self was pitted against self-diminishment. Study 2's findings may be attributable in part to the strong theoretical and empirical overlap between vastness vis-à-vis the self and self-diminishment, which we argue are complementary facets of the small self and is evidenced by the very high correlation between them. It is also possible that had vastness vis-à-vis the self been measured in isolation in Study 4, as it was in Study 2, it would have served as a significant mediator. Another intriguing possibility is that self-diminishment and vastness vis-à-vis the self differentially relate to different forms of prosociality—a promising avenue for future research.



them to gaze up at the trees for 1 min or at a tall building (control) for 1 min. Unbeknownst to participants, we then examined the effects of this fleeting experience on their levels of prosocial helping behavior.

We also collected self-reports of several other variables relevant to the hypothesized relationship between awe and prosociality. We assessed ethical decision-making, thus paralleling the central finding from Study 2. We also collected assessments of psychological entitlement, which reflects a sense that one deserves more and is entitled to more valued resources than others, and is inimical to prosocial behavior (Campbell et al., 2004).

## Method

**Participants.** Ninety undergraduates (40 female, 47 male, 3 unreported; age 18–32,  $M = 20.95$ ,  $SD = 3.29$ ) from a large public university participated in the study as partial fulfillment of their course requirement. Twenty-eight percent of participants were European American, 40% were Asian American, and 29% were African American, Latino/a, Native American, or other ethnicity (three unreported).

**Materials and procedure.** Participants arrived to the lab and provided consent before completing demographics. The experimenter then gave participants directions to meet a second experimenter at a designated site on campus. The second experimenter, naïve to the hypotheses and purpose of the study, used a randomized condition sheet to assign participants to the awe or the control condition. Sex of the experimenter was alternated, and participants completed the study one at a time. After greeting participants and informing them that the study was of visual perception, the second experimenter escorted participants to the designated study site in the eucalyptus grove. In the awe condition, participants were asked to spend 1 min looking up at the trees. Participants in the control condition stood in approximately (within a few yards of) this location but faced a different direction; they spent 1 min looking up at an adjacent tall building (see Figure 5). This manipulation was premised on the notion that atypically tall trees would violate people's expectations and elicit awe in a way that a tall building, not atypical from others on campus, would not. Participants were

informed that they would be asked to complete a questionnaire when 1 min had elapsed. The experimenter then stepped away from the participant and started a timer.

We followed this procedure in a separate sample of 49 participants to verify that the tall trees elicited more awe than the tall building. Participants spent 1 min looking up at the trees or the building before reporting how much Amusement, Anger, Awe, Disgust, Fear, Sadness, and Happiness they were feeling using single items (1 = *not at all*, 7 = *extremely*). As shown in Table 3, participants in the awe (tall trees) condition reported greater awe than participants in the control (tall building) condition. Amusement, Disgust, Fear, and Sadness did not vary by condition. However, participants in the awe condition reported less anger than control participants. As evident in the means, feelings of anger were nonetheless extremely low across conditions. We also found that the trees condition induced more general positivity (i.e., happiness) than the building condition. Controlling for awe, these differences became nonsignificant,  $t(47) = .03$ ,  $p = .98$ , whereas the effect of condition on awe was unchanged when controlling for happiness,  $t(47) = 6.33$ ,  $p < .001$ . These analyses confirm that the differences between conditions in general positivity were entirely driven by condition differences in awe. Therefore, we conclude that the tree gazing task is a valid and reliable induction of awe.

Our main dependent variable was the degree to which participants helped the experimenter in the context of a carefully practiced staged accident (adapted from Vohs, Mead, & Goode, 2006). After participants spent 60 s looking up at the trees or the building, the experimenter approached participants holding a questionnaire and a box of 11 pens, and spilled the pens in front of them—ostensibly by accident. The number of pens participants picked up was the measure of helpfulness ( $M = 7.34$ ,  $SD = 1.55$ ).

Participants then completed the questionnaire containing measures pertinent to our hypothesis. Participants completed a version of the measure of ethicality used in Study 2 (Detert et al., 2008). We preselected two face-valid scenarios from the eight in the original measure that would be relevant to university students. The first described the participant keeping money given to them acci-



Figure 5. View of the eucalyptus trees used to induce awe (left panel) and the adjacent building used for the control condition (right panel) in Study 5. See the online article for the color version of this figure.



dentally. The second described the participant failing to inform the professor about an error that resulted in them receiving a higher grade. Participants indicated how likely they would be to behave as described (1 = *very unlikely*, 7 = *very likely*). Responses to these two scenarios were highly correlated,  $r = .38$ ,  $p < .001$  and were reversed, summed, and averaged ( $M = 4.53$ ,  $SD = 1.65$ ).

