“Did I Do That?” The Influence of Perceived Motion on Responsibility and Regret

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

Micah Bryan Goldfarb

Graduate Program in Psychology

The Ohio State University

2013

Master's Examination Committee:

Dr. Lisa K. Libby, Advisor

Dr. Kentaro Fujita

Dr. Robert Arkin
Abstract

The social world is rife with ambiguity. Attributions of personal responsibility are an example of complex social situations that are inherently ambiguous. Emerging evidence demonstrates that the understanding of abstract social concepts can be influenced by physical experiences (Niedenthal et al., 2005). The current research investigates how perceived motion of the self relative to one’s environment influences judgments of responsibility and, consequently, feelings of regret. We propose a model of responsibility, such that perceiving oneself as moving through one’s environment (ego-moving) invokes a model where the self is perceived as being responsible for one’s behavior. While perceiving the environment as moving towards one’s stationary self (environment-moving), the self is perceived as being less responsible for one’s behavior. Given that personal responsibility is central for regret (Zeelenberg & Pieter, 2007) we chose to examine our model of responsibility through the framework of negative regrettable events. In two studies participants identified a regretted life event and either moved through their environment or remained stationary in a physical motion manipulation (Study 1) or in a perceptual motion manipulation (Study 2). As predicted, both studies showed that perceiving oneself as moving through one’s environment led to greater feelings of responsibility and, as a consequence, greater regret for one’s past behavior.
Acknowledgments

I would like to thank my advisor, Dr. Lisa Libby, for all of her help and support throughout the entire thesis process. I am grateful for the opportunity to be able to organize a project under her oversight and appreciate all of her assistance. I would also like to thank all the graduate students who have assisted me throughout this process with helpful feedback and insight along the way. A special thank you must go out to the entire Subjective Perception Lab (Greta Valenti, Karen MacGregor, Karen Hines, Janet Rha, and Jessica Rea), and Paul Stillman, for all of their help over the last two years as well as providing extremely useful feedback on earlier drafts of the thesis.
Vita

May 2007 ................................................. Sycamore High School

2011 ......................................................... B.A. Psychology, The Ohio State University

2011-2012 ............................................... Graduate Fellow, The Ohio State University

2012-2013 ............................................... Graduate Associate, Department of Psychology, The Ohio State University

Fields of Study

Major Field: Psychology
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Chapter 1: Introduction

*Responsibleness is the very essence of human existence*

*Victor Frankl, A Man’s Search for Meaning*

Why is responsibility important? The opening quote by Victor Frankl captures the importance and necessity for research to further understand the various elements of responsibility. Understanding one’s own level of responsibility for an event is critical to determining how one should feel as well as how one should act. The aim of the current research is to explore a novel approach to understanding personal responsibility. Our interest in responsibility regards the overarching elements of agency and controllability. These terms are not identical however are often used almost interchangeably. For simplicity we will refer to this concept, of being the causal agent of a specific outcome, as responsibility.

Understanding and appropriately attributing responsibility is a critical aspect of everyday life. Without being able to correctly attribute responsibility to oneself or one’s environment, life would be a constant state of uncertainty. One would be unclear the extent to which outcomes were due to one’s behaviors or rather to the circumstances or situation. The cause of an outcome would be ambiguous and therefore one would never know what or who caused a specific outcome. This ambiguity is unsettling and we are motivated to resolve such ambiguity in the world around us. The current work attempts to
demonstrate how perceptual cues in the environment influence perceptions of responsibility in ambiguous situations.

The television show character, Steve Urkel from *Family Matters* is a perfect example of the ambiguous nature of responsibility. Throughout each episode Steve would be engaged in various hijinks and mishaps that always end up backfiring and causing him to recite his infamous question, “Did I do that?” Beyond being funny, this playful anecdote touches on an important social psychological issue of understanding the ambiguous nature of perceptions of responsibility. Steve is struggling to understand that he is indeed responsible for the hilarious disaster that just befell him. People often interpret ambiguous situations entirely differently from one another (Griffin & Ross, 1991), and being able to recognize and appropriately categorize the extent one is responsible in certain situations is critical to understanding past behavior. However, we are often unaware of the various interpretations there may be for behavior and fail to acknowledge the external factors that may be at play when attributing responsibility for behavior.

The process of disambiguation is more ubiquitous than we may realize, especially given the failure to consider the existence of other interpretations, often due to naïve realism (Ross & Ward, 1996). There are many factors that influence the way we subjectively perceive and make sense of our world (e.g. Construal Level Theory, Trope & Liberman, 2003; Imagery Perspective, Nigro & Neiser, 1983; Libby & Eibach, 2011) and the current research focuses on a new approach. The current research aims to explore how one’s understanding and disambiguation of responsibility can be grounded in one’s
physical experience. In the present paper, we explore the hypothesis that perceptual cues derived from the motion of oneself relative to one’s environment can be used to disambiguate situations in which responsibility is ambiguous. We propose that perceived motion of the self invokes a cognitive model that determines one’s attribution of responsibility.

*Embodied Cognition*

Research on embodied cognition provides an approach to disambiguating information from our social worlds. In general, embodied cognition claims that the motor system is the basis for cognition (Borghi & Cimatti, 2010). According to this account, physical body position and/or movement can change the way people think, the conclusions they draw, and the decisions they reach (Lakoff & Johnson, 1999). Further research has found support that physical experience is the basis for understanding abstract concepts (e.g. humor, attitudes, and time) and that cognitive representations of the world are grounded in their physical context (Boroditsky & Ramscar, 2002; Niedenthal et al., 2005).

Numerous researchers have demonstrated this link between abstract concepts and physical context. For example, the facial feedback hypothesis states that people use facial feedback to shape their evaluations (Strack, Martin, & Stepper, 1988). Studies showed that people who were instructed to contort their face into a smile as opposed to a frown rated cartoons as being more humorous. This study showed that perceptions of humor are grounded in the physical experience of smiling instead of frowning. Another example of using cues from one’s body to influence judgments was shown through work on head
movements and persuasion (Wells & Petty, 1980). This research demonstrated that when people were instructed to nod their heads up and down, as opposed to shaking their heads side to side, during a supposed headphone-testing paradigm, they reported greater agreement with a radiobroadcast that was playing through the headphones during the head shaking/nodding task. A follow-up study demonstrated that this effect was driven by the thoughts participants were thinking while either nodding or shaking their head. Nodding one’s head was associated with supporting one’s thoughts as opposed to doubting one’s thoughts regardless of the message being broadcasted (Brinol & Petty, 2003). This work again demonstrated the powerful influence that cues from one’s body can have on inferring one’s attitudes.

