Guilt Underlies Compassion Among Those Who Have Suffered Adversity

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Abstract

Feelings of guilt can often result from the onset of adverse life events. Although guilt is often linked to psychological dysfunction, emerging findings suggest that it can also act as a powerful moral force in motivating compassion. Yet, little work has been done to examine how guilt, as a function of surviving past adversity, can affect people's propensity to feel compassion towards others. In 3 studies ($N = 350$), we examined if the emergence of guilt tendencies that result from having experienced adversity can foster increased compassion toward others in need. Replicating past work, we find across these studies that people who have suffered more adversity show a greater propensity to respond compassionately to the suffering of others. Of import, we provide novel evidence identifying feelings of guilt as a central mechanism that mediates the positive link between adversity and compassion.

Keywords: compassion, guilt, adversity, suffering

The emotion of guilt can powerfully shape the way people behave toward one another (Cohen, Panter, & Turan, 2013; Tangney, Stuewig, & Mashek, 2011). Although guilt is defined as an aversive self-conscious emotion that arises when one has violated a personally relevant moral or social standard and is often invoked as a response to a belief that one's actions have caused or not prevented harm to others (Kugler & Jones, 1992; Strelan, 2007), its downstream behavioral consequences can be positive as well as negative (e.g., Clement et al., 2015; Tangney, 1993; Tangney, Burggraf, & Wagner, 1995; Williamson et al., 2020).

In many cases, it is certainly true that the effects of guilt can be problematic, leading to psychological dysfunction (Clement et al., 2015; Williamson et al., 2020). Guilt is a key feature in disorders such as major depression (Cohen et al., 2011; Ghatavi, Nicolson, MacDonald, Osher, & Levitt, 2002; Jarret & Weissenburger, 1990), and obsessive-compulsive disorders (Niler & Beck, 1989; Shafran, Watkins, & Charman, 1996). Moreover, feelings of guilt are often associated with the onset of traumatic events. For example, feelings of guilt are a reliable predictor of posttraumatic stress symptoms following experiences of events such as child abuse, victimization, and violence (Owens et al., 2009; Gibson & Leitenberg, 2001; Street & Arias, 2001; Street, Gibson, & Holohan, 2005). In fact, much of the research literature in this domain has focused on the negative effects of guilt on mental health and social functioning within the context of trauma. To our knowledge, there is little to no extant work examining if guilt that stems from the trials and tribulations of hardship and suffering can also confer benefits that enhance prosociality.

Given that a growing body of research outside of the trauma domain documents the ability of guilt to foster behaviors associated with social acceptability (Haidt, 2003; Tangney,

1993), the role of adversity-induced guilt as a source of prosocial behavior stands as an important question. This possibility is supported by findings showing that the anticipation of guilt often steers people away from immoral behaviors that promote selfish gains (Ahn, Kim, & Aggarwal, 2013; Baumeister, Stillwell, & Heatherton, 1994; Erlandsson, Jungstrand, & Västfjäll, 2016; Vaish, 2018), as well as previous work showing that feelings of guilt can drive empathic tendencies (Basil, Ridgway, & Basil, 2008), and motivate a desire to respond compassionately to others in distress (Hibbert, Smith, Davies, & Ireland, 2007).

Research on life adversity confirms that while some individuals may experience psychological dysfunction as a result of traumatic experiences, some tend to emerge relatively unscathed after facing adverse experiences (Bonanno & Diminich, 2013). In many cases, individuals may even grow from such experiences and develop greater resilience (Seery, Holman, & Silver, 2010), gains in self-esteem, social connection, and feelings of general efficacy (Mangelsdorf & Luhmann, 2018; Woodward & Joseph, 2003). Moreover, an emerging body of research has shown that experiences with adversity may help people develop a greater propensity for prosociality and compassion. In particular, work by Vollhardt and Staub (2011) revealed that past adversity was associated with more prosocial attitudes in response to victims of a natural disaster. Likewise, our own previous work (Lim and DeSteno, 2016), confirmed that individuals who were severely affected by past adversity had higher levels of trait empathy which motivated compassionate responding in the form of charitable giving, and the anonymous helping of strangers in need. Finally, work by Greenberg, Baron-Cohen, Rosenberg, Fonagy, and Rentfrow (2018) has shown that experiences of childhood trauma may lead to long-lasting gains in empathy that persist into adulthood.

Given that one well-documented result of experiencing adversity in life is its association with guilt, we suspect that such feelings of guilt might serve to mediate the established link between adversity and compassion. For example, feelings of guilt are often associated with the onset of traumatic events (Owens, Steger, Whitesell, & Herrera, 2009; Gibson & Leitenberg, 2001) or passing through them while others met a worse fate (Brockner, Davy, & Carter, 1985; Hendin & Haas, 1991). If our suspicion were to prove true, there is reason to suspect that the well-documented increase in compassion shown by those who have experienced adversity (see Lim & DeSteno, 2016, 2020) might be partially driven by tendencies to experience heightened guilt. That is, if witnessing others' suffering evokes greater guilt in those who have experienced past adversity, this guilt might function to increase compassion toward those in distress, given the previously established association between guilt and prosociality (Tangney, 2003; Tangney et al., 2007). Of import, this view could illuminate a principal mechanism to explain why those who have successfully passed through adversity become motivated to care for others in need (Lim & DeSteno, 2016).

The Present Research

To our current knowledge, there is little research examining how guilt, as a sequela of adversity, could potentially lead to enhanced compassion. Therefore, in our current set of studies, we attempted to combine the two silos of research studying adversity-driven guilt, and guilt-driven prosociality to shed light on whether one phenomenon might mediate the other in terms of compassion. That is, while previous work has identified increased empathy as a mediator for the positive link between past adversity and compassionate responding (Lim & DeSteno, 2016), it may well be that feelings of guilt also play a mediating role. In the present studies, we sought to study this possibility, and through experimental manipulation, determine whether the relation is causal

or epiphenomenal. If it is causal, it will identify the negative experience of guilt as a short-term hedonic cost that subserves the potential longer-term benefits of increased compassionate responding by those who have faced adversity in life.

Across three studies, we sought to examine the links between adversity, guilt, and compassion in several ways. In Study 1, we utilized a day-reconstruction experience sampling strategy to assess whether guilt and compassion tend to occur together in participants' normal environs, and to determine if the intensities of these emotions are greater among those who have experienced past adversity in life. While correlational in nature, this tack was essential for providing ecological validity for the proposed model. In Study 2, we sought to replicate the findings of Study 1 using a design with greater internal validity. Here, we assessed the ability of feelings of guilt to mediate compassion to a specific, controlled target. Finally, in Study 3, we sought to more stringently test our causal model by experimentally manipulating guilt in its role as the mediator between adversity and compassion. If guilt truly functions as a mediator, then direct manipulation of it should result in corresponding changes in compassion.

Statement of Transparency and Openness. All three studies were not pre-registered. Access to the data of these studies is available upon request. Measurement and scales that were used in this study are available in the supplemental materials document. All studies were approved by the IRB at Northeastern University, #16-11-30.

Study One

The goals of this study were three-fold: to examine whether guilt and compassion covary in people's daily lives, to examine if the intensities of these emotions were greater among those who have faced past adversity, and to determine whether experiences of guilt could serve as a

mediator for the link between past adversity and increased compassion. To do so, we utilized a day-reconstruction method to assess guilt and compassion over a three-week period. The day-reconstruction method allowed us to obtain ecologically valid data with which to examine these questions in naturalistic settings. Measures of past life adversity were completed following the day-reconstruction phase of the study so as not to influence daily emotion reports.

Method

Participants. We recruited individuals from the community at a large research university in the northeastern region of the United States. Participants were paid $60 for the completion of this study that spanned a three-week period. The study was advertised as one involving research on personality and problem-solving.

Previous investigations linking adversity to compassion produced a medium effect size of $r = .43$ across two studies, indicating an effect size in the moderate to large range (Lim & DeSteno, 2016). However, because we had not explored the impact of guilt prior to this investigation, we decided to use a more conservative estimate of a medium effect ($r = .30$, Cohen's $f^2 = .09$) as a basis for the lower bound of sample size estimation. Using G*power and assuming a two-tailed alpha = .05, power = .80, with two predictors would be achieved by an N = 90. But as we planned to examine some effects for which no reliable previous estimates existed, we sought to recruit as many participants as we could beyond this lower bound given the resources available. The initial sample consisted of 154 participants, which was reduced to a final sample of $N = 125$ (gender: 67.2% female, 32.8% male; age: $M = 18.66$, $SD = 1.63$, range = 18 – 27) when 23 participants dropped out of the study during the 3-week experience sampling component (attrition rate of 15%), and an additional 6 participants were dropped due to excessive missing data for either the adversity measure and/or daily emotion assessments.

