Awe, Daily Stress, and Elevated Life Satisfaction

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stresses often arise out of an immersive focus on the self (e.g., Buss, 1980; Hull, 1981; Pyszczynski & Greenberg, 1987; Scheier & Carver, 1977; see review by Ingram, 1990), in the search for mediation we

Dohrenwend, 1974; Holmes & Rahe, 1967; Kanner et al., 1981; Lazarus, 1984).

As a result, daily stresses have emerged as a central focus in the empirical literature, alongside the study of more chronic structural stresses and traumatizing major life events. For example, in an early study by Kanner et al. (1981), self-reported stress levels in response to daily hassles, compared with those from major life events, more significantly predicted both concurrent and subsequent somatic health status. In a similar vein, Monroe (1983) found that whereas levels of major life-changing stress only moderately correlated with individuals' psychological symptoms (e.g., sleep difficulties; measured by General Health Questionnaire [GHQ], Goldberg & Hillier, 1979), levels of daily stress significantly predicted psychological symptoms, even after controlling for initial symptom levels.

Moreover, reports of daily stress appear to mediate the influences of more severe life events upon mental and physical well-being (Caspi et al., 1987; DeLongis et al., 1982; Kanner et al., 1981; Pearlin et al., 1981). For example, involuntary disruption of a job might turn the more ordinary challenges of daily routines—such as purchasing life necessities, keeping the home orderly, getting the kids from school, and assisting with their homework—into more significant sources of stress, and thereby significantly alter personal well-being. Consistent with this reasoning, levels of stress in response to daily hassles have been found to mediate, or at least partially mediate, the impact of major life events on health status and well-being (e.g., Eckenrode, 1984; Johnson & Sherman, 1997; Pearlin et al., 1981).

Grounded in the aforementioned studies of awe and stress, we predicted that the experience of awe will reduce daily stress levels by altering individuals' appraisals of the self. Select studies set the stage for our central hypothesis. In a recent investigation of veterans and youth from underserved communities, an awe-inspiring experience of white water rafting significantly reduced participants' stress-related symptoms and boosted both short and long term well-being one-week after the rafting trip (Anderson et al., 2018). Trait level awe was found to be associated with reduced levels of interleukin 6 (IL6), a biomarker of the body's inflammation response, which covaries with levels of stress (Stellar et al., 2015). People led to feel awe in laboratory experiments reported a reduced awareness of day-to-day concerns (Shiota et al., 2007), greater well-being (Rudd et al., 2012), and elevated parasympathetic autonomic activation (Gordon et al., 2017), all indirectly related to reduced daily stress.

The present work extends these studies in three ways. First, whereas past studies have focused on awe felt in natural settings (e.g., Anderson et al., 2018), in the present investigation we tested the relationship between awe and stress using a diverse range of nature and nonnature related elicitors, including narrative recall, evocative videos, and in vivo situations. Second, in light of recent concerns about biases in memory reconstruction (DiGiovanni & Balcetis, 2018; Ross, 1989), we captured individuals' levels of daily stress across daily measurements, ratings of standard hassle lists, and stress-related physiological responses while talking about daily stress.

Finally, we provide evidence for experienceassociatedwe pr(l41s)-4TJETT/Cs8kBT98.01893Tc90096.035Tmarkacsocia associated with reduced stress. Guided by an appraisal tendency

Participants and Procedure

One hundred twenty-three undergraduates (35 males) from a public university in Spain participated in exchange for course credit. The final sample size was determined in part from previous diary studies on emotion (e.g., Gordon & Chen, 2016) and in part by aiming to recruit as many participants as possible within two weeks. We only analyzed results after all participants completed the study. Participants ranged in age from 19–22 years old (= 19.67, D = .47). Participants filled out an online survey each night for 14 consecutive nights. Reminders were sent out every night at 8:00 p.m. Diaries completed after 8:00 a.m. on the following day were excluded from analyses. In total, participants finished 1705 diaries. Using the sensitivity curve produced by simulations from R package simr 1.5 (Green & MacLeod, 2016), we estimate that we achieved 80% power to detect effects of approximately a -scored $B = -.07$, unstandardized $B = -.05$ or smaller (for more details, see the online supplemental materials).