Researchers in cognitive psychology have demonstrated that time could be embodied as well. Boroditsky and Ramscar (2002) manipulated participants to imagine moving in a chair across a room (ego-moving) or remaining stationary and pulling the chair toward themselves (ego-stationary). They then asked participants an ambiguous question about time, “Imagine you have a meeting on Wednesday and it is moved forward two days. What day is the meeting on?” Forward, in this case, is ambiguous and depends on whether one sees time as moving towards oneself or rather that one is moving through time; therefore the answer could be either Monday or Friday (respectively). Participants interpreted forward as the direction of the motion, so that either they are moving through their environment or their environment is moving towards them. Therefore, participants in the ego-moving condition (moving a chair across a room) interpreted forward as in they are moving through their environment and see themselves
as moving through time. Therefore ego-moving participants interpreted that a meeting on Wednesday that is moved forward two days would now be scheduled for Friday. Participants in the ego-stationary condition (pulling a chair towards themselves) interpreted \textit{forward} as in their environment is moving towards them and see time as moving towards themselves as well. Therefore ego-stationary participants interpreted that a meeting on Wednesday that is moved forward two days would now be scheduled for Monday. These results demonstrate that one’s representation of space can influence one’s understanding of the abstract concept of time.

Further research has investigated the role of embodiment in resolving ambiguity in causal agency, which is related to responsibility; however the further research focuses on concrete aspects of responsibility for physical actions. Research demonstrates that people infer causal agency even for movements that they do not perform (Wegner, Sparrow, & Winerman, 2004). This research claims that agency is an inference and not a necessary fact. Wegner and colleagues claim that people use cues from body movements, positioning, sensory feedback, and visual feedback to infer behavior as either being agentic (self-responsible for behavior) or lacking agency (self not responsible for behavior). Wegner and colleagues demonstrated this by having participants stand facing a mirror with their hands at their side while a second participant acting as a “hand helper” stand out of sight just behind the first participant. This setup created a visual illusion with a mirror that led the first participant to perceive the hand-helper’s arms as being their own. The hand helper would be instructed to perform hand gestures. In one condition both participants could hear the instructions of what hand gesture was to be performed
while in the other condition only the hand-helper could hear what gesture they were supposed to perform. When participants could hear the instructions describing the upcoming gesture they were more likely than those who did not hear the instructions to perceive themselves as being responsible for the hand gestures, even though it was the “hand helper” who was making the gestures in both conditions.

Follow up research discovered that when the hand helpers snapped a rubber band on their own wrists the other participant displayed a significant physiological response. The non-hand-helper participant did not experience any actual pain from the rubber band, however still experienced a physiological response as if it had happened to themselves. These two studies helped to demonstrate that people use cues (such as pre-knowledge of body movements) to disambiguate and infer causal agency and determine whether they are the initiator or rather someone else is the initiator. The visual illusion, designed by this research paradigm, led to falsely attributing causal agency to oneself because cues are present that lead one to infer responsibility for the action. This research demonstrates the powerful role that physical and perceptual cues can play in inferring levels of agency and responsibility. The previous research established that agency can be inferred from one’s specific body gestures.

The current research creates a novel perspective that perception of the self’s motion in relation to the environment invokes general mental models of responsibility and agency that are then applied to judge personal responsibility in unrelated situations. The work by Wegner and colleagues examines perceptions of agency (am I moving my arm or is someone else moving my arm?) based on perceptual cues that are part of the
action about which agency judgments are made. Participants infer the extent they are responsible for moving their hands from the cues in the environment that make it appear that they are responsible for their movements. Similar to the agency work, our work examines how perceptual cues can influence the interpretation of ambiguous responsibility situations. However, a key distinguishing feature of our research is that we are not examining the effect of perceptual cues on judgments about that are a part of the physical actions about which agency judgments are made. Instead, we are examining use of perceptual cues in the immediate environment that invoke a general mental model of responsibility that is then applied to disambiguate unrelated events – e.g., a past instance of hurting a friend’s feelings.

We hypothesize that perceptual cues regarding the physical motion of the self relative to one’s environment provide the basis for two different cognitive models of personal responsibility. Perceiving oneself as moving through one’s environment (ego-moving) invokes a model where the self is the causal agent acting on the world. Applying this mental model leads people to perceive themselves as the “master of their destiny” and personally responsible for their behavior. On the other hand, perceiving the environment as moving towards one’s stationary self (environment-moving) invokes a model where the self is not the causal agent but rather is subject to causal forces that reside in the external world. Applying this mental model leads people to perceive themselves as lacking personal responsibility for their behavior and therefore as responding and reacting to situational issues thrust upon them. In the current work we manipulate the perceptual cues regarding participants’ motion in the immediate
environment and measure participants’ perceptions of personal responsibility for past behavior.

Consequences of Responsibility

Assessing responsibility is significant because of its many downstream consequences. Responsibility is the key component in many psychological processes including, but not limited to, self-efficacy (Bandura, 1982), commitment and persistence (Staw, 1981), pride (Weiner, 1972; Tracy & Robins, 2004), and regret (Gilovich & Medvec, 1995). The current work focuses particularly on the connection between responsibility and regret.

Regret is a comparison-based emotion of self-blame that one experiences when realizing or imagining that one’s present situation would have been better had one acted differently (Zeelenberg, 1999; Zeelenberg & Pieter, 2007). This is a universal feeling, as well as the experience of counterfactual thinking. Counterfactual thinking occurs when one wonders and contemplates about the possible alternative scenarios that could have transpired had one acted differently (Roese & Olson, 1995). For example, if I had only not said that rude comment then I would not have hurt my friend’s feelings. The key component of this feeling of regret is personal responsibility and agency (Landman, 1993; Sheffrin & Statman, 1985). Without a sense of responsibility then one will not experience regret but rather experience the emotion of disappointment (Zeelenberg & Pieter, 2007). An example used in the literature to differentiate between regret and disappointment is that “a child is disappointed when the Tooth Fairy forgets about his lost tooth, while the child’s parent feels regret for the lapse” (Zeelenberg & Pieter, 2007).
This demonstrates that the child lacks personal responsibility and therefore feels disappointment for the unfortunate event. The parent on the other hand was responsible for forgetting this childhood ritual and therefore feels regret for the lapse and thus the child’s disappointment. In addition to effects of perceived motion on responsibility, the current research is trying to further the understanding of regret and demonstrate that emotions of self-blame can be influenced by perceptions of motion.

Current Studies

The present research examines the extent that perceptual cues of motion of the self relative to one’s environment invoke a cognitive model of personal responsibility (has responsibility: ego-moving vs. lacks responsibility: environment-moving). The application of the cognitive model then has downstream consequences on feelings of regret. In two studies we will examine cues of motion through both physical (Study 1) and perceptual (Study 2) avenues and assess the extent they influence perceptions of responsibility and regret for a past behavior. The primary hypothesis is that participants will infer one’s level of responsibility from the perceptual cues of motion of oneself relative to one’s environment. The perceptual cues of motion will in turn influence regret through the effects on responsibility. In two studies we hope to demonstrate that perceptual cues of motion invoke a cognitive model of personal responsibility that will then determine the extent one experiences regret for past negative behavior.
Chapter 2: Study 1

Method

Participants

One hundred three Introductory Psychology students (57 males), who ranged in age from (18-42) with an average age of \( M= 19.23 \), received course credit in exchange for their participation.

Procedure

Participants arrived at a classroom in groups ranging from four to ten and were seated spaced apart throughout the room. Sessions were randomly assigned into either environment-moving or ego-moving conditions. The distinction between these two conditions is the motion manipulation, which will be discussed shortly.

