The Unburdening Effects of Forgiveness: Effects on Slant Perception and Jumping Height

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Abstract

Research shows that in the aftermath of conflict, forgiveness improves victims' well-being and the victim–offender relationship. Building on the research on embodied perception and economy of action, we demonstrate that forgiveness also has implications for victims' perceptions and behavior in the physical domain. Metaphorically, unforgiveness is a burden that can be lightened by forgiveness; we show that people induced to feel forgiveness perceive hills to be less steep (Study 1) and jump higher in an ostensible fitness test (Study 2) than people who are induced to feel unforgiveness. These findings suggest that forgiveness may lighten the physical burden of unforgiveness, providing evidence that forgiveness can help victims overcome the negative effects of conflict.

Across history and cultures, forgiveness is promoted as a virtuous, desirable, and laudable response to transgressions (Peterson & Seligman, 2004). Themes of forgiveness pervade the world's major religions (Rye et al., 2000), and philosophical musings on the virtue of forgiveness have similarly persisted for centuries (Griswold, 2007). Despite these widespread truisms on the positive consequences of forgiveness, systematic theoretical and empirical studies of the consequences of forgiveness are rare. Recent studies show that forgiveness improves victims' well-being and facilitates reconciliation between victims and offenders (Karremans & Van Lange, 2008; Lawler et al., 2003; McCullough, Bellah, Kilpatrick, & Johnson, 2001). Nonetheless, research on the consequences of forgiveness is still in its infancy (Karremans & Van Lange, 2008).

Given the ubiquity of the idea of forgiveness and the fervor with which it is often promoted, a deeper understanding of its precise consequences is vital. We argue that forgiveness affects how victims perceive and interact with the physical environment in domains unrelated to the conflict itself. Drawing from research on embodied perception and the economy of action, we specifically propose that compared to unforgiveness, forgiveness (a) reduces individuals' perceptions of hill steepness and (b) improves individuals' performance in a jumping task.

Research on embodied perception suggests that the objective features of an environment are not the sole determinants of how people perceive a physical environment. Perceptions are influenced by the physical demands of an intended action in a given environment (e.g., climbing a hill or walking down

a hallway; Proffitt, 2006). More specifically, according to Gibson's (1979) notion of affordances, visual perception is influenced by an economy of action, such that individuals seek to conserve valuable resources and ensure that their energy is used effectively (Proffitt, 2006). In other words, individuals use their visual perception to estimate how difficult it would be to climb a hill or walk down a hallway. Thus, the objective features of an environment and an individual's capacity to act within that environment both influence perception. For example, hills are perceived to be steeper by individuals for whom climbing the hill would be harder, including individuals who are elderly or tired (Bhalla & Proffitt, 1999). Similarly, people carrying heavy backpacks perceive distances to be longer than people who are not carrying heavy backpacks (Proffitt, Stefanucci, Banton, & Epstein, 2003).

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Consistent with the notion that visual perception regulates anticipated actions, recent studies have demonstrated that physical states influence both perception and action (Eves, 2014; Meier, Schnall, Schwarz, & Bargh, 2012). Building on the embodied perception research (Bhalla & Proffitt, 1999), these studies suggest that individuals who perceive their physical environments as more demanding are more likely to act within these environments in an energy-conserving manner. For example, individuals who are carrying heavy bags in shopping malls tend to avoid stairs and opt to use escalators instead, presumably due to the perceived length and steepness of the stairs (Eves, 2014). Consistent with these findings, another growing body of research suggests that concepts with a metaphorical link to individuals' energy capacities can influence their perceptions and actions in the same way that actual burdens do (Slepian, Masicampo, Toosi, & Ambady, 2012).

Forgiveness, Embodied Perception, and Action

Studies have shown that metaphorical links between abstract concepts (e.g., anger) and concrete bodily experiences (e.g., hot temperatures) can facilitate the *actual* concrete bodily experiences the metaphors suggest (Lakoff & Johnson, 1980, 1999; Landau, Meier, & Keefer, 2010). For instance, social rejection causes people to experience actual feelings of coldness (Zhong & Leonardelli, 2008). Similarly, anger causes people to estimate that the ambient temperature of a room is hotter than it actually is (Wilkowski, Meier, Robinson, Carter, & Feltman, 2008).