Participants also completed three measures of psychological entitlement. First, participants completed the Me versus Other Scale (Campbell et al., 2004; Piff, 2014). This measure contains seven sets of four circles, each with three circles labeled other and one circle labeled “me.” The size of the me circle increases across the seven sets, but the size of the other circles does not vary. Participants select a set of circles to represent how they see themselves in relation to others ( $M = 3.94$ ,  $SD = 1.09$ ). Participants also completed the Psychological Entitlement Scale (PES; Campbell et al., 2004), a 9-item measure of individuals’ sense of deservingness vis-à-vis others. Participants indicated their agreement (1 = *strongly disagree*, 7 = *strongly agree*) with statements such as, “I honestly feel I’m just more deserving than others” ( $\alpha = .86$ ;  $M = 3.18$ ,  $SD = 1.06$ ). Finally, we assessed monetary deservingness by asking participants to imagine they would be paid for their participation and to indicate an amount between \$1 and \$10 that represented how much they felt they should receive (adapted from Campbell et al., 2004;  $M = \$4.27$ ,  $SD = \$2.75$ ). Finally, participants were thanked and debriefed.

## Results and Discussion

**Does in vivo awe increase helping behavior?** We first tested whether participants in the awe condition offered more help to the experimenter than participants in the control condition. In keeping with our central hypothesis, participants in the awe condition gathered more pens ( $M = 7.70$ ,  $SD = 0.71$ ) than did participants in the control condition ( $M = 7.02$ ,  $SD = 1.98$ ),  $t(88) = 2.12$ ,  $p = .037$ ,  $d = .45$ .

**Does in vivo awe influence ethical decision-making?** We next tested whether ethicality varied across the awe and control conditions. Participants in the awe condition exhibited marginally greater ethical tendencies ( $M = 3.78$ ,  $SD = 1.75$ ) than did control participants ( $M = 3.17$ ,  $SD = 1.52$ ),  $t(88) = 1.79$ ,  $p = .078$ ,  $d = 0.38$ .

**Does in vivo awe reduce entitlement?** Finally, we examined the influence of condition on entitlement. Participants in the awe condition chose smaller circles to represent themselves in relation to others ( $M = 3.63$ ,  $SD = 1.07$ ) compared with the control condition ( $M = 4.23$ ,  $SD = 1.03$ ),  $t(88) = 2.74$ ,  $p = .007$ ,  $d = 0.58$ . Participants in the awe condition also scored lower on the PES ( $M = 2.74$ ,  $SD = 1.05$ ) than control participants ( $M = 3.59$ ,  $SD = 0.89$ ),  $t(87) = 4.10$ ,  $p < .001$ ,  $d = 0.88$ . Further, participants in the awe condition felt they deserved to be paid with significantly fewer dollars ( $M = \$3.57$ ,  $SD = 2.14$ ) than did control participants ( $M = \$5.74$ ,  $SD = 2.85$ ),  $t(87) = 4.03$ ,  $p < .001$ ,  $d = 0.86$ . We also standardized and averaged these measures to compute an entitlement composite ( $\alpha = .65$ ;  $M = 0.00$ ,  $SD = 0.77$ ). The awe ( $M = -0.37$ ,  $SD = 0.66$ ) and control conditions ( $M = 0.34$ ,  $SD = 0.71$ ) yielded robust differences in this composite measure,  $t(86) = 4.83$ ,  $p < .001$ ,  $d = 1.04$ .

In Study 5 we immersed participants in an awe-inspiring environment: a grove of towering trees. Participants who gazed up at the trees offered more help to an experimenter than did participants who gazed up at a building, and they reported increased ethicality and reduced feelings of entitlement. That these effects emerged after a brief treatment condition (1 min looking at trees) indicates that even fleeting experiences of awe can have a meaningful impact on various types of prosocial judgments and behavior. It is also notable that prosociality (and awe) diverged across two conditions that both involved physically large stimuli, highlighting again that neither awe nor its effects on prosociality is reducible to perceptions of entities simply large in size.

