Spring 2013

The Influence of Awe on Prosociality: Considering the Role of Empathic Concern and Emotion Regulation

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The Influence of Awe on Prosociality:

Considering the Role of Empathic Concern and Emotion Regulation

By

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Accepted in Partial Completion
of the Requirements for the Degree
Master of Science

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Master's Thesis

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Erika Lutz

June 1st, 2023

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A Thesis
Presented to
The Faculty of
Western Washington University

In Partial Fulfillment
Of the Requirements for the Degree
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Abstract

This study aimed to understand how the relationship between awe and prosociality is impacted by empathic concern and emotion regulation. Witnessing others in need and feeling a sense of connectedness towards them may elicit empathic concern and lead to prosocial behavior. However, emotion regulation impacts the capacity to focus on others. Greater emotion regulation difficulty has been associated with greater self-focus and may interfere with considering the perspective of others. Experiences of awe have been shown to not only decrease self-focus but may also increase connectedness to others, promoting empathic concern, and subsequently prosocial outcomes. We predicted that eliciting awe would increase empathic concern and prosocial behavior. We also predicted that the relationship between awe and prosocial behavior would depend on the level of emotion regulation difficulty, such that participants with greater emotion regulation difficulty would experience a greater magnitude of the effect of awe on prosocial behavior than those with less emotion regulation difficulty. Participants completed a measure of emotion regulation, watched an awe inducing or neutral video, read a story depicting human suffering and rated the degree of empathic concern felt before making a prosocial decision. We aimed to investigate empathic concern as a mediator between awe and prosociality and emotion regulation as a potential moderator. Neither of our hypotheses were supported in the current study. Possible explanations, limitations, and future directions are discussed.

Keywords: Prosocial behavior, empathic concern, awe, emotion regulation

Acknowledgements

I would like to first acknowledge and thank my advisors, Dr. Annie Riggs and Dr. Annie Fast for their guidance and mentorship during my time in the MS Experimental Program here at Western. It has been a pleasure working with them and learning from them these past two years. I would also like to acknowledge and thank Dr. Christie Scollon for providing guidance and feedback to improve the quality of this research. I am thankful for my committee members and appreciate the time and commitment they have dedicated to my thesis research project.

I would also like to thank Research and Sponsored Programs (RSP) at Western Washington University for sponsoring the follow-up study to this research. Lastly, I want to thank my cohort, friends, and family for their support.

I am extremely grateful for all of the love and support I received over the years that has helped me to get where I am. And I am happy and humbled by my experience. Thank you!

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Considering the Role of Empathic Concern and Emotion Regulation

Helping others is a fundamental building block of our society that helps to create and strengthen social relationships. Acting prosocially, or helping others, promotes cooperation and cohesion within communities. A behavior is defined as prosocial when it is performed voluntarily with the intention of improving another's well-being (Batson et al., 2007; van Kleef & Lelieveld, 2022). Additionally, prosocial behaviors are associated with some cost to the self, such as time, effort, or money, and can range from low cost, such as holding a door open, to more costly acts such as donating or volunteering. Despite the cost, prosocial actions not only improve the welfare of the recipient, but also improve the actor's mood (Lai et al., 2020) and well-being (Aknin et al., 2013). Prosocial behaviors promote trust and strengthen both interpersonal relationships, as well as communal ones (Piff et al., 2015).

Despite the benefits of acting prosocially, people must be *motivated* to act prosocially. A growing literature indicates many possible motivators for prosocial behavior but one important factor in deciding to *act* on prosocial motivations is the degree of closeness between the actor and recipient. The closer we feel, the more likely we are to help. For example, people are more likely to help needy family members than needy strangers (Maner & Gailliot, 2007). Familiarity and other shared characteristics also enhance someone's sense of closeness or connectedness. For instance, sharing nationality or a favorite sports team can create group membership and enhance feelings of connectedness (Fiedler et al., 2018; Hein et al., 2010). A sense of connectedness can also be promoted through self-expanding emotional states such as awe (Stellar et al., 2017). Awe can reduce self-salience or transcend an individual's focus beyond the self and towards others to promote prosocial behaviors (Piff et al., 2015).

To better understand the nuances of how awe promotes prosociality, the current study will specifically test the roles of empathic concern and emotion regulation in explaining the effect of awe on prosocial behavior.

Background

Prosocial behavior can be motivated by both cognitive and emotional factors. One motivation to act prosocially is reciprocity (Baumeister & Finkel, 2010b; Martin & Olson, 2015). When someone helps you, you may be more likely to want to help them. When someone performs an act of kindness, the recipient of that kindness is often inspired to reciprocate the good deed, increasing the likelihood that they will engage in subsequent prosocial behavior. Performing good deeds or acting prosocially can improve someone's reputation and social status by establishing or supporting trust and cohesion within a group or community (Baumeister & Finkel, 2010b; Martin & Olson, 2015; Penner et al., 2004). When faced with a needy other, an important factor in choosing to act prosocially stems from someone's emotional experience. For example, experiencing gratitude or admiration towards someone could then fuel reciprocity and further strengthen social bonds (van Kleef & Lelieveld, 2022). Additionally, helping others may signal an abundance of resources or desirable traits such as strength and bravery, which may indicate protector or caregiving abilities reinforcing an individual's reputation within a community. Reciprocity reinforces a sense of trust and reliability and may motivate future acts of prosociality (Baumeister & Finkel, 2010b; Martin & Olson, 2015). However, it is important to note that reciprocity relies on pre-existing social systems where people are more familiar with one another. For example, when a beneficiary is completely unfamiliar (e.g., a stranger), a prosocial actor is likely not motivated by expectations for reciprocity. Additionally, when there are no witnesses to the prosocial act, one may not be motivated by reputational concern. In these

instances, there must be other factors motivating prosocial actions, perhaps an individual's emotional experience plays a role.

Witnessing someone in need can be emotionally evocative, especially when the witness feels a sense of closeness or connectedness towards the target. When people feel a deeper sense of connectedness to a needy individual, they are more likely to help (Cialdini et al., 1997; Penner et al., 2004). One study found that shared bloodlines resulted in a greater sense of closeness which then led to greater willingness to help relatives over strangers due to their shared familial ingroup (Maner & Gailliot, 2007). A sense of closeness or connectedness can also arise from shared characteristics such as nationality, race, age, or gender (Fiedler et al., 2018; Martin & Olson, 2015), or from a shared group identity such as a sports team (Hein et al., 2010). Sharing identities with another, or considering them as an in-group member, promotes a sense of connectedness and a sense of "we-ness," while reducing the degree to which someone feels distinct or separate from others (Pavey et al., 2011). For example, viewing a needy other and feeling more similar to them enhances other-oriented processes such as perspective taking, understanding, and concern towards the needy individual (Galinsky et al., 2005). These other-oriented processes may then subsequently promote prosocial behavior as a way to improve the welfare of the sufferer (Batson et al., 2007). In contrast, viewing others as separate from the self, more as an "other," may not only minimize concern for their well-being but can even lead to cases of stereotyping and dehumanization (Baumeister & Finkel, 2010a).

Fortunately, a sense of connectedness is not static and can be promoted through self-transcendent emotional states such as awe. Self-transcendent emotions such as awe help to broaden focus and foster a sense of connectedness towards others and nature (Stellar et al., 2017). Through the process of self-transcendence, people are better able to minimize self-focus

and consider a larger perspective (Jiang & Sedikides, 2021). When experiencing self-transcendence, one's sense of self becomes less salient, providing opportunities for other-oriented processes such as perspective taking, empathy, and concern for others (Bethelmy & Corraliza, 2019). For example, viewing a needy individual and feeling more connected to them may promote feeling *with* them and sharing their experience (Berry et al., 2018). Perhaps promoting self-transcendence enhances feelings of empathy towards others in need, *leading* to greater prosocial behavior.

Awe

One empirically supported method for promoting self-transcendence and connectedness towards others is through experiences of awe. Awe is often experienced when viewing grand natural landscapes (Goldy, 2020). Imagine looking out at magnificent massive mountains— the view takes your breath away and evokes a sense of wonder. Awe is elicited when someone perceives vastness and experiences a shrinking sense of self (Keltner & Haidt, 2003; Shiota, et al., 2007; Stellar et al., 2017). As people perceive vastness and shift their attention towards the beauty and mystery of nature, they often experience a reduction in self-importance and a deepened sense of connectedness towards others and nature (Trautwein et al., 2014). Experiences of awe help diminish self-salience and provide opportunities for more connectivity with one's surroundings. This redirection of attention helps to reorient focus towards group success over the individual and may promote prosocial behavior, extending perhaps even to all of humanity (Bai et al., 2017; Keltner & Piff, 2020; Shiota et al., 2007; Stellar et al., 2017; van Kleef & Lelieveld, 2022).

One mechanism that may facilitate a decrease in self-salience is the "shrinking" sense of self awe elicits. A series of studies were conducted to assess the effects of awe on a shrinking

self-focus and expansion of focus toward the collective group (Bai et al., 2017). These studies included American, European, and Asian participants to test the effects of awe cross-culturally. Results from a diary study indicate that on days participants rated experiencing more awe compared to pride, joy, hope, happiness, and amusement, and after controlling for overall positive and negative mood, participants who rated the greatest awe also indicated a reduction in their perceived sense of self size (Bai et al., 2017). In a follow-up study, participants were recruited from either a national park or a wharf to rate their emotions, perceived self-size, and to draw themselves and write their signature. Results indicated that participants at the national park rated more awe, drew smaller pictures, and wrote their name smaller indicating a reduced sense of self compared to those at the wharf who rated less awe, drew larger pictures of themselves and wrote their signature larger (Bai et al., 2017). The last study demonstrated that after recalling an experience of awe, participants rated a reduced sense of self and a stronger connection to their community compared to participants who recalled a neutral or shameful event (Bai et al., 2017). These studies indicate properties of awe help to minimize perceptions of the self and diminish self-focus while increasing collective engagement above and beyond other emotions, cross-culturally (Bai et al., 2017).

To further elaborate on the influence of awe on attention, one study assessed brain functioning and vagal activity during an awe and a control state (Reinerman-Jones et al., 2013). Participants viewed an awe inducing video slowly zooming out from the Earth until the planet looks like a marble, and another video displaying stars in space from some distance (counter-balanced). Results indicated that while experiencing awe, compared to the control, participants showed decreased activation in theta brain wave activity. Reinerman-Jones and colleagues (2013) suggest that this change in activation indicates a decrease in fatigue and an increase in

awareness. Increased awareness can allow people to attend the natural processes in their environment, like the birds chirping or the small intricate details of flowers and trees, the beauty and intricacy of life. Increased attention towards nature can expand someone's sense of connectedness and can increase interaction within a given environment to support more of a collective focus.

