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What Should've, Could've, Would've Been: Affective, Motivational, and Behavioral
Consequences of Counterfactual Thinking In Interpersonal Contexts

By

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A dissertation submitted in partial satisfaction of the
requirements for the degree of

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Abstract

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Doctor of Philosophy in Psychology

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In a form of mental “time travel”, people often imagine the many ways the past might have been better, if only they had done something differently. This cognitive process, upward counterfactual thinking, commonly occurs after negative events, across a broad range of contexts. The present research examines the affective, motivational, and behavioral outcomes of counterfactual thinking in one particularly understudied context: conflict in close relationships. Study 1 participants recalled a close relationship conflict in which both they and the significant other played a role in the conflict, and then generated either self-focused upward counterfactual statements about the conflict, or self-focused factual statements about a neutral memory. Those who thought counterfactually about the conflict reported increased state guilt and, resultantly, were both more motivated and more likely to apologize to their relationship partners. Incorporating additional control conditions, Studies 2 and 3 provided evidence that these relationship-reparatory effects derive from counterfactual thinking as a broad, content-neutral pathway (as opposed to a content-specific pathway in which those thoughts must focus on the conflict in order for its consequences to help rectify that relationship). Finally, results from Study 4 illuminated potential differences between self-focused counterfactual thinking versus attributions of self-responsibility, particularly regarding the role of conflict resolution status and defensiveness. An internal meta-analysis across Studies 1 to 4 provides summative evidence that counterfactual thoughts about one’s role in a relationship conflict both induced more guilt and more attempts to apologize, relative to thinking factually about a neutral event.

What Should've, Could've, Would've Been: Affective, Motivational, and Behavioral Consequences of Counterfactual Thinking In Interpersonal Contexts

Here I should like to remark, for the sake of princes and princesses in general, that it is a low and contemptible thing to refuse to confess a fault, or even an error. If a true princess has done wrong, she is always uneasy until she has had an opportunity of throwing the wrongness away from her by saying: 'I did it; and I wish I had not; and I am sorry for having done it.'

—George MacDonald, *The Princess and the Goblin*

Introduction

Within every person's imagination lies a web of alternative realities — stories that we tell ourselves about what life would be like “if only” some aspect of the past had been different. These simulations of alternatives — i.e., counterfactual thoughts — are particularly common after negative events, in which case those thoughts focus on the *upward* alternatives, the myriad ways in which the past could have turned out *better* than it actually did. Much psychological research has focused on this phenomenon of upward counterfactual thinking, particularly with respect to its manifestations in judgment and decision-making contexts, such as consumer choice, monetary decisions, and academic performance (e.g., Kahneman & Miller, 1986; Markman & Miller, 2006; Roeser & Morrison, 2009). Broadly, this literature has expounded the benefits of upward counterfactual thinking: because these thoughts highlight the sequence of events that caused a negative outcome, as well as the actions that could have prevented it, counterfactual thinking induces attributions of causality and responsibility. Thus, by focusing people on their own role in a causal chain of events, counterfactual thinking serves an important function of helping people learn from their mistakes and subsequently improving their performance in similar future events. For example, upward counterfactual thinking has been causally associated with better performance on anagram-solving tasks (Markman, Karadogan, Lindberg, & Zell, 2009); flight simulations (Morris & Moore, 2000); and academic grades over the course of a semester (Nasco & Marsh, 1999).

Indeed, a large body of evidence demonstrates that upward counterfactual thinking highlights specific antecedents as causal ingredients in a past failure, thereby facilitating the process of learning from one's mistakes for future attempts. For instance, after thinking counterfactually about a personal performance failure, people plan to study harder, learn which mistakes to avoid, and create preventative measures for themselves (Roeser & Olson, 1993; Segura & Morris, 2005). Notably, however, these findings have largely been situated in the context of concrete, measurable performance outcomes; meanwhile, contexts involving social interactions remain relatively neglected within the field of counterfactual research. To the extent that people frequently imagine how their past social interactions might have turned out differently, present research certainly seems to provide an incomplete picture of how, when, and why counterfactual thinking operates. Indeed, a handful of existing findings suggest that counterfactuals just as frequently—if not *more* frequently—target social contexts; for example, one recent study reported that nearly half of participants' “if only” thoughts centered on social situations (i.e., romance, family, and parenting, which together comprised 45.2% of participants'

open-ended counterfactuals) (Morrison & Roese, 2011; see also Mandel, 2003; Sanna, Turley, Ames, & Meier, 1999). In light of this understudied question regarding the role of counterfactuals in relationship conflict, the current research complements and expands upon existing research in two primary ways.

First, in focusing on failures involving only the self, where only one's own outcomes are at stake, research on the affective consequences of counterfactual thinking is primarily limited to emotions that revolve around the self, such as regret and disappointment. On the other hand, thinking counterfactually about social events is likely to also implicate emotions that are interpersonal by nature: namely, social emotions that capture not only how one feels about the self and the situation, but also how one feels vis-à-vis the interaction partner. Therefore, the present research expands upon existing work that emphasizes the role of regret; specifically, we also account for social emotions such as guilt and shame to examine the prototypical affective components of counterfactual thinking.

Existing research suggests that counterfactual thinking has not only specific affective consequences, but also beneficial outcomes for goal pursuit. Upward counterfactual thoughts typically occur after negative events — those involving failures to reach important goals. Yet, as the functional theory of counterfactual thinking states, stimulating alternative actions works in the service of obtaining those strivings via its effects on both motivation (i.e., enhancing the desire to achieve those goals) and behavior (focusing attention on the actions that would better serve to reach said goals).

Goals, however, are just as pertinent in the social domain as they are in objective performance pursuits. Though previous findings broadly concur that thinking counterfactually about past missteps helps mobilizes upward progress, the circumscribed nature of these findings highlights a lingering question about whether such beneficial consequences are broadly true about counterfactual thinking, regardless of the context. If the functional perspective of counterfactual thinking does, in fact, apply equally well in interpersonal domains, we would expect to find similar effects on motivation and behavior, such as increased desires for and efforts to foster and maintain relationship wellbeing, especially after conflict. For example, imagining the alternative ways an argument with a significant other could have unfolded differently may lead to improved conflict resolution and reconciliation between relationship partners. However, having almost exclusively focused on performance context, the current literature on counterfactual thinking cannot conclusively answer whether functionality only applies within these achievement domains. Thus, the present research begins to fill this gap.

Given various questions about counterfactual thinking that remain unanswered, the present studies address the following goals. On the broadest level, we provide the first set of studies specifically concentrated on counterfactual thinking in interpersonal contexts in order to highlight the importance of this frequent but understudied phenomenon. Within this general goal, we also aimed to unpack some of the emotional, motivational, and behavioral consequences of counterfactual thinking about negative interpersonal events — specifically, conflicts with close relationship partners.

Counterfactual Thinking and Emotions

Emotions are potent consequences of counterfactual thinking; in particular, regret has been identified as the emotion that best personifies upward counterfactual thinking (i.e., imagining alternatives that are *better* than reality) (Zeelenberg & van Dijk, 2005). This characterization of regret as the “prototypical counterfactual emotion” (p. 148) is perhaps

unsurprising, given that it is a negative state linked to some personal shortcoming that has caused undesirable outcomes for the self: you are the primary victim of your own faulty actions (Roose & Summerville, 2005).

Phenomenologically, regret is similar to guilt; indeed the two words are often conflated or used interchangeably, and both emotions share common antecedents: namely, the appraisal that one's own behavior caused negative outcomes. Empirically, however, the two emotions diverge along a few key dimensions. First, guilt involves a sense of personal responsibility about how one's behaviors impacted *others'* outcomes, not merely one's own, as is the case for regret (Berndsen, van der Pligt, Doosje, & Manstead, 2004; Zeelenberg & Breugelmans, 2008). In other words, guilt and regret may often overlap or co-occur, but experiences of guilt are "mainly restricted to situations of interpersonal harm" (Breugelmans, Zeelenberg, Gilovich, Huang, & Shani, 2014, p. 1041) — that is, unique to social situations in which one's actions hurts others' wellbeing.

Second, guilt is distinct from regret in its invocation of moral norms. The sense that one has failed to live up to moral standards is more closely related to guilt than to regret, which involves a failure to live up to objective performance standards (i.e., dimensions of good/bad) rather than ethical standards (i.e., dimensions of right/wrong). Consequently, research shows that guilt, although negative, is largely a *prosocial* emotion in that it is associated with constructive relationship behaviors such as prosociality, conciliation, empathy, and forgiveness (Baumeister, 1994; Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996).

Given that regret is most intense following performance and achievement failures, it is perhaps unsurprising that existing counterfactual thinking research, which has largely confined itself to the intrapersonal domain, focuses primarily on regret as the paradigmatic affective outcome. In extending counterfactual research to the social domain, we hypothesize that, among the host of emotions that counterfactual thinking may instigate, guilt will also play a particularly central role. Although existing counterfactual research has scarcely examined guilt, a small handful of data nevertheless provide preliminary support for this proposition. In one study by Niedenthal, Tangney, and Gavanski (1994), participants who recalled a personal experience of guilt spontaneously engaged in behavior-centered, self-focused upward counterfactuals—in other words, the emotion of guilt caused people to imagine actions they could have done differently in order to make that memory turn out better. In another study, prisoners who were instructed to generate self-focused upward counterfactuals (versus factual statements) about their capture, conviction, and sentencing reported more intense guilt and self-blame (Mandel & Dhami, 2005). Thus, because research on counterfactual thinking has disproportionately focused on objective performance domains, the role of guilt remains relatively understudied. The present research addresses this gap by specifically examining how self-focused upward counterfactuals influence feelings of guilt.

The Relevance of Counterfactual Thinking For Close Relationships and Goal Pursuit

The study of goal pursuit has traditionally focused on achievement domains (e.g., academic and/or occupational performance), but more recently, researchers have recognized that *social* motives are also indispensable components of the broader set of goals that drive people's emotion and behavior. From broad belongingness motives that lead us to seek social connections with others in general (Baumeister & Leary, 1995) to specific ideals about a particular relationship (e.g., Fletcher, Simpson, Thomas, & Giles, 2005), having and maintaining successful relationships is a topmost priority among people's life goals (Emmons, 2003). Thus, if

the function of counterfactual thinking is to scaffold future goal-oriented behaviors based on past shortcomings, as previous research has established in the context of performance goals, this functionality may equally apply to situations involving social goals.