## General Discussion

Humans have evolved a number of mechanisms that facilitate life within social collectives—mechanisms that reduce the emphasis on the self and its interests, and encourage prosociality (e.g., reputation, social norms; for a review see Keltner et al., 2014). In the current investigation, we examined for the first time whether the experience of awe can serve this vital social function—a function widely speculated about in the theoretical literature (e.g., Durkheim, 1887/1972; Keltner & Haidt, 1999, 2003). Given that awe can trigger a relative diminishment of the individual self and its interests vis-à-vis something perceived to be more vast than oneself (Campos et al., 2013; Shiota et al., 2007), we reasoned that awe should promote more selfless, other-oriented behaviors.

The results of the five studies reported here lend support to this central hypothesis. Individuals higher in dispositional tendencies to experience awe exhibited more generosity in an economic game (Study 1). Experimentally inducing awe caused individuals to endorse more ethical decisions (Study 2), to be more generous to a stranger (Study 3), and to report more prosocial values (Study 4). A naturalistic induction of awe in which participants looked up at a grove of towering trees led to increased helpfulness, greater ethicality, and decreased entitlement (Study 5). These findings highlight that the experience of awe can influence prosociality in a broad fashion, and contribute to the growing literature documenting the centrality of emotions to human sociality (e.g., DeSteno, 2009; Keltner et al., 2014).

Why does awe arouse altruism? Across our studies we found that the effects of awe on prosociality are explained by self-reports of what we have generally referred to as the small self. In Study 2, the influence of the awe induction on ethical decision-making was accounted for by perceptions of something greater than the self, implying a relative diminishment of the concepts and concerns attached to the individual self. In Study 3, the effects of awe on generosity were explained by feelings of smallness, insignificance, and something greater than the self. In Study 4, the effects of awe on prosocial values were mediated by perceptions of things greater than oneself and feelings that one’s being, concerns, and interests are relatively insignificant (e.g., seeing oneself as less important in the grand scheme of things). It would seem, as hypothesized, that awe leads to more prosocial tendencies by broadening the individ-

ual's perspective to include entities vaster and more powerful than oneself and diminishing the salience of the individual self.

Finally, in several studies the effects upon prosociality were specific to awe and not other positive emotions or exposure to nature, both of which can be triggers of prosocial behavior (e.g., Lyubomirsky et al., 2005; Weinstein et al., 2009). In Study 1, awe predicted prosocial behavior in an economic game when controlling for various prosocial positive emotions, including love and compassion, the latter also demonstrating unique influences upon sharing. In Study 2, awe but not pride increased ethicality. In Study 3, awe elicited by nature, but not amusement elicited by nature, increased generosity. In Study 4, a nonnature-based induction of awe as well as a negative induction of awe that also elicited moderate levels of fear and uncertainty both enhanced prosocial tendencies. Awe exerts a specific and likely unique effect on prosociality that is distinct from the influences of other positive emotions, not confounded by more general positive affect, and not reducible to experiences in nature.

Several features of our findings increase our confidence that awe promotes altruism via the small self. We documented these results in diverse populations: student, online, and nationally representative adult samples. Our measures of prosociality ranged across its many forms, and included: sharing a resource (Study 1, 3, and 4), helping someone in need (Study 5), ethical decision-making (Study 2, 5), and psychological entitlement (Study 5). We observed these findings across multiple empirical approaches to awe: dispositional self-reports, narrative recall, video inductions, and looking up at 200-foot-tall trees. These findings suggest that the association between awe and prosociality is not confined to particular instantiations of awe or specific approaches to its study.

### Implications and Future Directions

Past theory and research argues that awe is a discrete emotion. Accounts of elicitors and self-reports of subjective experiences of awe are distinguishable from those of other positive emotions, including joy, love, amusement, and contentment (Campos et al., 2013; Shiota et al., 2006). Awe is also linked to specific patterns of vocalizations (Simon-Thomas, Keltner, Sauter, Sinicropi-Yao, & Abramson, 2009) and facial muscle movements (Shiota et al., 2003), and may be associated with a distinct physiological signature (Maruskin, Thrash, & Elliot, 2012; Shiota, Neufeld, Yeung, Moser, & Perea, 2011). Research has also begun to document unique effects of awe upon social cognition (e.g., Rudd et al., 2012; Valdesolo & Graham, 2014). Most relevant to our research, awe has been shown to trigger feelings of smallness of the self vis-à-vis something more vast or powerful than the individual (e.g., Shiota et al., 2007). Our findings show that beyond altering the self-concept, awe also encourages other-oriented, prosocial behavior.

Our findings should be extended and expanded upon in several ways. Building on the current research, investigations should further illuminate the sufficient features and necessary conditions of experiences of awe. In this regard, examining the interplay between vastness and accommodation will be particularly fruitful. How does the experience of awe unfold over time, as current knowledge structures and schema are updated

to accommodate the vastness being perceived? The novelty of a stimulus, and eventual habituation to it, are likely critical determinants of awe.