Excessive missing data was defined as missing a majority of data, with the typical percent

missing in this group of 6 being 80% or more.

Measures and procedure. There were two phases to this study: (1) a 3-week experience

sampling component that included the day-reconstruction method which captured the day-to-day

emotional life of our participants, and (2) a follow-up survey of individual difference measures.

At the conclusion of the 3-week period, participants also attended another separate lab session

that was part of a different study that was not relevant to the questions or analyses reported here.

Given that this session occurred after all data had been collected for the present study, no issues

of data contamination due to that session are possible.

In the first phase of this study, participants were instructed to complete a daily survey

component for 3-weeks as part of the day reconstruction method using the Qualtrics survey

platform. The purpose of this survey was to track and record the intensity of several emotions

(i.e., feelings of compassion, sympathy, and guilt, along with other distractor items) that our

participants may have experienced throughout the day. Therefore, we scheduled email

notifications to be sent every evening during the entire 3-week assessment period. In the email,

participants received a web link and instructions that facilitated the completion of the survey.

This survey contained a measure of emotion intensity and a series of filler items that probed the

participants about their daily activities (see Supplemental Materials for the full format).

Once participants completed the 3-week day-reconstruction method phase, they

proceeded to the second phase of the study which involved the completion of a short survey of

individual differences. Here, participants were sent another email with a web link to a survey

study on Qualtrics along with the relevant instructions. The primary questionnaire here was a

measure of the severity of past life adversity (Lim & DeSteno, 2016, 2020). However, we also

had participants complete measures of dispositional guilt, shame, and compassion (see Supplemental Materials for exploratory analyses using these measures).

Measure of Daily Emotions. In order to capture participants' day-to-day emotional experiences, we had them complete an emotions measure that captured the intensity of 16 emotions that they might have experienced throughout the day over a period of three (see Supplemental Materials for the complete measure). At the end of each day, the survey would prompt participants to answer the following question: "In the past 24 hours, to what degree have you experienced each of the following states?" Target items were used to measure compassion and guilt. Compassion was measured using two items: (1) "I have felt compassionate", and (2) "I have felt sympathy" which demonstrated excellent internal consistency (Cronbach's $\alpha = 0.91$) in this sample. Feelings of guilt were captured with a single item: "I have felt guilty". All items were rated for intensity on a 7-point Likert-type scale (1 = "Not at all", 4 = "Somewhat", 7 = "Extremely").

Measure of Adversity. As in past work, we utilized a 28-item measure to assess the level of past adversity that our participants experienced (Lim & DeSteno, 2016, 2020; see also Blum Silver, & Poulin, 2014; Poulin, 2006). These items captured adversity across six broad domains: (1) injury/illness, (2) violence/victimization, (3) bereavement, (4) relationships, (5) social-environmental stress, and (6) disasters. Given previous research showing that only severity of past adversity is associated with differences in compassion (Lim & DeSteno, 2016, 2020), we focus here solely on this aspect of past adversity, asking participants to indicate the degree to which 28 adverse life events had a severe impact on them by using a 5-point Likert-type scale (1 = "N/A", 2 = "Barely", 3 = "A little", 4 = "moderately", 5 = "severely").

Descriptive Information. Statistical moments and related distributional information for focal variables in all studies are presented in the supplemental materials.

Results

Given that we had daily measures of both guilt and compassion nested within individuals, averaging the emotion scores across the 3-week period would lead to a problem of non-independence. To address this nesting, we used a multilevel modeling approach to test for the simple and mediating relationships between daily guilt, daily compassion, and adversity. We set the daily emotion responses as level-1 variables (i.e., each day's emotional response nested within participants), and participants' degree of past adversity as a level-2 variable.

In order to test for multilevel mediation in this 2-1-1 model (see Zhang, Zyphur, & Preacher, 2009), we utilized MLmed software (Rockwood & Hayes, 2017). As depicted in Figure 1, results showed a strong relationship between degrees of past life adversity and the intensities of these daily emotional experiences: people who previously suffered from more severe adversity in life tended to experience more intense guilt and compassion on a daily basis.

When we next modeled mediation via guilt, evidence for a strong link between daily intensities of guilt and compassion emerged. Moreover, we found that the direct effect adversity exerted on daily compassion substantially declined, becoming nonsignificant. This fact provided support for our prediction that feelings of guilt might mediate compassion on a daily basis. Using the Monte Carlo method with 10,000 resamples, we tested the statistical significance of this indirect path and found daily guilt to be a significant mediator of adversity's influence on daily compassion, *estimate* = 0.23, *SE* = 0.09, *z* = 2.48, *p* = .013, Monte Carlo 95% CI [.059, .426].

Discussion

Study 1 provided initial support for our hypotheses in multiple ways. First, we observed that guilt and compassion tend to co-occur in daily life, with their intensities tracking one another. Second, we found support for the notion that past life adversity leads to greater intensities of both emotions. And third, we found that adversity-enhanced daily feelings of guilt could serve as a mediator for enhanced daily compassion.

Study 1 also possessed an important limitation, however. For all the benefits to ecological validity it provided, the day-reconstruction sampling approach limited our ability to clearly discern whether the reported compassion and guilt arose in response to the same event. That is, even though we could confirm that both states occurred on the same day, it might well have been the case that for some people, these emotions were evoked by two different events on any given day.

Study Two

Study 2 was designed as a conceptual replication of Study 1, with the primary goal being one of maximizing internal validity by ensuring that guilt and compassion were measured in response to the same stimulus. To accomplish this goal, we exposed participants to a standard compassion-inducing stimulus under controlled conditions (see Cameron & Payne, 2011; Lim & DeSteno, 2020), while assessing their feelings of guilt and compassion in a near-simultaneous manner. We also subsequently measured participants' varying degrees of past adversity to determine whether increasing severities of adversity would heighten guilt and compassion responses. Finally, we sought to replicate the previous finding that guilt could serve as a mediator between adversity and compassion.

Method

Participants. In order to arrive at a minimum sample size estimate that would allow us to achieve a power = .80, we referred to the guidelines laid out by Fritz and Mackinnon (2007) for mediation power estimation. Based on the results of study one, we assumed a medium effect size (HM) for our mediator which required us to have a sample size of $n = 115$ to obtain a power of 0.80 at an alpha level of 0.05. Ultimately, we were able to recruit a sample of $N = 131$ from Amazon's Mechanical Turk (Mturk) based on the resources that we had available. In order for Mturk workers to qualify for our study, they had to have a 98% or higher approval rating with at least a history of 1000 completed Human Intelligence Tasks. Data from 5 participants were removed from the data set due to excessive incomplete responses which resulted in a final sample size of $n = 126$ (gender: 55.6% female, 44.4% male; age: $M = 32.87$, $SD = 11.46$, range = 18 - 55).

Measures and procedure. Participants were recruited from Amazon's Mturk and were redirected to a survey on Qualtrics to participate in the study. After providing consent for their participation in the study, they were shown a presentation about those suffering due to a major conflict in Darfur, Sudan. After viewing the presentation, we measured the participants' emotional states, levels of life adversity, and demographic information. Participants were compensated with $1.00 for the completion of the study upon debriefing.

Compassion Probe. To assess compassionate responding, we used a paradigm developed by Cameron and Payne (2011), that both they and we (Lim & DeSteno, 2020) have previously used to evoke compassion. The paradigm entails having participants view a presentation about the civil war conflict in Darfur. The presented text stated:

> "In the West Darfur region of Sudan, there has been a civil war raging for the past five
> years. The Sudanese government and allied militias have been in intense conflict with

various rebel groups. This conflict has resulted in unchecked violence against civilians,

who have been killed, abducted, or driven from their homes. These civilians suffer from

malnutrition, unsanitary living conditions, and are at risk for a variety of deadly diseases

such as malaria, dysentery, and cholera. Here are pictures of eight children from Darfur."

While reading about the conflict, participants were shown a slide show of eight suffering

children whose pictures were shown back-to-back, one after another. This was modified from the

original method where the pictures of eight suffering children were shown simultaneously. This

paradigm has been shown to induce compassion in previous studies, especially among those who

have experienced adversity (Cameron & Payne, 2011; Lim & DeSteno, 2020).