Measures

. Mindful of cultural biases introduced by translation of single words (e.g., Bai et al., 2017; Russell, 1989, 1994), we followed previous awe research (e.g., Bai et al., 2017) and oriented each participant to an understanding of awe through a theoretical definition and a facial expression of this emotion. Specifically, before the start of the daily diaries portion of the study, participants were instructed to complete an online survey in which we provided them with a general definition of awe (derived from Keltner & Haidt, 2003): "People sometimes experience the emotion of 'awe' when we are in the presence of something amazing or breathtaking, something that we perceive as being vast or that they do not fully understand in the moment, something that can fascinate or impress us, but that can also make us feel overwhelmed or a little bit frightened." In addition to the definition, participants also viewed a photograph of facial expression that has been found to communicate awe reliably across different cultures (Bai et al., 2017; Shiota et al., 2004).

. The daily measures were kept brief to maintain motivation (Reis & Gable, 2000). Participants reported how much they experienced in addition to joy, anxiety, sadness, contentment, pride, loneliness, gratefulness, anger, being tired, and amusement. Participants also responded to one statement assessing their ("Today I felt stressed, overburdened or pressured"). All items were measured on 11-point Likert scales (1 = , 11 =).

. As part of the daily diary, participants were also asked whether they experienced anything awe-eliciting during the day. If the answer was yes, they were asked to describe the awe-inducing daily event, including who they were with, where they were, what they saw, and how they felt (for analyses of the contents of the awe narratives, see the online supplemental materials). If participants did not experience awe that day, they were asked to write about a positive experience they had during the day (in total, participants wrote 248 awe experiences; each participant reported 2.02 awe experiences on average).

The daily diaries consisted of multiple data points nested within individuals as well as within each day (everyone completed the diaries during the same two-week period), violating assumptions of independence between subjects and days. Thus, we used a two-level cross-classified model to conduct our analyses. Level 1 intercepts were allowed to vary for the individual and day, and slopes were allowed to vary for the individual. These analyses were conducted using the package in the statistical program R; degrees of freedom and values were calculated using the Satterthwaite method (Bates et al., 2015; Kuznetsova et al., 2017), which yields that are somewhere between the number of observations, individuals, and days depending on the relative variance explained by each factor; this also explains why the degrees of freedom varies from model to model. Finally, we report the significance of random effects using the function from lmertest which reports likelihood ratio tests comparing the model to a model dropping the random effect being tested.

First, we examined whether the fluctuation of awe within the same participant was associated with daily stress levels. To do so, we predicted individuals'

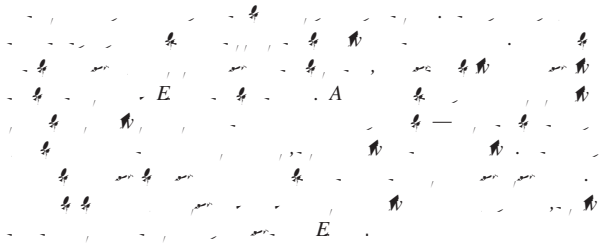
their own norm across the two-week period, they reported feeling less stressed, $B = -.20$, 95% CI [−.26, −.14], (78.52) = −6.84, $p < .01$ (Table 1; for further analyses of within-subject variability, see the online supplemental materials). To rule out the possibility that the effect of daily awe experience on daily stress is actually tapping into differences in daily positive experiences, we controlled for the level of general daily positivity using an aggregated value of the other positive experiences—joy, contentment, pride, gratefulness, and amusement. As expected, the effect still held after controlling for general daily positivity, $B = -.08$, 95% CI [−.13, −.02], (345.87) = −2.75, $p = .01$. Finally, to rule out the

awe on a regular basis reported lower intensities of stress associated with the 117 daily hassles, $\beta = -.13$, $= -2.39$,

Data Coding and Analysis

[illegible]. After watching the video in the lab, participants were instructed to describe their hassle again. To test whether the manipulation triggered participants' endorsement of the two types of small self-appraisals when thinking about their daily stress, we had two native English-speaking research assistants coded the appraisals of each stressor. A third coder read all the codes and settled discrepancies between the two coders. All three coders were naïve to the hypotheses.