First, participants recalled a time when they had hurt a friend’s feelings and thought about the regret they felt for hurting their friend. They were given three minutes to recall and visualize the scenario. After the three minutes passed, participants wrote down the date that this scenario occurred and were given another three minutes to write in as much detail as possible to describe the time they hurt a friend’s feelings. After the three minutes passed, participants were asked to stop writing.

Motion manipulation. After we had participants describe the time that they felt regretful for hurting their friend’s feelings, we then manipulated participants into either an ego-moving or environment-moving perspective. In both conditions, the experimenter
explained that “for the next part of the study…” as he or she flipped through many paper packets and searched for the next part of the study before explaining that “I am very sorry, but I think I forgot the second part of the study upstairs”. For the ego-moving condition, the experimenter said “why don’t you all follow me upstairs to complete the rest of the study” and the participants moved through their environment and followed the experimenter upstairs into another room where they completed the rest of the study. The environment-moving condition experienced the same supposed misplaced packets as the other condition, however the experimenter said “why don’t you all stay here and I will bring the packets to you”. Therefore, the participants in this condition remained stationary while the experimenter brought the packets to them, creating a situation where their “environment” was moving towards their stationary selves. The experimenter was not aware of the hypotheses until after the data were collected.

**Dependent measure.** Following the motion manipulation, participants completed a questionnaire about the event they had recalled earlier. The focal dependent measures assessed level of responsibility and regret for past behavior. First, participants answered the question; “how responsible do you believe you were for hurting your friend’s feelings?” on a 5-point likert-type scale from not at all responsible to very responsible, with midpoints of not very responsible, somewhat responsible, moderately responsible. Then participants reported “how much regret do you currently feel?” again on a 5-point scale from none at all to an extreme amount. Participants also completed the Positive And Negative Affect Scale (Watson et al., 1988b), with the instructions to “indicate to what extent you feel this way RIGHT NOW”. We added the item “regretful” as the final
item on the scale to see how regretful participants felt at the moment, while not directly focusing on the time they actually hurt their friend’s feelings. Participants then completed demographic information and were debriefed and thanked for their participation.\(^1\)

Results and Discussion

*Responsibility items*

To assess responsibility, we looked at the item asking, “How responsible do you believe you were for hurting your friend’s feelings?” We expected that those who perceived themselves as moving through space (ego-moving condition) would rate themselves as more responsible for hurting their friend’s feelings than would those who perceived the environment as moving towards themselves (environment-moving condition). As predicted, participants in the ego-moving condition felt more responsible for hurting their friend’s feelings \((M = 4.37)\) than those in the environment-moving condition \((M = 3.98)\), \(t(101) = 2.06, p = 0.04\) (see figure 1).

*Regret Items*

We averaged the two regret items (“how much regret do you feel right now” and “regretful” item added to the PANAS) \((r(102) = .66, p < 0.01)\) to create an index with higher numbers indicating greater regret. While the effect of perceived motion on responsibility is the primary hypothesis, we did expect that those in the ego-moving condition would feel greater regret than the environment-moving condition.

\(^1\) There were many other dependent variables included in the study that did not show clear effects which will not be discussed further. The full materials are included in (Appendix A).
Unfortunately, analysis revealed a non-significant effect of perceived motion on regret such that participants in the ego-moving condition (M = 2.92) did not feel any more regret for hurting their friend’s feelings than participants in the environment moving condition (M = 2.84, t (101) = .36, p = .72). Therefore, our motion manipulation had no total effect on the regret items; however, we conducted our planned mediation to examine the predicted pathway that perceptual cues of motion through space will influence responsibility, which will in turn influence feelings of regret.

Mediation analysis

We predicted that moving through space would make one feel more responsible and feeling more responsible would lead to greater regret. Using bootstrapping analysis (Preacher & Hayes, 2008), we found a significant indirect pathway of the influence of motion on regret through responsibility (CI: .01, .18). The motion manipulation indirectly influenced feelings of regret through the mediator of responsibility. Moving through space led to greater feelings of responsibility (B = .19, SE = .09, p < 0.05) and greater feelings of responsibility led to greater feelings of regret (B = .38, SE = .11, p < 0.05). However, as reported earlier, there was no total effect of perceived motion on regret (B = .04, SE = .11, p = 0.72).

Affect

There was no effect of our manipulation on the negative affect scale of the PANAS (t (79) = 0.38, p = .70) or on the positive affect scale (t (100) = 0.04, p = .97).²

² There was an error in data collection and a portion of the participants did not receive several items of the scale, which is why there is a difference in the degrees of freedom between the negative affect scale and the positive affect scale.
However, a bootstrapping analysis (Preacher & Hayes, 2008) found a significant indirect effect of motion on general negative affect through responsibility (CI: .04, .27). Feeling responsible for hurting a friend’s feelings led participants to feel bad in general. However, controlling for regret eliminated the indirect pathway (CI: -.04, .05). In contrast, when conducting the original mediation pathway of motion on regret through responsibility while controlling for negative affect, the indirect pathway was still significant such that responsibility was a significant mediator of motion on regret (CI: .03, .25). This demonstrates that the key outcome of the effect of motion on responsibility is feeling regret and not feeling bad in general.

These findings suggest that moving through one’s environment can lead to greater feelings of responsibility for a past negative behavior, and feeling more responsible for negative behavior will lead to greater feelings of regret. However, one can argue that the physical motion increases levels of arousal that might influence perceptions of responsibility and regret. The ego-moving participants could be more aroused, because they physically moved, as compared to the environment-moving participants who remained stationary. Study 2 was developed to hold physical motion constant while replicating the effect of perceived motion on responsibility, as well as the downstream consequences of feeling responsible influencing feelings of regret. Study 2 utilizes an optical illusion task designed to eliminate arousal as an alternative explanation and demonstrate that perceptual cues are the driving force behind the phenomenon, such that the effect is not reliant upon physical motion.
Chapter 3: Study 2

Method

Participants

Forty-eight Introductory Psychology students (25 males), who ranged in age from (18-21) with an average age of $(M=18.94)$, received course credit in exchange for their participation.

Procedure

The procedure for Study 2 was similar to Study 1 except that participants completed the entire experiment on computers as well as completed the new visual motion manipulation. Participants were given the same amount of time to recall a time they had hurt a friend’s feelings, visualize, and write an account of the event. This study also did not emphasize thinking about the “regret felt” but rather instructed participants to just recall a time they had hurt a friend’s feelings and think about the “event”(instead of regret). This was done to avoid priming regret directly and then measuring regret as a dependent variable.

Participants then completed the motion manipulation, which will be explained shortly. Following the motion manipulation, participants completed the causal dimension scale (Russell, 1982) which was added in order to have participants think about the
various attributions that could be made from the scenario.\(^3\) This was included to try to make salient the ambiguous nature of responsibility, such that there were multiple ways of interpreting the scenario (See appendix B for Study 2 additional materials).