Emotions Measure. In order to capture the emotions felt by our participants after the

presentation of the compassion probe, we utilized a 17-item emotions measure. This emotions

measure utilized a 7-point Likert-type scale which measured the intensity of the emotional states

(1 = not at all; 4 = moderately; 7 = very much). Compassion was measured using two items "I

feel compassionate" and "I feel sympathetic" which demonstrated good internal consistency in

this sample (Cronbach's α = 0.77). The emotion of guilt was measured using a single item "I feel

guilty.". We also measured positive and negative affect to rule out alternative potential

mediators. We averaged 3 items ("I feel [Pleasant/Good/Happy]") to form a composite score for

positive affect (Cronbach's α = 0.90). To measure negative affect, we averaged 2 items ("I feel

[Sad/Gloomy]") to form a composite score (Cronbach's α = 0.71).

Measure of Adversity. To measure the severity of past adverse life experiences, we

utilized the same measure that was administered in Study 1.

Results

Similar to Study 1, regression analyses revealed that compassion, β = .28, t(124) = 3.27, p = .001, 95% CI [.11, .45], and guilt, β = .24, t(124) = 2.73, p = .007, 95% CI [.07, .41] were both predicted by the severity of past adversity. Additionally, compassion was again associated with guilt, β = .34, t(124) = 4.08, p < .001, 95% CI [.18, .51], again suggesting guilt's viability as a mediating mechanism. In this case, however, we could be certain that the adversity-enhanced intensities of guilt and compassion occurred in response to a single stimulus – one known to evoke compassion.

To support the hypothesis that guilt mediates the positive association between adversity and compassion, we once again subjected the data to a mediational analysis. By including felt guilt as a mediator of the positive association between adversity and compassion, we observed that the direct effect between adversity and compassion was reduced to β = .21, t(123), p = .014, 95% CI [.04, .38], suggesting that guilt was a partial mediator in this case (see Figure 2). A bootstrap estimation procedure for the indirect effect again confirmed the statistical significance of state guilt as a mediator for past adversity's influence on compassion, *indirect effect* = .19, *SE* = 0.08, 95% *Bias-corrected CI* [.05, .38].

We also examined whether negative and positive affect could serve as potential alternative mediators of the direct effect between adversity and compassion. Adversity did not predict differential intensities of positive affect, β = -.12, t(124) = -1.40, p = .166, 95% CI [-.72, .13]. Moreover, positive affect was negatively associated with compassion, β = -.26, t(124) = -3.04, p = .003, 95% CI [-.49, -.10]. Therefore, we found no evidence for general positive affect as an alternative mediator.

Adversity also did not predict differential intensities of negative affect, β = .15, t(124) = 1.66, p = .100, 95% CI [-.07, .81]. Negative affect was positively associated with compassion, β

= .34, $t(124) = 3.98$, $p = < .001$, 95% CI [.18, .54]. But when both guilt and negative affect were included a predictors in a regression model, both guilt, $\beta = .23$, $t(123) = 2.37$, $p = .019$, 95% CI [.03, .36] and negative affect, $\beta = .22$, $t(123) = 2.22$, $p = .028$, 95% CI [.03, .44] independently predicted compassion. However, since adversity did not predict negative affect, negative affect is unlikely to serve as an alternative mediator for its effects on compassion.

Discussion

Study 2 provided a conceptual replication of the findings from Study 1 in response to controlled stimuli. More specifically, we confirmed (1) that both guilt and compassion arise in response to a standardized stimulus previously shown to evoke compassion, (2) that the intensities of these emotions track one another and are positively related to people's experiences of life adversity, and (3) that support exists for guilt to serve as a mediator for the link between adversity and compassion. We were also able to rule out general states of positive and negative affect as alternative mediators.

Nonetheless, the data collected from both Studies 1 and 2 remain correlational in nature. Therefore, although the presented statistical analyses are consistent with causal claims of mediation, the causal chain cannot be firmly established. In Study 3, we sought to address this limitation via direct manipulation of the proposed mediator: guilt.

Study Three

In this study, we set out to establish firm confirmation of guilt's causal role as a mediator. To tease apart whether guilt truly motivates compassion among those who have experienced adversity, we decided to manipulate guilt to observe its downstream effects on compassion. To achieve this, we utilized a confederate-based paradigm involving a staged accident that would

allow us not only to induce guilt and measure compassionate prosocial action, but also to establish the causal direction in which guilt could influence compassionate responding in a highly ecological but controlled environment.

More specifically, we assigned participants to one of two conditions: crash and observer. Participants in the crash condition would open a door and, by so doing, crash into a confederate, causing her work – a set of puzzle blocks arranged into a solution – to crash to the floor and be ruined. Participants in the observer condition would simply see this crash take place. Unlike most situations in which people see someone in distress or in need, only one person could feel guilt here. It was clear which participant was at fault for the crash, and that person would almost invariably immediately apologize. Thus, observers had no reason to feel guilt, either for causing the problem or failing to act to help remedy it. Nonetheless, they could feel compassion upon seeing someone's work ruined.

Our prediction was that in the crash condition, we would replicate the mediational models found in Studies 1 and 2: where guilt served as a mediator for the link between life adversity and compassion. In the observer condition – where we experimentally removed the link between adversity and guilt – we would expect to find an absence of guilt-mediated compassion. That is, because observers would have no reason to feel guilt – it's not as if they could have prevented or remedied the problem by donating money, volunteering to assist, etc. – any subsequent compassion they experienced should be reduced and not mediated by guilt. In addition, the absence of a guilt-compassion link would also argue against any suspicion of reverse causality or third variable effects (i.e., other influences like gender, personality type, etc. that would make people more prone to both guilt and compassion in this situation). That is, if compassion caused

adversity-enhanced guilt, we should not see it reduced when the direct positive link between past adversity and guilt was severed.

Method

Participants. The average effect size observed across all predictor variables in studies one and two was $r = .31$, thereby supporting the validity of using a default measure of a medium effect size ($r = .30$) in earlier calculations to determine sample size. We had originally planned to employ a 2 (Adversity: Low vs. High) × 2 (Condition: Guilt Induction vs. Control [see more below]) ANOVA design. By converting this r to a Cohen's $f = .31$, we arrived at a minimum sample size of 84 participants to achieve a power = .80. Once again, we treated this number as a lower bound and instead recruited as many participants as resources allowed, with the constraint that no data would be analyzed before recruitment ended. We ultimately were able to recruit 118 participants. Given that the manipulation to evoke guilt required precise timing by confederates to simulate an accident (see below), 18 of these manipulations failed, which resulted in no accidents occurring. Therefore, we had a final sample size of N = 100 for the primary analysis (gender: 55.0% female, 45.0% male; age: $M = 19.44$, $SD = 1.95$, range = 18 – 34), resulting in an *a priori* power = .86.

However, after the data collection, it became clear that a superior analytic tack would involve continuing to treat adversity as a continuous variable (as in Studies 1 and 2) and using a moderated mediational model to examine the predicted changes that would come from manipulating the mediator. Therefore, we chose to follow this analytic strategy. The Supplemental Materials presents the moderated mediational model treating adversity as a dichotomous variable split at the median as we had originally planned. The results of both models are consistent.

Measures and procedure. Participants were brought into the lab in pairs along with a research assistant who was a confederate working for us. Participants were under the impression that the study was about cognition and problem-solving. After collecting informed consent, the participants were randomly assigned to complete a filler task that would set up the pretext for an accident that should induce feelings of guilt. Once the accident had been resolved, all participants would be redirected back to their computers to answer an emotions measure, a measure of past adversity, and a demographic questionnaire. At the end of the session, participants were debriefed about the procedures and were told about the true purpose of the study prior to leaving the lab.

Guilt Manipulation. Participants were brought into the lab in pairs and they were randomly assigned to be in the crash condition (i.e., the condition in which they would accidentally crash into a confederate and thus ruin her work) or the observer condition (i.e., control). That is, while the participants in the crash condition believed they directly caused the staged accident, those in the observer condition witnessed the accident from a distance as it occurred.

As participants arrived, they were brought into a lab with a row of four computer cubicles. To orchestrate the staged accident, we utilized 3 out of 4 available cubicles. Participants assigned to the crash condition were seated at the cubicle nearest to the door, to the left, while the confederate was seated in the middle. The participants in the observer condition were seated to the right of the room which was the furthest from the door but had a good view of the doorway for the purpose of witnessing the accident.