A predominating theory within the motivation literature describes two different orientations toward achieving one's goals: approach motivation (directing attention and action toward positive stimuli) and avoidance motivation (direction attention and action away from negative stimuli) (Elliot, 1999; Lewin, 1926). Critically, although this hierarchical model of approach-avoidance motivation was initially studied most extensively in the context of achievement domains, it has been shown to equally characterize social goals (Gable, 2006). Thus, the psychological need for social connectedness can manifest as either attempts to foster and deepen one's relationships, or to fend off conflict and discord.

Indeed, conflicts with relationship partners are important, salient, and very negative setbacks to the overarching goal to maintain satisfying relationships; discord undermines attempts to maintain positive interpersonal connections and threatens the sense of stability and security in a relationship (Gable & Impett, 2012). However, conflict is also endemic to social interaction, for "the very activity of two people relating to each other" inevitably breeds discord (Canary, Cupach, & Messman, 1995, p. 3). Given that relationship discord is commonly reported as a topmost painful life event (Kipper & Furcon, 1981), this is a crucial research question to address.

In sum, extant research on counterfactual thinking has established its benefits for improved goal pursuit in objective performance and achievement domains, its applicability — and potential functionality — in social contexts is relatively understudied. Do the functional advantages of counterfactual thinking similarly support the pursuit and attainment of relationship goals? If so, we should expect to see counterfactual thinking exert these influences most acutely in the face of threats to relationship well-being — thus, we hypothesize that in conflicts with close others, counterfactual thinking will increase relationship-reparatory intentions and behaviors by activating approach and/or avoidance motivation. Thus, the present studies examine the consequences of thinking counterfactually about past experiences specific to one of the most negative and frequent social contexts — conflicts with close relationship partners, such as friends, family members, and romantic partners.

Counterfactual Thinking, Guilt, and Relationship-Reparatory Motivations

If, as we hypothesize, counterfactual thinking about a conflict with a close relationship partner increases guilt and highlights relationship-oriented motivations, what are the downstream consequences for behavior, both actual and intended? Despite its negative valence, guilt is associated with a variety of positive social consequences, and decades of research paint a consistent picture of guilt as a prosocial emotion. From a social functionalist perspective, long-term social bonds would not be possible without emotions like guilt which, in the absence of formal sanctions, reinforce compliance with moral standards and social norms (Ferguson, Stegge, & Damhuis, 1991). The guilt that results from any violation of these norms therefore motivates remedial, other-oriented actions that help restore balance between transgressors and victims. Shame, on the other hand, is associated with negative interpersonal consequences, including denial, withdrawal, anger, and externalized hostility (Tangney, Mashek, & Stuewig, 2005). Although the two often occur concomitantly, and are often indistinguishable on a *phenomenological* level, guilt and shame sharply differ in their underlying behavioral and motivational signatures. For this reason, any functional (i.e., in the service of relationship goals)

consequences of counterfactual thinking about social situations should be primarily associated with guilt, rather than with shame.

Indeed, empirical data backs up this proposition; for instance, feeling greater guilt about a transgression against a significant other predicts both greater *desires* to apologize and seek forgiveness (Roseman, Wiest, & Swartz, 1994), as well as *actual* apologetic and forgiveness-seeking behaviors (Riek, Luna, & Schnabelrauch, 2013). Moreover, on a trait level, those higher in guilt-proneness are more skilled at interpersonal problem-solving: namely, they generate better solutions for resolving problems, possess greater self-efficacy in implementing those solutions, and expect more positive outcomes from interpersonal problem-solving interactions (Covert, Tangney, Maddux, & Heleno, 2003). Against this backdrop of guilt as a prosocial, relationship-enhancing emotion, we hypothesize that the experience of guilt evoked through counterfactual thinking about an interpersonal conflict will lead people to seek reconciliation with their relationship partners.

Though consensus seems to rest on guilt having largely prosocial consequences, the nature of the motivations underlying those consequences is less conclusive. As aforementioned, goal pursuit can derive from two distinct underlying orientations — approach, on the one hand, or avoidance, on the other. Whether guilt engenders relationship-reparatory effects through approach versus avoidance motivations remains an open question. Some evidence suggests that guilt is primarily an approach-oriented emotion that focuses attention on prescriptive injunctions (what *should be* done, versus what *should not be* done) and desires for positive interactions with victimized significant others (e.g., Schmader & Lickel, 2006; Sheikh & Janoff-Bulman, 2010).

In contrast, other research has directly tied guilt to avoidance motivations and behaviors — for instance, highly guilt-prone individuals are more likely to withdraw from interdependent relationships, and refrain from entering them in the first place (Wiltermuth & Cohen, 2014). In a similar vein, research that applies this approach-avoidance framework of goal pursuit to the relationship domain has traditionally conceptualized guilt as the emotional concomitant of the avoidance motive. For instance, in their research on sacrifice, Impett, Gable, and Peplau (2005) employ the following items in their measures of avoidance-oriented motivation: “*I feel guilty if I do not sacrifice*”; and “[*I sacrifice in order*] *to avoid feeling guilty*”. In the present research, we adopted this same approach-avoidance perspective and thus hypothesized that counterfactual thinking would beget prosocial consequences largely through avoidance-oriented, as opposed to approach-oriented, relationship-reparatory motivations.

Effects of Counterfactual Thinking: Two Competing Pathways

Thinking counterfactually about a problem is associated with improved attempts to achieve a desired outcome. Is this because the specific content of those counterfactual thoughts helps guide future behaviors (i.e., a *content-specific* pathway), or is it a byproduct of more general properties that just happen to be true for counterfactual thinking as a broader cognitive process (i.e., a *content-neutral* pathway)? For example, some research supports the latter viewpoint in showing that the mere act of thinking about alternatives to reality primes a “counterfactual mindset”, a broad analytical cognitive orientation that facilitates subsequent performance even on unrelated problem-solving tasks (Galinsky & Kray, 2004). Moreover, researchers have argued that guilt is mentally linked to a broad repertoire of cognitions and behaviors, such that merely activating the concept of guilt inevitably activates behaviors that are associated with guilt emotions, such as helping and apologizing (Zemack-Rugar, Bettman, & Fitzsimons, 2007).

On the other hand, the beneficial effects of counterfactual thinking might operate in a content-specific manner, in that the semantic meaning of the counterfactual thoughts functions to structure behavioral intentions for future goal pursuit. Supporting this perspective, for example, Smallman (2013) reported that counterfactuals are more effective at guiding corrective future behavior when their content specifically and concretely targets the antecedent failure. Thus, this content-specific pathway suggests that the benefits of counterfactual thinking might not transfer between unrelated domains.

Complementing these competing theories about the content-specificity versus -neutrality of counterfactual thinking, research on guilt similarly provide contradictory evidence. Some studies have suggested that the effects of guilt are specific to the source of guilt. Having wronged one person, a transgressor becomes preoccupied with repairing that particular relationship; attempting to improve another relationship bond does not wash away the guilt (de Hooge, Nelissen, Breugelmans, & Zeelenberg, 2011). The absolution of guilt, in other words, is non-transferable. Meanwhile, other research suggests that transgressors' preoccupation is not with repairing the specific relationship bond, but with the action of repair in and of itself (e.g., de Hooge, 2012).

Given that both counterfactual thinking and guilt can incur effects through two similarly competing pathways, the present studies therefore also aimed to examine whether one of these pathways applies in the context of self-counterfactuals in close relationship conflict.

The Present Research

The present research attempts to synthesize two broad areas of research: on the one hand, extensive emotion research demonstrates the beneficial social functions of guilt; meanwhile, counterfactual research describes the functional role of counterfactual thinking in directing and guiding goal-oriented behavior. In order to bridge these two disparate literatures, we hypothesize that upward counterfactual thinking in social contexts invokes interpersonal emotions such as guilt and shame. In particular, because counterfactual thinking is a cognitive process in the service of goal attainment, we reasoned that guilt, being relatively more relationship-oriented than shame, should be the primary affective consequence. Moreover, to the extent that goals in an interpersonal context focus on maintaining and nurturing healthy relationships, we also hypothesize that counterfactual thinking and guilt lead to greater reconciliatory motivations and behaviors—specifically, increased desire to apologize, as well as higher likelihood of actually apologizing.

Furthermore, because this process might occur either because of the specific content of counterfactual thoughts or because of a more general property of thinking about alternatives to reality, the present studies incorporate a variety of different control conditions to test whether the specific content of counterfactual thoughts drives this path from guilt to apologizing. More specifically, if counterfactual thinking increases guilt and leads to greater apologizing because thinking about alternative ways the conflict might have played out activates an abstract or causal-association mindset, then those effects should hold even when the specific content of the counterfactuals changes. Thus, throughout the present studies, we incorporate three different types of control conditions with which to compare upward self-focused counterfactual thinking.

In Study 1, participants recalled a recent and relatively upsetting conflict within an important and ongoing close relationship (for example, an argument with a family member, friend, or romantic partner). Then, in a manipulation of counterfactual thinking, participants either reflected on this memory in terms of upward self-focused counterfactuals or reflected

factually on a neutral everyday event of grocery shopping. Study 2 tested an additional question to extend on findings from Study 1: if the effects from Study 1 are specific to the reality-mutating components of counterfactuals, does this mode of thought incur its affective and motivational consequences through a content-neutral (versus content-specific) mindset? Thus, Study 2 incorporated two additional control conditions: participants either reflected on the conflict in terms of self-focused upward counterfactuals, other-focused upward counterfactuals, or reflected on a personal performance failure in terms of self-focused upward counterfactuals. Study 3 examined the same questions as Study 2, but in the specific context of close romantic relationships. Finally, in Study 4, we examined differences — if any — between two components that are inherent to the process of counterfactual thinking. One component involves identifying one's causal role in a relationship conflict — in other words, accepting responsibility for one's actions. Another component involves mentally mutating those actions by imagining better alternatives — that is, upward counterfactual thinking about one's actions. Study 4 assessed whether imagining alternatives (the “counter” component of counterfactual thinking) engenders outcomes that differ from thinking solely factually about reasons one is responsible.