Awe may help to minimize self-focus while expanding focus towards the environment and others to promote prosocial behaviors. Awe predicted prosocial outcomes across a series of studies conducted in China (Guan et al., 2019). First, dispositional awe, the amount of awe one typically experiences as a trait-like awe, was predictive of self-reported prosocial tendencies, suggesting that individuals with a greater propensity to experience awe were more likely to report greater prosocial tendencies. A follow-up study indicated that both positive and negative forms of awe (such as watching a tornado) significantly predicted greater monetary support for welfare compared to a neutral condition. Finally, when assessing the impact of awe on volunteer times, positive awe alone, (not negative awe), remained predictive of helping behavior (Guan et al., 2019). Together, these studies indicate that there are unique qualities associated with positive awe's promotion of prosociality, across multiple prosocial measures, even when the decision to help is costly.

Another mechanism that may influence the effect of awe on connectedness to others is the pursuit of the authentic self. Recently, dispositional awe was associated with a stronger pursuit of an authentic self which reinforces bonds for those we feel more connected to (Jiang & Sedikides, 2021). When people are more in touch with an authentic self, the importance of life's mundane tasks diminishes while enhancing a sense of connectedness and understanding within one's community. Feeling more connectedness contributes to a greater sense of openness and

increases approach orientation (Jiang & Sedikides, 2021). A deeper connection to others can increase the ability to recognize and understand the experiences of others, promoting empathy, and through an increased approach orientation can promote prosocial behaviors.

One common way to elicit awe and promote connectedness is through exposure to nature. A series of studies conducted by Castelo and colleagues suggest that nature promotes self-transcendence, heightening one's sense of connectedness to something greater than the self (Castelo et al., 2021). Results from their first study indicate that simply remembering time spent in nature effectively decreased self-focus and increased other orientation (Castelo et al., 2021). A second study assessed whether people were more likely to engage in costly prosocial behavior before or after a nature walk. This study demonstrated that when participants were offered the opportunity to donate to charity or be entered into a raffle drawing for the chance to win an iPad, participants chose the other-oriented option of donating significantly more often *after* the hike than before. Self-transcendence, or the shift in focus from the self towards the needs and well-being of others (van Kleef & Lelieveld, 2022) mediated the effect of nature on prosociality (Castelo et al., 2021), suggesting that self-transcendence *explained* the increase in prosocial donations. Overall, this research indicates that nature is one way awe can be induced to minimize self-focus and promote prosociality, even when the decision to help is costly.

Castelo's team interpreted their findings to suggest that nature promoted self-transcendence, explaining the increase in prosociality. Exposure to nature made people feel connected with something greater than the self, a sense of unity to humanity, which promoted prosocial behavior (Castelo et al., 2021). However, it is also possible that through awe's promotion of self-transcendence and diminished focus towards the self (Shiota et al., 2007), a greater sense of connectedness led to higher degree of empathy for the target in need,

subsequently influencing prosocial behavior (Jiao & Luo, 2022). Thus, it is possible that awe not only minimizes self-focus but also shifts focus away from oneself and towards the broader world, leading to greater feelings of connectedness and interdependence. And that an enhanced sense of connectedness facilitates greater empathy towards those in need to promote prosocial behavior as a way to help the broader humanity (Piff et al., 2015).

Thus, it is possible that exposure to the transcendent qualities of awe led people to experience other-oriented processes, which then promote prosocial behavior. Not only can awe minimize self-salience but it can also encourage a sense of connectedness, allowing people to consider the perspective of others more easily (Goldy, 2020; Perlin & Li, 2020). Perspective taking is a necessary component of other-oriented emotions such as empathy and concern for others (van Kleef & Lelieveld, 2022). It is possible that through experiences of awe, increased connectedness enhances the likelihood of empathizing with targets and may provide one mechanism through which awe promotes prosociality.

Empathic Concern

Empathy is an other-oriented emotional state defined by an ability to both understand and vicariously share the experience of a needy other (Stellar et al., 2020). The Empathy-Altruism Hypothesis proposes that experiencing empathy promotes helping behaviors (Batson et al., 1988). Despite the many ways in which empathy has been conceptualized and measured in the literature, we intend to focus on one piece of the empathic process referred to as empathic concern. Empathic concern (also referred to as affective empathy) is an other-oriented emotion elicited when someone experiences understanding, sympathy, and compassion for a person in need (George-Levi et al., 2021). When someone experiences empathic concern towards a target (Batson et al., 1988), they are more likely to want to help as a means to improve the sufferer's

situation (Batson et al., 1997; Davis, 1980). Empathic concern is typically measured by averaging participant ratings of how *sympathetic, moved, compassionate, tender, warm*, and *softhearted* they felt towards a target (Batson et al., 1997). Empathic concern is one component of empathy that has been directly associated with increased prosociality and cooperation, even towards strangers (Batson et al., 2007; Penner et al., 2004). In one study, participants were asked to engage in an anonymous online game of Cyberball with three other players (all computerized) only labeled with a generic name. During the game, players toss the ball around and one "player" becomes ostracized and is ignored for the remainder of the game. Despite the anonymity involved in the virtual game, participants who reported greater empathic concern for the ignored player were more prosocial according to supportive emails that they wrote to the ignored "player." Although this experiment utilized a relatively low-cost prosocial option, greater empathic concern explained the increase in prosocial behavior (Berry et al., 2018).

As an other-oriented emotion, empathic concern first requires that someone is able to orient their attention towards the needs of others. One way this could be achieved is through experiences such as awe that heighten one's sense of connectedness towards others. Research suggests that experiences of awe can minimize self-salience and increase a sense of connectedness and belonging within one's community (Jiao & Luo, 2022; Perlin & Li, 2020). It is then possible that a greater sense of connectedness enhances someone's motivation to attend and care for others within the community. An enhanced sense of connectedness can thus prompt empathic concern and emotional understanding of a needy other, promoting prosocial behaviors in order to improve the others situation (Jiao & Luo, 2022). For example, immersion in nature can be an awe evoking experience that reduces someone's self-salience and deepens one's sense of connectedness to something greater than oneself and towards a broader humanity (Castelo et

al., 2021; Perlin & Li, 2020). When people experience empathic concern, they may be more likely to behave in a prosocial manner as a means to help a broader humanity (Perlin & Li, 2020). The current study aims to further understand the effect of awe on prosocial behavior by considering the role of empathic concern. It is possible that awe's transcendent abilities may help people feel more connected to others, increasing empathic concern, and thus *explaining* an increase in prosocial behavior (Mulukom et al., 2020).

Emotion Regulation

Despite empathic concern being a strong predictor of helping behaviors, other factors and individual differences may influence this relationship. One potential factor that may influence this relationship is emotion regulation. Emotion regulation refers to the degree of control someone has over which emotion is felt, or how strongly it is experienced or expressed (Gross, 2002). Sometimes the goal is to achieve a more neutral state or minimize the intensity of an emotional experience (Gasper et al., 2019). For example, upon hearing sad news in public, an individual may attempt to regulate their own distress or sadness in order to achieve a more neutral state until they can more appropriately process their emotions. Individual differences in emotion regulation difficulty (more or less difficulty in regulation ability), could play an important role in determining a response to witnessing human suffering (Richardson, 2019).

When people witness the presence of other people, their arousal increases. This increase in arousal can be interpreted as a challenge or a potential threat. When viewed as a challenge, people are more likely to respond with an approach motivation and are more likely to act prosocially to help the sufferer (Blascovich et al., 1999). In contrast, when people perceive arousal as a threat, they are more likely to respond with an avoidance motivation to alleviate their own distress and escape the threatening stimuli (Blascovich et al., 1999; Milojevich et al.,

2019). Individual differences in emotion regulation may play a key role in determining whether a viewer interprets a scenario as challenging or threatening and subsequently whether they choose to approach and help or avoid and ignore.

One common way to appraise situations is by identifying them as a challenge or threat. When situations are interpreted as challenging, they are likely to be cognitively demanding but with manageable emotional intensity (less overwhelming). For example, solving a jigsaw puzzle is effortful but the emotional experience associated with completing one is manageable and may be approached as a challenge and may even be accompanied by a sense of eagerness (Palmwood & McBride, 2019). Appraising arousing situations as threatening however, occurs when the intensity or experience of an emotion is overwhelming and less easily managed. Those who tend to view stimuli as threatening over challenging report more anxiety and greater difficulty regulating their emotions (Carthy et al., 2010). For example, perhaps the thought of completing a jigsaw puzzle is stressful or too demanding or exhausting. This appraisal presents the puzzle as a threat. Without an ability to cope with this distress, the threat is overwhelming and often leads to avoidance which is a less cognitively demanding coping strategy (Swerdlow et al., 2022).

In order for individuals to engage in prosocial behavior, they typically need to have an approach orientation, as opportunities to help others typically require some degree of interaction with a target. Witnessing human suffering elicits some degree of distress such as fear, sadness, or anger within an observer, and creates some personal distress. Personal distress is a self-focused emotional response that allows people to assess threats to protect themselves from harm (Stevens & Taber, 2021). When individuals are able to *minimize* their personal distress upon recognizing that they are not in danger, they eliminate the need to protect themselves and may be more likely to attend to external stimuli (Reinerman-Jones et al., 2013; van Kleef & Lelieveld, 2022). Better

emotion regulation ability supports attending to others and offers greater opportunity for perspective taking and helping.

In contrast, some individuals witness others suffering and experience more *difficulty* regulating their own anxiety, fear, or sadness. In these instances, individuals are less able to minimize their own distress exacerbating the need to remain self-focused as the individual is preoccupied with trying to ensure their own safety (Scheffer et at., 2021). Although some degree of personal distress can be beneficial as it promotes self-preservation, preoccupation with ensuring one's own safety often leads to avoiding stimuli that may further increase personal distress, increasing the likelihood of ignoring and avoiding needy others (Forster et al., 2022). Additionally, individuals who experience greater emotion regulation difficulty experience longer lasting periods of distress and report higher rates of anxiety and depressive symptoms (Berna et al., 2014; Carthy et al., 2010; Forster et al., 2022). Thus, it is typical for individuals with greater emotion regulation difficulty to avoid interacting with needy others, opting to escape the situation instead (Jazaieri et al., 2015).