When the two participants and confederate were properly positioned in their assigned seats, the experimenter would brief them on their first task. Both participants were told that they

were randomly assigned to complete a Stroop task that would take 10 minutes to complete, while the confederate would be assigned to assemble a series of wooden block puzzles that were designed as brain teasers. The confederate was instructed to complete as many of these puzzle blocks as possible under a time limit and was told to bring the puzzle blocks to the experimenter's office using a tray, which was adjacent to the lab space. The purpose of this timed puzzle block task was to eventually set up an accident where the participant in the crash condition opened the lab door, thereby crashing it into the confederate as she was holding the tray of puzzle blocks while heading to the experimenter's office, resulting in the blocks being scattered throughout the lab.

Once the Stroop task had started, the experimenter would leave the experiment room and wait for the participants to finish the Stroop task at an office located in a separate location. At the conclusion of the Stroop task, the participants in the observer condition were instructed to wait at their desk for further instructions, so as to allow them to witness the accident that was about to happen while the participants in the crash condition were asked to inform the experimenter in the office that they were done with the Stroop task. When the participants in the crash condition stepped out of the experiment room and arrived at the experimenter's office to signal that they were done, the experimenter would bring the participants back into the lab to set up another filler questionnaire that asked about their performance on the Stroop task they just completed. After setting up the filler questionnaire for both participants, the experimenter cued the confederate for the accident by saying:

"Looks like you are almost done with your task, once the timer is up, please bring the puzzle blocks to me. I'll be at the office down the hallway."

At this point, the experimenter exits the room again but closes the lab room door to set the stage for the accident. Once the lab door was shut and the participants were done with the filler questionnaire, the computer would instruct the participants in the crash condition to approach the experimenter once more. This time, as the participants in the crash condition left the lab room to see the experimenter, the confederate picked up the tray of puzzle blocks and slowly made their way to the lab door unbeknownst to the participants in the crash condition. As the participants arrived at the experimenter's office, the experimenter would instruct the participants in the crash condition to head back into the lab. With the confederate already approaching the opposite side of the lab door while holding on to the puzzle pieces on a tray, the crash participants would open the door to re-enter the lab, and thereby cause the door to crash into the confederate's tray of puzzle blocks. The result was a loud ruckus as the puzzle pieces and tray hit the floor, a sound that would gain the attention of the participant in the observer condition.

Once the accident had been resolved, the experimenter approached the confederate just outside of the lab door and engaged in a brief dialog so as to allow the participants to eavesdrop on what was being said:

Experimenter: "What happened?"

Confederate: "I'm sorry but there was an accident as I was exiting the lab and I dropped the puzzle blocks onto the ground."

Experimenter: "Well, that is fine. We still have extra time in this session. Perhaps you could give those puzzles another attempt. I'll come look for you when the time is up."

Confederate: "Okay."

When the conversation was over, the confederate would head back to the computer cubicle to re-attempt the puzzle blocks.

Emotions Measure. To measure the intensity of state emotions felt after being part of the lab accident, we administered a 20-item emotions measure that was similar to the one used in study two (see Supplementary Materials for the full measure). This scale was on a 7-point Likert-type scale (1 = "not at all"; 4 = "moderately'; 7 = "very much"). Compassion was once again measured using the average scores across two items, "I feel compassionate", and "I feel sympathetic", these items demonstrated good internal consistency in the sample (Cronbach's α = 0.77). To improve the robustness and internal consistency of our guilt measure, we averaged the scores of two items "I feel guilty" and "I feel remorseful", these items had good internal consistency (Cronbach's α = 0.70) in our sample.

Measure of Adversity. To measure the severity of past adverse life experiences of our participants, we utilized the same measure that was administered in studies one and two. Participants were asked to rate the severity of their experiences with adverse life events that they may or may not have experienced across six broad domains which were measured over 28 items.

Results

Manipulation check. To determine whether the crash condition caused an increase in guilt, we compared mean guilt intensities across the two conditions. As predicted, those in the crash condition experienced greater guilt than did those in the observer condition (see Figure 3, *t(98)* = 3.22, *p* = .002, *d* = 0.65). Given the skew in the distributions, we also employed a nonparametric analysis that confirmed this basic finding (Mann-Whitney *U* = 836.5, *p* = .003).

Moderated Mediation Analysis. We used PROCESS (version 3.5) to conduct the moderated mediation analysis (model 8). As depicted in Figure 4, experimental condition (i.e., crash versus observer) significantly altered parameters of the mediation model (moderated mediation index = .54, 95% CI [.10, 1.16]. A regression analysis centering predictors at their respective means confirmed the expected interaction between adversity and manipulation condition with respect to feelings of guilt, β = .24, $t(96)$ = 2.54; p = .013, 95% CI [.05, .44], see also Figure S4 in Supplementary Materials): adversity corresponded to an increase in guilt due to the accident for those in the crash condition (see Figure 4). Similarly, increased guilt predicted increased compassion for those in the crash condition. It did not do so for those in the observer condition, as any feelings of guilt there were not intensified due to the crash for which participants were not responsible. In both conditions, increased adversity also had a direct effect on compassion – a finding in accord with our previous work (Lim and DeSteno, 2016, 2020). However, what these findings make clear, is that adversity-induced guilt serves as a partial mediator for the causal link between life adversity and compassion. When the link with guilt is severed, adversity's explanatory power is reduced by at least 12%.

Discussion

In this study, we established the causal direction of the indirect effects observed in Studies 1 and 2. We found that when we induced guilt in our participants via their involvement in a staged accident, it was greater among those who had experienced greater adversity in life. What's more, we found that the link between adversity and compassion was diminished when people were prevented from feeling guilty. Put another way, the moderated mediation analysis shows that, unlike their low-adversity counterparts, high-adversity individuals were more likely to experience a large spike in guilt from their involvement in the accident which subsequently

led to greater compassion. In this way, guilt's role as a partial mediator of compassion among those high in adversity can readily be seen.

General Discussion

The current set of studies offers an important insight related to the general notion that having experienced adversity in life can lead to increased compassion (Greenberg et al., 2018; Lim & DeSteno, 2016, 2020; Volhardt & Staub, 2011). More specifically, these studies identified a proneness to guilt as a novel mediating mechanism for the link between adversity and compassion. As demonstrated here, not only are the intensities of guilt and compassion magnified among people who faced adversity when they encounter a person in distress, but alterations in the intensity of guilt can be seen to causally influence subsequent alterations in compassion among those who have experienced more severe adversity in life.

We suspect that the role guilt plays in motivating compassion may be one of several adaptive mechanisms that arise in people who have faced adversity in the past and benefitted from the assistance of others. Compassion and related prosocial emotions are known to enhance social capital through motivating prosocial behaviors (cf. DeSteno, 2015; Rand, Kraft-Todd, & Gruber, 2015). And building social capital through cooperation is often essential for avoiding or overcoming present or future adverse events. Accordingly, feeling guilty because of potential inaction to assist others in need stands as an effective potential motivator of increased compassion among those who have previously experienced adversity. It can upregulate compassion where it might not otherwise have intensified, and in so doing, nudge people toward engaging in greater efforts to assist those in need.

It is important to realize, though, that the demonstrated link between guilt and compassion is likely to be a broad one. As noted, feelings of guilt at witnessing the suffering of others among those who have faced adversity can be due either to their own actions or potential lack thereof. That is, even upon seeing people suffering whose misfortune they did not cause, those higher in adversity will experience an increased sense of guilt that likely reflects a recognition that they could, and have not yet, engaged in any actions that might help to remedy that suffering. So, for example, when witnessing victims of war, famine, or disease, those who have experienced adversity feel more guilt for not having yet acted to help – guilt that leads to compassion, which in turn, motivates action to assist such victims (cf. Lim & DeSteno, 2016).

The broadness of this effect, however, also suggests that guilt could enhance compassion via an incidental route among those who have experienced adversity. Much as other social emotions like gratitude and compassion have been shown to induce prosocial behavior toward targets unrelated to their evocation (e.g., Bartlett & DeSteno, 2006; Condon & DeSteno, 2011), feelings of guilt in response to one target might well engender increased compassion toward another. Whether such an outcome would constitute a problem or a beneficial spandrel of sorts remains to be seen. However, we would expect that incidental compassionate responding would lead to the usual benefits that accrue from acts of downstream reciprocity.

In the current set of studies, we did not examine the boundary conditions of our effects as we made a case for its broadness. Nonetheless, future studies could test for potential moderators that reveal the boundary conditions in which guilt, as a sequela of adversity, might lead to a lack of compassion or even the attenuation of it. For example, among a minority of people, adversity results in ongoing distress – a factor that might limit their ability to muster compassion for others. Likewise, variables such as different attachment styles (Burnette et al., 2009; Joireman,

Needham, & Cummings, 2002) might alter the impact feelings of guilt have on compassion and prosociality. Similarly, victim-blaming tendencies, such as the perceptions of failures of and complaining by others in need might attenuate guilt-motivated compassion (Ruttan, McDonnell, & Nordgren, 2015). Nonetheless, in general, it does appear that an adversity-induced propensity for guilt enhances compassion in most.