Study 1

In Study 1, we examined the hypothesis that remembering a past conflict with a close relationship partner in terms of self-focused counterfactuals would induce feelings of guilt and increase participants' desires to apologize, as well as their actual attempts to apologize to the relationship partner in question.

Method

Participants. For Study 1, participants were recruited from two separate sources. In Study 1a, participants were recruited from a psychology department participation pool at a public university in the western United States; participants ($N = 131$) received course credit for taking part in the study. Based on *a priori* criteria, 22 were excluded from the analyses for failing one of two embedded attention checks and/or not following instructions. This left a total of 109 participants ($M_{\text{age}} = 20.70$, $SD_{\text{age}} = 3.00$; 87 female, 20 male, 2 declined to answer; 24 White, 53 Asian, 14 Hispanic or Latino(a), 3 Black, 15 other).

Notably, participants from this pool were primarily college-aged students, and disproportionately female and Asian or Asian American. Such demographic characteristics present potential confounds for processes that theoretically entail emotions of guilt, as existing research linking guilt-proneness with age, gender, and ethnicity—i.e., older adults, females, and Asian Americans tend to report higher levels of guilt (Albertsen, O'Connor, & Berry, 2006; Orth, Robins, & Soto, 2010). Therefore, in Study 1b we recruited 216 participants from Amazon's Mechanical Turk (MTurk) to obtain a more representative, nationwide sample. To increase power, we aimed to roughly double the number of participants in Study 1a.

Of the 216 MTurk participants who completed the study, 17 were excluded for failing one of two built-in attention checks and/or failing to follow instructions, leaving 199 ($M_{\text{age}} = 33.84$; $SD_{\text{age}} = 11.00$; 114 female; 155 White, 18 Asian, 8 Black, 11 Hispanic/Latino(a), 7 other). Because the sample source did not significantly moderate any findings, we collapsed across these two batches for Study 1, creating a total sample size of 308 (Results were nearly identical with all participants included in the analyses, including all significant results remaining significant; all individual findings also remain largely the same when analyzing each sample separately.)

Procedure. All participants first recalled a relatively recent and upsetting conflict with someone close to them according to the following instructions:

No matter how strong your relationships with others may be, there are times you might get into conflicts with an important person in your life, such as a parent, sibling, close friend, or romantic partner. For example, you might fight about differing viewpoints, argue about how to make a decision, or get mad at each other for betrayals or dishonesty.

Take a few moments to remember a time when you were at odds with someone close to you (for example, a parent, sibling, close friend, or current romantic partner). Please think of a relatively recent and upsetting memory involving an important person in your life, someone with whom you still have a relationship. In this conflict, both you and the other person said or did things that were hurtful.

When you think of a memory, please click 'next' to continue.

Critically, as seen in this prompt, we instructed participants to recall conflicts with a few specific features: namely, conflict should have occurred with ongoing close relationship partner; *both* the participant and significant other should have played some role in its perpetuation; and the conflict should still be relatively upsetting — i.e., not completely resolved. These preconditions were implemented throughout all studies to allow for participants to recall experiences where guilt and reparatory behaviors would be more relevant. Indeed, data from pilot studies showed that when prompted for memories of conflicts in general, participants by-and-large reported disputes with strangers, ex-partners, and/or situations in which participants primarily perceived themselves as the victims. These memories invariably evoked anger and blame, consistent with previous research that has used the same recall paradigm as a targeted induction of anger (e.g., Kross, Ayduk, & Mischel, 2005). Further, participants were asked to recall relatively recent and upsetting events; when it comes to conflicts with close relationship partners, reflecting upon a past conflict may also evoke different responses depending on the extent to which participants have already resolved the issue with their relationship partners. Because guilt and relationship reparatory goals may not be particularly relevant when conflicts are completely resolved, we aimed to the relatively unresolved post-conflict stage in which that relationship partners might be most likely to experience the impact — if any — of counterfactual thinking.

After recalling a memory and providing a short name for it, participants provided pre-manipulation contextual information by rating the severity of the conflict, the extent to which the conflict was resolved, and how long ago it occurred. They were then randomly assigned to one of two conditions to manipulate thought type. In the upward self-counterfactual condition ($n = 146$), participants were told to think about the variety of ways the conflict might have been different, “if only” they, themselves, had done something differently. Although counterfactual thinking is a widely common and early-developing mode of thought, not everybody recognizes it by this term, nor do they consciously realize when they are engaging in it. Thus, a brief set of instructions defined counterfactual thinking for those in this condition:

Sometimes when people experience negative events, they have "if only" thoughts about how things might have been better "if only" they had done something differently. For example, someone who gets a C on a test might think, "If only I

had studied harder, then I would have done better on this test".

Please take some time to visualize the memory of your conflict/argument. Play it back to yourself as though it were happening again. What are some of the "if only" thoughts that come to mind when you think about your memory, [___]? In other words, what are some things you could or should have done to make things turn out differently?

In the spaces below, list some of these "if only" thoughts about what you could or should have done differently in this conflict. Specifically, please fill in the blanks for these statements: "if only I _____ then _____".

A new survey page provided up to 5 blank text boxes for participants to complete the stem, "If only I ____ then ____". Although various phrases are indicative of counterfactual thoughts (e.g., "I wish", "should have", "could have"), this particular sentence construction, involving both the hypothetical antecedent "if only" and the consequent "then", is most emblematic of upward counterfactual thinking (Leitgeb, 2012). In this study and the ones that follow, we induced self-focused counterfactual thinking with this same procedure and refer to this condition as "conflict self-CF". In Study 1, participants completed anywhere from 1 to 5 of these counterfactual sentence stems about their role in the relationship conflict (on average, participants in this condition listed 3.78 counterfactual thoughts; mean time = 3.27 minutes, SD = 1.58 minutes).

In the control condition ($n = 162$), participants also engaged in a self-focused thought-listing task, but in the context of factual statements about a mundane everyday task: specifically, control participants listed 1 to 5 things that they saw, did, or thought about during their most recent trip to the grocery store (on average, participants in this condition listed 4.83 neutral-factual thoughts; mean time = 2.81 minutes, SD = 1.55 minutes). In this study and all subsequent studies that implemented a neutral control condition, participants in this group completed the same task, and we refer to this condition as "neutral-F".

Following the experimental manipulation, participants proceeded to questionnaires assessing state affect, relationship improvement motivations, and behavioral intentions toward the relationship partner. Finally, participants briefly described what happened in the conflict memory, provided demographic information, and answered various data assurance questions (e.g., how carefully they read the instructions, how honestly they answered the questions).

Measures.

State affect.

Modified Differential Emotions Scale. For the first measure of state negative affect, various discrete negative emotions from the Modified Differential Emotions Scale (MDES; (Fredrickson, Tugade, Waugh, & Larkin, 2003) were included as face-valid measures of state guilt ("repentant, guilty, blameworthy"), shame ("ashamed, humiliated, disgraced"), anger ("angry, irritated, or annoyed"), contempt ("contemptuous, scornful, or disdainful"), embarrassment ("embarrassed, self-conscious, or blushing"), and sadness ("sad, downhearted, or unhappy"). In addition, a regret item ("regret, remorse") was

created and added for the purposes of the present study, though it does not appear in the original MDES. Due to a survey creation error, this item was administered only within the university batch of Study 1 participants and was not completed by MTurk participants.

State Shame and Guilt Scale. As a less direct measure of shame and guilt, the State Shame and Guilt Scale (SSGS, Marschall, Sanftner, & Tangney, 1994) consists of five shame-related and five guilt-related items that gauge the underlying phenomenology distinguishing the two emotions. The guilt subscale thus assessed negative emotions about one's actions (e.g., "*I feel tension about what I did*"; $\alpha = .88$), whereas the shame subscale assessed negative emotions directed at the core self (e.g., "*I feel that I am a bad person*"; $\alpha = .88$).

Relationship improvement motivations. Desires to improve relationships can be framed either in terms of obtaining incentives or avoiding threats. To assess these two orientations — i.e., approach and avoidance motivations specific to the nominated relationship partner — we used Elliot, Gable, and Mapes's (2006) approach-avoidance scale, which consists of eight items. Four items form an avoidance subscale (e.g., "*I am trying to avoid disagreements and conflicts with him/her*"; $\alpha = .72$), and four form an approach subscale (e.g., "*I am trying to deepen my relationship with him/her*"; $\alpha = .95$).

Apologizing.

Self-reported apologizing. As a measure of behavioral intentions, the next task presented participants with the opportunity to write a letter to the significant other involved in the conflict memory. This survey screen was designed to look like a sheet of letter stationery, and the instructions asked participants, "Is there anything you would like to say to the other person involved in that interaction? If so, imagine you are writing a letter to the other person. What would you say to that person now?"

Although we were primarily interested in apologizing — i.e., a proactive relationship-reparatory behavior — the open-ended nature of this letter prompt lent itself to a variety of sentiments that participants could express to their partners (in fact, the letter did not require a response at all). Thus, four items after the letter-writing task asked participants to self-report their motivations in writing the letter (if they had written anything at all): attempts to apologize, express forgiveness, express resentment or bitterness, and suggest possible solutions for resolving the issue. All four were assessed on a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scale.

Coder-rated apologizing. Self-reported motivations, of course, do not always align with actual behavior, or with how outside observers perceive behavior. Thus, two condition-blind coders—i.e., the first author and a research assistant—rated the letters to provide more objective indices corresponding to each of the variables that participants had self-reported. Specifically, the letter content was coded on a 0-3 scale of elaborateness for the following dimensions: apologizing, forgiving, resentful, and problem-solving. For each of these, a code of 0 corresponded to complete absence of that sentiment; an implicit expression received a 1; explicit statements reflecting the sentiment received a 2; and, finally, letters that almost entirely focused on that sentiment were rated a rating of 3. Additionally, the same coders (blind to condition) counted the frequencies of three types of counterfactuals that participants spontaneously expressed in these letters: self-focused (e.g., "If only I had known"); situation-focused (e.g., "I wish it hadn't happened"); and other-focused (e.g., "I wish you hadn't talked about my parenting skills").

The coders first collaboratively rated a set of 10 letters to establish consensus on coding criteria. Then, both independently coded the same half of the data (the MTurk portion). Because interrater reliability was high across all dimensions ($ICC_{\text{apologizing}} = .95$; $ICC_{\text{forgiveness}} = .81$; $ICC_{\text{problem-solving}} = .71$; $ICC_{\text{resentment}} = .89$; $ICC_{\text{self-CF}} = .92$), the first author proceeded to code the remaining half of the letters (the RPP portion), and all data analyses involving these letter codes use only the codes from this single rater.