*Motion manipulation.* After describing the time that they had hurt their friend’s feelings, participants were manipulated into either an ego-moving or environment-moving perspective through the use of an optical illusion created for this study. Participants were told a cover story that we were interested in the interplay between visual optics and memory and that these videos would be presented sporadically throughout the session. In both conditions, a rectangular block that seemed far away appeared in a checkered hallway that expanded in size throughout each trial of the five-second video. The manipulation was whether the checkered walls surrounding the block moved or remained stationary. In the ego-moving condition the checkered walls moved past the block as the block enlarged giving participants the sensation that they were moving towards the block. In the environment-moving condition the walls remained stationary giving participants the sensation that the block was moving towards them. There were four sets of videos presented interspersed with dependent measures throughout the experiment.

*Dependent measure.* After watching the motion manipulation participants completed a questionnaire about the incident in which they had hurt their friend’s feelings. Again the focal dependent measures were aimed at assessing level of responsibility and regret for their behavior. Participants completed the same dependent

\(^3\) There were no effects of perceived motion on the causal dimension scale. As the goal of the scale was to help participants realize the ambiguous nature of responsibility the null results will not be discussed.
measures as in Study 1 examining responsibility and regret, while also completing an additional responsibility item added to the experiment. After reporting the initial items used in the responsibility scale, participants were asked “how responsible do you think you were for hurting your friend’s feelings?” on a 7-point likert-type scale from 0-15% to 85-100% with the midpoint of the scale being 50%. Participants then completed the same regret measures and the rest of the materials from Study 1.

A manipulation check was included to assess the extent that participants felt that they were moving toward the block or that the block was moving towards them. Participants were asked to choose whether the block appeared to be moving towards them or whether they appeared to be moving towards the block. There was also a seven-point bipolar scale asking participants how confident they were about the nature of the motion in the video from “extremely confident that the image is moving towards me” to “extremely confident that I am moving towards the image”. We also directly assessed feelings of arousal by first defining it as follows: “Arousal has to do with how wide awake, alert, or activated a person feels-independent of whether the feeling is positive or negative.” Then, we asked participants to rate on a seven-point bipolar scale how aroused they felt from extreme sleepiness to extremely high arousal. We also assessed power by asking “How powerful do you feel right now?” on a 5-point likert-type from not at all to extremely. Participants were debriefed and thanked for their participation.
Results & Discussion

Primary Analysis

Responsibility items. To assess responsibility we looked at questions from both studies; “how responsible” from Study 1 and the new item created for Study 2, “what percentage responsible”. In examining the item from Study 1, unfortunately we found a non-significant effect of perceived motion on “how responsible”. This effect was in the predicted pattern with participants in the ego-moving condition feeling relatively more responsible for hurting their friend’s feelings ($M = 3.84$) than participants in the environment moving condition ($M = 3.48$, $t (46) = 1.10$, $p = 0.28$). However, upon examining the percentage participants were responsible we found the predicted effect of perceived motion leading to greater responsibility. Participants in the ego-moving condition felt more responsible for hurting a friend’s feelings ($M = 5.44$) than those in the environment-moving condition ($M = 4.39$, $t (46) = -2.04$, $p < 0.05$).  

Regret Items. We averaged the two items assessing regret (ratings of current regret and regretful from the PANAS) ($r (48) = .47$, $p < 0.01$) to create an index with higher numbers indicating greater regret. Similar to Study 1, the effect of perceived motion on responsibility was the primary hypothesis; we expected that participants in the ego-moving condition would feel greater regret than participants in the environment-moving condition.

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4 When we standardized and averaged the two items assessing responsibility ($r (48) = .53$, $p < 0.001$) to create an index with higher numbers indicating greater responsibility ($M = 0$, $SD = 0.87$) we found a marginal effect in the predicted direction of perceived motion on the combined responsibility measure ($t (46) = 1.8$, $p = 0.08$). When assessing the mediation pathway this combined responsibility measure did not show consistent significant results through multiple uses of bootstrapping analysis (even when increasing the cases sample size) and therefore this combined item did not seem entirely dependable and was not included.
moving condition. Unfortunately, analysis revealed a non-significant effect of perceived motion on regret such that participants in the ego-moving condition \((M = 2.58)\) did not feel any more regret for hurting their friend’s feelings than participants in the environment moving condition \((M = 2.61, t(46) = .09, p = .93)\). Therefore our motion manipulation had no total effect on the regret items. However, we conducted our planned mediation to examine the predicted pathway that perceptual cues of motion through space will influence responsibility, which will in turn influence feelings of regret.

**Mediation analysis.** We predicted that seeing oneself as moving through space would make one feel more responsible and feeling more responsible would lead to greater regret. A bootstrapping analysis (Preacher & Hayes, 2008) revealed a significant indirect pathway from the motion manipulation to regret through responsibility (CI: .01, .31). The ego-moving condition indirectly influenced feelings of regret through the mediator of responsibility. Perceived motion through space led to greater feelings of responsibility \((B = .52, SE = .26, p < 0.05)\) and greater feelings of responsibility led to greater feelings of regret \((B = .23, SE = .08, p < 0.001)\). However, there was no total effect of perceived motion on regret \((B = -.01, SE = .16, p = 0.93)\). An explanation of this null finding will be addressed in the discussion section as possible suppression effects are explored.

**Manipulation Check**

We examined the effectiveness of the optical illusion manipulation as assessed by the motion manipulation check. We expected that those in the ego-moving condition would report that they perceived themselves as moving toward the image, in the
categorical choice question, as well as rating themselves as confident that they were moving towards the image. As expected, the motion manipulation did affect responses on the categorical choice measurement. Seventy-two percent of participants in the ego-moving condition, compared with only 4% of participants in the environment-moving condition felt like they were moving towards a stationary object, \( \chi^2(1, N = 48) = 22.93, p < .001 \). The bipolar measure also showed the expected results that those in the ego-moving condition were confident that they were moving towards the image \((M = 4.44)\) while the participants in the environment condition were confident that the image was coming towards them \((M = 1.83, t(46) = -5.02, p < .001)\). There was no effect of our manipulation on the PANAS negative affect scale \((t(46) = 0.05, p = .96)\) or positive affect scale \((t(46) = 0.86, p = .39)\). There was also no indirect effect of motion on general negative affect through responsibility \((CI: -.10, .07)\). In addition, we conducted the original analysis of the indirect effect of motion on regret through responsibility while controlling for negative affect, and found that the indirect pathway was still significant such that responsibility was a significant mediator of motion on regret \((CI: .01, .28)\). This demonstrates that the key outcome of the effect of motion on responsibility is feeling regret and not feeling bad in general. We also found no effects of our manipulation on arousal \((t(46) = 0.02, p = .99)\) or power \((t(46) = 0.03, p = .98)\).
Chapter 4: General Discussion