[illegible]. Two coders coded each entry as including the presence or absence of something vast vis-à-vis the self (interrater reliability: Cohen's κ = .94). For example, the following narrative reported by one participant was coded as referring to something vast in relation to the self:



[illegible]. Two coders coded each entry for whether it referred to an insignificant sense of the self (interrater reliability: Cohen's κ = .60). For example, the following narrative reported by a separate participant includes references to the insignificant perception of the self:

[illegible]

Manipulation Check

Participants' self-reported emotions confirmed that those who watched the awe-inducing video (= 6.33, D = .95) experienced stronger feelings of awe compared with participants who watched the amusement-inducing video (= 3.02, D = 1.47) as well as those who watched the neutral video (= 2.98, D = 1.71), $F(2, 125) = 77.99$, $< .01$, $\eta_p^2 = .55$. Participants in the amusement condition (= 6.12, D = .83) experienced more amusement compared with those in the awe (= 4.21, D = 2.03) and neutral (= 3.32, D = 1.63) conditions, $F(2, 125) = 35.14$, $< .01$, $\eta_p^2 = .36$.

Awe and Daily Stress Levels

To examine our prediction regarding awe's impact on daily stress levels, we first examined participants' reported levels of daily stress in response to their own central daily stressor within a 3 (emotion condition: awe vs. amusement vs. neutral) $\times$ 2 (time: pre or post) assessment of daily stress levels) repeated-measures ANOVA.[2] Results yielded a significant interaction between emotion condition and time, $F(2, 125) = 10.43$,

(amusement and pride) were not significant (coefficients for control emotions are presented in the online supplemental materials).

Awe and Appraisals of Daily Stressors

Of the participants in the awe condition, 50% referred to vastness vis-à-vis the self-appraisals when talking about their daily stressors, which is more than five times the frequency with which appraised vastness was mentioned in the amusement (9.75%) and neutral control (9.09%) conditions, $\chi^2 = 26.29$, $p < .001$. Furthermore, whereas 19.04% of participants in the awe condition endorsed an insignificant sense of the self when talking about their daily stressors, no participant in the amusement or neutral condition referred to this appraisal theme, $\chi^2 = 17.28$, $p < .001$. Consistent with our prediction, participants in the awe condition more

al., 2009). Finally, we also measured participants' self-reported stress levels at the end of the study. We predicted that these levels would be lower in the awe condition compared with the neutral condition.