Relevant to this research, the abstract concept of forgiveness is often discussed in terms of the concrete bodily experience of letting go of a heavy weight. According to this metaphor, unforgiveness entails carrying a heavy burden and forgiveness may release this burden. As noted by one prominent author, "Forgiveness takes the burden of hate, guilt and bitterness off your back and, with a lighter load, you can climb higher and faster" (Ziglar, 2009). Another author noted that forgiveness "has everything to do with relieving oneself of the burden of being a victim" (Strahan, 2006). Popular books on forgiveness note that "Forgiveness can lighten our load" (Hamilton, 2012) and that "Once the choice to forgive is made, the burden is lifted from the offended one" (Wood, 2008).

Research suggests that abstract concepts that have a metaphorical association with physical heaviness can produce an actual sensation of heaviness. A concrete, physical feeling of heaviness can result from the metaphorical "weight" of keeping a secret (Slepian et al., 2012; Slepian, Masicampo, & Ambady, 2014) or feeling guilty (Day & Bobocel, 2013). Together with the evidence for a metaphorical association between forgiveness and heaviness, these studies suggest that unforgiveness might produce a physical feeling of heaviness that forgiveness can alleviate. In turn, forgiveness may alter victims' perceptions and actions in the physical world.

We test these ideas in two studies. In Study 1, we examine the effect of induced feelings of forgiveness and unforgiveness on the participants' visual perceptions of a hill's geographical slant. We predict that induced feelings of unforgiveness increase the perceived physical demands of climbing a hill, causing the participants to perceive it as steeper than the participants who are induced to feel forgiveness. In Study 2, we examine the effect of induced feelings of forgiveness and unforgiveness on the participants' actions during an ostensibly unrelated jumping task. Assuming that unforgiveness activates the concrete experience of a heavy burden, we predict that feelings of unforgiveness increase the perceived physical demands of performing a jumping task. Thus, in addition to influencing the perceived steepness of a hill, induced feelings of unforgiveness should reduce individuals' jumping heights compared to the heights reached by those with induced feelings of forgiveness.

Study 1

Participants and Procedure

Forty-eight undergraduate students were recruited from Erasmus University to participate in the study in exchange for a monetary payment. One participant was unable to complete the study due to unforeseen rain and another was unable to complete the study due to lack of English proficiency. Thus, the final sample included 46 participants (37% male; $M_{age} = 22.18$). To minimize the demand characteristics, the participants were asked to participate in two ostensibly unrelated studies conducted by two different experimenters. Upon arrival at the experimental lab, the participants were asked to complete a "social experience survey" in which they wrote about a conflict they had experienced in the past. After completing the writing task, the participants answered questions measuring their affect, the manipulation checks, and demographic questions. Then, the participants were asked to complete an unrelated "object perception survey" in which they walked alone to a nearby hill and were asked to estimate its steepness. Finally, the participants reported their weight and height and completed a suspicion check question. None of the participants reported any suspicion about the connection between the two tasks or the actual purpose of the study. They were then debriefed about the actual purpose of the study.

Manipulation and Measures
Forgiveness

The participants were randomly assigned to one of the two conditions, namely, forgiveness or unforgiveness. In the forgiveness condition, the participants were asked to write about a time they were seriously offended by another person and ultimately forgave them. In the unforgiveness condition, the participants were asked to write about a time they were seriously offended by another person but did not forgive them. This procedure was consistent with previous studies in which specific feelings were induced by asking the participants to produce a
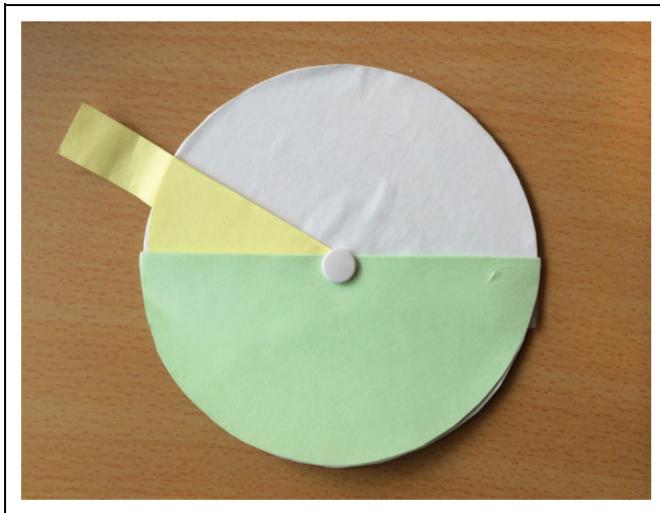
Figure 1. Visual measure. The light-yellow section is adjusted by participant to reflect hill slant.