Across two studies we found support for the idea that perceived motion of the self relative to one’s environment provides the basis for two different mental models of personal responsibility, which in turn affect levels of regret for past negative behavior. Perceiving the self as moving through the environment (ego-moving perspective) caused people to feel more responsible for, and thus more regretful about, past behavior than did perceiving the self as stationary relative to a moving environment (environment-moving perspective). We believe that these effects reflect the role of perceived motion in invoking a general mental model of personal responsibility. Motion of the self relative to the environment invokes a general mental model in which the self is the causal force in the environment whereas motion of the environment relative to a stationary self invokes a general mental model in the self is not a causal factor but rather subject to causal forces in the external world. These general mental models of responsibility evoked by physical experience in the immediate environment are then applied to disambiguate personal responsibility in unrelated events at other time points – e.g., in the experiments reported here, one’s personal responsibility for hurting a friend’s feelings. These judgments of responsibility then have downstream effects, such as determining feelings of regret in the experiments reported here.
Study 1 demonstrated the initial effect that perceptual cues of motion can influence perceptions of responsibility. Participants who moved through their environments, walking upstairs into another room to complete the survey, reported greater feelings of responsibility for past behavior than those who remained stationary and had the survey brought to them. This result supports the hypothesis that people infer levels of responsibility for past behavior from the self’s physical motion in the immediate environment. Study 2 was aimed at isolating the role of perceptual cues to motion, apart from arousal or other concomitants of actual physical motion, in producing the effect in Study 1. Study 2 used a video optical illusion of motion to create the perception of motion in the absence of actual physical motion. This study replicated the findings from Study 1 showing that perceiving oneself as moving through one’s immediate environment led to feeling greater responsibility for past behavior than did perceiving one’s environment as approaching one’s stationary self. Study 2 also replicated the finding from Study 1 that perceptions of greater responsibility for the negative past behavior led to greater feelings of regret. Study 2 eliminated any physical motion confounds such as arousal, and eliminated concerns that physical action was used to activate responsibility. Therefore the effect of motion on responsibility, as seen in Study 1, appears to have been due to the perception of the self’s motion relative to the environment and not other aspects of actual physical motion.

One remaining question is that in both studies we did not find an overall effect of perceived motion on regret; however both studies did demonstrate the predicted mediation pathway. Our findings are consistent with the central feature of our hypothesis,
which was that perceived motion would influence perceptions of responsibility, which would influence feelings of regret. However, we also expected to find that perceived motion would influence feelings of regret directly. One possible explanation for the lack of an overall effect of motion on regret could be another variable, influenced by perceived motion, which is acting upon regret that is wiping out or hiding the overall effect. In other words, perhaps perceived motion is influencing a second variable – in addition to responsibility - and this second variable, also known as a suppression variable, is reducing feelings of regret via that path. Therefore there are two mediators acting in unison that both have equal and opposite impacts on the dependent measure of regret. In such a case we would not be able to see a significant effect of motion on regret because two opposing mediators are suppressing it. The current data do not fully shed light upon the question of what could be this other variable acting inversely upon regret. Future research should explore what other factors might both influence feelings of regret and be influenced by perceived motion. We are currently exploring this question and look forward to future developments uncovering possible suppression variables.

Ongoing work revealed a potential suppression variable: feelings of activeness (“how active one feels right now”). This study had participants recall a past negative behavior, manipulated perceived motion (ego- vs. environment-moving), and measured perceived responsibility, regret, and feelings of activeness (among other variables). The results showed that the effect of perceived motion on regret was unable to be seen without controlling for both mediators, perceived responsibility and feelings of activeness. In addition, ego-moving (vs. environment-moving) participants perceived
greater responsibility, which led to greater regret, while ego-moving participants also felt 
less activeness, which led to less regret. This might suggest that feeling less active could 
result in feeling less involved in the past behavior, which would naturally lead to less 
regret. This study measured activeness after responsibility and regret, and thus is not 
perfectly designed to examine the suppression effect, but future studies could be 
specifically designed for this purpose.

The lack of an overall effect of motion on regret brings forth the question of 
which is more important: practical or theoretical significance. The theoretical 
significance is that we are trying to understand the mechanism and process of the effect 
and therefore the goal is to demonstrate support for the predicted pathway, which we do. 
At the theoretical level this process is extremely interesting in its own right because it 
adds to the literature on the burgeoning domain of the effects of inferring one’s attitudes, 
judgments, and, in this case, perceptions of responsibility from one’s physical experience. 
The practical significance of this null effect is unfortunate because whether perceived 
motion leads to differences in regret remains unclear. Therefore, at the practical level, we 
cannot conclude that motion directly influences emotions of regret. However, we believe 
there are cases in which we would see our expected effect at both the theoretical and the 
practical level. Future research needs to further explore potential suppression variables in 
order to demonstrate both the practical and theoretical significance of the current 
mediation pathways.
Implications

Responsibility and regret are pervasive in everyday human experience and have crucial implications both theoretically and practically. Theoretically, the current work provides a novel approach to understanding personal responsibility. This research also expands the research on the impact of using cues from one’s environment to infer perceptions of responsibility and regret. The current work hopes to further our understanding of both the concept of responsibility and the impact of using perceptual cues to make inferences and judgments. The current work also attempts to provide the groundwork for further exploration into related domains of efficacy and how perceptions of efficacy may be constructed.

There are also possible functional benefits of feeling like you are moving through the world rather than the world is coming at you. At an applied level there are clear implications in a variety of domains, especially education testing and business productivity. Our theory claims that the effects from physical motion are due to the perceptual cues of motion (as demonstrated in the optical illusion tasks). While the effect may depend on the visual field, physical motion includes the use of these visual cues and physical motion is equally effective at influencing perceptions of responsibility. Physical motion is also often more practical to initiate in real world settings. Study 1 shows that simply walking to take a survey versus remaining stationary leads to greater felt responsibility than those who had the survey brought to them. This could have important implications for the education system alone. Students could feel more responsible and efficacious after moving through their environments (e.g. walk to receive a test versus
pass the test out to stationary students) that could impact academic achievement as well as perceptions of future academic success. Our research would also suggest that block classes (where students stay in the same room with the teachers changing rooms) might be deleterious to student performance. This work could have an immediate impact in the education system by promoting a more active approach to learning. In order to create an active learning environment, perhaps inducing an ego-moving mindset (through physical or perceptual motion) could be beneficial.

Another implication we plan to expand this research into is in the realm of self-regulation and prospective self-control (Ainslie, 1975; Rachlin, 2000). We believe that an ego-moving perspective would map on to a proactive regulatory mindset that will anticipate future self-control conflicts and avoid confronting temptations. While an environment-moving perspective will map on to a reactive regulatory mindset that will wait to see if there is a problem and then respond in the moment. Both perspectives can be functional and dysfunctional. A proactive approach can waste so much time planning for any possible scenario that may never happen, while a reactive approach could fail to take advantage of opportunities to avoid tempting situations. This work would broaden the current theory by demonstrating that perceptual cues activate different construals of a self-control conflict, which will determine the use of prospective self-control strategy. This work also explores the impact that situational factors play in determining self-control success, a domain that has received little attention especially in comparison to the potential significance of understanding prospective self-control (Fujita & Roberts, 2010; Fujita, 2011).
The proposed research program also has practical implications to be implemented in the workplace, such as changing the physical layout to promote moving through space versus remaining stationary. According to the proposed framework, such a change would produce greater responsibility, commitment, and efficacy, which has been shown to facilitate job satisfaction, increased performance, and greater effort on related tasks (Stajkovic & Luthans, 1998). Further, across a variety of domains (including the workplace), feelings of regret can be beneficial when it leads people to change negative behavior to reduce future regrets and not replicate mistakes (Gilovich & Medvec, 1995). The current research could help people learn from their mistakes, a skill that transcends every facet of life. For example, perhaps if Steve Urkel could adopt an ego-moving perspective of his world he would realize the extent that he is responsible for the mishaps that surround him and the subsequent regret would cause a change in behavior.