Although personal distress and empathic concern seem to be in opposition, they do occur simultaneously along a spectrum. Recent literature poses that personal distress and empathy are co-occurring and some degree of distress is necessary to motivate helping behaviors (Kogan et al., 2014). Additionally, for individuals with greater emotion regulation difficulty, the degree of personal distress is too high that it dominates focus as opposed to being balanced with empathic concern. In order to promote an approach orientation and prosocial behavior, empathic concern may need to be felt more strongly than the distress one experiences, or distress must be minimized (Maibom, 2019). Some degree of personal distress is necessary for prosocial behavior but must be balanced with empathic concern to effectively promote helping behaviors (Penner et

al., 2004). Across multiple studies, enhancing connectedness towards others provided one reliable method to minimize self-focus and decrease avoidance (vanOyen Witvliet et al., 2010; Wei et al., 2021) while increasing empathic concern and subsequent prosocial behavior (Cialdini et al., 1997).

Greater emotion regulation difficulty interferes with a shift in focus towards others which negatively impacts perspective taking abilities. When individuals experience greater difficulty minimizing their own distress, they likely lack the capacity to attend to the experiences of others (Thayer & Lane, 2000), let alone experience concern for others (Hodges & Klein, 2001). Without some way to minimize self-focus, individuals who experience greater emotion regulation difficulty remain in a state of personal distress and are less likely to act prosocially (Brethel-Haurwitz et al., 2020; De Castella et al., 2018; Grynberg & Lopez-Perez, 2018). In summary, individuals who experience greater emotion regulation difficulty may struggle to attain an other-focused orientation where the needs of others can be considered and are thus more likely to express avoidant behaviors. In contrast, individuals with less emotion regulation difficulty may be more likely to consider the perspective of others, empathize, and act prosocially.

When people are better able to regulate their emotional experiences, they are more likely to consider another's perspective and empathize with their situation, increasing the likelihood of helping (Lockwood et al., 2014). It is possible that experiencing awe leads to a greater sense of connectedness with others, *especially* for those with regulation difficulties (Chirico & Gaggioli, 2021). The transcendent qualities of awe may help to encourage other-oriented processes including empathic concern and prosocial behavior through improving an individual's coping ability and emotion regulation in general (Atamba, 2019; Berna et al., 2014; Jiao & Luo, 2022).

Additionally, as individuals who experience greater emotion regulation difficulty require more time to return to a baseline emotion, it is possible that these individuals will remain in a heightened other-oriented state for longer, promoting greater empathic concern and prosocial behavior (Berna et al., 2014). Experiencing states of awe may decrease heart rate and activate the parasympathetic nervous system (Bernstein, 2022) which further supports the influence awe might have on improving coping and emotion regulation (Atamba, 2019; Berna et al., 2014). Given the documented relationship between awe and prosocial behavior, awe might be *especially* useful for promoting an approach-orientation and increasing prosociality among individuals with greater emotion regulation difficulty (Jiang & Sedikides, 2021). On the other hand, folks with better emotion regulation may also benefit from self-transcendent qualities of awe but may be more likely to regulate their experience, limiting emotion carryover. The present study builds upon this foundation to investigate whether experimentally induced awe influences prosocial behavior differently depending on levels of emotion regulation difficulty.

Present Study

The current study investigated how awe impacts prosociality by examining two potential contributing factors. The first factor we investigated is empathic concern, which prior studies have found to be a key motivator of prosocial behavior (Batson et al., 2007; Penner et al., 2004). Thus, we tested whether experiences of awe promote prosocial behavior because awe increases empathic concern. Since awe leads to the de-prioritization of the self and helps to transcend an individual beyond their own immediate needs, awe will likely also increase concern for others (Chirico & Gaggioli, 2021; van Kleef & Lelieveld, 2022), in turn promoting prosocial behavior (Batson et al., 1988; Davis, 1980). Therefore, in the current study, we tested whether empathic concern explained the relationship between awe and prosocial behavior (see Appendix I: Figure 1).

The second factor we investigated was whether the impact of awe on prosociality varies according to individuals' capacity for emotion regulation. Individuals who experience greater difficulty with emotion regulation may remain in a self-oriented focus when witnessing human suffering. Since witnessing human suffering may induce some degree of sadness, fear, or anger, those who are less able to regulate this distress are often motivated to alleviate their own distress through avoidance behaviors (self-oriented) as opposed to prosocial behaviors (other-oriented) (De Castella et al., 2018). We aimed to understand if awe influenced empathic concern, particularly for those who experience greater emotion regulation difficulty and may typically avoid others in distress. In contrast, less emotion regulation difficulty may allow for easier regulation of personal distress, providing the opportunity to experience other-orientation and the potential for prosociality. As these individuals experience less difficulty regulating their own distress, we believed experiencing awe would still be beneficial but to a lesser degree than those

who experience greater difficulty. We tested whether exposure to awe promoted prosocial behavior differently based on emotion regulation difficulty (see Appendix I: Figure 2).

In order to investigate how empathic concern and emotion regulation impact the effect of awe on prosociality, we randomly assigned participants to watch a video of awe (or not). Next, a vignette/ picture displayed an example of human suffering and participants rated their subsequent empathic concern towards the needy other. Participants completed demographics questionnaires and were asked to make a prosocial decision (or not). Separately, emotion regulation difficulty was measured. We induced awe (or not) using brief videos (nature video vs. control video). Participants indicated their empathic concern after viewing an image and vignette describing an example of human suffering (e.g., flash flood destruction), and then were provided the opportunity to act prosocially (by donating money to a charitable organization) or more selfishly (by entering a raffle for an iPad). First, we hypothesized that for all participants, empathic concern would mediate the relationship between awe and prosociality. Second, we hypothesized that emotion regulation difficulty would moderate the relationship between awe and prosociality such that the effect of awe on prosocial behavior would be stronger at higher levels of emotion regulation difficulty.

Method

All research questions, hypotheses, materials, and analytic plan have been pre-registered and are accessible on the Open Science Framework (OSF; https://osf.io/t8p6j/). Our SPSP 2023 conference poster and thesis documents are also available through the OSF project link.

Participants

To determine our required sample size, we conducted an a priori power analysis using G*Power ($\alpha = .05$) specifying 80% power and a small effect size ($f^2 = .04$). This effect size estimate was chosen based on prior literature that utilized a dichotomous (self vs other) prosocial dependent measure and found a medium effect ($d = .64$) with a smaller sample size (Castelo et al., 2021). Our power analysis yielded a sample size of approximately 200 participants to provide the power to detect a small effect. Therefore, we recruited 304 participants via SONA to receive research credits for 10 minutes of participation in an online Qualtrics study. Participants were primarily Caucasian (75.67%), female (76.81%), and between the ages of 18 to 20 (73.76%) (see Appendix I: Tables 1-6 for breakdowns).

Stimuli

We selected stimuli based on an initial study (see Appendix F), in which we tested the degree to which four videos (see Appendix A for descriptions) elicited awe. In this initial study, participants viewed one of the four awe videos and completed the Awe Experience Scale (AWE-S; Yaden et al., 2019) (Appendix C). Of the four videos tested, the video that evoked the most awe (and thus was chosen as the Awe condition stimulus) depicts vast landscapes including mountains, trees, and waterfalls for 2.26 minutes. Additionally, participants were shown one of four control videos, which were selected to not evoke awe, and then completed the AWE-S a second time. Of the four control videos, the least awe-inducing video (and thus was chosen as the Control condition stimulus) shows a man explaining multiple methods to repair various types of drywall damage for 2.56 minutes. Importantly, the awe video ($M = 4.23$, $SD = 1.06$) evoked a significantly greater amount of awe than the control video ($M = 2.12$, $SD = 0.64$), $t(42) = 7.16$, $p < .001$.

The initial study also tested the degree to which four stimuli depicting human suffering (Appendix B) could induce empathic concern. Participants each reviewed one of five (including one control) images accompanied by a vignette describing the scenario. Participants next rated the degree to which they experienced empathic concern based on Batson's Empathy Adjectives (Batson et al., 1988). We compared the mean scores of the 6-item survey to determine which stimulus elicited the highest empathic concern compared to the control stimulus (which depicted a man walking along the sidewalk). The stimulus depicting a woman carrying a toddler during a destructive flash flood resulted in significantly higher ratings of empathic concern ($M = 4.15$, $SD = 0.97$), compared to our control stimulus ($M = 2.39$, $SD = 0.87$), $t(27) = 3.84$, $p < .001$ and was thus chosen for the current study.

Measures

Measures included the Difficulties in Emotion Regulation Scale (DERS-18; Victor & Klonsky, 2016), Batson's Empathy Adjectives to assess empathic concern (Batson et al., 1988; Appendix D), a demographics questionnaire (Appendix H), and a prosocial decision.

To measure emotion regulation, we presented participants with a shortened version of the highly reliable (Cronbach's $\alpha = .91$) Difficulties in Emotion Regulation Scale (DERS-18; Victor & Klonsky, 2016) (Appendix G), which includes 18 items such as: "When I am upset, I have difficulty controlling my behaviors," rated as 1-almost never, 2-sometimes, 3-about half of the time, 4-most of the time, 5-almost always. Items 1, 4, and 6 require reverse coding prior to computing composite scores for each participant, which can range between 18 and 90, with higher scores indicating greater difficulty with regulation.

Empathic concern was assessed using Batson's Empathy Adjectives (Cronbach's $\alpha = .91$; Batson et al., 1988; Batson et al., 2007). Participants rated the degree to which they experienced

sympathy, softheartedness, warmth, compassion, tenderness, or were moved on a 1 (not at all) – 7 (extremely) scale. We computed an average score for each participant.

Participants also completed an attention check. Participants were asked to choose the picture that best represented the video they watched previously. Three images were depicted for each condition. The screenshot image from the awe video displayed mountains, with failed check images picturing a volcano and beach scene. The image from the control video displayed a drywall patch, with failed check images including painting and mixing plaster. Participants who failed the attention check were removed prior to analyses (N = 31).

A brief demographics questionnaire asked for participants' age, sex, gender, and racial identity (Appendix H). Demographics information was only used for descriptive purposes and was therefore not included in the statistical models.