"life event inventory" detailing a specific event from their own past (Karremans & Van Lange, 2008; Schwarz & Clore, 1983).

Perception of Geographical Slant

After the forgiveness manipulation, the participants took part in a purported object perception survey that served as our measure of geographical slant perception. First, the participants walked individually to a predetermined point at the base of a nearby hill. Then, the participants provided three estimates of the hill's slant, that is, verbal, visual, and haptic. The verbal measure required the participants to verbally estimate the slant of the hill from 0° to 90° and then record this verbal estimate on a piece of paper. The visual measure required the participants to adjust a disk until a yellow layer, representing the hill, matched their perception of the hill's slant. The participants were allowed to adjust the yellow layer anywhere from 0° (parallel to the ground) to 90° (perpendicular to the ground). The device used is shown in Figure 1. Although the participants could not see degree marks on the disk, a protractor on the back allowed the experimenter to record the participants' estimates in degrees. The haptic measure required the participants to place their hand on a computer tablet mounted on a tripod stand that was equipped with iAngle Meter (Phagdeechat, 2010), a software program that records the tablet's tilt based on the participant's movements (see Figure 2). The participants were given the following instructions: "Please put your dominant hand on this pad. Please match the pad's tilt to the slant of the hill, as if you are placing your hand on the incline of the hill." Furthermore, the participants were instructed not to look at their hand while adjusting the pad.

Previous research indicates that these three measures of geographic slant should produce divergent effects. The visual and verbal measures should be influenced by subjective factors such as the participants' tiredness, whereas the haptic measure should not be influenced (Bhalla & Proffitt, 1999; Proffitt,

Figure 2. Participant using haptic measure.

Bhalla, Gossweiler, & Midgett, 1995; Schnall, Harber, Stefanucci, & Proffitt, 2008). Thus, the forgiveness manipulation should influence the participants' visual and verbal estimations of the hill's slant, but have no effect on the participants' haptic estimations of the hill's slant.

Manipulation Check and Controls

After completing the forgiveness recall task, the participants indicated the extent to which they still held a grudge against their offender (1 = *not at all*, 7 = *very much*). As perceptions of hill slant can be influenced by gender and physical fitness (Bhalla & Proffitt, 1999), the participants also indicated their gender, weight, and height. In addition, the participants' mood states were measured using Watson, Clark, and Tellegen's (1988) 20-item Positive and Negative Affect Schedule (PANAS) scale.

Results and Discussion

Manipulation Check

To examine the effectiveness of our forgiveness manipulation, we conducted an independent samples *t*-test. As expected, the participants in the forgiveness condition held significantly less grudge against their offenders ($M = 3.14$, $SD = 1.67$) than the
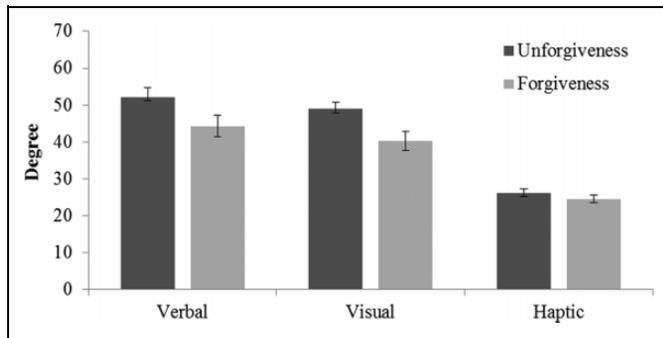
Figure 3. Mean slant estimates in the two conditions in Study 1. Error bars indicate standard errors of means.

participants in the unforgiveness condition ($M = 4.00$, $SD = 1.22$), $t(44) = -2.02$, $p = .05$, $\eta^2 = .09$.