Additional work should further elucidate *why* awe is associated with prosociality. Whereas we focused on the mediating role of the small self, other plausible mechanisms linked to awe should be tested, including enhanced feelings of connection with others and more universal self-definitions (e.g., Shiota et al., 2007; Van Cappellen & Saroglou, 2012). It will also be important to differentiate the small self from negative self-feelings, which refer to lower judgments of self-worth, self-respect, and self-acceptance (e.g., Crocker & Wolfe, 2001). In our studies, inductions of awe elicited levels of happiness comparable with other positive emotions (e.g., amusement). In other work, awe was positively associated with positive emotions, including pride (Shiota et al., 2006), which is central to self-esteem (Scheff, Retzinger, & Ryan, 1989). These findings suggest that awe is not injurious to one's self-worth in the way that other social threats and self-devaluation can be. One reason for this may be that the object of awe is often nonsocial (i.e., awe is typically experienced toward nonhuman entities). As such, awe may not involve the social comparison processes that trigger threatening feelings of shame, inferiority, or unworthiness (e.g., Leary, Tambor, Terdal, & Downs, 1995; Murray et al., 2005). Another possibility is that a *large* self is not necessarily the *best* self. That is, a reduced sense of self may allow people to transcend self-interest and behave in accordance with their higher moral values, which may actually increase self-esteem (e.g., Canevello & Crocker, 2011; for a related discussion on the distinction between humility and self-worth, see Tangney, 2009). These topics are promising avenues for future research.

We examined the effects of awe on a broad array of prosocial outcomes, from generosity and helping to psychological entitlement and abstinence from cheating. Future studies should explore other facets of prosocial action, including donations to public goods, proenvironmental behavior, and altruistic punishment—that is, punishing noncooperators at a cost to oneself (Keltner et al., 2014). Such investigations will help illuminate the breadth and boundaries of awe's prosocial effects. In addition, although our interest has been in documenting prosociality as an interesting and important consequence of awe, we do not mean to suggest that it is the only consequence of awe. The experience of awe is likely to impact other significant and as yet unexplored outcomes. For example, insofar as awe challenges one's normal frame of reference and triggers the sense that one's default schema needs to be updated, it may also motivate people to take in new information. It will be interesting to test whether experiences of awe can specifically enhance curiosity—the recognition, pursuit, and regulation of novelty and challenge—across both social and nonsocial contexts, for example by enhancing people's openness to novel experiences (Kashdan, Rose, & Fincham, 2004).

A final area fertile with interesting research questions and novel hypotheses concerns the association between awe and religiosity. A number of theorists have pointed to religion as being a potent catalyst and occasion for awe (e.g., James, 1902/1985; Keltner & Haidt, 2003). Places of worship such as temples, cathedrals, and mosques are in part designed to elicit

awe (e.g., Francis, Williams, Annis, & Robbins, 2008). In religious texts, God is often conceptualized as limitless, all-powerful, and incomprehensible (see Weber, 1920/1993)—appraisals that are also common to the experience of awe. In essential ways, religions represent social institutions that elicit, organize, and ritualize awe. Most relevant to the current investigation, recent work suggests that religion is associated with increased prosocial behavior (e.g., Norenzayan & Shariff, 2008; Saroglou, Pichon, Trompette, Verschuere, & Dernelle, 2005; Shariff & Norenzayan, 2007; Wilson, 2002). What this conceptual analysis suggests is that the effects of religion on prosociality may be partly attributable to awe. Religious institutions may promote prosociality insofar as they attune individuals to forces more powerful than themselves and are effective conduits of awe—an intriguing hypothesis for future research.

### Conclusion

Awe arises in evanescent experiences. Looking up at the starry expanse of the night sky. Gazing out across the blue vastness of the ocean. Feeling amazed at the birth and development of a child. Protesting at a political rally or watching a favorite sports team live. Many of the experiences people cherish most are triggers of the emotion we focused on here—awe. Our investigation indicates that awe, although often fleeting and hard to describe, serves a vital social function. By diminishing the emphasis on the individual self, awe may encourage people to forego strict self-interest to improve the welfare of others. Future research should build on these initial findings to further uncover the ways in which awe shifts people away from being the center of their own individual worlds, toward a focus on the broader social context and their place within it.

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Received April 24, 2014

Revision received February 11, 2015

Accepted March 3, 2015 ■