To measure prosocial behavior, participants completed a prosocial decision similar to the one used by Castelo and colleagues (2021). Participants were provided the option of (hypothetically) donating $3.00 to charity or could instead opt to be entered into a raffle for themselves for the chance to win an iPad. Consistent with Castelo and colleagues (2021), we provided the same (hypothetical) options. Despite the donation only being for $3, Castelo's team (2021) did not find support for ceiling effects (83% of participants in the experimental condition and 52% of participants in the control condition chose to donate). This task provides the option of performing an other-oriented behavior or a self-oriented action.

Procedure

Participants were recruited via SONA and compensated with research credits. After signing up for the study through SONA, participants were asked to carefully read and complete

the Qualtrics survey which first displayed the informed consent, followed by the DERS-18 (Victor & Klonsky, 2016).

After participants completed the DERS-18, Qualtrics randomly assigned participants to either an awe inducing or control video clip. We asked participants to adjust their volume accordingly, enable Fullscreen for best viewing capability, and carefully attend to the video. In the awe condition, participants viewed a video depicting natural scenery (see Appendix A for video descriptions). In the control condition, participants viewed a video clip explaining various ways to repair drywall. Qualtrics had a built-in 2-minute timer to prevent participants from skipping through the videos. After the video, participants were instructed to carefully attend the stimuli depicting human suffering and then complete Batson's Empathy Adjectives (Batson et al., 1988; Appendix D). Next, participants completed an attention check measure and brief demographic questionnaire which acted as a buffer between the stimuli and the prosocial decision, consistent with the methodology of Castelo and colleagues (2021).

Lastly, participants were prompted to make a prosocial decision, as they were asked to indicate whether they would like to choose to either donate to charity or be entered into a raffle for the chance to win an iPad. At the end of the study, participants were debriefed, provided research credits, and were thanked for their time.

Results

Exclusion Criteria

The full dataset included data from 304 participants. The current study excluded 10 participants for failing to complete the study. Additionally, participants were excluded for failing the attention check question (N = 31; 21 failed from the awe condition, 10 failed from the control condition).

Data Preparation

The DERS-18 (Victor & Klonsky, 2016) first required reverse coding items 1, 4, and 6. Then, composite scores for each participant were computed to reflect difficulty with emotion regulation. Higher scores indicate greater emotion regulation difficulty, whereas lower scores indicate less emotion regulation difficulty. Normality, skew, and kurtosis were within the appropriate range (+/- 1.96). Consistent with prior research (Berna et al., 2014) a median split was used to divide participants into two categories indicating high or low regulation ability. The highest 50% of scores (ranged 45-80, M = 54.68, SD = 8.13) indicated participants with the most emotion regulation difficulty from our sample and will be labelled as LERs (Low Emotion Regulators). Thus, the lowest 50% of scores (ranged 20-44, M = 35.28, SD = 5.78) represent participants with the least difficulty with emotion regulation and will be referred to as the HERs (High Emotion Regulators). These groups were dummy coded as 0 (LERs) or 1 (HERs).

We computed an average empathic concern score for each participant using their responses to the six adjectives (Batson et al., 1988; Appendix D). Normality, skew, and kurtosis were within the appropriate range (+/- 1.96).

Participants were coded to indicate which condition they were assigned: control (0) or awe (1), as well as which decision was made: self-oriented (0) or prosocial (1). Descriptive statistics are reported for demographic information including race, class, sex, and gender (see Appendix I: Tables 1-6).

Analyses

Research Question 1: Does Empathic Concern Mediate the Awe to Prosocial Relationship?

The first goal of the current study was to investigate whether empathic concern mediated the effect of awe on prosocial behavior (see Appendix I: Figure 3). A binary logistic regression

was conducted in R using the Lme4 package (Bates et al., 2015). First, our independent variable of condition (0: control video, 1: awe video) was entered into the regression to assess the influence of awe on our dependent variable, prosocial decision. We predicted that the total effect (path c) of video condition (control: 0, awe: 1) would positively predict prosocial decision (self-oriented: 0, prosocial: 1). The regression results indicated that condition did not predict prosocial decision in the current sample, $\chi^2 = 0.62$, $p = .43$, OR = 0.82, 95% CI [0.50, 1.35]. Because the direct pathway between the awe (or control) did not predict our dependent variable of prosocial decision (donate or enter raffle), we failed to meet the first precondition for testing mediation effects (Preacher & Hayes, 2004).

Additionally, empathic concern was not predictive of prosocial decision in our study, $\chi^2 = 0.01$, $p = .92$, OR = 0.99, 95% CI [0.63, 1.20]. The awe condition had similar empathic concern scores ($M = 4.84$, $SD = 1.24$) to the control condition ($M = 4.76$, $SD = 1.32$; $t = 0.50$, $p = .62$).

Research Question 2: Does Emotion Regulation Moderate the Awe to Prosocial Relationship?

Our second research goal was to investigate whether an individual's emotion regulation ability moderates the effect of awe on prosociality. Although we expected that greater awe would lead to more frequent prosocial decisions, we also predicted that participants' ability to emotionally regulate could change this effect. Of the participants who were in the awe condition (n = 124; 68 were in the HERs group; 56 in the LERs group), 68% (46 out of 68) of the HERs group chose to donate compared to 59% (33 out of 56) of the LERs group. Of the participants who were in the control condition (n = 139; 69 were in the HERs group; 70 in the LERs group), 55% (38 out of 69) of the HERs group chose to donate compared to 63% (44 out of 70) of the LERs group (see Appendix I: Chart 1). A Chi-square Test of Independence revealed that the

difference between groups across conditions was not significant, $\chi^2 = 1.18$, $p = .28$. Thus, emotion regulation did not moderate the effect of awe on prosociality.

Lastly, we explored the difference in empathic concern ratings based on DERs group. Although participants in the LERs group rated empathic concern marginally higher ($M = 4.93$, $SD = 1.27$) compared to those in the HERs group ($M = 4.67$, $SD = 1.29$), the difference was not significant, $t = 1.70$, $p = .09$. We also explored whether there was a significant difference among empathic concern ratings within each emotion regulation group. For those in the LERs group that viewed the control video ($M = 4.91$, $SD = 1.33$) versus those in the LERs group that viewed the awe video ($M = 4.96$, $SD = 1.18$), there was no significant difference in empathic concern rated, $t = -0.19$, $p = .85$ For those in the HERs group that viewed the control video ($M = 4.60$, $SD = 1.30$) versus those in the HERs group that viewed the awe video ($M = 4.74$, $SD = 1.30$), there was no significant difference in empathic concern rated, $t = 0.63$, $p = .53$.

Discussion

The goal of the current research was to more clearly understand the influence of awe on prosocial behavior by considering the impact of empathic concern and emotion regulation. Specifically, we predicted that the transcendent properties of awe would enhance feelings of empathic concern towards a needy target, and thus would promote greater prosocial behavior. Therefore, we hypothesized that empathic concern would mediate the relationship between awe and prosocial behavior. Further, we hypothesized that emotion regulation difficulty would moderate the relationship between awe and prosocial behavior. Despite the vast literature supporting these predictions, the results of the current study did not support our hypotheses. More specifically, we did not find a direct effect of awe on prosocial behavior nor an effect of empathic concern on prosocial behavior. Additionally, our hypothesis of emotion regulation as a

moderation between awe and prosocial behavior was not supported. We discuss the possible explanations, limitations, and future directions of this work.

Recent research demonstrates the effect of awe on prosocial behaviors (Bai et al., 2017; Castelo et al., 2021; Keltner & Piff, 2020; Piff et al., 2015). One potential explanation for why we did not find a significant effect of awe on prosocial behavior is recruitment method. For example, Castelo and colleagues (2021) demonstrated that convenience sampling by surveying people before or after a nature walk significantly predicted their likelihood of donating, such that those who participated after the nature walk were more likely to choose the donation option over a self-oriented raffle than participants surveyed before the walk. The current study utilized a similar prosocial measure adapted for online use and was unable to provide additional support for these findings. Perhaps the effects seen in Castelo and colleagues (2021) were specific to individuals who chose to interact with and walk in nature. Similarly, a daily diary study revealed that participants who reported experiencing greater awe on a daily basis indicated more self-diminishment (Bai et al., 2017; Stellar et al., 2018). Further, when participants were conveniently sampled from either a national park or a wharf, those at the national park rated greater awe and indicated less self-salience than those at the wharf (Bai et al., 2017). Given our participants were not recruited from awe inducing locations (nature walks, or national parks), perhaps there is something inherently different about the people within these samples compared to our own sample.

The presence of a researcher could be another possible explanation for the differences in findings between the current study and the prior work. Castelo and colleagues (2021) approached participants in a parking lot and asked them to complete a study on paper, whereas our sample completed the study online without an experimenter present. Other in-lab studies involve

researcher interaction and presence during testing as well (Berry et al., 2018; Guan et al., 2019; Stellar et al., 2018). The presence of a researcher could make participants more likely to donate due to social desirability. Even if participants knew their decisions would be private, they may be more likely to donate in the presence of another person as prosocial behavior can be prompted by weak social cues. For example, a series of three dots arranged to represent a face (a nose and two-eyes) is sufficient enough to demonstrate an effect on prosocial behaviors (Rigdon et al., 2009). Our participants may have taken comfort in some degree of anonymity suggesting that they may have been more likely to act in favor of themselves and thus may have been more likely to choose the self-oriented option as opposed to an other-oriented prosocial (Franzen & Pointer, 2012).

Another important consideration is the method used to elicit awe and measurements used to assess awe. It is important to note that some research supporting the awe to prosocial relationship has used measures of dispositional awe (Guan et al., 2019; Jiao & Luo, 2022; Piff et al., 2015; Stellar et al., 2018) or used cross-sectional designs to investigate awe's influence on prosocial behavior (Jiao & Luo, 2022). Dispositional, or trait-like awe, describes how awe prone someone might be but may not provide the same results as experimentally induced, momentary awe. Additionally, it is important to note the various induction methods used to elicit awe including participants looking up at trees, recalling experiences of awe, being at a national park, or walking in nature (Bai et al., 2017; Castelo et al., 2021; Piff et al., 2015). It is likely that being physically present in a naturally awe-inducing environments, such as looking out over a national park, would elicit a stronger effect of awe than a short video clip (Bai et al., 2017; Castelo et al., 2021). Despite one study supporting the evocativeness of awe-inducing video clips (Piff et al., 2015), this induction method did not support changes in empathic concern or prosocial behavior

beyond baseline in the current study. Future research might consider assessing the differences between dispositional awe and state awe.