Results.

State affect.

Factor analysis. A factor analysis (with pairwise deletion to account for missing regret data for half of the sample) extracted four main clusters among the ten SSGS items and seven MDES items. The SSGS items split into two factors, one containing the five theorized guilt items and the other containing the five theorized shame items. Meanwhile, the seven MDES items clustered into another two factors: one containing the anger, sadness, and contempt items, and another containing the self-conscious items of guilt, shame, embarrassment, and regret. Thus, as a global metric of negative affect (NA), we created a composite of the anger, contempt, and sadness items (i.e., excluding the self-conscious emotions of shame, guilt, and embarrassment) ($\alpha = .84$).

Results from the factor analysis corroborated predominating emotion theories that distinguish between shame and guilt based on their cognitive appraisals and action tendencies (e.g., Tangney, Stuewig, & Mashek, 2007). These empirical differences, however, are often imperceptible on a phenomenological level; the two emotions often occur concomitantly, and their terms are commonly used interchangeably. Thus, in this and all subsequent studies, we thus rely on the SSGS subscales as discrete measures of shame and guilt instead of the items from the MDES.

Effects of experimental manipulation. Both MDES composites (i.e., general negative and self-conscious affect) also significantly differed between conditions, with CF participants reporting higher overall negative affect than control participants, $F(1, 306) = 10.16, p = 0.002$, Cohen's $d = .36$.

Turning to the key question regarding the effects of counterfactual thinking on guilt, a two-level between-subjects ANOVA revealed that participants in the counterfactual condition reported feeling significantly more guilt on the SSGS than those in the control condition, $F(1, 306) = 17.04, p < .001$, Cohen's $d = .48$ (see Figure 1). Moreover, the two groups did not significantly differ on SSGS shame ($p = .14$), and the effect of counterfactual thinking on guilt remained significant even when controlling both for shame, $F(1, 306) = 16.83, p = .001, \eta_p^2 = .05$, and for the negative affect composite, $F(1, 306) = 10.48, p = .002, \eta_p^2 = .03$.

Relationship improvement motivations. In a mixed-model ANOVA, we tested for differences between conditions (the 2-level between-subjects factor) in the two types of relationship improvement motivations: approach- and avoidance-oriented goals (the 2-level within-subjects factor). The main effects of condition and of orientation type were both nonsignificant, $ps = .19$ and $.17$, respectively; the interaction between the two was also nonsignificant, $p = .34$. However, because we posited *a priori* hypotheses that condition differences would primarily manifest in avoidance-oriented motivations, subsequent analyses explored the simple effects of condition within each type of relationship motivation orientation.

The effect of condition on approach motivation was nonsignificant, $F(1, 306) < 1, p = 0.65$, Cohen's $d = 0.05$; however, in line with predictions, relationship avoidance motivations were significantly higher for those in the conflict self-CF group, $F(1, 306) = 3.80, p = 0.05$, Cohen's $d = 0.21$ (Figure 2).

Behavioral intentions. A between-subjects ANOVA tested for effects of condition on each of the four self-reported letter variables¹. Participants in the two conditions significantly differed: compared to those in the control condition, those in the counterfactual condition reported greater attempts to write apologetic letters than did those in the control condition, $F(1, 298) = 10.03, p = 0.002$, Cohen's $d = 0.36$ (Figure 3a), and marginally significantly less resentful letters, $F(1, 298) = 3.46, p = .06$. Self-reported motivations to express forgiveness or to suggest future solutions did not significantly differ between conditions, $ps = .34$ and $.12$, respectively.

Objectively perceived behaviors largely corresponded with participants' intended behaviors, as revealed in medium to high correlations between self-reported and observer-coded motivations ($r_{\text{apologize}} = .72, r_{\text{forgive}} = .36; r_{\text{resentment}} = .53; r_{\text{solutions}} = .30$). ANOVA analyses on these coded variables echoed the findings from participants' self-reported motivations. Specifically, the letters written by participants in the counterfactual condition were objectively more apologetic, $F(1, 283) = 5.40, p = .02$, Cohen's $d = .25$ (Figure 3b). Group differences did not reach significance for any of the other three coded letter variables, all $ps > .24$.

Spontaneous counterfactual statements.

The act of counterfactual thinking has been shown to induce a more general “if-only” mindset. Thus, one counterfactual thought can perpetuate a general mode of imagining how reality might have turned out differently. As an assessment of this counterfactual mindset, we also analyzed participants' spontaneous, self-generated counterfactuals by counting the number of counterfactual statements expressed in their open-ended letters. Among the entire sample, the frequency of spontaneous counterfactuals in participants' apology letters highly correlated with self-reported apologizing, $r = .29, p < .001$, and with observer-coded apologizing, $r = .35, p < .001$.

A subsequent analysis tested for condition differences in self-generated counterfactual statements. Because these frequencies were heavily overdispersed (i.e., involving most participants generating 0 counterfactuals), we employed a negative binomial regression instead of standard OLS regression (Coxe, West, & Aiken, 2008). Controlling for word count of participants' letters, a significant effect of condition emerged, $b = .97$, Wald $\chi^2(1) = 60.11, p = .001$. Because coefficients for a negative binomial regression are interpreted similarly to Poisson regression coefficients — i.e., in logarithmic units — this is equivalent to the average conflict self-CF participant being 2.64 times more likely to spontaneously express a self-focused counterfactual statement.

Mediation analyses: apologizing.

Mediation by guilt. Turning to our mediational hypothesis, we examined whether condition led to increased apologizing through its effects on state guilt. When self-reported apologizing was simultaneously regressed on condition (with self-CF coded as 0 and neutral-F as 1) and SSGS guilt, the effect of guilt remained significant, $b = 0.72, p < .001$, while the effect of condition became nonsignificant, $b = .27, p = .23$. A bias-corrected bootstrapping mediation

analysis with 10,000 resamples showed that this indirect effect through guilt was indeed significant, 95% CI [-.80, -.27]. As predicted, participants in the counterfactual condition reported writing more apologetic letters to their relationship partners, and this was accounted for by their increased feelings of guilt. Similarly, SSGS guilt mediated the effect of condition on coder-rated apologizing, 95% CI [-.41, -.15] (based on 10,000 resamples).

Mediation by guilt versus shame. To investigate whether these observed relationship-reparatory effects of counterfactual thinking were specific to guilt, we first re-ran the mediation controlling for SSGS shame. In this model, guilt continued to fully mediate the effect of condition on self-reported apologizing, 95% CI [-.78, -.27], as well as coder-rated apologizing, 95% CI [-.46, -.18]. The reverse, however, was not true: controlling for guilt, shame did not mediate the effect of condition on either self-reported apologizing, 95% CI [-.17, .02] or on coder-rated apologizing, 95% CI [-.14, .02].

In a further test of whether this mediational effect was unique to guilt (versus shame), we compared indirect effects of each simultaneously—i.e., in the same mediation model. This method not only tests for the significance of an overall mediation effect (analogous to evaluating total R^2 from a multiple regression analysis), but also tests for a unique mediation effect of a specific variable, conditional on including other mediators in the model (Preacher & Hayes, 2008).

In comparing the indirect effects of guilt and shame, a significant pairwise contrast showed that guilt and shame differentially mediated the effect of counterfactual thinking on apologizing, $b = -.74$, boot SE = .21, 95% CI [-1.18, -.35]. This same pairwise contrast also reached significance when entering coder-rated apologizing as the outcome variable, $b = -.49$, boot SE = .13, 95% CI [-.75, -.24].

Specifically, controlling for the indirect effect through shame, the indirect effect of guilt remained significant in predicting both self-reported apologizing, $b = -.66$, 95% CI [-1.01, -.34], and coder-rated apologizing, $b = -.41$, 95% CI [-.60, -.23]. In other words, conflict self-CF participants reported increased guilt, which then led to greater self-reported attempts to apologize. Meanwhile, the indirect effect through shame trended in the opposite direction for both operationalizations of apologizing (though nonsignificantly): increased shame was associated with *less* apologizing when controlling for the indirect effect of guilt (self-reported apologizing $b = .08$, 95% CI [-.02, .21]; coder-rated apologizing $b = -.08$, 95% CI [-.01, .18]).

Mediation by guilt versus global negative affect. Alternatively, to explore whether the effect of guilt might be attributable to negative affect more broadly, we paralleled the aforementioned alternative mediations by first controlling for global NA. In this model, guilt continued to fully mediate the effect of condition on self-reported apologizing, 95% CI [-.75, -.20], as well as coder-rated apologizing, 95% CI [-.39, -.12]. However, when controlling for guilt, the indirect effect of global NA did not reach significance in predicting self-reported apologizing, 95% CI [-.01, .23]. The indirect effect did, in fact, reach significance when using coder-rated apologizing as the outcome of interest; however, it operated in the reverse direction, such that neutral-F participants reported higher global NA and, consequently, apologized less, 95% CI [.002, .12].

Discussion.

Study 1 showed that participants who reflected on their conflict in terms of upward self-focused counterfactuals differed in affect, motivations, and behavioral intentions. They felt increased guilt, specifically, and also experienced more intense desires to prevent negative

outcomes with their relationship partners. Moreover, counterfactual thinking led participants to write more apologetic letters to their relationship partners as a result of its impact on guilt, specifically, not shame or negative affect more broadly. In fact, in a series of mediation tests, the data from Study 1 support existing theorizing on the uniquely prosocial function of guilt, and the present results further connect this work to counterfactual thinking. Namely, in contrast to counterfactual thinking leading to more apologizing (both subjectively and objectively), shame and global NA operated in the opposite direction by mediating the effects of condition on less apologizing.

Study 2

Findings from Study 1 demonstrated that, relative to a neutral-factual condition, upward self-focused counterfactual thinking about a relationship conflict increase guilt which, in turn, motivates people to apologize. This is a promising extension of counterfactual thinking into new domains of research, highlighting its potential importance with regards to interpersonal relationships, conflict resolution, and self-conscious emotions, to name a few. To gain traction on this claim, the subsequent studies aimed to extend these findings or rule out alternative explanations by comparing CFs generated for a relationship conflict (conflict self-CF) to additional control conditions.