Test of Primary Hypothesis

We conducted an independent samples t-test to examine the effect of forgiveness on the participants' verbal estimates of the hill's slant. This analysis revealed a significant effect of forgiveness: $t(44) = -2.04$, $p = .048$, $\eta^2 = .09$. The participants in the forgiveness condition perceived the hill to be less steep ($M = 44.27$, $SD = 13.68$) than the participants in the unforgiveness condition ($M = 52.13$, $SD = 12.50$). Our analysis of the participants' visual estimates also confirmed our prediction. The participants in the forgiveness condition perceived the hill to be less steep ($M = 40.27$, $SD = 12.51$) than the participants in the unforgiveness condition ($M = 48.92$, $SD = 9.38$), $t(44) = -2.67$, $p = .01$, $\eta^2 = .14$. However, as predicted, the participants in the forgiveness condition ($M = 24.55$, $SD = 5.03$) and unforgiveness condition ($M = 26.13$, $SD = 5.12$) did not differ in their perceptions of the hill's slant when using the haptic measure, $t(44) = -1.05$, $p = .30$, $\eta^2 = .03$; see Figure 3.

Tests of Alternative Explanations

To rule out alternative explanations for our findings, we examined the potential roles of the participants' feelings of guilt (Kouchaki, Gino, & Jami, 2014), positive and negative mood states, gender, and body mass index (BMI). First, we examined the potential explanatory roles of the participants' feelings, such as guilt, and their overall positive ($\alpha = .82$) and negative ($\alpha = .84$) mood states. The participants' feelings of guilt were not influenced by the forgiveness manipulation, $t(43) = .55$, $p = .59$, $\eta^2 = .01$, and were uncorrelated with the three measures of hill slant (rs < .18, ps > .23). The participants' positive mood states were likewise not influenced by the forgiveness manipulation, $t(43) = -.05$, $p = .96$, $\eta^2 = .00$, although a marginally significant correlation did emerge between the participants' positive mood states and the haptic measure of hill slant ($r = .28$, $p = .06$). A marginally significant difference emerged between the unforgiveness ($M = 2.25$, $SD = .80$) and the forgiveness conditions ($M = 1.86$, $SD = .65$) in the participants' negative moods, $t(43) = 1.80$, $p = .08$, $\eta^2 = .07$. However, the

participants' negative moods were unrelated to the three hill slant estimates (rs < .20, ps > .20).

Finally, we examined the potential explanatory roles of the participants' individual differences such as BMI and gender. We first correlated BMI with the three slant estimates and found that BMI was not related to any of them (rs < .11, ps > .48). We then conducted a series of two-way analyses of variance (ANOVAs) with the forgiveness condition and gender as independent variables and the three slant estimates as dependent variables. The results revealed no significant two-way interaction effects on the verbal or visual estimates (ps > .14). The main effect of gender was marginally significant for the verbal estimates, $F(1, 42) = 3.24$, $p = .08$, $\eta^2 = .05$, but not significant for the visual estimates, $F(1, 42) = 2.03$, $p = .16$, $\eta^2 = .05$. The main effect of the forgiveness condition on both the verbal estimates, $F(1, 42) = 6.73$, $p = .01$, $\eta^2 = .14$, and the visual estimates, $F(1, 42) = 7.68$, $p = .01$, $\eta^2 = .16$, remained significant. For the haptic measure of two-way interaction, $F(1, 42) = .03$, $p = .86$, $\eta^2 = .00$, the main effect of the forgiveness condition, $F(1, 42) = .82$, $p = .37$, $\eta^2 = .02$, and the main effect of gender, $F(1, 42) = .14$, $p = .72$, $\eta^2 = .00$, were not significant. Thus, the results for the three slant estimates were consistent with the results that did not control for gender.

The results from Study 1 provide evidence that feelings of forgiveness and unforgiveness influence victims' visual perceptions of a hill's geographical slant. Specifically, forgiveness reduces the perceived steepness of geographical slants: the participants in the forgiveness condition perceived a hill to be less steep than the participants in the unforgiveness condition.