We believe it is also important to address the type of prosocial measures that have supported the awe to prosocial relationship. Studies that have supported a relationship between awe and prosocial behavior utilize an assortment of prosocial measures such as dictator games to distribute raffle tickets or money (Piff et al., 2015), large range donation scales from 0 to $100 which provide a great deal of variability (Guan et al., 2019), writing letters to targets (Berry et al., 2018), counting the number of pens participants help pickup (Piff et al., 2015), or relied on prosocial tendency measures (Jiao & Luo, 2022). Self-report prosocial measures may include items that do not necessarily capture prosocial behavior such as asking about likelihood of someone helping a neighbor to shovel snow or how likely they are to offer transportation to strangers (Baumsteiger & Sigel, 2019). The current study implemented a prosocial decision to assess whether participants would be more likely to actually make a decision to help others over the chance to win something for themselves.

It is important to consider the type of prosocial measurement used and how the effects may vary. The current study offered participants a choice between donating money to a person focused charity or they could be entered for the chance to win an iPad (Castelo et al., 2021). Although Castelo and colleagues (2021) were able to find an effect, we believe participant age and prize meaning might have had an impact. In the prior work (Bai et al., 2017; Castelo et al., 2021; Jiao & Luo, 2022; Piff et al., 2015; Stellar et al., 2018) participants were older than those within our sample (who were all college students). Research has demonstrated that people tend to become more prosocial with age which we think may play a role in prior literature's findings (Bailey et al., 2020). Additionally, when younger people are offered the opportunity to act

prosocially, they are less likely to provide financial help and may opt for other methods of helping instead (Bailey et al., 2020). Regarding prize meaning, it is possible that older populations and those walking in nature for enjoyment may interpret the significance of an iPad differently than our sample. In the current study, it is possible that some participants may have chosen the iPad raffle option as a potential way to fulfill a need as opposed to a desire. According to a survey completed in Fall 2021, (N = 264, out of 1982 students), 45% of the student's report having food insecurity in the last 30 days, 32% reported housing insecurity, and 13% reported insufficient internet/ technology access (Office of Student Life, n.d.). It is possible that some students who indicated the raffle may have had an actual need for a computer or tablet to efficiently complete their coursework which may have influenced their decisions independently of their empathic concern towards a target and may not have captured helping behavior.

Empathic Concern

Recently, the awe to prosocial relationship has been supported with empathy as a significant mediator (Jiao & Luo, 2022). The current study did not find support for awe as a predictor of prosocial behavior or empathic concern. Additionally, we did not find support for the empathy to prosocial link either, however, both our awe and control group reported higher than average empathic concern (above 4 on a 1-7 scale). Decades of research supports a link between empathic concern and prosocial behavior (Batson et al., 1988; Batson et al., 1997; Batson et al., 2007; Berry et al., 2018; Brethel-Haurwitz et al., 2020; Davis, 1980; Penner et al., 2004). However, the measures used to assess helping behaviors vary with varying effects. Previously, we discussed findings from a Cyberball study indicating that empathic concern towards an ostracized (computerized) player was predictive of prosocial behavior as assessed through a written letter and subsequent inclusion in the game (Berry et al., 2018). Although

computerized, participants believe they are engaging with an ostracized target. The interaction that occurs may lead to a greater sense of connectedness, greater empathic concern, and may offer a more difficult escape for distressed participants who might otherwise opt for avoidance. In our study, distressed participants could have disengaged from our stimulus more easily and without continued exposure. Additional research supports that despite successful elicitation of increased empathy, prosocial behavior as measured by a dictator game might not be effective (Lonnqvist & Walkowitz, 2019), indicating that prosocial measurement and recipient description may alter the effects.

As Stellar and colleagues (2017) suggests, the effect of awe may not be as effective in subsequent prosocial actions towards out-group members which may have played a role in our findings. Although we did not explicitly describe race or geographical location, our suffering stimulus depicts a woman presumably of Hispanic origin which may have influenced assumptions of group membership. In one study, simply asking participants to recall a time when they felt distinct or similar to others was enough to play a critical role in influencing prosocial behavior. If after exposure to nature individuals were reminded of a time when they felt separate from others, they were less likely to choose to donate (Castelo et al., 2021) indicating that despite the evidence supporting awe's transcendent properties, something about inviting distinctiveness separates an individual from a broader humanity negating the transcendent properties of awe. It is possible that having participants complete the demographic questionnaire before the prosocial decision may have impacted their decision. It is possible that participants were more likely to consider the target as an outgroup member, minimizing the likelihood of donating.

In another study investigating the influence of group membership on helping, empathic concern was not a predictor for helping outgroup members. Despite group membership (Muslim or German), overall ratings of empathic concern were significantly higher across all participants after viewing a Muslim student struggling versus a German student struggling (Sturmer et al., 2006). Despite the high ratings of empathic concern towards the Muslim student across groups, empathic concern was only predictive of helping for in-group members (Sturmer et al., 2006). Additional work investigating willingness to physically help a needy family member or stranger indicated that empathic concern played a role in decisions to help when the target was a family member but was not predictive of helping towards a stranger (Maner & Gailliot, 2007). Evidence suggests that different neural pathways are activated when witnessing others suffering and that these pathways differ for in-group versus out-group members (Chiao & Mathur, 2010). These findings suggest that although empathic concern may play a role in influencing prosocial behavior, this effect may be limited to in-group members.

To compare the influence of empathic concern on prosocial helping towards family, community members, and strangers, Candelo and colleagues (2018) conducted a series of studies across 11 Mexican villages. Results indicate that empathic concern was predictive of helping family members in a dictator game. However, empathic concern was not predictive of helping behaviors towards strangers *or* community members and participants were less likely to help either of these targets (Candelo et al., 2018). It is important to untangle to what extent group membership plays a role in helping and whether helping is dependent upon the type of prosocial outcome measured. Additionally, it is important to assess whether empathic concern is only predictive of helping behavior towards family members or if there are methods such as awe that might be capable of expanding connectedness beyond familial in-group.

A recent study investigating a series of mediated models explaining the awe to prosocial relationship found that the effect of awe on a variety of prosocial outcome variables differed depending on the recipient (Lutz et al., 2023). After viewing an awe or control video, participants responded to two hypothetical donations (person focused and nature focused) and a proenvironmental behaviors scale. Although awe predicted donations for nature charities and proenvironmental behaviors, awe did *not* predict donations to charities that support people which is consistent with the current work (Lutz et al., 2023). Additionally, a series of mediating variables assessing (1) closeness to community, (2) closeness to Americans, (3) closeness to all of humanity, and (4) connectedness to nature were assessed. Only closeness to community and connectedness to nature fully mediated the models, explaining the link between both awe and nature donation as well as awe and proenvironmental behaviors (Lutz et al., 2023). These findings suggest that awe may have an effect on promoting proenvironmental behaviors and donating to nature focused charities through enhancing connectedness to nature, but also enhancing connectedness to one's community. As connectedness to community was found to fully mediate the awe to proenvironmental relationships, we wonder if awe might help to increase empathic concern towards individuals they directly associate with their local community. We believe that these results indicate that awe may have an influence on how connected people feel to their community but may not always increase connectedness towards those outside of one's community, such as all Americans or all of humanity which may have influenced the current findings. Other studies have found support for cognitive empathy predicting prosocial behavior but were not able to establish the same link for affective empathy. We believe additional research is required to more clearly understand how types of empathy might differentially influence helping behavior. We also believe further investigation is

necessary to parse out to what extent group membership might play a role in prosocial behavior and how awe may differentially influence empathic concern and emotion regulation processing when faced with others in need.

Emotion Regulation

The current study investigated the influence of emotion regulation difficulty on the awe to prosocial relationship. Prior work has indicated that emotion regulation is predictive of prosocial behaviors directly and can be mediated through empathy as well (Benita et al., 2017). Despite prior literature suggesting that emotion regulation difficulty impacts likelihood of empathizing with needy others and influences helping behavior (Blascovich et al., 1999; Palmwood & McBride, 2019; Stevens & Taber, 2021), our results indicated that there was no significant effect of awe on prosocial behavior and that emotion regulation was not a significant moderator. The first consideration is that the current study was underpowered for detecting a difference across emotion regulation groups. Although we conducted an a-priori G*Power analysis, the analysis was conducted for our mediation model and did not consider the moderator. Future work should consider an appropriate sample size to provide enough power to detect an effect.

The next consideration discussed is that our stimuli may not have elicited the desired effect. We consider the possibility that our awe stimulus was not effective at eliciting awe and recommend future work consider stronger awe effects through nature exposure or Virtual Reality. Regarding our suffering stimulus, although participants rated relatively high empathic concern across groups, it is possible that our suffering stimulus was not believable and if discomfort did arise, it may have been more easily managed compared to actual interactions with needy others one might pass on the street for example. The stimulus presented was merely an

image with a brief description of a presumably Hispanic woman and child. It is possible that participants felt distinct from the target which may have made distancing themselves from the target's suffering easier to manage (Scheffer et al., 2021). Furthermore, research suggests that when participants experience personal distress and escaping or avoiding the stimulus is easy, cognitive demand is low and often leads to disengagement from the target, reducing prosocial behavior (Batson et al., 1983; Cameron et al., 2019;). However, when empathy is rated higher than personal distress, helping is more likely despite difficulty of escape (Batson et al., 1983). The current study might have included a measure to assess personal distress to determine whether distress outweighed empathy for individuals with certain degrees of emotion regulation difficulty. Future work might consider ways to implement a more interactive suffering stimuli such as a game where a player becomes ostracized (Berry et al., 2018) or perhaps video calling with a seemingly distressed confederate. This engagement could enhance participant distress through continued engagement with a needy other, offering a more difficult escape and could help to make clear distinctions of helping behavior based on emotion regulation difficulty.

The last consideration discussed pertains to the decision to use a median split to assess differences in emotion regulation difficulty. Although this method has been used successfully in past studies (Berna et al., 2014), a design created to utilize regulation difficulty as a continuous measure may be more effective in shedding light on the relationship between emotion regulation and helping, or even in a tertiary manner to indicate high, low, and moderate difficulty with regulation (Lockwood et al., 2014). Future work might also include measures to assess specific regulation strategies (Grynberg & Lopez-Perez, 2018) or close vs distant instructional approaches (Brethel-Haurwitz et al., 2020). We believe that additional research is necessary to adequately assess the impact of emotion regulation on awe, empathy, and helping behavior.