Study 1a

Participants

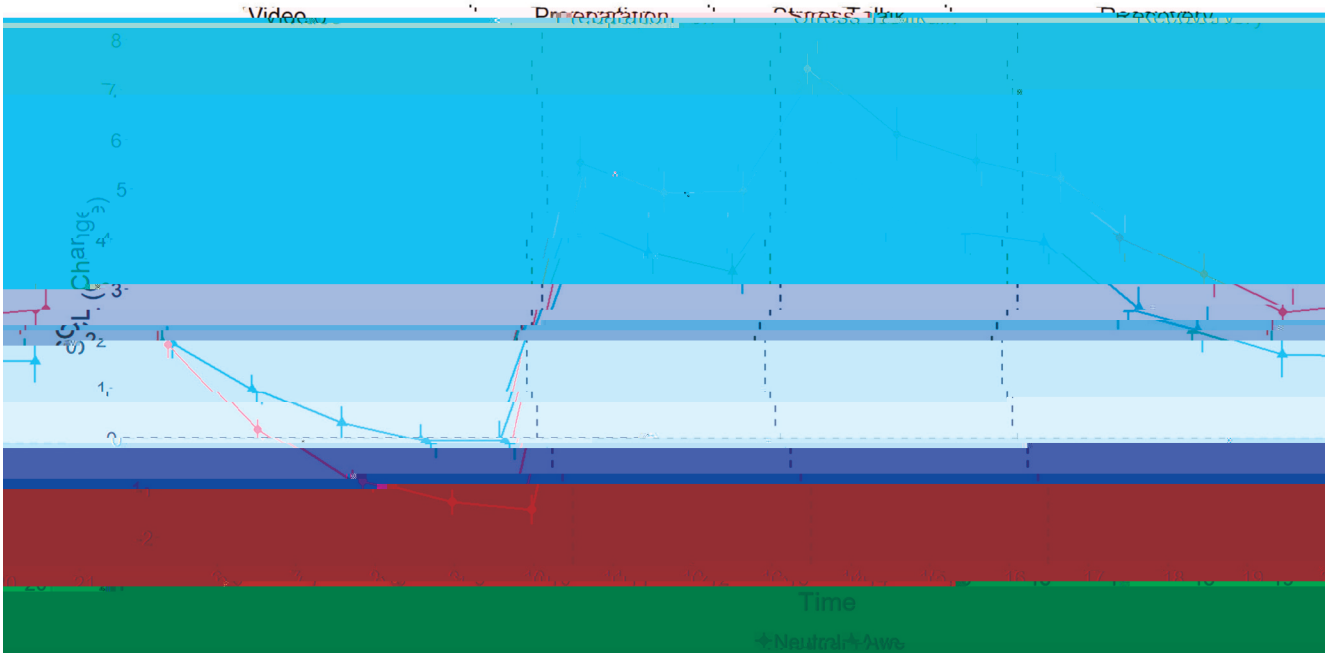
One hundred seventy-five college students at a major public west coast university in the United States participated in exchange for 1.5 course credit. This sample was driven by aiming to collect as much data as possible within the time period covering summer session and the following fall semester. We only analyzed results after all participants completed the study. Among all participants, four encountered procedural or tech-related problems (e.g., building construction interfering with study), three reported health conditions (e.g., heart condition or coughing symptoms), five participants' data were missing, and eight participants failed to follow instructions. The data were not merged or analyzed until after data collection ended. The final sample size consisted of 155 participants (49 male; $_{age}$ = 20.61, $D_{\sim}$ = 2.48). Using the sensitivity curve produced by simulations from R package simr 1.5 (Green & MacLeod, 2016), we estimate that we achieved 80% power to detect effects of approximately a | $_{\sim}$ | =1.70 or more extreme for SCL and | $_{\sim}$ | = 2.65 for HR (for more details, see the online supplemental materials). The ethnic distribution of this sample was: 18.1% European American, 58.1% Asian or Asian American, 1.9% African American, 14.8% Latino/Latina, .6% Native American, and 6.5% mixed race.

Procedure

Participants were invited to participate in a study of emotional experience. Before visiting the lab, they completed an online presurvey in which they reported one personal central hassle and rated the intensity of this hassle. Within 24 to 48 hr of completing this online survey, participants completed the lab session. Upon arrival at the lab, participants were seated in front of a computer and a large 44-in. screen TV. The experimenter applied sensors to participants' skin in Lead II configuration to gather Electrocardiogram (ECG) signals, a belt was placed on the torso to assess respiration, and two additional sensors were placed on the palmar surface of the participant's nondominant hand to measure skin conductance. We used the MP150 hardware and Acqknowledge 4.4 software (Biopac Systems, Inc.) for data acquisition and subsequently analyzed the data in one-Minute epochs using Mindware Technologies, LTD'

Awe and Decreased SCL

We first examined participants' average SCL reactivity for each phase—video, preparation, stress talk, and recovery (for full model on minute-by-minute data, see the online supplemental materials).



. SCL change scores were calculated by subtracting the last minute of the participants' baseline SCL from their current SCL. Error bars represent ±1 *E* (Study 4). See the online article for the color version of this figure.

referred more frequently to vastness vis-à-vis the self, especially when talking about their daily stressor.