This research could also be used when reducing perceptions of responsibility, efficacy, or regret is adaptive. It is not always beneficial to be able to appropriately conclude that one is responsible for a negative event. Imagine a CEO who is responsible for firing employees. The CEO does not want to reflect on how he/she is responsible for ruining their employee’s life. In this case viewing their work from an environment-moving perspective would be beneficial and adaptive. One could imagine the perspective taken also influencing depressed individuals who typically withdraw and are less active, and would probably naturally adopt an environment-moving perspective. Perhaps feeling like the world is coming at you and that you lack responsibility would lead those in this perspective to believe they lack efficacy and are not capable of accomplishing goals or
changing one’s ways. Perhaps in order to focus on positive attributes or achievements these individuals would benefit from an ego-moving perspective induction so the individual will acknowledge that they indeed are responsible for positive outcomes rather than luck or the circumstances. Both perspectives have their utility; in no way is one perspective categorically better. In certain situations perhaps inducing an environment-moving perspective could help depressed individuals recognize the situational influences that led to negative outcomes and therefore attribute less responsibility to oneself as being the source of the problem. The situation will determine what the valued perspective is. Perhaps the perspective adopted could even be motivated. Perhaps one’s motivation could license the use of perceptual cues of motion to infer responsibility to fit one’s needs and wishes. Are the effects of perceived motion cues flexible and how long will the effects last? There are countless questions still to be answered and we look forward to answering as many as possible.

Future Directions

Threat. The current package of studies attempts to address potential alternative explanations of the data. We have already discussed how Study 2 was created to eliminate any physical motion or arousal confounds present in Study 1. One potential alternative explanation for the results of Study 2 is that both the experience of watching a block move towards the stationary participant, or feeling like one is moving towards a stationary block could be perceived as threatening, which might add unwanted noise to the data. However, the videos do not move very fast and it is unlikely that participants felt threatened by the videos. Along with being unlikely, more important is the fact that
there is no reason to believe that participants in Study 1 felt threatened by walking into another room or remaining stationary. Therefore although level of threat may be a potential concern in Study 2, this explanation does not easily explain the findings from Study 1. Regardless, future studies must include measurements of threat in order to convincingly show that threat is not causing the effects seen in the current studies.

*Ambiguity of scenario.* Another potential question is that perhaps recalling “A time when you hurt a friend’s feelings”, may have implied personal agency, causing everyone to report high levels of responsibility. The intention of the prompt was to elicit an event that was ambiguous and suggest that the participant could have caused something to happen to his/her friend, or, that it was an unfortunate situation that caused the participant to hurt his/her friend. The prompt itself does however seem to imply that the participant did something to his/her friend and therefore should be more responsible. This is why the causal dimension scale and additional responsibility measures and were added to Study 2, in order to create a more ambiguous scenario and a more sensitive measure. This shortcoming in the methods may in fact make the effect more impressive. Future studies will use a scenario where participants “recall a time when a friend was upset with you”. This adjustment takes the focus of the action off of the participant and on to the friend, and allows for more ambiguity in the extent to which participants were responsible for how their friend feels. This ambiguity should strengthen the use of perceptual cues to infer responsibility. The results of such a study may be more likely to show the overall effect of perceived motion on regret, which was not observed in the current studies.
Direction of motion. Another interesting idea that may be a factor when examining the influence of perceptual motion on responsibility is the direction of the motion. In the presented studies both conditions consisted of participants who were approaching or being approached by the object. We are interested in whether these effects will persist if one was avoiding rather than approaching the image. It is possible that perceiving oneself as approaching versus avoiding an object could determine how responsible one believes to be for past behavior. This would imply that the current studies were contingent on the manipulation simulating approach behavior and if the videos were reversed in order to simulate avoidance we would not find the same effect. We, however, disagree and predict that this will not be the case and that perceived motion is the key component regardless of direction of motion. Even in situations when one is moving away from an object, that person is still acting on their world and could still be described as being the “master of their destiny”. In a preliminary study investigating this question we crossed manipulations of perceived motion (ego vs. environment-moving) and the direction of the motion (approach vs. avoidance). As predicted, results revealed that ego-moving participants felt greater responsibility than environment-moving participants, regardless of the direction of the motion. This study is consistent with the idea that the key component of our effect is the perception of the relative motion and not the direction of the motion. Approach versus avoidance behavior is critical in understanding a great deal of behavior; however, it does not seem to be the driving force behind the current phenomena.
Regret vs. Disappointment. The current studies have been framed in such a way that we have been focusing on the influence of perceived motion on the extremity of emotion, such as an ego-moving perspective invokes a cognitive model leading to greater amounts of regret. We also predict that these differing cognitive models, invoked by perceptual cues of motion, lead to qualitatively different emotional experiences. We predict that people in an ego-moving perspective would interpret their behavior in an ambiguous scenario as being regretful, while those seeing the world from an environment-moving perspective would interpret the emotion attached to their behavior as disappointment. As described earlier the key distinction between regret and disappointment is that to experience regret there must be an element of personal responsibility. Preliminary data support these claims. A recent study we conducted showed that after being explained the distinction between regret and disappointment, ego-moving participants were more likely to categorize their emotional state as regret while environment-moving participants categorized their emotional state as disappointment. This finding is consistent with the idea that these cognitive models invoked by perceptual cues can lead to qualitatively different experiences. This is an exciting and impactful claim that subtle differences in perceptions of motion can lead to not only two opposing views of attribution of responsibility and blame, but can also lead to two entirely unique experiences.

Extensions to future events. The work described so far has focused on past behaviors. However, can our theory be harnessed to have meaningful implications for future goal pursuit? We believe this to be possible and a logical future direction of the
current research. A simple first step would be to alter the current scenario to be about a hypothetical future situation where “you hurt your friend’s feelings”. We would expect that those in the ego-moving condition would report greater feelings of responsibility, greater feelings of anticipated regret, and would be more likely to categorize the emotion associated with their future behavior as being regret rather than disappointment, when compared to the environment-moving condition. The demonstration of this effect would be interesting, such that perceived motion could influence one’s attributions of future responsibility, such that perceptual cues in one’s immediate environment could impact one’s perception and understanding of future behavior. This could have critical implications in the domain of goal pursuit and commitment.

There are numerous implications of demonstrating these effects on future behavior. For example, by impacting perceptions of future responsibility for a negative event, one might encourage people to avoid the event all together, or be more careful. Also making people feel more responsible for a future positive event might motivate them to pursue goals, or perhaps they will lack motivation because they feel like they feel like they have made a great deal of progress already. These effects of perceptual cues might be useful in further exploring the progress and commitment literature of motivation and goal pursuit (Fishbach & Dhar, 2005).