These additional conditions were designed to examine whether the consequences of counterfactual thinking depend on the specific content of those thoughts, or whether they are more general properties of thinking counter-to-fact. Past research on both counterfactual thinking and guilt have independently suggested that each of these might operate along content-neutral pathways (similar to mindsets). In other words, guilt and/or counterfactual thoughts that originate in one domain can incur downstream consequences in contexts unrelated to the original source (Kray & Galinsky, 2003; Zemack-Rugar, Bettman, & Fitzsimons, 2007). For Study 2, we considered two potential limits of this hypothesized content-neutrality: on the one hand, the effects of counterfactual thinking that we observed in Study 1 could stem from imagining a different past sequence of actions, regardless of who carries out those actions. Thus, in one control condition, participants generated upward counterfactual thoughts about the conflict, but instead of mentally mutating their own behaviors, their thoughts focused on what the other person could have done differently (conflict other-CF). On the other hand, if counterfactuals need only refer to the self, imagining how one could have behaved differently in *any* negative past experience — even one entirely different than the conflict itself — might incite guilt, relationship avoidance motivations, and apologizing for a close relationship conflict. In another control condition, we therefore asked participants to generate self-referential upward counterfactuals about receiving negative evaluation (neg self-CF), rather than about a relationship conflict.

If the effects of counterfactual thinking are context-specific, then we expected to observe the hypothesized findings only in the conflict self-CF condition. If, on the other hand, counterfactual thinking operates like a mindset (in line with a content-neutral hypothesis), then the neg self-CF condition should exhibit results similar to those observed in the conflict self-CF condition — that is, similarly high levels of guilt, relationship-oriented motivations, and apologizing, indicating that the effects of imagining alternatives about an *unrelated* negative event can spill over into conflict contexts.

Method

Participants.

For Study 2, 152 participants were recruited from Amazon's MTurk. The sample size was relatively smaller because, initially, this study was designed to pilot-test the instructions and sequencing for the two novel control conditions. Because the procedure involved asking those in the neut-F condition to alternate between memories when progressing through the survey, we aimed to test both the instruction wording and survey flow. Open-ended responses indicated that participants did not, in fact, find the instructions and/or transitions confusing or unclear, and we report the data analyses here in the interest of transparency.

Ten participants (6.6%) were excluded for failing a built-in attention check and/or failing to follow instructions; all reported results were thus conducted on a filtered sample of 142 participants ($M_{\text{age}} = 33.43$; $SD_{\text{age}} = 9.72$; 78 female, 62 male, 2 declined to answer; race data were not collected). (Results were nearly identical with all participants included in the analyses, including all significant results remaining significant.)

Measures.

All measures in Study 2 were identical to those from Study 1: as measures of state affect, we administered the SSGS and MDES; both subscales from Elliot et al.'s (2006) approach-avoidance scale assessed relationship improvement motivations; and behavioral intention to apologize were measured both through a post-letter-writing self-report item and through coders' ratings of letter content.

Procedure.

All participants first generated two memories: one about a conflict with a close relationship partner (identical to Study 1), and the other about receiving negative feedback regarding their performance on some task. The instructions for the negative feedback memory read as follows:

No matter how hardworking people are, there are times they might get negative feedback about their performance on some task. For example, someone might get negative feedback on a job evaluation or receive a bad grade on a school assignment.

Take a few moments to remember a time when you got negative feedback on your performance at work, school, or any other type of task. Please think of a relatively recent memory of a time you received this criticism.

When you think of a memory, please click 'next' to continue.

The two memory recall prompts were presented in randomized order within subjects, followed by the between-subjects thought-listing manipulation. In this task, participants were randomly assigned to one of three conditions: self-focused upward counterfactuals about the conflict (conflict self-CF; $n = 49$), other-focused upward counterfactuals about the conflict (conflict other-CF; $n = 49$), or self-focused upward counterfactuals about receiving negative evaluation (neg self-CF; $n = 44$). We did not include a neutral control condition from Study 1 and its omission is an issue we address in Study 3.

All participants were then instructed to complete the SSGS and MDES with respect to the relationship conflict they recalled. Then, to assess apologetic motivations,

participants were given the opportunity to write a hypothetical letter to the relationship partner involved in the conflict memory, followed by four self-report items assessing their motivations in writing the letter (as in previous studies, these again included attempts to apologize, express forgiveness, express resentment, and suggest possible solutions for resolving the issue). Two coders subsequently rated all letters on equivalent dimensions to provide objective assessments complementing participants' self-reported intentions in writing the letters.

Results.

State affect. As in Study 1, the SSGS and MDES items clustered into the same four factors: SSGS guilt, SSGS shame, and two subcomponents of the MDES reflecting global NA and overall self-conscious emotions; we thus created composite variables of state affect with the same procedures as in Study 1.

A series of between-subjects ANOVA models tested for condition effects on the three measures of state affect: SSGS guilt, SSGS shame, and MDES negative emotions composite (see Table 3). The omnibus effect of condition was significant in predicting SSGS guilt, ($F(2, 140) = 4.87, p = .01, \eta_p^2 = .07$) but not SSGS shame ($F(2, 139) = 1.72, p = .18, \eta_p^2 = .024$) or MDES negative emotions composite ($F(2, 139) < 1, p = .88, \eta_p^2 = .002$).

To decompose the effect on state guilt, planned pairwise comparisons tested whether conflict self-CF participants significantly differed from those in either of the two comparison conditions. Compared to participants in the conflict other-CF condition, participants in both the conflict self-CF and neg self-CF conditions experienced significantly higher state guilt, $F(1, 139) = 8.26, p = .005$, Cohen's $d = .57$ and $F(1, 139) = 5.32, p = .02$, Cohen's $d = .48$, respectively. Moreover, these effects remained significant when controlling for shame and the negative emotion composite, $ps = .007$ and $.003$, respectively. Guilt did not significantly differ between those in the conflict self-CF and neg self-CF conditions, $p = .63$ (see Figure 4).

Relationship approach and avoidance. Paralleling analyses from Study 1, a mixed-model ANOVA tested for differences between conditions (a 3-level between-subjects factor) in the two types of relationship improvement motivations: approach- and avoidance-oriented goals (a 2-level within-subjects factor). Echoing similar conclusions from Study 1, the main effects of condition and of orientation type were both nonsignificant, $ps = .36$ and $.86$, respectively; the interaction between the two was also nonsignificant, $p = .54$.

Given *a priori* expectations that counterfactual thinking would influence guilt and relationship improvement motivations by specifically amplifying avoidance orientation, we proceeded to test the simple effects of condition despite null omnibus effects. The simple effect of condition on avoidance motivation reached marginal significance, $F(2, 139) = 2.38, p = 0.10, \eta_p^2 = .03^2$ (see Figure 5).

Behavioral intentions. A marginally significant omnibus effect emerged in predicting letter apologizing, $F(2, 139) = 2.59, p = .08, \eta_p^2 = .036$. As demonstrated in Figure 6a, the group means for self-reported apologizing were directionally consistent with the pattern observed for state guilt: namely, planned contrasts revealed that conflict self-CF participants reported more apologizing than did conflict other-CF participants, $F(1, 139) = 5.02, p = .03$, Cohen's $d = .46$, while apologizing among participants in the neg self-CF condition did not significantly differ from those in the other two groups ($ps > .15$) (see Figure 6a).

Paralleling similar analyses in Studies 1, participants' letters in Study 2 were coded to provide objective behavioral measures of apology, forgiveness, resentment, problem-solving, and number of spontaneous self-counterfactuals. Interrater reliability was high across all dimensions ($ICC_{\text{apologizing}} = .94$; $ICC_{\text{forgiveness}} = .66$; $ICC_{\text{problem-solving}} = .82$; $ICC_{\text{resentment}} = .89$; $ICC_{\text{self-CF}} = .82$), and only the first author's coded variables were used in subsequent analyses for these measures. Correlations between self-reported and observer-coded motivations ranged from moderate to high, $r_{\text{apologize}} = .79$, $r_{\text{forgive}} = .23$; $r_{\text{resentment}} = .64$; $r_{\text{solutions}} = .48$). Analyses on these coded variables revealed a significant overall effect of condition on apologizing, $F(1, 136) = 6.50$, $p = .002$, $\eta_p^2 = .09$. Critically, planned contrasts showed that participants in the two conditions that focused on the self — that is, conflict self-CF and neg self-CF — wrote objectively more apologetic letters to their significant others compared to letters written by those in the conflict other-CF condition, $F(1, 136) = 12.80$, $p < .001$, Cohen's $d = 0.74$ and $F(1, 136) = 4.54$, $p = .03$, Cohen's $d = 0.45$, respectively (see Figure 6b). Objective apologizing in the two self-focused counterfactual conditions did not significantly differ, $p = .16$. Furthermore, group differences also emerged on the coded variable of blaming the relationship partner, $F(1, 136) = 3.96$, $p = .02$, $\eta_p^2 = .06$. Specifically, conflict other-CF participants expressed more blame than did those in either the conflict self-CF or neg self-CF conditions, $F(1, 136) = 6.65$, $p = .01$, Cohen's $d = 0.51$ and $F(1, 136) = 5.04$, $p = .03$, Cohen's $d = .46$, respectively. The latter two conditions did not significantly differ in their expressions of resentment, $p = .81$.

Spontaneous counterfactual statements.

Finally, using negative binomial regression tests, we examined whether the frequency of self-focused counterfactuals expressed in the letters differed between conditions. Though there was not a significant omnibus difference among groups, the pairwise contrast between participants in the conflict self-CF and conflict other-CF conditions reached marginal significance, $b = .83$, Wald $\chi^2(1) = 3.28$, $p = .07$. In other words, participants who were instructed to generate self-focused counterfactual statements about the conflict were 2.29 times more likely to spontaneously use self-focused counterfactual statements in subsequently writing letters to their relationship partners, compared to participants who had generated other-focused counterfactuals. None of the other pairwise contrasts between conditions reached marginal or full significance.