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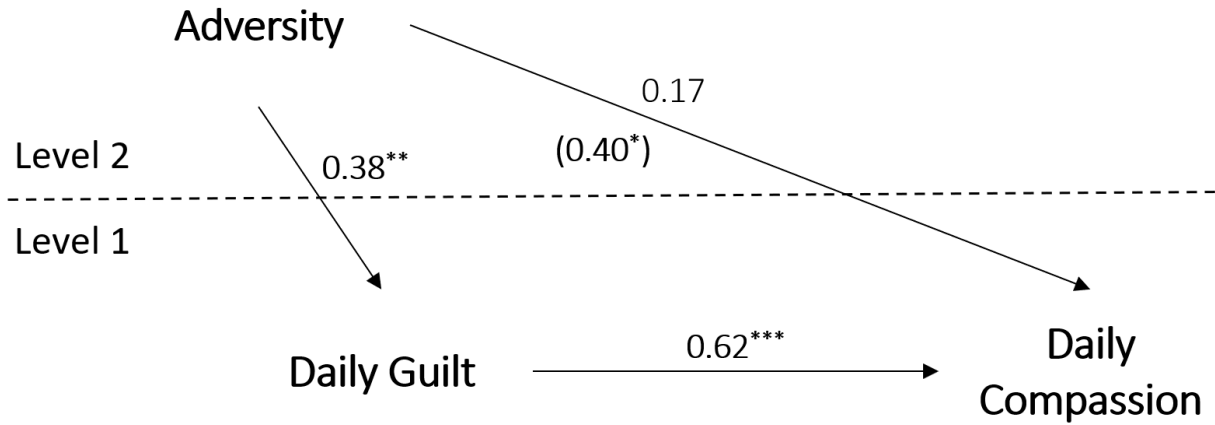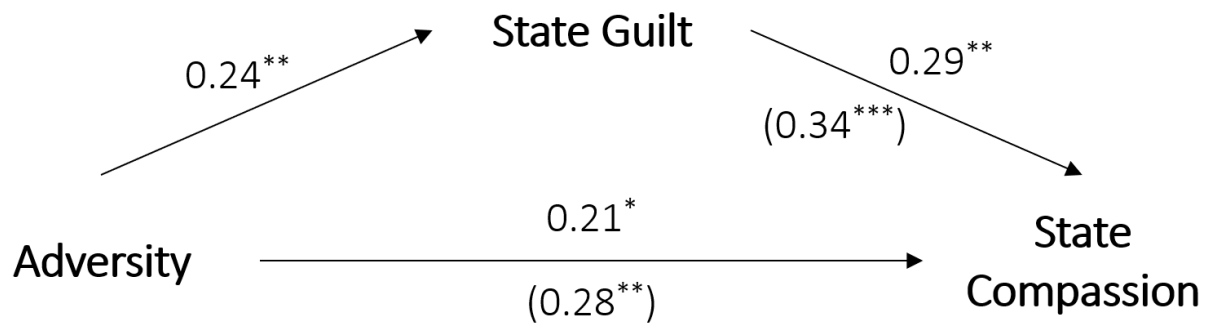Methods*, *12*(4), 695-719. doi:10.1177/1094428108327450.

Figure 1. Multilevel mediation model for daily guilt as a mediator of daily compassion in Study

1. Coefficients are raw values. The parameter in parentheses refers to the bivariate relation

linking Daily Compassion to Adversity. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Figure 2. Guilt as a mediator of the influence of adversity on compassion in Study 2. Parameters in parentheses refer to zero-order correlations. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
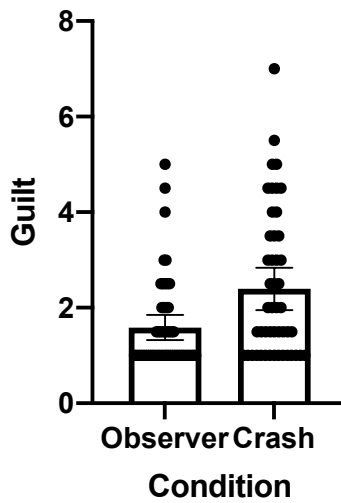
Figure 3. Mean guilt intensity as a function of experimental condition in Study 3. Error bars indicate 95% CIs.

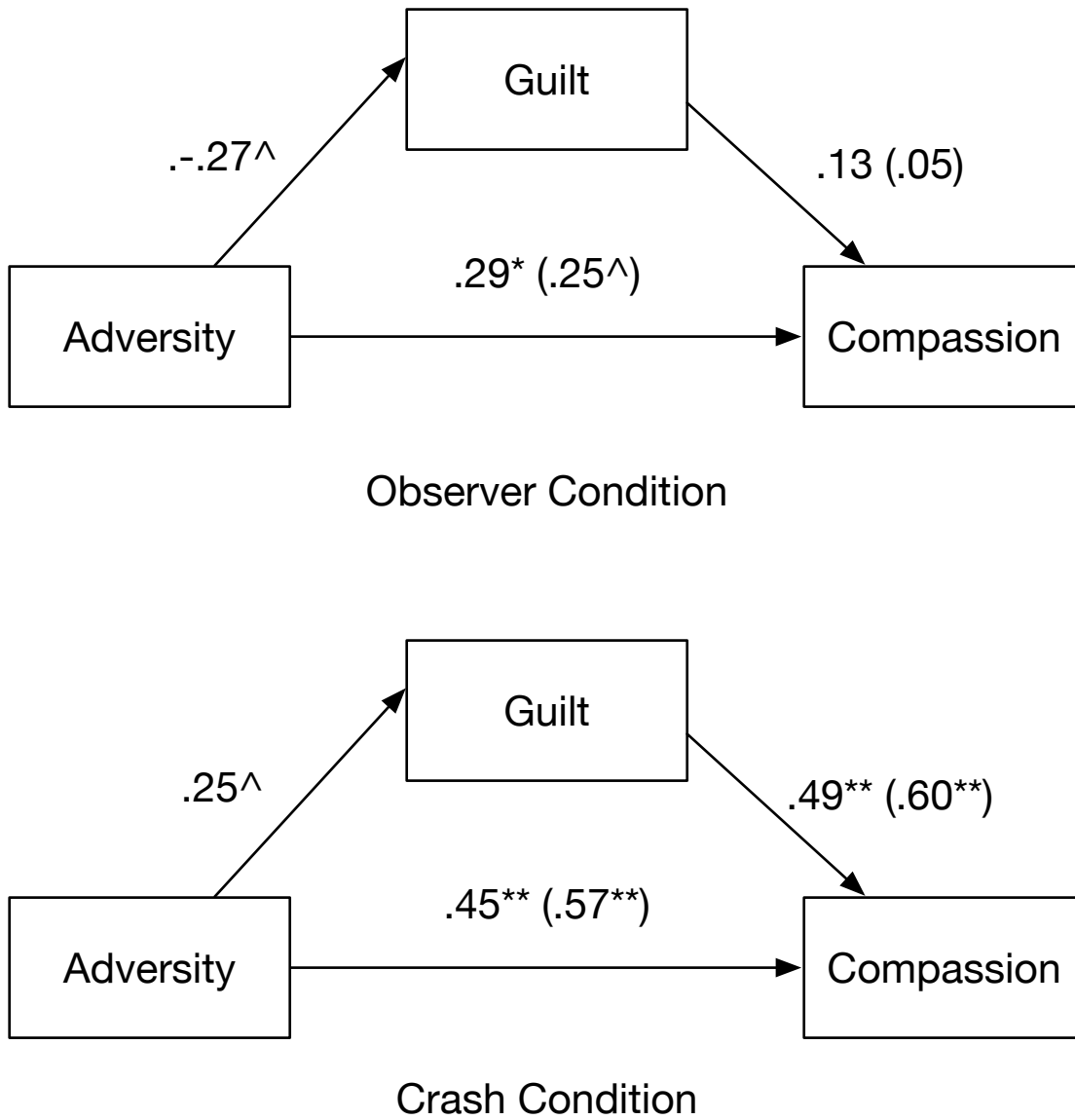Observer Condition

Crash Condition

Figure 4. Moderated mediation analysis from Study 3. Parameters in parentheses refer to zero-order correlations.

^ *p* < .10, **p* < 0.05, ***p* < 0.01.