Study 2

In Study 2, we examined the effect of feelings of forgiveness and unforgiveness on the participants' actual actions during an ostensibly unrelated jumping task. We predicted that feelings of unforgiveness increase the perceived physical demands of a jumping task. Thus, feelings of forgiveness should increase individuals' jumping heights compared to the feelings of unforgiveness.

Participants and Procedure

There were 160 undergraduate student participants from two universities of which 72 were from Erasmus University and 88 were from the National University of Singapore.[1] They completed the study in exchange for course credit (53.1% male; $M_{age} = 20.84$). As in Study 1, the participants were asked to participate in two ostensibly unrelated studies. First, they were asked to complete a "social experience survey" that served as our forgiveness manipulation. Then, they were asked to complete a "physical fitness study." Finally, the participants completed demographic and control items and a suspicion check question. None of the participants reported any suspicion about the connection between the two tasks or the true purpose of the
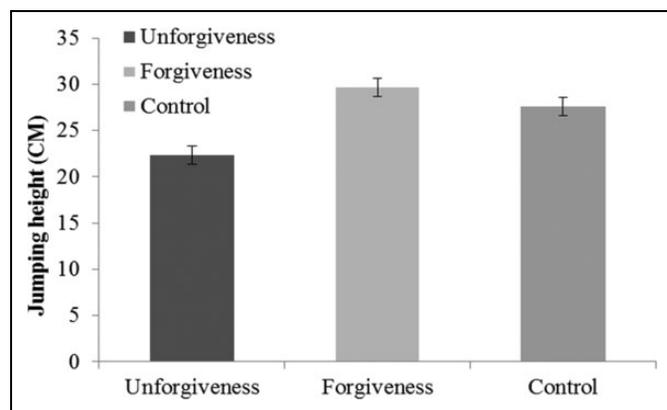
Figure 4. Mean jumping height in the three conditions in Study 2. Error bars indicate standard errors of means.

study. They were then debriefed about the actual purpose of the study.

Manipulation and Measures

Forgiveness

The forgiveness and unforgiveness manipulations were identical to those in Study 1. In this study, we added a control condition wherein the participants were asked to write about a recent interpersonal interaction (e.g., dinner with a friend and a conversation with a coworker). The participants were randomly assigned to one of the three conditions.

Jumping Height

After the forgiveness manipulation, the participants took part in an ostensible physical fitness task. The task required them to jump 5 times. To keep the participants' jumps consistent, they were asked to jump without bending their knees. We videotaped the participants jumping on a yoga mat. A scale on the wall was used to record the height of their jumps in centimeters. Two coders watched the videos independently and recorded the height of the jumps. We averaged the two coders' ratings to create a composite measure of jumping height ($r = .88$). This served as the dependent variable.

Manipulation Check and Controls

After completing the forgiveness recall task, the participants indicated the extent to which they held a grudge against their offender ($1 = not\ at\ all$, $7 = very\ much$). As in Study 1, they were asked to indicate their feelings of guilt and mood states using the 20-item PANAS scale of Watson et al. (1988).

Jumping height can vary as a function of gender, physical fitness, and physical activity. Thus, these variables were used as controls in Study 2. As a measure of physical activity, the participants completed the International Physical Activities Questionnaire (Craig et al., 2003), which is a 7-item instrument measuring the average time individuals spend on three types of

physical activities per week, namely, vigorous activity, moderate activity, and walking. Sample items are as follows: "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?" and "How much time did you spend doing vigorous physical activities on one of those days?"

Results

Manipulation Check

To examine the effectiveness of our forgiveness manipulation, we conducted a one-way ANOVA. The main effect of the forgiveness manipulation was significant: $F(2, 157) = 9.36$, $p < .01$, $\eta^2 = .11$. A contrast analysis indicated that the participants in the forgiveness condition ($M = 2.67$, $SD = 1.73$) felt less grudge against their offenders than the participants in the unforgiveness condition, $M = 3.53$, $SD = 1.60$), $t(157) = 2.80$, $p = .01$, $\eta^2 = .06$. There was no difference between the forgiveness ($M = 2.67$, $SD = 1.73$) and control conditions ($M = 2.24$, $SD = 1.41$), $t(157) = -1.38$, $p = .17$, $\eta^2 = .02$. The participants in the unforgiveness condition ($M = 3.53$, $SD = 1.60$) felt more of a grudge against their offenders than the participants in the control condition ($M = 2.24$, $SD = 1.41$), $t(157) = -4.25$, $p < .01$, $\eta^2 = .16$. Thus, the forgiveness manipulation was successful.