Finally, whereas participants in the awe condition exhibited significantly lower sympathetic arousal (SCL in this case) during the recovery phase compared with their counterparts in the neutral condition, their self-reported daily stress levels were not significantly different than controls. This result clearly departs from our hypothesis and the findings thus far, and may have been due to the fact that participants reported on their stress after an emotional disclosure, an intervention that has been shown to decrease subjective stressful reactions but not sympathetic arousal through enhanced emotion understanding (Clark, 1993; Cordova et al., 2001; Greenberg et al., 1996; Kennedy-Moore & Watson, 2001; Lepore et al., 2000, 2004; Zech & Rimé, 2005).

Study 5

Thus far, we have seen that trait and state awe are associated with decreased levels of daily stress. In Study 5, we induced awe by asking participants to write about a prototypical experience of the emotion (e.g., Griskevicius et al., 2010). These data allowed us to test our hypothesis about awe and decreased daily stress in the moment through a greater variety of elicitors of awe than just nature, which has been a focus in the field thus far (e.g., Anderson et al., 2018). To further ascertain awe's unique impact upon daily stress, we contrasted the effect of awe with joy and pride. Joy, like awe, is a positive emotion, often accompanied by reduced self-related concerns, but it is not triggered by vastness and is often contrasted with awe (Bai et al., 2017; Piff et al., 2015; Shiota et al., 2007; Van Cappellen & Saroglou, 2012). Pride is also a positive emotion, but in contrast to awe, promotes self-focused attention (Bai et al., 2017; Tracy & Robins, 2004).

Finally, guided by the appraisal-tendency approach, we incorporated a measure that assessed both facets of the small self construct—vastness vis-à-vis the self and an insignificant sense of the self (Bai et al., 2017; Piff et al., 2015; Stellar et al., 2018)—and examined the role of each in driving the link between awe and reduced stress. Based on studies of stress interventions (e.g., Chiesa & Serretti, 2009; Grossman et al., 2004), we tested two competing predictions about mediation. Whereas the literature on self-distancing would suggest that appraisals of vastness vis-à-vis the self reduce stress (Ayduk & Kross, 2010; Kross & Ayduk, 2011), studies of narcissism find that an insignificant sense of the self might drive the stress-reducing effects of awe (e.g., Cheng et al., 2013). Our analyses, therefore, ascertain whether the reduction of daily stresses following from experiences of awe is produced by appraisals of vastness vis-à-vis the self or an insignificant sense of the self.

Participants

Two hundred twenty-one college students at a major public west coast university in the United States participated in exchange for one course credit. This sample was determined by aiming to collect as much data as possible before the end of school year. We only analyzed results after all participants completed the study. Sixteen participants who failed more than one attention check (out

of five) were excluded. The final sample consisted of 205 students (64 male, = 21.17, D = 3.16). According to a post hoc power sensitivity analysis in G*Power 3.1.9.2, our final sample of 205 participants and α = .05 achieves 80% power to detect effects of η_p^2 = .046 or larger for the within-between interaction in a repeated measures ANOVA with two within (time) and three between (condition) factors (for more details, see the online supplemental materials). The ethnic distribution of this sample was as follows: 34% European American, 41% Asian or Asian American, 2% African American, 10% Latino/Latina, 3% Native American, and 10% were mixed race.

Measures and Procedure

After giving consent, participants completed measures of baseline daily stress levels, and then recalled and wrote about a personal experience of awe, joy, or pride. They then reported their daily stress levels and their appraisals of the self.

[illegible]. As in Study 3, participants recalled a central hassle that occurred in the past month and rated their level of stress on a scale from 1 ( ) to 10 ( ).

[illegible]. Participants were randomly assigned to describe an experience that elicited awe, joy, or pride. Participants were provided with the definition of the target emotion (see below) and an emoticon (see the Appendix) showing the prototypical facial expression of the target emotion (Bai et al., 2017). Following Strack et al. (1985), the instructions emphasized focusing on concrete, vivid, experiential aspects of the target emotion.

A :

B *B*

Items included: "I feel relatively small," "I feel insignificant," "I feel my personal needs are not important."