A future extension of our research plans to look at another element of the influence on future behavior, specifically through assessing perceptions of self-efficacy. As mentioned earlier, perceptions of personal responsibility are tied to perceptions of self-efficacy such that feeling responsible is a critical component to feeling efficacious
and capable of completing a task. (Bandura, 1982). Examining this phenomenon in the domain of academic achievement would have extremely beneficial implications. Future studies could have participants think about an upcoming test and then, following a motion manipulation, assess how efficacious they believe themselves to be at succeeding on the particular examination as well as how efficacious they feel more generally about achieving good grades. We predict that the ego-moving condition will report greater levels of self-efficacy and that these participants will report being more capable of succeeding on the upcoming test as well believing to be more responsible/in control of their grades generally, than the individuals in the environment-moving condition. The distinction explored here will be the extent participants believe one’s performance depends on one’s preparation for the test vs. one’s performance depending on the difficulty of the test. This similarly applies to how responsible one believes one is for one’s grades more generally. From an ego-moving perspective one might assess one’s academic performance as a reflection of one’s work ethic and intelligence. In essence, an ego-moving perspective should lead individuals to feeling responsible for getting good or bad grades. While an environment-moving perspective would lead individuals to assess one’s academic performance as a reflection of chance happenings and uncontrollable outcomes (either positive or negative). In essence, an environment-moving perspective would lead individuals to assess one’s academic performance as a reflection of poor/good teaching or an unfair/easy test. There are countless and exciting contributions of this work in the domain of academics that has already been touched on in the implications section.
Positive events. The current studies only focus on negative scenarios, however, we have other work done in this research line demonstrating that being able to infer responsibility from perceptions of motion is not restricted to negative events but can also be generalized to positive events. A preliminary study explored the positive domain of pride, because of the connection that feeling responsible for behavior is a critical component of feeling pride. This study was similar to Study 1 utilizing the room-moving paradigm except that participants recalled a time in which they were proud of themselves before changing rooms or remaining stationary. We found that when recalling a prideful event, participants who moved through their environment (ego-moving) felt greater responsibility than participants whose environment moved towards them (environment-moving), for the event that participants were proud of, as well as the downstream consequence of feeling greater pride. The effects of perceptual cues seem to have a similar influence on attribution of responsibility regardless of positivity or negativity of the event. An interesting extension of this work is to explore further how perceptual cues influence pride, specifically exploring the distinction between authentic pride that requires responsibility and hubristic pride that lacks responsibility (Tracy & Robins, 2007). We believe that an ego-moving perspective would use perceptual cues to infer greater authentic pride, while an environment-moving perspective would use perceptual cues to infer greater hubristic pride. This research would not merely expand our findings to a positive domain, but will also allow us to explore a critical distinction between the two perspectives.
Interpretation of perceptual cues. Research we are currently conducting is attempting to pit responsibility for the motion against the perceived cues of motion to eliminate any concerns that perceived action is activating responsibility. In this study we are not only manipulating the perceived motion (ego vs. environment-moving) but also manipulating how participants interpret their responsibility for the motion in the video (responsible for motion: participant is walking towards the block/pulling the block towards themself vs. not responsible for motion: a conveyer belt is moving the participant/a conveyer belt is moving the block to the participant). In this study we hope to hold responsibility constant and still get the same effect. We plan to demonstrate through this study that the effect is not due to differences in feeling responsible for the motion and that the predicted pathway will be seen when holding responsibility constant. We are also open to the possibility of there being an interaction between one’s interpretation of the motion in the video and the extent one infers responsibility from the motion. Perhaps feeling responsible for the motion licenses the use of perceived motion as a cue to infer one’s level of responsibility.

Bidirectional link. The focus of the current work is exploring the extent to which perceptual cues of relative motion have social psychological effects on responsibility and regret. This research has significance of understanding what influences attributions of responsibility, especially interesting when the “unrelated” domain of perceived motion influences responsibility. The inverse of this question is also of interest. In future work we would like to demonstrate a bidirectional link such that while motion influences attributions of responsibility, so do levels of responsibility influence one’s understanding
of ambiguous motion. These studies will manipulate feelings of responsibility, and then present ambiguous motion videos. These videos will be designed to make it unclear who/what is moving (oneself or an image in one’s environment) allowing for “unrelated factors” like responsibility to influence perception. We predict that participants manipulated to feel highly responsible will perceive themselves as moving towards the image rather than the image approaching their stationary self. This will add a unique addition to the current work by showing that not only is one’s understanding of responsibility and regret influenced by perceptual cues, but also that emotional states of responsibility and regret could potentially influence one’s perception. This will add a novel perspective on biased visual perception and the interplay between emotion and perception (Balcetis & Dunning, 2006). Perhaps there is truth behind the metaphor that one can be “blinded by anger”. Further research hopes to examine the interplay between emotion and perception to a greater extent.

Conclusion

Couch potato, get out of the house! Actively moving through space in any fashion has obvious cardiovascular benefits over a sedentary lifestyle. However, benefits of exercise may be more than strictly physical. Perceptual cues in the environment can have a pronounced influence on inferring attributions of responsibility, emotional states (regret and pride), and perhaps even perceptions of self-efficacy. By identifying a physical basis for the psychological understanding of responsibility, the current research supports an emerging new perspective in social psychological inquiry (e.g. Niedenthal et al., 2005). The effect of physical and perceived motion on responsibility may have psychological
benefits of making people feel more able, efficacious, and committed in broad range of situations.
References


In this study we would like you to try to recall a past situation.

We would like you to recall a time when you hurt a friend’s feelings.

As you recall such a situation, you will have three minutes to choose a specific memory and think about the regret.

It is important that in this study you think of a time that you have hurt a friend’s feelings.

Please take your time and close your eyes and visualize your memory, and when you have a detailed image, hold it there, until the three minutes are up.

DO NOT continue until experimenter tells you to proceed.
Please estimate to the best of your ability the month and year in which the situation you have been recalling occurred. Please enter the month (e.g. ‘01’ for January, ‘02’ for February) and then the 4-digit year in which the situation occurred.

_________________________

Now you will have another three minutes to provide a detailed description of the time you hurt a friend’s feelings in the space below.
Now please recall the regret from earlier in the study.

As you recall the regret of hurting a friend’s feelings please answer the following questions.

Please circle your responses.

1. How responsible do you believe you were for hurting your friend’s feelings?

   Not at all responsible
   Not very responsible
   Somewhat responsible
   Moderately Responsible
   Very responsible

2. As you recall the memory right now, how much regret do you currently feel?

   None at all
   A little bit
   A moderate amount
   A great deal
   An extreme amount

3. As you recall this memory right now, to what extent do you believe that the incident was determined by fate?

   Not at all determined by fate
   Slightly determined by fate
   Somewhat determined by fate
   Very much determined by fate
   Extremely determined by fate

4. As you picture this memory right now, how easy is it for you to imagine the incident happening another way?

   Not at all easy
   Slightly easy
   Somewhat easy
   Very easy
   Extremely easy

45
As you recall this memory right now, we are interested in what caused your behavior. For example, there may have been things about you (e.g., your personality, traits, character, attitudes and mood) that caused your behavior.

Alternatively or, in addition, there may have been things about the circumstances surrounding the incident (e.g., other people, the physical location, the time of day, and other events going on in your life) that caused your behavior.