Author Contributions

Daniel Lim developed the study concept, formulated the hypotheses, and collected the data for all studies. All authors contributed to the study design and data analyses. Daniel Lim drafted the manuscript with David DeSteno providing critical revisions. All authors approved the final version of this manuscript for submission.

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Supplementary Materials

Measure of Daily Emotion Intensity (Study 1)

In the past 24 hours, to what degree have you experienced each of the following states? (1 = Not at all, 4 = Somewhat, 7 = Extremely)

1. I have felt grateful.
2. I have felt appreciative.
3. I have felt happy.
4. I have felt angry.
5. I have felt bored.
6. I have felt frustrated.
7. I have felt proud.
8. I have felt content.
9. I have felt sad.
10. I have felt guilty.
11. I have felt physical pain.
12. I have felt worried.
13. I have felt bad.
14. I have felt compassionate.
15. I have felt powerful.
16. I have felt sympathy

Filler Questions

How many times, in the past 24 hours, have you done the following behaviors?
    Helped somebody
    Had an argument or disagreement with someone
    Skipped a meal
    Made a phone call
    Made a purchase
    Played some kind of game

Please answer the following questions.
    How many hours of sleep did you get last night?
    How many hours have you spent exercising?
    How many hours have you spent by yourself?
    How many hours have you spent on social networking sites?
    How many hours have you spent in class or studying?
    How many hours have you spent working?
How many hours have you spent socializing?

Emotions Measure (Study 2)

Please indicate your current mood by stating your agreement with the following words or statements using a 7-point scale (1 = not at all; 4 = Moderately,7 = very much).

1. I feel distressed
2. I feel disgusted
3. I feel angry
4. I feel sad
5. I feel compassion
6. I feel sympathetic
7. I feel pity
8. I feel bored
9. I feel embarrassed
10. I feel queasy
11. I feel gloomy
12. I feel content
13. I feel grateful
14. I feel good
15. I feel happy
16. I feel guilty
17. I feel pleasant

Emotions Measure (Study 3)

Please indicate your current mood by stating your agreement with the following words or statements using a 7-point scale (1 = not at all; 4 = Moderately,7 = very much).

1. I feel proud
2. I feel remorseful
3. I feel satisfied
4. I feel fulfilled
5. I feel positive
6. I feel good
7. I feel content
8. I feel happy
9. I feel compassionate
10. I feel sympathetic
11. I feel distressed
12. I feel sad
13. I feel uncomfortable
14. I feel angry
15. I feel confident
16. I feel tired
17. I feel focused
18. I feel attentive
19. I feel guilty
20. I feel regret

Prevalence of Adversity

Below, we provide frequencies for each type of discrete category of adversity experienced by participants. Note that a majority of people have experienced more than one type of adverse experience.

Table S1. *Study 1: Prevalence of Adversity by Domain*

Type of Adversity	At least once	Never	%
Illness and Injury	109	16	87.2
Violence and Victimization	66	59	52.8
Bereavement	106	19	84.8
Relationship	100	25	80.0
Social-environmental	53	72	42.4
Disaster	44	81	35.2

Table S2. *Study 2: Prevalence of Adversity by Domain*

Type of Adversity	At least once	Never	%
Illness and Injury	111	15	88.8
Violence and Victimization	87	39	69.6
Bereavement	113	13	90.4
Relationship	112	14	89.6
Social-environmental	87	39	69.6
Disaster	67	59	53.6

Table S3. *Study 3: Prevalence of Adversity by Domain*

Type of Adversity	At least once	Never	%
Illness and Injury	113	5	90.4
Violence and Victimization	92	26	73.6
Bereavement	97	21	77.6
Relationship	97	21	77.6
Social-environmental	64	54	51.2
Disaster	51	67	40.8

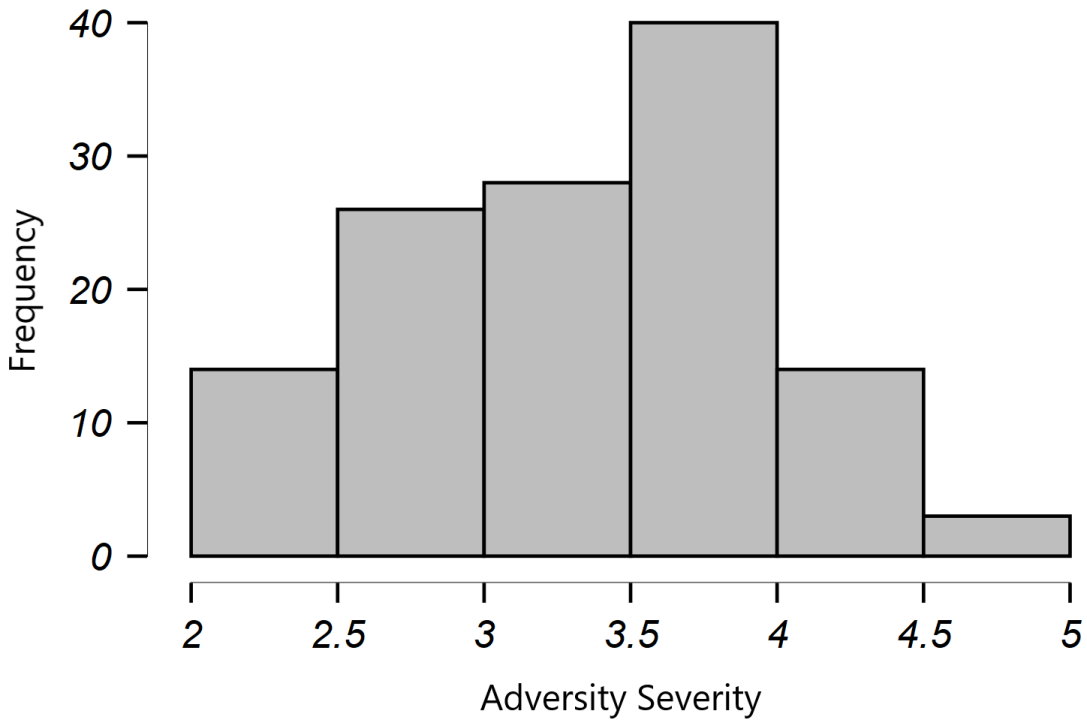**Frequency Distribution of Adversity**

Figure S1. The distribution of adversity severity scores for Study 1.
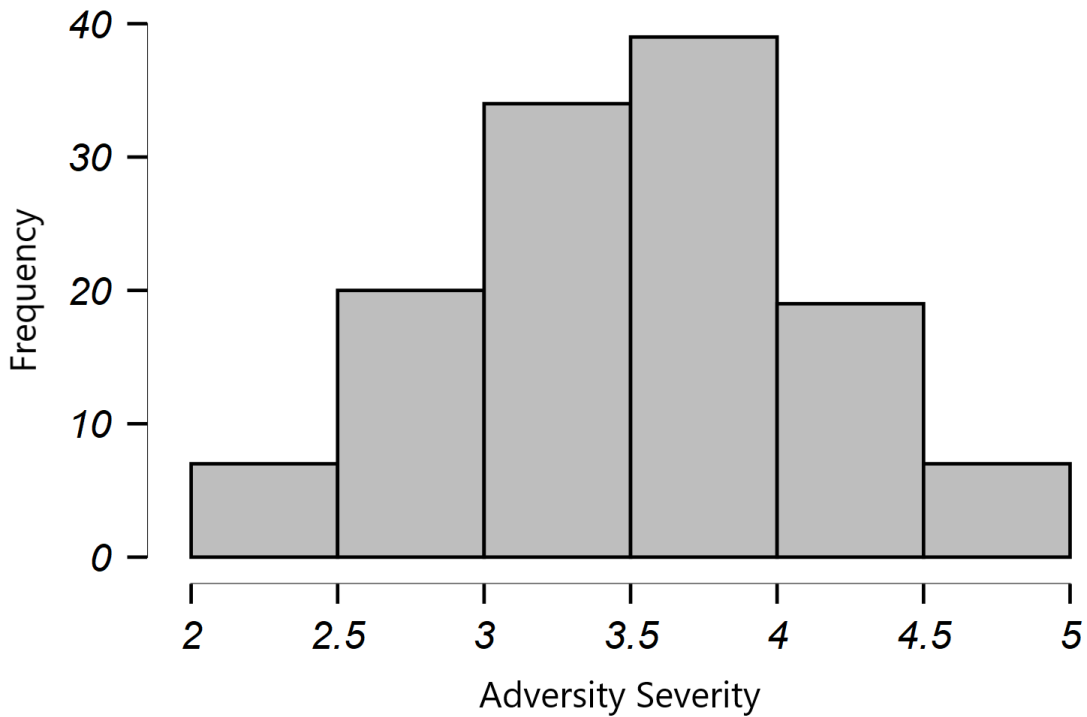