. Participants reported the degree to which they felt each of nine emotions during the experience they wrote about (happiness, awe, amusement, sadness, fear, anger, gratitude, pride) on a 7-point scale (1 = ; 7 =).

Data Coding

Two native English-speaking research assistants from the United States were trained to code each entry as elicited by something in nature or not (interrater reliability: Cohen's κ = .97). A third native coder read all the codes and settled discrepancies between the two coders. All three coders were naïve to the hypotheses. In total, 36 of 66 awe narratives were coded as elicited by something in nature.

Awe Experience and Decreased Daily Stress Levels

To examine our prediction regarding awe's impact on daily stress levels, we first examined participants' reported levels of daily stress in response to the general hassle items within a 3 (emotion condition: awe vs. joy vs. pride) $\times$ 2 (time: pre or post) assessment of daily stress levels) repeated measures ANOVA. Results yielded a significant interaction between emotion condition and time, $F(2, 202) = 3.39$, = .036, $\eta_p^2 = .03$ (see Figure 4). Simple effects analyses revealed that people in all three conditions were less bothered by their central daily hassle after the recall task, but this effect was much larger among participants in the awe condition, $F(1, 202) = 97.47$, $< .001$, $\eta_p^2 = .33$, compared with those in the joy condition, $F(1, 202) = 56.09$, $< .001$, $\eta_p^2 = .22$, or in the pride condition, $F(1, 202) = 39.80$, $< .001$, $\eta_p^2 = .16$.

To explore the impact of emotion condition on changes in daily stress levels (a difference score calculated by subtracting their daily stress rating provided before emotion priming from their daily stress rating after writing their emotional experience), we conducted pairwise comparisons between the three conditions and present the false discovery rate (FDR) corrected p-values. The pairwise comparisons reveal that individuals in the awe condition (= -2.56, E = .28) demonstrated less stress than those in the pride (= -1.62, E = .15) condition (E = .37 = .01, FDR adjusted = .03). In addition, whereas individuals in the awe condition reported lower stress than those in the joy (= -1.94, E = .20) condition, the comparison were not significantly different (E = .37, = .09, FDR adjusted = .14). Finally, the comparison between the joy and pride conditions were also not significantly different (E = .37, = .39, FDR adjusted = .39). The overall results indicate there are differences, and the corrected p-values suggest the trend is awe being different than pride and joy, but given the trade-offs between Type I and Type II error when correcting values in multiple comparisons, a larger sample size would be needed to compare all three conditions simultaneously.

To rule out the possibility that awe's effect on daily stress levels was only observed in response to nature elicitors, we compared levels of stress of participants who recalled a nature-related awe experience with those who recalled other elicitors of awe. Neither the interaction between elicitor and time significant, $F(1, 64) =$ .05, = .83, nor the main effect of elicitor, $F(1, 64) = 3.08$, = .09, were significant.

Supporting Hypothesis 2 and replicating the results from Studies 3 and 4, participants' self-reports of awe were significantly correlated across conditions with decreases in daily stress levels, = $-.18$, = .01. Importantly, as in Studies 3 and 4, regression analyses across participants from all three conditions revealed that after controlling for other positive and negative emotions (happiness, amusement, sadness, fear, anger, gratitude, pride), awe was the only emotion that was significantly associated with changes in daily stress levels, $\beta = -.33$, E = .11, = .002 (coefficients for control emotions are presented in the online supplemental materials).

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proposed mediating model using a bootstrapping procedure recommended by Preacher and Hayes (2004; 2008). Analyses were conducted with the PROCESS macro for SPSS (Hayes, 2013) using 5,000 bootstrap samples. This technique yielded a significant indirect path with a 95% bias-corrected confidence interval that did not include zero [−.13 to −.002], providing support for Hypothesis 3 that the sense of vastness vis-à-vis the self helps to explain awe's impact on decreased daily stress levels. We then treated the same model with the insignificant sense of the self facet set as the mediator in the model. This time, bootstrapping results revealed that the indirect effect was not significant (95% CI [−.02, .11]).