Limitations and Future Directions

The current study investigated empathic concern as a potential mediator in the awe to prosocial relationship and investigated emotion regulation as a potential moderator. Neither effect was supported in the current work. Despite the strengths of this research, there are certainly also limitations. Specifically, we discuss limitations regarding the stimuli, measurements, and the current sample. First, we consider potential limitations with our stimuli. In considering our awe induction, we relied on a 2-minute video clip to elicit awe. Although this method has been successful in past literature (Piff et al., 2015), as well as in our stimuli testing study, we question the effectiveness of the stimuli in the current study. Additionally, it is possible that our awe induction may have elicited some degree of awe but that the effect of awe may have been regulated and may not have contributed to participant interpretation of the suffering stimulus. It is also possible that even if an effective amount of awe was induced, it may not have led to an increase in empathic concern for the specific case of human suffering we presented to participants or may not have encouraged greater prosocial action beyond baseline, though average ratings of empathic concern were rather high (above 4 on a 1-7 scale). It is also important to note that the current study relied on an awe video that was specifically displaying nature. It is possible that our awe stimulus might have been more successful if we had elicited empathic concern towards the environment and focused on a nature charity, we may see very different results. Furthermore, it is possible that other emotional experiences provoked by people or a person, such as admiration and gratitude might be more effective in enhancing person-focused helping.

Additionally, the suffering stimulus we used to elicit empathic concern was rated as the most effective from our stimuli testing study, it is possible that even if awe was effective, it may

not have been evocative enough to increase connectedness towards the target and thus may not have impacted prosocial decisions as our target may have been considered as an out-group member and empathic concerns were relatively high. Perhaps emphasizing shared characteristics and other similarities might have increased sense of connectedness and may have influenced empathic concern.

Next, we consider limitations with our measurements. One limitation of the current study was that we did not include an awe scale. Incorporating an awe scale would have allowed us to examine the effect of awe more clearly in our study as a manipulation check and could have been used to compare differences more thoroughly between conditions. Furthermore, we chose to utilize a dichotomous self vs other prosocial decision to measure prosocial behavior. Relying on a binary predictor as well as a binary outcome variable did not provide a supportive design in the current study. We do not believe that we were able to obtain enough variability to truly capture group differences. Although we wanted to strictly offer a self-oriented and other oriented-option, other studies have utilized primarily measures of prosocial tendencies or dictator games to assess helping behavior. Future research may consider implementing methods to utilize continuous outcome variables beyond monetary amounts in dictator games and beyond a simple yes or no option to capture response variability to help tease apart differences across various types of prosocial measures. Additionally, future researchers might consider adding additional prosocial outcomes to examine differences based on various recipients across group membership. Furthermore, the current study relied on closed ended self-report measures only. Including measurements for physiological data such as EEG (electroencephalograms), EKG (electrocardiograms), and vagal activity (Reinerman-Jones et al., 2013) or video for facial coding

could offer new insights into these relationships, especially for individuals with less emotion regulation ability who may be less aware of their feelings and how to interpret or express them.

The last type of limitation discussed concerns our sample. The current study recruited college students from a SONA research pool. Recruiting from SONA has been criticized for the lack of data quality these samples often produce. This poor data quality includes components such as a lack of attentiveness, incompleteness, and non-genuine responses (Douglas et al., 2023) as demonstrated by the current study's exclusion of 41 participants for failing to complete the study and/ or failing our attention checks. Other studies have conducted in-lab online studies and have only reported removing participants who experienced technical difficulties. Future studies may consider these methods to potentially avoid some degree of incompleteness or attention check failures.

Additionally, it is important to note that the current study was conducted using a Pacific Northwestern undergraduate sample. The Pacific Northwest is known for its rich natural beauty including an abundance of mountains, forests, and waterways. The natural beauty of the general area may cause people to be less awe prone, or more desensitized to the awe-inducing stimuli presented in a video format. Future research may consider measuring awe-proneness or susceptibility to awe to control for these individual differences. Additionally, future research might consider using methods such as a natural environment for stronger effects or Virtual Reality for a more controlled but potentially effective methodology to induce awe.

Conclusion

The current study did not find support for the direct effect of awe on prosocial behavior. Further, empathic concern did not mediate this effect and emotion regulation did not moderate this effect. Overall, the current research contributes to the literature by providing evidence

contrary to predictions informed by prior work. We believe these findings may help to shed light on discrepancies and potential directions to help unravel the nuances guiding prosocial decision making. For example, we know that group membership plays a role in experiencing empathy and prosocial decision making, but it is possible that *effectively* induced awe can expand this sense of group membership to connect with others more broadly as literature suggests (Jiang & Sedikides, 2021; Keltner & Haidt, 2003; Stellar et al., 2017). Additionally, although different emotion regulation difficulties reported marginal differences in empathic concern and prosocial behavior, we believe that these variables should be further investigated with an appropriate sample size before inferring they have no association. It is important to differentiate the impact of awe and empathic concern on various types of prosocial behaviors whether through monetary donations, letter writing, or proenvironmental behaviors in order to explore the extent of awe's potential effects.

In considering the obtained results, we think that the recipient is of at most importance. The current study attempted to elicit awe in order to promote prosocial decisions towards a charity aimed at helping *people* specifically. Might the effect of awe on empathy and prosocial behaviors be limited to nature focused helping? We believe it is impertinent to assess the effect of awe and empathic concern as it pertains to helping other people and believe that these findings demand replication as prior literature heavily supports these relationships. Additionally, we believe that emotion regulation should be investigated as a continuous moderator in a study with more power to truly determine whether or not a relationship exists. Overall, this research contributes to the current literature by enhancing our understanding of awe, empathic concern, emotion regulation, and prosocial behavior and provides recommendations and considerations for future research to more clearly explore the relationships between them.

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Appendix A: Video clip descriptions

*indicates videos chosen for the current SONA study

Control videos:

Handwashing (2:35)- this video demonstrates the steps of proper handwashing

Tie (2:22)- this video demonstrates how to tie a tie

*Drywall (2:56)- this video from Lowe's shows how to repair drywall with various amounts of damage

Shed (2:56)- this video from Lowe's shows how to build the foundation for a shed.

Awe videos:

L-PE-1 (2:24)- This video compilation depicts vast landscapes including mountains, trees and waterfalls.

L-PE-2 (2:31)- This video compilation depicts vast landscapes including mountains, trees and bodies of water.

L-PE-3 (2:33)- This video compilation depicts vast landscapes including mountains, trees and bodies of water.

*Primal 1 (2:26)- This video compilation depicts vast landscapes including mountains, trees and waterfalls.

Appendix B: Suffering Stimuli

SS_Bodhi

Millions of people around the world lack access to safe drinking water and sanitation. In some areas it can take an hour to get just a bucket of water. Lacking access to water increases risks of disease and death rates. Sadly, increasing temperatures have drastically worsened conditions.

This is Bodhi. Bodhi is the oldest of 4 children and as the oldest is responsible for bringing water home. After walking a mile to the nearest water, and waiting in line for nearly 2 hours, he tries to fill his bucket.

***SS_Maria**

Flash flooding occurs rapidly and with little warning. Within less than 6 hours, the strength and power of these floods can affect river flow, destroy homes and belongings, and cause thousands of deaths each year.

This is Maria. Maria is a single mother to her daughter Maya since her husband died last year. Maria had to save her daughter as their house flooded and destroyed everything they had.

SS_Anastasia

Increasing temperatures and experienced droughts have led to an influx in wildfires. Wildfires can spread rapidly and can be difficult to contain.

This is Anastasia and her son Daniel. They were told to flee their home in the middle of the night as wildfire rapidly approached. In the morning, they returned to find their home and everything in it destroyed.

SS_Mei

Earthquakes occur when tectonic plates in the Earth's crust shift. This can lead to buildings crumbling and can trigger landslides. Landslides occur when rocks, trees, and other debris lose grounding and can cause a great deal of damage and harm.

This is Mei. In the aftermath of a landslide caused by an earthquake, she desperately searches the remains of the elementary school her daughter was attending at the time.

SS_Control_Brandon

Many people rely on walking as a form of transportation. Walking can help reduce air pollution from vehicle emissions. Additionally, walking offers many health benefits such as improving cardiovascular health and immune functioning. Walking can also reduce stress and lower risks of high blood pressure.

This is Brandon. Brandon chose to live downtown to avoid driving as much as possible. He walks to and from work.

Appendix C: AWE-S (Yaden et al., 2019)

Please read the following questions carefully and provide your honest opinion regarding the video clip you saw. There are no right or wrong answers.

1	2	3	4	5	6	7
Strongly disagree	**Moderately disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Moderately agree**	**Strongly agree**

1. I sensed things momentarily slow down
2. I noticed time slowing
3. I felt my sense of time change
4. I experienced the passage of time differently
5. I had the sense that a moment lasted longer than usual
6. I felt that my sense of self was diminished
7. I felt my sense of self shrink
8. I experienced a reduced sense of self
9. I felt my sense of self become somehow smaller
10. I felt small compared to everything else
11. I had the sense of being connected to everything
12. I felt a sense of communion with all living things
13. I experienced a sense of oneness with all things
14. I felt closely connected to humanity
15. I had a sense of complete connectedness

16. I felt that I was in the presence of something grand
17. I experienced something greater than myself
18. I felt in the presence of greatness
19. I perceived something that was much larger than me
20. I perceived vastness
21. I felt my jaw drop
22. I had goosebumps
23. I gasped
24. I had chills
25. I felt my eyes widen
26. I felt challenged to mentally process what I was experiencing
27. I found it hard to comprehend the experience in full
28. I felt challenged to understand the experience
29. I struggled to take in all that I was experiencing at once
30. I tried to understand the magnitude of what I was experiencing

Appendix D: Empathic Concern Scale (Batson et al., 1988)

Please indicate to what degree you are experiencing each of the following states based on the image and description previously displayed.

	1	**2**	**3**	**4**	**5**	**6**	**7**
	Not at all						**Extremely**
Sympathetic							
Softhearted							
Warm							
Compassionate							
Tender							
Moved							

Appendix E: Informed Consent: SONA
Western Washington University
Graduate Thesis in Experimental Psychology
Principle Investigator: Erika Lutz

Researchers
This study is being conducted by Erika Lutz as part of a master's thesis in the Experimental Psychology graduate program under advisors Dr. Annie Riggs (riggsa2@wwu.edu) and Dr. Annie Fast (fasta3@wwu.edu) in the Department of Psychology.