Mediation analyses: apologizing. To examine our mediational hypothesis, we used indicator coding to test the indirect effect of condition through guilt on apologizing in the letter. Given the multicategorical condition variable, indicator coding allows the mediation test to quantify *relative* effects of a specific condition, compared to a reference condition. In this case, the conflict-CF condition was coded as the reference condition, which was then compared to conflict other-CF (D1) and neg self-CF (D2) conditions separately (see Figure 7). As implemented in Hayes and Preacher's (2013) SPSS mediate macro, this process generated two relative indirect effects (i.e., pairwise comparisons of mediation), while controlling for the indirect effect of the complementary analysis. We first tested the mediating role of guilt on the effects of condition on two independent variables — self-reported apologizing and coded apologizing. Then, we examined shame and global NA as potential alternative mediators.

Mediation by guilt. Compared to participants in the conflict self-CF condition, those in the neg self-CF condition did not report significantly different levels of guilt, self-reported

apologizing, or coded apologizing. The indirect effects of guilt on both self-reported and coded apologizing were also both nonsignificant, $b = -.09$, 95% bias-corrected bootstrap CI $[-.47, .27]$ and $b = -.04$, 95% bias-corrected bootstrap CI $[-.46, .64]$, respectively.

However, relative to those in the self conflict-CF condition, participants in the other conflict-CF were significantly lower on guilt and in turn lower on both DVs — self-reported apologizing and coded apologizing. Guilt significantly mediated both of these effects of condition: for self-reported apologizing, $b = -.53$, 95% bias-corrected bootstrap CI $[-.98, -.015]$, and for coded apologizing $b = -.19$, 95% bias-corrected bootstrap CI $[-.36, -.05]$.

Mediation by guilt versus shame. To investigate whether these observed relationship-reparatory effects of self-referential counterfactual thinking were specific to guilt, we first re-ran the mediation controlling for SSGS shame. In the comparison between the self conflict-CF and other conflict-CF conditions, guilt continued to fully mediate the effect of condition on self-reported apologizing, $b = -.60$, 95% CI $[-1.09, .20]$, and partially (as the direct effect remained significant) mediated the effect of condition on coder-rated apologizing, $b = -.21$, 95% CI $[-.39, -.06]$. Meanwhile, for the comparison between the conflict self-CF and neg self-CF groups, both mediation tests remained nonsignificant: for self-reported apologizing, 95% CI $[-.76, .04]$, and for coded apologizing, 95% CI $[-.28, .02]$.

The reverse mediation — i.e., relative indirect effects of shame controlling for guilt — did not hold for any of the three pairwise comparisons of condition, either using self-reported or coded apologizing as the outcome of interest (see Table 5).

Paralleling Study 1 analyses in a further test of guilt as a specific mediator, we compared indirect effects of guilt and shame in the same model. Replicating results from Study 1, a pairwise contrast demonstrated that guilt and shame significantly differed in their respective mediational effects on both self-reported apologizing, $b = .79$, boot SE = .34, 95% CI $[.32, 1.47]$ and coder-rated apologizing, $b = .27$, boot SE = .13, 95% CI $[.10, .53]$.

The significance of these mediation contrasts specifically stemmed from guilt being positively associated with apologizing, but shame negatively associated. Controlling for the indirect effect through shame, increased guilt led to greater self-reported attempts to apologize, $b = .67$, boot SE = .26, 95% CI $[.30, 1.17]$ and higher coder-rated apologizing, $b = .23$, boot SE = .10, 95% CI $[.10, .42]$. In contrast, the indirect effect through shame mediated apologizing in the opposite direction: increased shame was associated with *less* self-reported apologizing when controlling for the indirect effect of guilt, $b = -.12$, boot SE = .11, 95% CI $[-.37, -.004]$. However, this indirect effect of shame was not significant for coder-rated apologizing $b = -.04$, boot SE = .04, 95% CI $[-.14, .003]$.

Mediation by guilt versus global negative affect. Alternatively, we considered global NA as a potential mediator. When controlling for global NA, guilt continued to mediate the effect of condition on self-reported apologizing, 95% CI $[.28, 1.09]$, as well as coder-rated apologizing, 95% CI $[.10, .43]$.

Finally, comparing the simultaneous effects of global NA and guilt produced significant contrasts both when considering self-reported and coder-rated apologizing as the outcomes of interest. Controlling for the indirect effect through global NA, increased guilt continued to predict greater self-reported apologizing, $b = .60$, boot SE = .22, 95% CI $[.27, 1.00]$. The same held true for coder-rated apologizing, $b = .21$, boot SE = .08, 95% CI $[.09, .37]$. Meanwhile, the indirect effects through global NA were nonsignificant.

Discussion.

The present findings conceptually replicate results from similar analyses in Study 1 but also extend upon those findings by showing that the affective influences of self-focused counterfactual thinking specifically targets emotions of guilt, as opposed to negative affect more broadly. And, despite the phenomenological and lay conceptual similarities between shame and guilt, the affective consequences of self-focused counterfactual thinking operate discretely on guilt, independent of its close counterpart of shame. Further, the findings from Study 2 support previous research showing that guilt is uniquely associated with pro-relationship behaviors and motivations, distinct from shame and distinct from negative emotions more broadly construed. Critically, the present work extends upon these findings by incorporating counterfactual thinking into this association between guilt and relationship reconciliation: namely, the results of Study 2 demonstrated that feelings of guilt mediated the difference in apologizing between the self- and other-conflict counterfactual conditions, but participants in the two self-focused conditions did not significantly differ in terms of guilt and, consequently, apologizing.

Furthermore, by comparing two types of self-referential counterfactual thinking to other-focused counterfactual thinking, Study 2 suggests that the affective and motivational consequences of counterfactual thinking may occur through a content-neutral pathway, such as from a broad counterfactual mindset or through context-general influences of guilt. Thus, focusing specifically on how one's *own* actions could have been different in the past instigates a functional, problem-solving orientation, even in the context of a relationship conflict. The specific content of those counterfactual thoughts, however, need not necessarily center on any particular situation or interaction for this functional process to unfold. However, the present results introduce an important nuance about this content-neutral path: while upward counterfactual thoughts in general may be sufficient for inducing guilt and relationship-reparatory motivations, they may need to be *self*-referential.

Study 3

Though the findings from Study 2 expanded promisingly upon Study 1's results, it notably lacked a neutral-factual comparison condition, and also had a relatively small sample size. Study 3 was thus designed to address these limitations and further test the hypothesis that upward self-focused counterfactuals increase guilt and, in turn, motivate people to apologize for their role in a close relationship conflict. We return to the hypothesis regarding the content-neutrality versus -specificity by implementing a novel version of the negative self-counterfactual comparison condition, similar to the condition in Study 2 but targeting a slightly modified type of negative experience. Again, we hypothesized that, in line with a content-neutral account, any type of self-focused counterfactuals — either about the conflict or about another negative experience — would increase guilt, relationship-oriented motivations, and reparatory behaviors.

As an additional extension upon Studies 1 and 2, Study 3 explored self-counterfactual thinking in the context of a specific relationship. We reasoned that, if counterfactual thinking instigates a process of relationship-reparatory emotions, motivations, and behaviors, examining this potentially prosocial phenomenon should be most impactful in the context of one of the most frequently occurring, and personally important, social bonds for adults. In fact, adult romantic relationships are not only topmost in frequency and subjective meaning, but also of paramount importance for long-term outcomes like health and life expectancy (e.g., Smith & Christakis, 2008). Corroborating this, of the 441 participants in Studies 1 and 2 combined, 42% ($n = 187$) reported a conflict with a romantic partner (followed in frequency by siblings/close friends (34%, $n = 149$), parents (17%, $n = 76$), other (e.g., aunt, uncle, grandparent; 4%, $n = 18$), and

sons/daughters (3%, $n = 6$). Thus, Study 2 homed in on conflict in romantic relationships in order to explore how counterfactual thinking affects guilt and relationship reconciliation within romantic relationships.

Method

Participants.

For Study 3, 454 participants were recruited from Amazon's MTurk, under the precondition that they currently be involved in a romantic relationship. Of these participants, 21 reported that they were unable to think of a conflict fitting the criteria outlined in the memory prompt, and thus were automatically skipped to the end of the survey. Seventy-nine (18%) were excluded based on *a priori* criteria: 1) failing a built-in attention check; and/or 2) failing to follow instructions for the experimental manipulation³. All reported results were thus conducted on a filtered sample of 354 participants ($M_{\text{age}} = 33.66$; $SD_{\text{age}} = 9.98$; 196 female, 156 male, 2 declined to answer. Race/ethnicity data were not collected). Results were nearly identical with all participants included in the analyses, including all significant results remaining significant.

Measures.

All measures in Study 3 were identical to those from Studies 1 and 2.

Procedure.

As a within-subjects component, all participants first generated two memories. One, the "relationship conflict", was a time when participants and their significant others had a conflict in which both parties played a role. The other memory, the "self-standards failure", focused on a non-social negative memory involving failing to live up to a personal performance standard. The instructions for these memory recall prompts read as follows:

Relationship conflict prompt:

No matter how strong people's relationships are, there are times they get into conflicts with a significant other, such as a husband, wife, girlfriend, boyfriend, or other type of romantic partner. For example, two people might fight about differing viewpoints, argue about how to make a decision, or get mad at each other for betrayals or dishonesty.

Think of a time when you were at odds with your current romantic partner, [INSERT NAME HERE]. Please think of a relatively recent and upsetting memory in which both you and [INSERT NAME HERE] said or did things that were hurtful to each other.

When you think of a memory, please click 'next' to continue.

Self-standards failure prompt:

No matter how hardworking people are, there are times they let themselves down by not meeting their own standards of performance. For example, someone might fail to meet their own expectations on a work or school project, a hobby, or any other personal goal.

Think of a time when you had specific expectations for yourself, but you let yourself down by not meeting those expectations. This might be a memory related to work, school, a hobby, or any other type of goal. Please think of a relatively recent memory.

When you think of a memory, please click 'next' to continue.

The two memory recall tasks were presented in randomized order, followed by the between-subjects manipulation. Here, participants were randomly assigned to list up to five types of thoughts focusing on one of the two memories: counterfactuals about one's own actions in the conflict memory (self-conflict counterfactuals, "conflict self-CF") ($n = 84$); counterfactuals about the significant other's actions in the conflict memory (other-conflict counterfactuals, "conflict other-CF") ($n = 82$), counterfactuals about the self in the failure memory (negative self-counterfactuals, "neg self-CF") ($n = 89$); or factual statements about a neutral grocery store trip (neutral factuals, "neg-F") ($n = 99$).