The results of Study 5 extend our understanding of the relation between experiencing awe and altered perspective of daily stresses in the moment. First, awe's calming effect on daily stress is not limited to immersion in nature, the source of awe in Studies 3 and 4. Moreover, consistent with Hypothesis 3, perceived vastness vis-

(Hypothesis 1); (b) the intensity of the subjective experience of awe would significantly correlate with their daily stress levels (Hypothesis 2); and (c) that awe's attenuation of daily stress would be explained by a sense of vastness vis-à-vis the self (Hypothesis 3). Finally, guided by existing findings on both awe and daily stresses' association with well-being (e.g., Lazarus, 1984; Rudd et al., 2012; Stellar et al., 2015), we predicted that the positive effect of awe on enhanced life satisfaction can be explained, at least partially, by its impact on reduced daily stress levels (Hypothesis 4).

Study 5

Participants

Eighty-six college students at a major public west coast university in the United States participated in exchange for one course credit. This sample was determined primarily by aiming to collect as much data as possible within a summer session. We only analyzed results after all participants completed the study. According to a post hoc power sensitivity analysis in G*Power 3.1.9.2, our final sample of 86 participants and $\alpha = .05$ achieves 80% power to detect effects of $\eta_p^2 = .085$ or larger for a repeated measures ANOVA interaction of two within (time) and two between (condition) factors (for more details, see the online supplemental materials). All our participants were college students (25 male; = 20.64 yrs, $D = 2.42$ yrs) at a major public west coast university who participated in the experiment in exchange for course credit. The ethnic distribution of the sample was as follows:14% were European American, 1% were African American, 54% were Asian American, 20% were Latin American, and 12% were other ethnicities.

Measures and Procedure

Participants were invited to participate in a study of emotional experience. Upon arriving at the lab, participants filled out measures of daily stress levels and life satisfaction. Afterward, participants walked with the experimenter to the Campanile, a clock tower at the center of the UC Berkeley campus with a height of 200 feet, where they were told to finish another set of questionnaires. Mindful of the potential confounding biases introduced by the elevated height, we brought all participants to the top level of the tower and then randomly assigned them to one of two conditions. In the awe condition, participants looked out and enjoyed the expansive view of the Bay, San Francisco, and the Golden Gate Bridge. In the control condition, participants faced the inside wall of the tower and were not allowed to look out of the tower until they finished answering all the questions (see Figure 6). Participants in both conditions were asked to report their emotional experiences, sense of perceived vastness vis-à-vis the self, daily stress level, as well as life satisfaction while standing at the top level of the tower. Upon finishing, all participants were allowed to tour around the tower and were then brought across campus back to the lab room, debriefed, thanked, and released.

[illegible]. On a 7-point scale from 1 ( ) to 7 ( ), participants indicated the extent to which they experienced amusement, happiness, awe, fear, and anger while viewing either the interior of the tower or the bay from the top of the tower.

[illegible]. Participants reported upon vastness vis-à-vis of the self subscale with the same three items from Study 5 ($\alpha = .82$, = 4.44, $D = 1.70$).[9]

[illegible]. Participants reported upon central hassle-related stress levels as used in Study 3 and the general hassle scale as used in Study 2.

[illegible]. Participants reported on their life satisfaction as measured with the Satisfaction with Life Scale (Diener et al., 1985). This scale contains five items that measure global life satisfaction judgments. Participants responded using a seven-point Likert scale ranging from 1 ( ) to 7 ( ), indicating how much they agreed or disagreed with each item in the current moment ($\alpha = .89$, $_{before} = 4.79$, $D_{before} = 1.21$; $\alpha = .89$, $_{after} = 4.93$, $D_{after} = 1.33$).

[illegible]

Awe Experienced at the Top Level of the Tower

An independent samples test showed that compared with the participants who faced the wall in the interior of the Campanile (control condition; = 2.73, $D = 1.62$), participants who looked out of the tower (awe condition; = 5.26, $D = 1.48$) reported stronger feelings of awe (84) $= -7.56$, $< .001$, = 1.84.