Summary
We are asking you to participate in a research study. Participation is voluntary. The purpose of this form is to give you the information you will need to help you decide whether to participate. Please read the form carefully. You may contact the researcher about anything that is unclear. When we have answered all of your questions, you can decide if you want to participate in the study or not. This process is called "informed consent."

Purpose of this study
The purpose of this study is to understand how the perception of various stimuli informs decision making.

Procedures
Participation in this study is expected to take less than 30 minutes. Participation will include viewing video clips, images, and short stories and responding to a series of questions in a survey. If at any point you are uncomfortable and no longer wish to participate, you may close the survey but we will be unable to provide research credit as we will not be able to identify who closed the survey. SONA will be set-up to auto-grant credit upon completion.

Risks/ Discomfort
It is possible that while viewing stimuli, you may experience some personal distress. If you should become too upset or uncomfortable, you may terminate the study. If you experience any distress, you are encouraged to seek services from the Western Washington University Counseling Center. More information is available at https://cwc.wwu.edu/.

Alternatives to Participation
Students not wanting to participate in this research can earn credit alternatively through other studies offered or through an assignment provided by their course instructor.

Benefits of Participation
You may have a better understanding of the research process in psychology.

Compensation

The study is expected to take less than 30 minutes to complete. You will be compensated with .5 SONA research credits for your participation.

Financial Conflict of Interest:

There are no financial conflicts of interest among any of the researchers involved in this study.

Data Security and Protections

We take every precaution to protect your data, though no guarantee of security can be absolute. You will be assigned an ID number for this study, which will be used to label your data. Data will be kept indefinitely and stored on a secure server. There are also times when studies are reviewed by Western Washington University to make sure that they are being conducted safely. In the event that this occurs, the reviewers will be responsible for protecting your information.

Your name and email address will be collected for this study but will be kept separately from the data and will not be linked to your responses. As such, once data has been collected, you will not be able to withdraw the data, as we will have no way to verify your entry.

Research Participant Rights

If you have any questions about this research, you may contact Erika Lutz, whose contact information is listed below. If you have any questions about your rights as a research participant, you can contact the Western Washington University Office of Research and Sponsored Programs (RSP) at compliance@wwu.edu or (360) 650-2146

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You may save or print a copy of this consent form directly from this page if you wish to have one for your records.

Approval

By clicking "I agree to participate" below and continuing with the survey, you are indicating that you consent to participating in the study. By doing so, you agree that you can read and understand English, have read the information provided, and understand that participation is voluntary.

Appendix F: Stimuli Testing

Prior to running the proposed study, a study was conducted to assess the evocativeness of stimuli. Piloted stimuli included: four video clips designed to induce awe and four control video clips (not designed to induce awe) (video clip descriptions in Appendix A), and four vignettes with corresponding pictures depicting human suffering and one control vignette and picture not depicting human suffering (Appendix B).

Participants

Participants were undergraduate psychology students at a Pacific Northwestern university. Although 119 students signed up to participate, data was only collected for 110 (N=110). The nine students whose data was not recorded were removed before analysis.

Stimuli

Awe has typically been evoked through exposure to vast, natural landscapes. We located and agreed upon video clips that showed sweeping mountains, towering trees, or grand canyons. Videos were not considered if humans were present. All videos were accompanied by uplifting instrumental background music. In addition to the four awe inducing videos, researchers decided on four control (non-awe inducing) stimuli. These videos demonstrated procedural information for task completion (i.e., tying a tie, or repairing drywall) (See Appendix A for all video descriptions). All videos were between two and three minutes long.

Witnessing human suffering may provide opportunities for empathic concern. We chose four images depicting humans suffering due to natural conditions (i.e., forest fire, or flash flood) and created brief vignettes to introduce the focal person and explain their scenario (Appendix B). These stimuli aimed to induce empathic concern. As a control to the suffering stimuli, one

vignette was created to describe a neutral scenario depicting a man casually walking along a sidewalk.

Measures

A 30-item awe scale (AWE-S) (Yaden et al., 2019) (Appendix C) was used to assess the evocativeness of our video stimuli. Items such as "I sensed things momentarily slow down" were rated along a 1-7 scale with labels from strongly disagree, to strongly agree.

Empathic concern was measured according to Batson's descriptive ratings (Appendix D; Batson et al., 2007) to assess how evocative our suffering/control stimuli (image/vignettes) were. The items: sympathetic, softhearted, warm, compassionate, tender, and moved were rated along a 1-5 scale with anchors not at all to extremely (Batson et al., 2007).

Procedures

A Qualtrics survey was distributed via a Pacific Northwestern university's SONA research pool. After consenting, participants were randomly assigned to watch either one of the four awe inducing or one of the four neutral video clips and complete a measure of awe (Yaden et al., 2019). Participants then viewed one of the four suffering stimuli (or the control stimulus) and rated to what degree they experienced empathic concern (Batson et al., 2007). Lastly, participants viewed a video from the opposite awe or neutral condition and completed the same awe measure. Participants were thanked and compensated with research credits.

Pilot Study Results

Results from the pilot study suggested that our most awe inducing stimulus (M = 4.23, SD = 1.06), was statistically significantly different from our best control video (least awe inducing) (M = 2.12, SD = 0.64), $t(42) = 7.16$, $p < .001$. Thus, these stimuli were decided on as the awe inducing and control videos for the subsequent study.

Results from the pilot study also suggested that our most evocative suffering stimulus (M = 4.15, SD = 0.97), was statistically significantly different from our control stimulus (M = 2.39, SD = 0.87), $t(27) = 3.84$, $p < .001$. Thus, our suffering stimulus was determined for the subsequent study.

Appendix G: Difficulties in Emotion Regulation Scale (DERS-18) (Victor & Klonsky, 2016)

ANSWER SCALE:

Almost never				Almost always
1	2	3	4	5

1. I pay attention to how I feel. (A) (-)
2. I have no idea how I am feeling. (C)
3. I have difficulty making sense out of my feelings. (C)
4. I am attentive to my feelings. (A) (-)
5. I am confused about how I feel. (C)
6. When I am upset, I acknowledge my emotions. (A) (-)
7. When I am upset, I become embarrassed for feeling that way. (N)
8. When I am upset, I have difficulty getting work done. (G)
9. When I am upset, I become out of control. (I)
10. When I am upset, I believe that I will remain that way for a long time. (S)
11. When I am upset, I believe that I'll end up feeling very depressed. (S)
12. When I am upset, I have difficulty focusing on other things. (G)
13. When I am upset, I feel ashamed with myself for feeling that way. (N)
14. When I am upset, I feel guilty for feeling that way. (N)
15. When I am upset, I have difficulty concentrating. (G)
16. When I am upset, I have difficulty controlling my behaviors. (I)
17. When I am upset, I believe that wallowing in it is all I can do. (S)

18. When I am upset, I lose control over my behaviors. (I)

NOTE:(-) denotes item to be scored in reverse fashion

Subscales: A Awareness, C Clarity, G Goals, I Impulse, N Nonacceptance, S Strategies

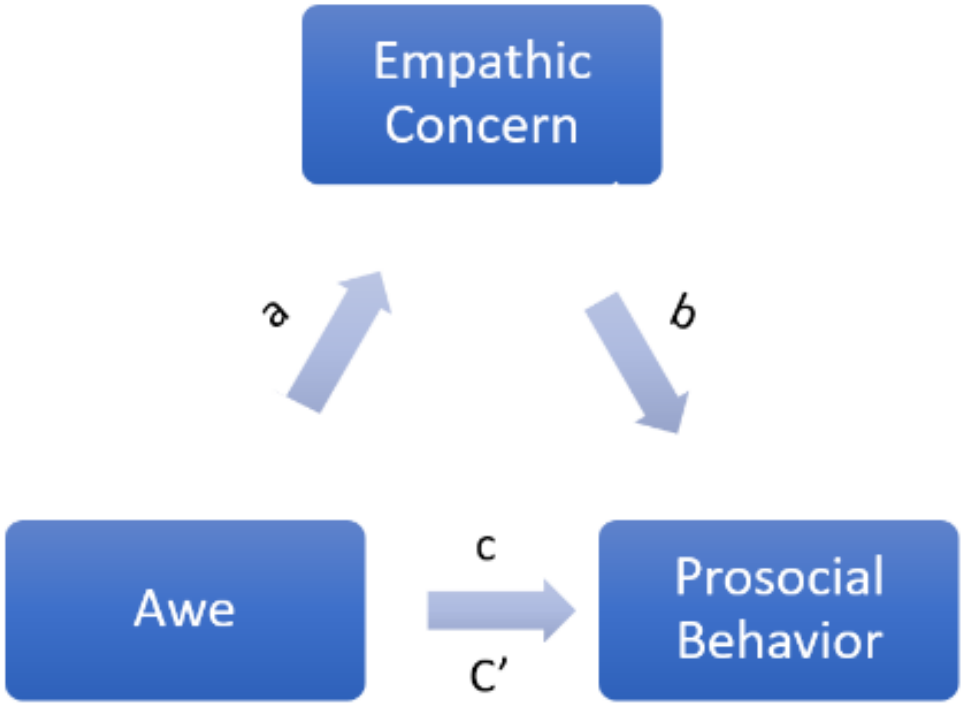
Appendix H: Demographic

1. How old are you? _____
2. What racial identity do you identify most closely with?
    a. Black/ African American
    b. White/ Caucasian
    c. Hispanic
    d. Asian
    e. American Indian/ Native
    f. Pacific Islander
    g. Biracial
    h. Other: _____
3. What sex do you most identify with?
    a. Female
    b. Male
    c. Other: _____
4. What gender do you most identify with?
    a. Man
    b. Woman
    c. Non-binary
    d. Transgender
    e. Other: _____
    f. Prefer not to disclose

Appendix I: Figures, Charts, and Tables

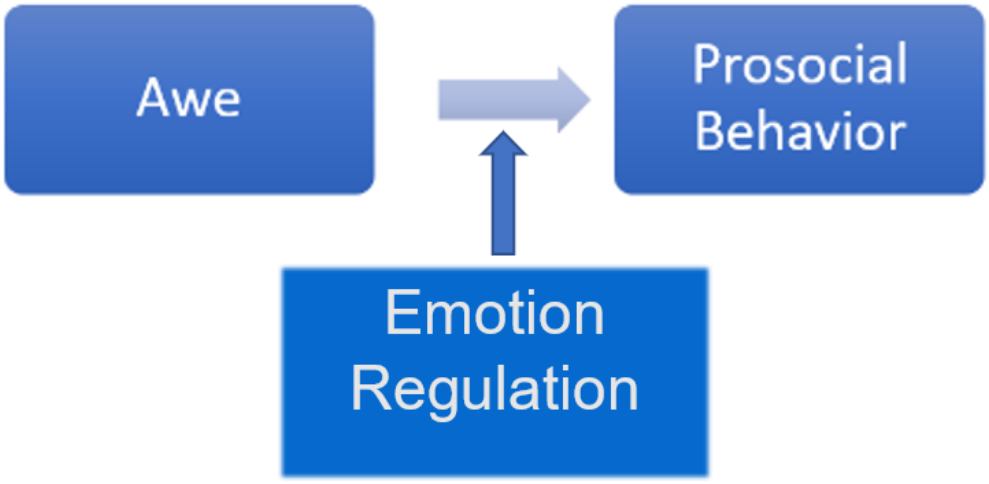
Figure 1.