Instructions for conflict self-CF participants were identical to those used in Studies 1 and 2. Meanwhile, participants in the conflict other-CF condition were reminded of their conflict memory and provided with five modified sentence stems to complete: "*If only he/she ____, then ____*". Neg-CF participants were told to continue thinking about their memory of the time when they failed to live up to some performance standard they had for themselves. They then completed the same counterfactual thought-listing task, but in the context of the self-standards failure instead of the relationship conflict — that is, they were provided with five instances of the stem "*If only I ____, then ____*" to complete. The procedures for the neg-F control condition were identical to those in Study 1.

A neutral filler task then followed the thought-listing manipulation in order to examine the duration of the guilt-induction effect of self-counterfactual thinking. If counterfactual thinking induces guilt that is relatively brief and fleeting, it might have little direct bearing on real-life relationship reconciliation. On the other hand, researchers have argued that guilt, relative to other negative emotions, is particularly intense and enduring (e.g., Ho, Fu, & Ng, 2004). By adding an interjectory task, we sought to address whether intervening time between the manipulation and measurement of the dependent variables might influence the duration of the effects of counterfactual thinking.

In the filler task, participants clicked through a series of 17 photographs that were pretested as neutral on interestingness (i.e., nonsignificantly different from the midpoint of a scale from 1 to 7 of *very uninteresting* to *very interesting*). Participants rated each photograph for how uninteresting or interesting it was; on average, this filler task took 2.14 minutes ($SD = 1.73$ minutes).

After the filler task, all participants were then instructed to think back to (or continue thinking about) the conflict memory in answering the remainder of the questions assessing the various dependent variables of interest, using the same measures and procedure as in Studies 1 and 2 (i.e., the SSGS, the MDES, and relationship approach and avoidance motivations). Then, participants were given the opportunity to write a hypothetical letter to the significant other involved in the conflict memory, followed by four self-report items assessing their motivations while writing the letter (attempts to

apologize, express forgiveness, express resentment, and suggest possible solutions for resolving the issue).

Finally, participants briefly described what happened in the conflict memory, provided demographic information, and answered various data assurance questions (e.g., how carefully they read the instructions, how honestly they answered the questions).

Results.

State affect.

A series of between-subjects ANOVA models revealed nonsignificant omnibus effects of condition on all three state affect measures: SSGS guilt, $F(3, 350) = 1.98, p = .12, \eta_p^2 = .017$; SSGS shame, $F(3, 350) < 1, p = .61, \eta_p^2 = .005$; MDES composite, $F(3, 350) < 1, p = .89, \eta_p^2 = .002$. For these three dependent variables, none of the Tukey's pairwise comparisons between conditions reached significance (all $ps > .11$). Notwithstanding this null effect for state guilt, and in the interest of paralleling analyses from Studies 1 and 2, we tested for effects of condition on guilt while controlling for both shame and negative affect, which remained nonsignificant ($p = .17$).

Relationship improvement motivations. We submitted the composites of relationship approach and avoidance to a mixed-model ANOVA. As in Studies 1 and 2, the main effect of condition was null, $p = .17$. However, overall approach orientations were significantly higher than avoidance, $F(1, 350) = 105.33, p < .001, \eta_p^2 = .23$. The interaction between condition and orientation type was nonsignificant, $p = .25$.

Given our *a priori* expectations that counterfactual thinking would influence guilt and relationship improvement motivations by specifically amplifying avoidance orientation, we proceeded to test the simple effects of condition despite the null omnibus effects. The simple effect of condition on avoidance motivation, however, was not significant, $F(1, 350) < 1, p = 0.58$.

Behavioral intentions. In a final set of analyses, we examined whether the thought-listing manipulation influenced relationship reparatory motivations as manifested in self-reported intentions to apologize and actual displays of apologizing in the hypothetical letter, despite finding nonsignificant effects of condition on the hypothesized mediators as described above. A significant omnibus effect emerged for predicting participants' self-reported attempts to apologize in the letter task, $F(3, 353) = 3.18, p = .024, \eta_p^2 = .027$. Planned contrasts revealed that this effect primarily stemmed from participants in the neg self-CF condition reporting significantly higher motivations to apologize in their letters, but only compared to participants in the neut-F condition, $p = .018$. All other pairwise contrasts were nonsignificant ($ps > .12$).

Coder-rated apologizing. Paralleling the coding analyses from the prior two studies, two coders rated the letters following the same procedures as described in Study 1. Within the half of letters mutually coded by both coders, interrater reliability was high for all four variables ($ICC_{\text{apologizing}} = .92$; $ICC_{\text{forgiveness}} = .57$; $ICC_{\text{problem-solving}} = .77$; $ICC_{\text{resentment}} = .63$; $ICC_{\text{self-CF}} = .93$); therefore, subsequent analyses on these variables used the full set of codes from the first author. Consistent with Study 1, correlations between self-reported and observer-coded motivations ranged from moderate to high, $r_{\text{apologize}} = .75, r_{\text{forgive}} = .21; r_{\text{resentment}} = .46; r_{\text{solutions}} = .42$). However, inconsistent with previous results, and contrary to hypotheses, omnibus and pairwise

differences between conditions on each of the four coded letter variables failed to reach significance, all $ps > .11$.

Spontaneous counterfactual statements.

Negative binomial regression models tested for condition differences in the number of self-focused counterfactuals expressed in the letters. The omnibus effect of condition reached marginal significance, $p = .07$, and we proceeded to examine the pairwise contrasts. Conflict-CF participants were marginally significantly more likely to communicate using self-focused counterfactuals compared to participants in both the neut-F and neg-F conditions, $b = .57$, Wald $\chi^2(1) = 3.10$, $p = .08$ and $b = .53$, Wald $\chi^2(1) = 2.79$, $p = .10$, respectively. These coefficients correspond to the conflict self-CF participants being 1.77 times more likely than neut-F, and 1.70 times more likely than neg-F participants, to express counterfactual statements to their significant others. None of the other pairwise contrasts between conditions reached marginal or full significance.

Discussion.

Given the nonsignificant effects of condition on guilt (the ‘a’ path in the hypothesized mediation model), and the fact that only one (unexpected) pairwise contrast reached significance in predicting letter apologizing (the hypothesized ‘c’ path), unsurprisingly, the hypothesized mediated effect of counterfactual thinking on apologizing via guilt similarly failed to reach significance. Notably, though, the lack of a mediating effect doesn’t appear attributable to a relative *dearth* of either guilt or apologizing motivations in the present study. Rather, the average levels of these two variables were descriptively comparable to the levels of guilt and apologizing in the similar self-focused conflict counterfactual conditions from both Studies 1 and 2. In Study 3, however, participants reflected specifically on ongoing *romantic* relationships, which tended to be relatively long-term ($M = 7.62$ years; $SD = 7.80$ years), highly committed ($M = 6.38$, $SD = 1.20$ on a 7-point scale), and highly satisfying ($M = 5.98$; $SD = 1.27$ on a 7-point scale)⁴. Long-term romantic pair bonds are by-and-large the most important relationships for individuals within the age group encompassed by Study 3 participants (Fingerman & Hay, 2002). In such central relationships, goals to maintain high positive interactions and avoid threats to relationship integrity may therefore be chronically accessible and readily activated. If guilt and motivations to apologize are more easily activated in romantic relationships, compared to other significant but platonic relationships, then the mere act of recalling a conflict with a romantic partner would have triggered guilt and apologizing in the present study, regardless of condition. Thus, in Study 4, we returned to asking participants about important relationships in general, while continuing to explore remaining alternative explanations for the effects of counterfactual thinking.

Study 4

As demonstrated in past research, counterfactual thinking can produce beneficial outcomes partly by highlighting one’s responsibility for the situation, which then aids in learning from one’s mistakes. This raises the question: how does counterfactual thinking differ, if at all, from factual-based reflections on the reasons for which one was responsible for a negative outcome? If such thoughts of self-blame are part of the reason that counterfactual thinking produces functional outcomes, does imagining better alternative realities offer any unique benefits?

Because attributions of self-responsibility are inherently wrapped up in self-counterfactual thinking, we expected to find similar affective, motivational, and behavioral outcomes from both types of thinking — i.e., imagining the *if-onlys* and reflecting factually on why one was responsible. That is, both should similarly induce guilt, which should then lead to increased relationship improvement motivations and apologizing. However, differences may emerge in more nuanced manifestations. For one, we hypothesized that counterfactual thinking might have benefits above and beyond factual responsibility-based reflections by mitigating defensive reactions to the conflict memory. Thinking about undesirable actions that one has performed in the past may elicit desires to justify those behaviors, and, when faced with such a threat to one's integrity or moral standing, people may be prone to defensively think, “well, *anybody* else would have done just as I did.”

To examine these issues, Study 4 combined data collected at two different time points. In the first set, participants were randomly assigned to a 2×2 between-subjects manipulation of target (self vs. other) and thought type (counterfactual vs. responsibility factual). In the second set, participants were randomly assigned to one of three conditions: self-counterfactual, self-responsibility-factual, or neutral factual. Where they overlapped, the results did not significantly differ between these two batches of data collection, so we combined all data, resulting in a total of 5 different conditions. Furthermore, because we were primarily interested in comparing counterfactual thinking about things one could have done differently in a conflict, versus factual thoughts about reasons one was responsible for a conflict, the two other-focused conditions are not further discussed here. Instead, we focus the analyses below on the self-counterfactual, self-responsibility-factual, and neutral-factual conditions.

Method

Participants. For Study 4, 1062 participants were recruited from MTurk. Of these, 302 were in one of the two other-focused conditions and thus not included in the present analyses. Of the remaining 760 participants, 119 failed to follow instructions for the manipulation and were thus excluded from all analyses. (Failure to follow instructions included generating thoughts about the wrong actor — i.e., self vs. other; not completing the manipulation at all; and/or entering irrelevant/nonsense text into the text boxes.) All analyses presented here are thus conducted on a sample of 641 participants (263 male, 377 female; $M_{\text{age}} = 37.42$ years, $SD_{\text{age}} = 11.94$ years).

Measures.

All measures in Study 4 were identical to those from Studies 1-3, with the addition of a new single-item assessment of defensiveness. This question asked participants to rate their agreement with the statement, “Most other people would have acted just the same as I did if they had been in that same conflict.”