Awe Decreases Daily Stress Levels

To examine our prediction regarding awe's impact on daily stress levels, we first examined participants' reported levels of daily stress in response to the general hassle items within a 2 (emotion condition: awe vs. control) $\times$ 2 (time: pre- or postassessment of general hassle-related stress) repeated measures ANOVA. Results yielded a significant interaction between emotion condition and time, $F(1, 84) = 13.21$, $< .001$, $\eta_p^2 = .14$. Simple effect analyses revealed that people in both conditions reported lower levels of daily stress in response to the general hassle items after walking to the top level of the tower, which fits with what is known about the benefits of being outdoors (e.g., Hartig et al., 2003;

and time, $F(1, 84) = 18.99$, $p < .001$, $\eta_p^2 = .18$. Simple effects analyses revealed that although people in both conditions were less bothered by their central daily hassle after walking to the top level of the tower, this effect was much larger among participants in the awe condition ($_{dif} = -3.40$, $E = 2.18$), $F(1, 84) = 130.77$, $p < .001$, $\eta_p^2 = .61$, compared with the ones who were facing the inner side of the tower ($_{dif} = -1.59$, $E_{dif} = 1.66$), $F(1, 84) = 29.91$, $p < .001$, $\eta_p^2 = .26$.

Awe Increases Life Satisfaction

Stress shapes both mental and physical health (e.g., Antonovsky, 1987; Folkman, 2013; Kanner et al., 1981). In the literature on stress, increasing attention has been paid to daily stresses—everyday hassles—that often predict mental and physical health in surprisingly powerful ways (e.g., DeLongis et al., 1982; Folkman & Lazarus, 1985; Kanner et al., 1981). In the present investigation, we focused on how awe reduces daily stresses.

The results of the current six studies lend direct support for this central hypothesis: experiencing awe is associated with immediately decreased levels of daily stress. This relationship was observed in the context of everyday life (Study 1), at the trait level (Study 2), after viewing awe-inducing video clips (Studies 3 and 4), when recalling a past experience of awe (Study 5), and in venturing outdoors and immersing oneself in an awe-inspiring setting (Study 6). Lending support to our second hypothesis, participants' reports of their experience of awe significantly correlated with reduced daily stress levels, even after controlling for other positive and negative emotional experiences (Studies 1–6). This finding is in line with studies showing that the experience of an emotion tracks emotion-specific influences upon cognition (Keltner & Horberg, 2015;

daily stress usually correlates with stress in response to major life events (Caspi et al., 1987; Kanner et al., 1981), many scholars of early stress intervention work conceptualized them as isomorphic and confounded them in measurement. Given evidence uncovering the unique causes and consequences of daily stress, we focused on daily stress and found that altered self-appraisals produced by experiences of awe can reduce the levels of stress felt toward daily events. It will be important for future research to test whether awe similarly attenuates the stress associated with major life events and conditions (e.g., death of a loved one, poverty, incarceration)—and why it may or may not work.

Our investigation also lends further credence to recent conceptual approaches that advocate the examination of distinct states within the broader family of positive emotions (Shiota et al., 2017). Although researchers have long been interested in differentiating negative emotions (e.g., anger, fear, and disgust), research on discrete positive emotions is more recent (e.g., Ekman, 1994; Fredrickson, 2001; Shiota et al., 2004). Our findings support earlier research on positive states generally predicting decreased levels of stress (e.g., Folkman & Moskowitz, 2000; Fredrickson, 2001). At the same time, by comparing awe to other positive emotions such as amusement (Study 2), joy (Studies 3 and 5), and pride (Study 5)—all of which are known to buffer stress and improve well-being (e.g., Fredrickson, 2001; Thorson et al., 1997)—our findings suggest that awe exerts unique influences upon daily stresses through introducing a sense of perceived vastness vis-à-vis the self. It will be important for future research to test other discrete positive emotions (e.g., contentment; Cordaro et al., 2016) and the mechanisms by which they mitigate stressful responses.

Finally, our fi

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Appendix
Emoticons Used in Study 5

Emotion	Emoticon
Awe	
Joy	
Pride	

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