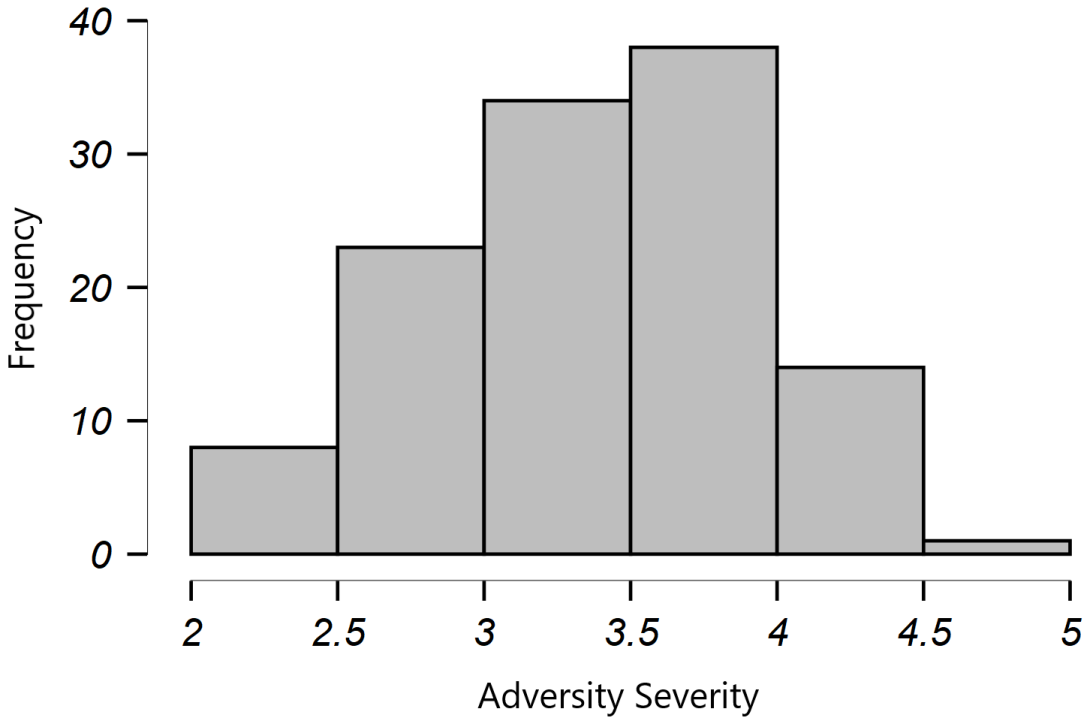**Figure S2.** The distribution of adversity severity scores for Study 2.

Figure S3. The distribution of adversity severity scores for Study 3.
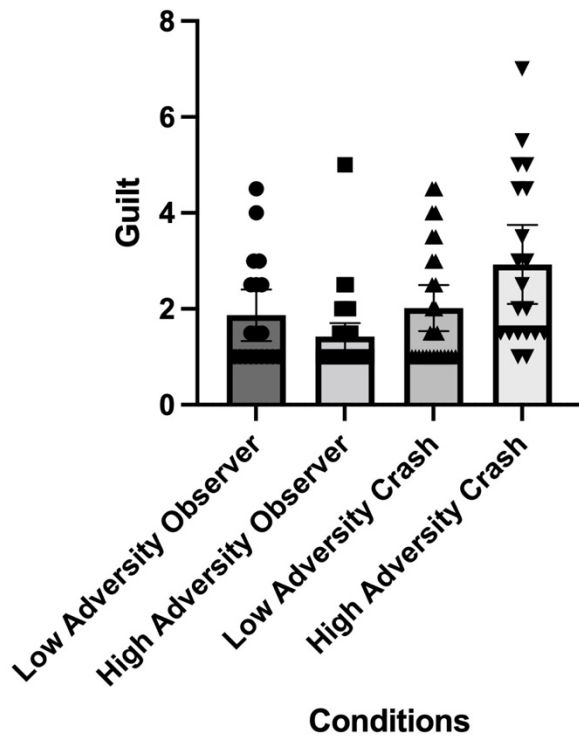

Figure S4. Mean guilt as a function on condition in Study 3. Error bars indicate 95% CIs.

Descriptive Statistics for Key Variables

Table S4. Descriptive Statistics for Adversity Severity

Type of Adversity	*Mean*	Std. Dev	Median	Range
Study 1	3.40	0.64	3.50	3.00
Study 2	3.55	0.61	3.56	3.00
Study 3	3.43	0.57	3.50	2.62

Table S5. Descriptive Statistics for Compassion

Type of Adversity	*Mean*	Std. Dev	Median	Range
Study 1 (Dispositional Compassion)	5.61	0.91	5.80	4.20
Study 1 (Daily Compassion)	3.09	1.14	3.09	5.28
Study 2 (State Compassion)	4.95	1.64	5.00	6.00
Study 3 (State Compassion)	4.14	1.80	4.00	6.00
Observer Condition	3.94	1.75	4.00	6.00
Guilt Condition	4.34	1.85	4.25	6.00

Table S6. Descriptive Statistics for Guilt

Type of Adversity	*Mean*	Std. Dev	Median	Range
Study 1 (Guilt Proneness)	5.26	0.99	5.38	4.63
Study 1 (Daily Guilt)	2.51	1.03	2.24	4.14
Study 2 (State Guilt)	3.32	1.96	3.00	6.00
Study 3 (State Guilt)	1.90	1.28	1.50	6.00

Correlation Tables For Key Variables

Table S6. Correlations of Key Variables (Study 1)

Type of Adversity	*1*	2	3	4	5	6
1. Adversity Severity		.26**	.25**	.22*	-.04	.20*
2. Dispositional Compassion	.26**		.21*	.37***	-.01	.37***
3. GASP (Shame)	.25**	.21*		.46***	.02	.16
4. GASP (Guilt)	.22*	.37***	.46***		-.09	.20*
5. Age	-.04	-.01	.02	-.09		-.09
6. Gender	.20*	.37***	.16	.20*	-.09	

$* = p < 0.05$, $** = p < 0.01$, $*** = p < 0.001$

Table S7. Correlations of Key Variables (Study 2)

Type of Adversity	*1*	2	3	4	5
1. Adversity Severity		.28**	.24**	.20*	-.09
2. State Compassion	.28**		.34***	.19*	.23**
3. State Guilt	.24**	.34***		-.06	-.00
4. Age	.20*	.19*	-.06		-.03
5. Gender	-.09	.23**	-.00	-.03	

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

Table S8. Correlations of Key Variables (Study 3)

Type of Adversity	1	2	3	4	5
1. Adversity Severity		.41**	-.00	-.08	.29**
2. State Compassion	.41**		.39***	-.03	.03
3. State Guilt	-.00	.39***		.15	-.07
4. Age	-.08	-.03	.15		-.19*
5. Gender	.29**	.03	-.07	-.19*	

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

Adversity Measure

	Scale:	**1**	**2**	**3**	**4**	**5**
	How much did this affect you?	None (N/A)	Barely	A little	Moderately	Severely

Instructions: The following questions will ask you to indicate the frequency, recency, and severity of 28 adverse life events that you may or may not have experienced. Please use the scales, as described in each row above, to indicate your response for each adverse event.