Test of Primary Hypothesis

A one-way ANOVA was conducted to examine the effect of the forgiveness manipulation on the participants' jumping heights. As predicted, there was a main effect of the forgiveness manipulation on jumping height: $F(2, 157) = 7.12$, $p < .01$ $\eta^2 = .08$. The contrast analyses showed that the participants in the forgiveness condition jumped higher ($M = 29.68$, $SD = 9.61$) than those in the unforgiveness condition ($M = 22.30$, $SD = 8.97$), $t(157) = 3.64$, $p < .01$, $\eta^2 = .08$, whereas the participants in the unforgiveness condition jumped lower ($M = 22.30$, $SD = 8.97$) than the participants in the control condition ($M = 27.61$, $SD = 12.40$), $t(157) = -2.66$, $p < .01$, $\eta^2 = .04$. However, there was no significant difference in jumping height between the forgiveness ($M = 29.68$, $SD = 9.61$) and the control conditions ($M = 27.61$, $SD = 12.40$), $t(157) = -1.01$, $p = .31$, $\eta^2 = .01$ (see Figure 4).

Test of Alternative Explanations

Consistent with Study 1, we examined the participants' feelings of guilt, positive ($\alpha = .85$) and negative ($\alpha = .85$) mood states, gender, BMI, and physical activity levels as potential alternative explanations for our findings. A series of ANOVAs indicated that there were no significant differences in feelings of guilt, positive mood states, or negative mood states across all the conditions; all the p values were $> .10$. Furthermore, feelings of guilt, positive mood states, and negative mood states were all unrelated to the participants' jumping heights (rs $< .09$, all ps $> .26$).

Neither BMI nor physical activity was related to the participants' jumping heights (BMI: $r = -.10$, $p = .23$; physical activity: $r = .08$, $p = .32$). We conducted a two-way ANOVA with the forgiveness condition and gender as independent variables and jumping height as the dependent variable and found a significant main effect of gender, $F(1, 154) = 11.09$, $p < .01$, $\eta^2 = .07$. Additionally, there was a significant main effect of the forgiveness condition, $F(2, 154) = 6.92$, $p < .01$, $\eta^2 = .08$. The results revealed no significant two-way interaction, $F(2, 154) = .93$, $p = .40$, $\eta^2 = .01$. Thus, the effect of the forgiveness manipulation on the participants' jumping heights does not appear to be unduly affected by gender.

General Discussion

Conflict is inevitable in an interdependent world (De Dreu & Gelfand, 2008). Although scholars have promoted forgiveness as a beneficial response to transgressions, research on the precise nature of these benefits is limited. We demonstrate that forgiveness has even more far-reaching effects on victim outcomes than previously observed. Beyond its effects on victims' psychological well-being, forgiveness also has implications for how victims perceive and interact with their physical surroundings. Building on the literature on embodied perception and action, we demonstrate that forgiveness both reduces the perceived slant of a hill and improves victims' performance on a physical fitness task. Subsequently, we discuss the implications and limitations of these findings and offer suggestions for future research.

First, our findings contribute to the understanding of forgiveness in meaningful ways. In tandem with research demonstrating that forgiveness benefits the physical health of victims (e.g., Lawler et al., 2003), our research shows that forgivers perceive a less daunting world and perform better on challenging physical tasks. Although we focus on the effects of forgiveness on victims' experiences in the physical domain, our research opens the door to a more expansive examination of the effect of forgiveness on victims' physical experiences beyond the conflict domain. Furthermore, our research emphasizes the importance of empirically examining the consequences of forgiveness. Although writers and philosophers have frequently touted the benefits of forgiveness, the lack of empirical studies of these benefits risks an oversimplified understanding of the many ways in which forgiveness influences a victim.