5. To what extent did things about YOU vs. things about the CIRCUMSTANCES cause your behavior?

1  2  3  4  5  6  7

You caused event  Both equally caused event  Circumstances caused event

6. To what extent did things about you (e.g., your personality, traits, character, personal style, attitudes and mood) cause your behavior?

Not at all    A little bit     Somewhat    Very much    An extreme amount

7. To what extent did things about you (e.g., other people, the physical location, the time of day, and other events going on in your life) cause your behavior?

Not at all    A little bit     Somewhat    Very much    An extreme amount

8. To what extent is the time you hurt your friend’s feelings a result of an action that you did (action), OR, an action that you did not do that later hurt your friend’s feelings (inaction)?

1  2  3  4  5  6  7

Action    Inaction

46
9. If you could turn back time, to what extent do you believe you would have been able to act a different way?

[1] It is not at all likely that I would have acted differently
[2] It is not very likely that I would have acted differently
[3] It is somewhat likely that I would have acted differently
[4] It is moderately likely that I would have acted differently
[5] It is very likely that I would have acted differently

10. How much have you changed since the time of the situation you are recalling?

Not at all   A little bit   Somewhat   Very much   An extreme amount

11. As you recall the memory right now, how much do you regret the event originally?

Not at all   A little bit   Somewhat   Very much   An extreme amount

12. How hard was it to come up with a specific example that you recalled in this study?

Not at all hard   Not very hard   Somewhat hard   Moderately hard   Very hard

13. How vivid would you say your memory is?

[1] Perfectly clear and as vivid as normal vision
[2] Clear and reasonably vivid
[3] Moderately clear and vivid
[4] Vague and dim
[5] No memory at all

14. How negative would you rate the outcome of this situation in which you hurt your friend's feelings?

Not at all negative   Slightly negative   Somewhat negative   Very negative   Extremely negative

15. How often do you think about this situation when you hurt your friend's feelings?

Never   A little   Sometimes   Quite often   Very often
The next section is asking about how you feel *currently*.

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<td><strong>Hostile:</strong></td>
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As you picture this memory, for each word indicate to what extent you feel this way RIGHT NOW.

**Enthusiastic:**

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**Proud:**

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**Irritable:**

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**Ashamed:**

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**Inspired:**

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**Nervous:**

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**Determined:**

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As you picture this memory, for each word indicate to what extent you feel this way RIGHT NOW.

**Attentive:**

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**Jittery:**

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**Active:**

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**Afraid:**

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**Regretful:**

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**Disappointed:**

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Appendix B: Additional measures added to Study 2

(Causal Dimension Scale)

Was what caused you to hurt your friend’s feelings something for which:

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<tr>
<td>Reflects an aspect of yourself</td>
<td>Reflects an aspect of the situation</td>
<td></td>
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</tbody>
</table>

Was what caused you to hurt your friend’s feelings something for which:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controllable by you or others</td>
<td>Not controllable by you or others</td>
<td></td>
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</tbody>
</table>

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<th>6</th>
<th>7</th>
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<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent</td>
<td>Temporary</td>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended by you or others</td>
<td>Unintended by you or others</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside of you</td>
<td>Inside of you</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable over time</td>
<td>Stable over time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Something about you</td>
<td>Something about others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Was what caused you to hurt your friend’s feelings something for which:

1 2 3 4 5 6 7 8 9
Changeable Not changeable

Was what caused you to hurt your friend’s feelings something for which:

1 2 3 4 5 6 7 8 9
No one is responsible Someone is responsible

(Additional Responsibility item added to Study 2)

What percentage do you believe you were responsible for your friend being upset with you?

0-15% 15-30% 30-45% 50% 55-70% 70-85% 85-100%
Please indicate how well each of the following describes you.

**Self-confident:**

<table>
<thead>
<tr>
<th>A lot</th>
<th>Some</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
</table>

**Forceful:**

<table>
<thead>
<tr>
<th>A lot</th>
<th>Some</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
</table>

**Assertive:**

<table>
<thead>
<tr>
<th>A lot</th>
<th>Some</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
</table>

**Outspoken:**

<table>
<thead>
<tr>
<th>A lot</th>
<th>Some</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
</table>

**Dominant:**

<table>
<thead>
<tr>
<th>A lot</th>
<th>Some</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
</table>

Arousal has to do with how wide awake, alert, or activated a person feels—
independent of whether the feeling is positive or negative:

On a scale of 1-7, from extreme sleepiness to extremely high arousal, please rate how aroused you feel right now?

1 2 3 4 5 6 7

extreme sleepiness extremely high arousal
Please rate the extent that you agree with the following statements from “Not at all” to “Extremely”.

1. **How powerful do you feel right now?**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

2. **I have high self-esteem.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

3. **I am physically tired right now.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

4. **I am physically fit.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

5. **People typically do what I say.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

6. **I am the master of my own destiny.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely

7. **I am a highly moral person.**
   - Not at all
   - A little bit
   - A moderate amount
   - A great deal
   - Extremely
Read each of the following statements and decide how much you agree with each according to your beliefs and experiences.

1. I don’t mind doing things even if they involve extra effort.
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

2. I am a “workaholic.”
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

3. I feel excited just before I am about to reach a goal.
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

4. I enjoy actively doing things, more than just watching and observing.
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

5. I am a “doer.”
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

6. When I finish one project, I often wait awhile before getting started on a new one.
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree

7. When I decide to do something, I can’t wait to get started.
   - Strongly disagree
   - Moderately disagree
   - Slightly disagree
   - Slightly agree
   - Moderately agree
   - Strongly agree
8. By the time I accomplish a task; I already have the next one in mind.

   Strongly disagree  Moderately disagree  Slightly disagree  Slightly agree  Moderately agree  Strongly agree

9. I am a “low energy” person.

   Strongly disagree  Moderately disagree  Slightly disagree  Slightly agree  Moderately agree  Strongly agree

10. Most of the time my thoughts are occupied with the task that I wish to accomplish.

   Strongly disagree  Moderately disagree  Slightly disagree  Slightly agree  Moderately agree  Strongly agree

11. When I get started on something, I usually persevere until I finish.

   Strongly disagree  Moderately disagree  Slightly disagree  Slightly agree  Moderately agree  Strongly agree

12. I am a “go-getter.”

   Strongly disagree  Moderately disagree  Slightly disagree  Slightly agree  Moderately agree  Strongly agree
Figure 1. Ratings of responsibility for hurting a friend's feelings on a 5 point Likert-type scale in Study 1, $t (101) = 2.06, p = 0.04$. 

Appendix C: Figures
There was a significant indirect pathway that an ego-moving perspective led to greater feelings of responsibility, which led to greater feelings of regret. A 95% confidence interval for the mediation using bootstrapping indicates that responsibility did mediate the effect of perceived motion on regret (01, .18).
Figure 3. Ratings of responsibility for hurting a friend’s feelings on a 7 point Likert-type scale in Study 2, $t(46) = -2.04, p < 0.05$. 
There was a significant indirect pathway that an ego-moving perspective led to greater feelings of responsibility, which led to greater feelings of regret. A 95% confidence interval for the mediation using bootstrapping indicates that responsibility did mediate the effect of perceived motion on regret (.01, .31).

Figure 4. Mediation in Study 2