Specific Adversity	Adversity Domain
1. Suffered a serious accident or injury 2. Serious accident or injury of a loved one 3. Witnessed family member injured or killed 4. Suffered a serious illness 5. Serious illness of a loved one	Injury/illness
6. Were physically attacked or assaulted 7. Been coerced with threats of harm to yourself or your family 8. Witnessed someone (other than a family member) being injured or killed 9. Been hit or pushed by someone you know 10. Had someone touch or feel private areas of your body or touched/felt another's private areas under force or threat 11. Had sexual relations under force or threat	Violence
12. Death of an immediate family member (i.e., parents, siblings, child) 13. Death of someone in your extended family (i.e., cousin, uncle, grandparents) 14. Death of a friend 15. Lost someone close due to suicide or homicide	Bereavement
16. Experienced forced separation from family 17. Ended a close relationship or gotten rejected in a relationship 18. Experience your parents' (or stepparents') divorce 19. Been shamed, embarrassed, or told repeatedly that you are "no good" 20. Had an unwanted pregnancy or unwanted child.	Relationship Events
21. Experienced serious financial difficulties (i.e., no money for food or shelter) 22. Lived in dangerous housing or neighborhood 23. Been discriminated against because of your ethnicity, religious background, or sexual orientation 24. Been exposed to dangerous chemicals or biological agents	Social-Environmental Stress
25. Experienced a major fire, flood, earthquake, or any natural disaster in your community 26. Suffered a loss in a major fire, flood, earthquake, or any natural disaster in your community 27. Experienced a tragedy or disaster in your community caused by people (a shooting, bombing, etc.) 28. Suffered a loss in a tragedy or disaster in your community caused by people (a shooting, bombing, etc)	Disaster

Study 1 – GASP as a potential mediator between Adversity and Compassion

   Measure of Dispositional Guilt and Shame. To measure trait-level guilt and guilt-related

tendencies, we adopted the Guilt and Shame Proneness Scale (Cohen et al., 2011). We were

specifically interested in the Guilt-Repair and Guilt-Negative-Behavior-Evaluation scale as a trait

measure of guilt proneness. These subscales consisted of 8 items in total that adopted a 7-point

Likert-type scale (1 = "Very unlikely", 4 = "About 50% likely", 7 = "Very likely"). Using this scale,

participants rated how likely they were to engage in certain guilt-driven actions and experience

certain guilt-related feelings that were depicted using short vignettes of hypothetical situations.

For example, participants would read about the following situations:

   "You reveal a friend's secret, though your friend never finds out. What is the

   likelihood that your failure to keep the secret would lead you to exert extra effort to

   keep secrets in the future?"

   "While discussing a heated subject with friends, you suddenly realize you are shouting

   though nobody seems to notice. What is the likelihood that you would try to act more

   considerately toward your friends?"

   "You secretly commit a felony. What is the likelihood that you would feel remorse about

   breaking the law?"

Upon reading about these situations, participants rated the likelihood of them taking corrective

action or feeling negative about their own actions. We averaged all scores among these items

to form a composite score of guilt proneness. These items that measured guilt proneness

demonstrated a good level of internal consistency (Cronbach's α = 0.73) in our sample.

We also included the shame proneness scales which consisted of the Shame-Negative-

Self-Evaluation scale, and the Shame-Withdrawal scale. The format of these scales was similar

to the guilt proneness scales, they contained a combined total of 8 items each which were on a

7-point Likert-type scale (1 = "Very unlikely", 4 = "About 50% likely", 7 = "Very likely"). Shame

proneness was calculated by averaging the scores across all 8 items, which yielded a good level

of internal consistency (Cronbach's α = 0.76) in our sample.

Results

Relations Between Adversity and Dispositional Measures of Compassion and Guilt.

Our first step to chart the possible role guilt plays in compassion among those who have

experienced past adversity was to examine bivariate associations between these emotions and

adversity. That is, we sought to answer the question: Do those who have experienced greater

adversity in life regularly feel more guilt and more compassion? Here, regression analyses

confirmed that dispositional compassion,   = .26, t(123) = 3.01, p = .003, 95% CI [.09, .43], and

dispositional guilt,   = .22, t(123) = 2.46, p = .015, 95% CI [.04, .39], were both predicted by the

severity of past adversity. In addition compassion was predicted by guilt proneness, $β$ = .37,

t(123) = 4.43, p < .001, 95% CI [.21, .54].

In order to examine whether guilt proneness might serve as a mechanism by which

adversity influences compassion, we next conducted a mediation analysis. When compassion

was regressed on both adversity and dispositional guilt, the direct effect between adversity and

compassion was reduced to β = .19, t(122) = 2.26, p = .026, 95% CI [.02, .36], while guilt's direct

effect on compassion remained similar, β = .33, t(122) = 3.91, p < .001, 95% CI [.16, .50],

suggesting that guilt proneness was a partial-mediator of the direct effect between adversity

and dispositional compassion (see Figure 1.). Supporting this view, a bootstrap estimation

procedure of the indirect effects with 5000 resamples confirmed the statistical significance of

the indirect path linking adversity to compassion via guilt as a mediator, *indirect effect* = .10, *SE*

= 0.01, 95% *Bias-corrected* CI [.01, .24].

As we also wanted to ensure the effect of guilt was distinct from any overlap with the

related emotion of shame, we next sought to determine the links between adversity, shame

proneness, and compassion. Although we did find that adversity was positively associated with

shame proneness, β = .25, t(123) = 2.82, p = .006, 95% CI [.07, .42], shame proneness was not

significantly associated with dispositional compassion when controlling for adversity, β = .16,

t(122) = 1.78, p = .077, 95% CI [-.02, .34]. This suggests that shame proneness was unlikely to be

a mediator for the adversity's impact on compassion. Supporting this view, when we included

shame and guilt proneness in the same model predicting compassion, only guilt proneness

emerged as a significant predictor, β = .35, t(122) = 3.67, p < .001, 95% CI [.16, .53]. Shame had

no reliable effect, β = .05, t(122) = 0.57, p = .568, 95% CI [-.13, .24]. However, guilt proneness

was not a predictor of daily guilt γ_{01} = 0.06, $\gamma_{std\ error}$ = .10, p = .541.

Measure of guilt proneness

Refer to GASP scale developed by Cohen et al. (2011) at https://www.cmu.edu/tepper/faculty-and-research/assets/docs/guilt-shame-proneness-gasp-scale-aug-2011.pdf

Study 3 Moderated Mediation (Adversity as Continuous Variable)

We determined that guilt mediated the direct effect between adversity and compassion as a function of our experimental guilt manipulation in the main analysis with adversity being coded dichotomously using a median split. We also conducted the same moderated mediation analysis with adversity as a continuous variable and found a similar result when a single outlier was excluded from the data. As expected, we found that the indirect effects of guilt-mediated compassion that results from adversity is different as a function of condition (index = 0.58, SE = .28, CI 95% [0.11, 1.17] between condition (see Figure S4A & S4B).
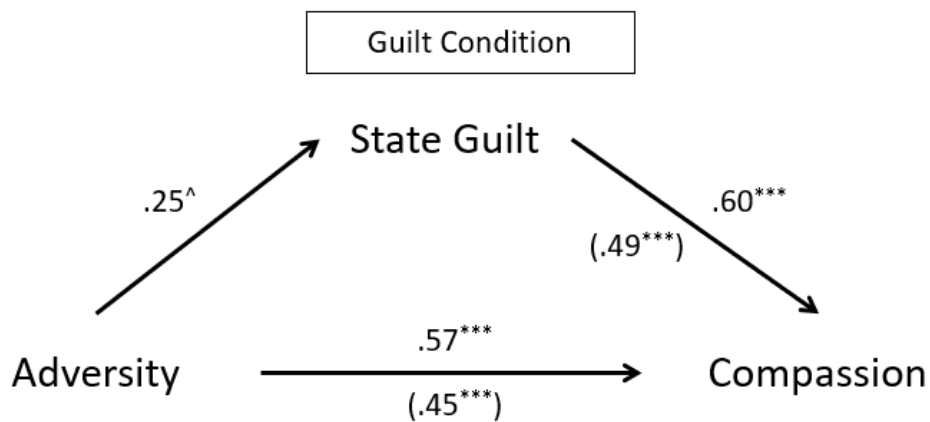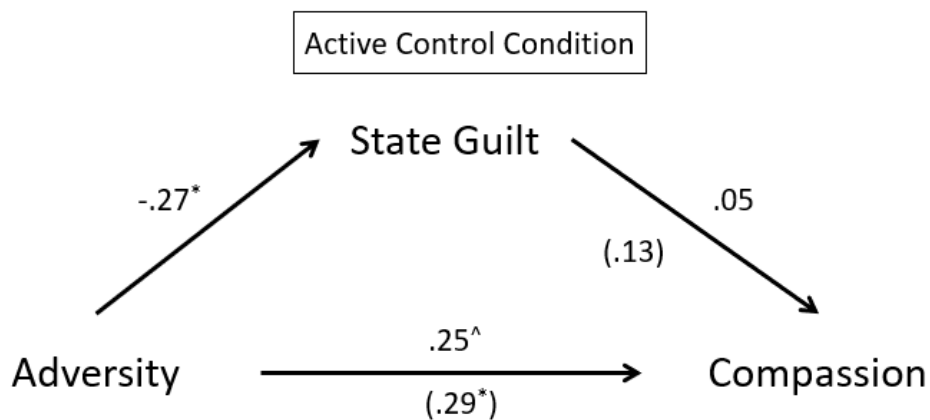
Figure S4A.

Figure S4B.

^ = $p < 0.10$, * = $p < 0.05$, ** $p = < 0.01$, *** = $p < 0.001$