Beyond its implications for the forgiveness literature, our research also has important implications for the embodied perception literature. Unlike the majority of previous studies that have focused on actual burdens such as physical impairment and the carrying of heavy objects, we build on the findings of Slepian et al. (2012) and Slepian et al. (2014) to demonstrate that concepts with a metaphorical relationship to heaviness can influence the perceived slant of hills. Similarly, unlike most embodied perception research, which has focused on perceptual implications (Meier et al., 2012), we demonstrate that metaphorical burdens directly influence action, leading the participants to jump less high than they otherwise would.

Finally, we contribute to the literature on the link between embodied perception and psychosocial resources. Previous research in this domain has focused on social support and felt understanding (i.e., the feelings of being validated, respected, and appreciated; Beckes & Coan, 2011; Harber, Einev-Cohen, & Lang, 2008; Oishi, Schiller, & Gross, 2012; Schnall et al., 2008). This research has demonstrated that psychosocial resources such as social support and felt understanding can "lighten" individuals' burdens and make the physical world seem less demanding. There has been no discussion of conflict in this literature, although psychosocial resources are particularly likely to be compromised by conflict. Our findings imply that forgiveness might be an intervention that allows individuals to reclaim the psychosocial resources they have lost.

This study is not without its limitations, which highlight important directions for future research. First, it is important to note that the effects of forgiveness are not universally positive. Previous studies demonstrate that the positive effects of forgiveness are moderated by several factors (Exline, Worthington, Hill, & McCullough, 2003; Luchies, Finkel, McNulty, Kumashiro, 2010; Wallace, Exline, & Baumeister, 2008). For example, some studies suggest that the positive effects of forgiveness are attenuated when the offender is unrepentant or disagreeable (Luchies et al., 2010). Thus, the effects of forgiveness on victims' interactions with the physical world might hinge on the characteristics of the offender. Likewise, the effects of forgiveness might hinge on the social norms and expectations surrounding a particular offence. Sociological research has conceptualized reconciliation processes as social rituals in which the victim and offender are expected to fulfill prescribed roles. In particular, when offenders apologize to their victims, victims are typically expected to offer forgiveness in return (De Cremer, Pillutla, & Reinders Folmer, 2010; Risen & Gilovich, 2007; Tavuchis, 1991). This suggests that the burden of unforgiveness might be particularly high when the offender is repentant, yet the victim is still unable to forgive.

Finally, we note that although Studies 1 and 2 converge to suggest that unforgiveness produces a burden akin to carrying a heavy load (Bhalla & Proffitt, 1999; Proffitt et al., 2003; Slepian et al., 2012, 2014), the precise mediating mechanisms of these effects were not tested. One potential explanatory mechanism might involve the participants' feelings of power. Power is an important determinant of individuals' resource availability (Emerson, 1962; Keltner, Gruenfeld, & Anderson, 2003), and it may affect the perception of the physical properties of objects via resource availability. Indeed, a recent study finds that individuals who experience social power perceive a box of books to be physically lighter than individuals who experience a lack of social power (Lee & Schnall, 2014). This is consistent with research showing that social power is associated with more efficient mobilization of action-relevant bodily resources (Scheepers, de Wit, Ellemers, & Sassenberg, 2012). Given that victims who are unable to reconcile with their offenders often feel a sense of powerlessness within the victim–offender relationship (Schnabel &

Nadler, 2008), this suggests that the sense of powerlessness may deplete resources and this makes it more difficult to deal with physical challenges.

Unforgiveness also enhances rumination (Carlsmith, Wilson, & Gilbert, 2008), which may decrease the availability of cognitive resources such as glucose that can be otherwise used to cope with physical challenges such as jumping and climbing a hill (Schnall, Zadra, & Proffitt, 2010). Future research should explore the potential mediating mechanisms of these effects. Along similar lines, although our research suggests there is a link between perception and action, this link was not directly tested. Future research should address this issue by simultaneously measuring both perception and action and examining the link between these two phenomena.

Conclusions

A state of unforgiveness is like carrying a heavy burden—a burden that victims bring with them when they navigate the physical world. Forgiveness can "lighten" this burden. Our findings suggest that the benefits of forgiveness may go beyond the constructive consequences that have been established in the psychological and health domains; it may have lasting implications for how forgivers perceive and interact with the physical world.

Note

1. Although data were collected in two locations, inclusion of location as a moderator or control did not influence our results in any way.

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