Proposed Mediation Model



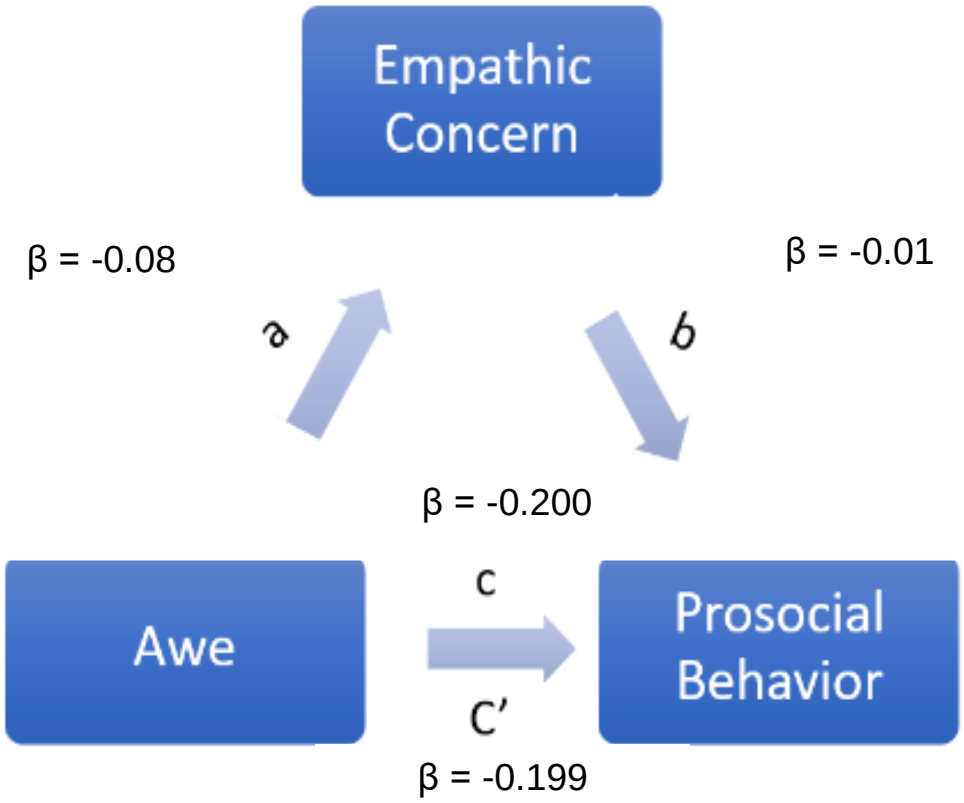
Note. Figure 1 displays the proposed mediation model where awe (awe: 1, or control video: 0) was hypothesized to predict prosocial behavior through the direct (c) pathway. We proposed empathic concern as a mediating variable between awe (path a) and prosocial behavior (path b).

Figure 2.
Proposed Moderation Model



Note. Figure 2 displays the proposed moderation model where awe (awe: 1, or control video: 0) was hypothesized to predict prosocial behavior through the direct pathway. We proposed emotion regulation as a moderating variable between awe and prosocial behavior.

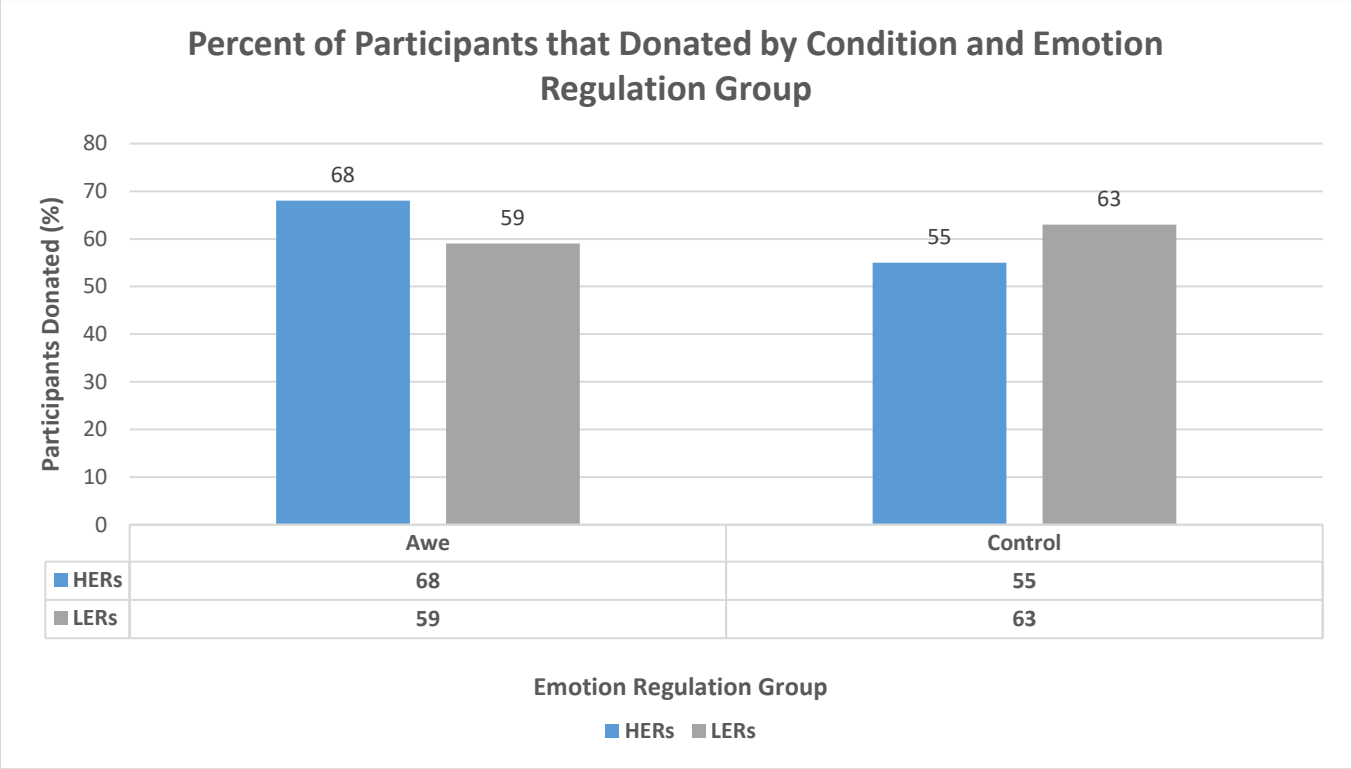
Figure 3.
Proposed Mediation Model with Beta Weights



Note. Figure 3 displays the current mediation model where awe (awe: 1, or control video: 0) did not significantly predict prosocial behavior through the direct (c) pathway. We proposed empathic concern as a mediating variable between awe (path a) and prosocial behavior (path b). Empathic concern was not predictive of prosocial behavior and awe did not predict empathic concern. All pathways were non-significant. All Beta Weights are included and were all non-significant.

Chart 1.

Bar Chart Depicting Donations (%) by Condition and Emotion Regulation Group



Note. Chart 1 displays a bar chart displaying the percentage of participants who chose to donate based on video condition (awe or control) and emotion regulation group (HERs or LERs).

Table 1.
Participants Demographics by Condition

Condition	Total
Awe	**124 (47.15%)**
Control	**139 (52.85%)**
	263

Note. Table 1 displays the percentage of participants in each condition.

Table 2.
Participants Demographics by Sex

Sex	Total
Female	**202 (76.81%)**
Male	**57 (21.67%)**
Other	**3 (1.14%)**
Total	**263**

Note. Table 2 displays the percentage of participants by reported sex.

Table 3.
Participants Demographics by Gender

Gender	Total
Male/ Man	**49 (18.63%)**
Female/ Woman	**178 (67.68%)**
Non-binary	**22 (8.37%)**
Transgender Male/ Man	**3 (1.14%)**
Other	**10 (3.80%)**
No disclosure	**1 (0.38%)**
Total	**263**

Note. Table 3 displays the percentage of participants by reported gender.

Table 4.
Participants Demographics by Age

Age in years (M +/- SD)	
Age range in years	**Total**
18-20	**194 (73.76%)**
21-23	**56 (21.29%)**
24-26	**7 (2.66%)**
27-29	**2 (0.76%)**
30-32	**2 (0.76%)**
33+	**2 (0.76%)**
Total	**263**

Note. Table 4 displays the percentage of participants based on age.

Table 5.
Participants Demographics by Class Standing

Class	Total
Freshman	**74 (28.24%)**
Sophomore	**72 (27.48%)**
Junior	**87 (33.21%)**
Senior	**28 (10.69%)**
Graduate Student	**1 (0.38%)**
Total	**262**

Note. Table 5 displays the percentage of participants based on class standing.

Table 6.
Participants Demographics by Race

Race	Total
American Indian/ Native	**2 (0.76%)**
Asian	**15 (5.70%)**
African American/ Black	**5 (1.90%)**
Hispanic	**17 (6.46%)**
Middle Eastern	**6 (2.28%)**
White/ Caucasian	**199 (75.67%)**
Biracial	**15 (5.70%)**
Other	**4 (1.52%)**
Total	**263**

Note. Table 6 displays the percentage of participants by reported race.