Procedures. After accessing the online Qualtrics survey, participants were instructed to recall a relatively upsetting conflict with a close relationship partner, one in which both parties did or said things that might have hurt the other. The exact instructions read as follows:

*Take a few moments to remember a time when you were at odds with someone close to you (for example, a parent, sibling, close friend, or current romantic partner). Please recall an upsetting conflict involving an important person in your life, someone **with whom you still have a relationship**. In this*

conflict, both you and the other person said or did things that were hurtful to each other.

After confirming that they had indeed brought a specific incident to mind, participants then typed a short identifying name for the conflict (e.g., “Elmwood house garage”), as well as the name of the significant other involved in the memory; both of these idiosyncratic strings were subsequently piped in whenever the survey referenced the event or significant other, respectively. As with the previous three studies, participants then rated the severity of the conflict, the extent to which the conflict was resolved, and how long ago it occurred.

Following the conflict memory generation, participants were then randomly assigned to one of five thought conditions (though only three of these conditions are discussed here). In a manipulation of thought type, participants were asked to generate up to five statements about their actions in conflict, which were either counterfactual or responsibility-focused factual thoughts. The responsibility-factual statements cued participants to focus on actions that caused or contributed to the conflict (i.e., “I was responsible because ____”) (which we refer to as resp-F; $n = 236$), whereas the counterfactual statements asked participants to imagine how things would have turned out differently “if only” the self or other had done something else (i.e., “If only I ____, then ____”) ($n = 258$). As in Studies 1 and 3, the neutral factual condition asked participants to list up to five statements about things they did or saw during their most recent trip to the grocery store ($n = 147$).

Participants then proceeded to questions assessing the dependent variables, including state emotions (e.g., guilt), responsibility allocations, relationship approach/avoidance motivations, defensiveness, and an open-ended letter providing the opportunity to apologize. Afterward, participants provided background information about their relationship to the significant other (e.g., relationship type, length, satisfaction, IOS) as well as demographics (gender, age).

Results

State affect. Overall, participants in the three conditions did not significantly differ in levels of guilt on the SSGS⁵, $F(1, 638) = 1.95$, $p = .14$, $\eta_p^2 = .006$, nor did any of the planned pairwise comparisons reach significance, all $ps > .16$. Reports on the MDES general negative affect composite also did not significantly differ between conditions, $p = .60$ (see Table 8).

When controlling for SSGS shame and the general negative affect composite (in order to parallel similar analyses in Studies 1-3), a significant main effect of condition emerged in predicting SSGS guilt, $F(2, 636) = 3.88$, $p = .02$, $\eta_p^2 = .012$. Unexpectedly however, pairwise comparisons demonstrated that this effect was driven by a significant difference only between conflict self-CF and resp-F participants: at mean levels of shame, resp-F participants actually reported higher levels of guilt than did those in the conflict self-CF condition, $t(638) = 2.63$, $p = .03$. Differences in mean guilt did not reach significance for any other comparisons.

Relationship improvement motivations. Levels of approach- and avoidance-oriented motivations for improving the relationship did not significantly differ by condition, $ps = .52$ and $.43$, respectively. None of the planned pairwise comparisons reached significance, all $ps > .66$.

Behavioral intentions. Self-reported apologizing significantly differed among conditions, $F(2, 638) = 8.27$, $p < .001$, $\eta_p^2 = .03$. Resp-F participants reported the greatest attempts to apologize in the letter task, significantly more so than neut-F participants, $t(639) = 2.65$, $p = .02$, but nonsignificantly different from those in the conflict self-CF condition, $p = .11$.

Participants in the conflict self-CF condition, though descriptively higher on mean apologizing, were not significantly different from those in the neut-F condition, $p = .40$.

Defensiveness. Overall, levels of defensiveness significantly differed among conditions, $F(2, 638) = 8.27, p < .001, \eta_p^2 = .03$. Conflict-CF participants reported lower agreement with the defensive statement than did N-F participants, $t(640) = 2.97, p = .01$, as did SRF participants, $t(640) = 4.02, p < .001$. Conflict-CF and SRF participants did not significantly differ on defensiveness, $p = .68$.

Coder-rated apologizing. Given the high interrater reliability achieved by two coders in Studies 1-3, only one condition-blind coder (the first author) coded the letters in Study 4.

Correlations between self-reported and researcher-coded motivations ranged from moderate to high, $r_{\text{apologize}} = .73, r_{\text{forgive}} = .23; r_{\text{resentment}} = .61; r_{\text{solutions}} = .38$. Overall, and controlling for word count, the effects of condition significantly influenced the extent of apologizing expressed in the letters, $F(2, 631) = 5.13, p = .006, \eta_p^2 = .016$, a difference specifically driven by apologetic sentiments being significantly lower in the neutral-F condition compared to the conflict self-CF and resp-F conditions, $t(627) = 2.90, p = .012$ and $t(6427) = 3.10, p = .006$ (Bonferroni-adjusted), respectively. The latter two conditions did not significantly differ in coded apologizing, $p > .99$.

Spontaneous counterfactual statements.

The concept of counterfactual mindsets predicts that participants would have spontaneously expressed more counterfactual statements in the open-ended letters if they had been earlier instructed to generate counterfactual statements. To statistically assess this prediction, we again employed negative binomial regression models to first test the omnibus effect of condition, followed by planned pairwise comparisons (controlling for word count). Overall, spontaneous self-counterfactuals did not significantly differ by condition, $p = .34$, and none of the pairwise comparisons reached significance.

Mediation analyses: apologizing.

Mediation by guilt. As shown in Table 9, guilt significantly mediated the effect of condition on self-reported apologizing only when comparing participants in the neut-F and resp-F conditions, 95% CI [.002, .48]. Resp-F participants reported higher state guilt and, as a result, greater attempts to apologize. The same held true for observer-rated apologizing, 95% CI [.005, .05]. Contrary to hypotheses, and failing to replicate analogous mediation tests from Study 1, the indirect effect of guilt did not reach significance when comparing the conflict self-CF and neut-F conditions.

Mediation by guilt versus shame. When state shame was entered as a covariate, the indirect effect of guilt did reach significance for two pairwise condition contrasts: conflict self-CF compared to resp-F (95% CI [.07, .46]), and neut-F compared to resp-F (95% CI [.01, .47]). Those in the resp-F conditions reported more guilt and, as a result, greater attempts to apologize in their hypothetical letters. This transpired not only in their self-reported apologizing, but also in coder-rated apologizing (95% CIs [.03, .20] and [.001, .21], respectively).

Notably, however, the reverse mediation — i.e., with shame as the mediator — also reached significance when comparing resp-F to conflict self-CF participants. That is, conflict self-CF participants reported relatively more shame (controlling for guilt), which then led to more self-reported apologizing (95% CI [.02, .14]) and observer-coded apologizing (95% CI [.01, .08]).

Mediation by guilt versus global negative affect. Alternatively, we considered global NA as a potential mediator. When controlling for global NA, guilt significantly mediated the effect of condition on apologizing only for the comparison between neut-F and resp-F conditions, both for self-reported apologizing 95% CI [.01, .51], as well as coder-rated apologizing, 95% CI [.002, .23]. However, for both apologizing variables, global NA was not a viable mediator of the effect between any two of the conditions.

Regression models incorporating conflict resolution ratings.

As aforementioned, the pre-manipulation instructions for generating a conflict memory required participants to think of a relatively upsetting conflict with someone important to them; however, participants tended to recall conflicts that were anywhere from completely unresolved to completely resolved ($M = 4.67$; $SD = 2.10$; range = 1-7).

To examine whether the effects of the counterfactual manipulation differed across the range of resolution status, dummy codes were first created to identify each of the three conditions. Resolved ratings were mean-centered and multiplied by condition dummy codes to create interaction terms; thus, each interaction term in a regression model represents the difference in slopes between the comparison group and the condition coded as “1” under that associated dummy code. We analyzed each DV first with the neutral factual condition as the comparison group, and then followed up by implementing the same regression model with the self-counterfactual group as the comparison. In a series of subsequent regression models, we therefore examined each of the key dependent variables predicted by the main effects of condition and resolution status, along with their interaction. In the event of a significant conflict-by-resolved interaction, we further probed the simple interaction contrasts and simple slopes.

SSGS guilt. In omnibus analyses, the main effect of condition did not significantly predict state guilt ($p = .15$); however, there was a significant main effect of resolution status, $F(2, 635) = 10.65$, $p = .001$, $\eta_p^2 = .016$. Importantly, a significant omnibus interaction emerged between condition and resolution, $F(2, 635) = 3.60$, $p = .03$, $\eta_p^2 = .011$.

To deconstruct this interaction (pictured in Figure 9), we probed interaction contrasts and simple slopes within each of the three conditions. For participants in the resp-F and neut-F conditions, state guilt increased only when conflicts were more resolved (simple slopes $b = .18$ and $b = .129$, respectively). In contrast, guilt was more or less independent of resolution status for participants in the conflict self-CF condition, as shown in a simple slope $b = -.006$.

Did these simple slopes differ significantly? Indeed, for those in the conflict self-CF group, the slope relating guilt and resolution status was significantly less steep compared to: 1) the slope within the neut-F group, $b = .19$, $t(635) = 2.343$, $p = .02$; and 2) the slope for the resp-F group, $b = .14$, $t(635) = 2.076$, $p = .04$. The latter two did not significantly differ, $p = .54$.

Further probing these interaction contrasts, we analyzed the simple slopes within each condition. Participants in the resp-F and neut-F conditions reported increased guilt only when conflicts were more resolved, resp-F $b = .18$, $t(635) = 2.71$, $p = .007$ and neut-F $b = .13$, $t(635) = 2.67$, $p = .008$. In contrast, participants who thought counterfactually about the conflict reported high levels of guilt independent of their perceptions of how resolved the conflict currently was, as reflected in a simple slope that was not significantly different from 0, $b = -.006$, $t(635) < 1$, $p = .89$ (see Figure 9).

Relationship approach. The main effect of condition did not significantly predict levels of relationship approach, $p = .82$, though resolution status did significantly predict approach

motivations, $F(2, 635) = 123.41, p < .001, \eta_p^2 = .16$. More pertinent to the present question at hand, the omnibus interaction effect between condition and resolution status did not reach significance, $F(2, 635) = 1.84, p = .16, \eta_p^2 = .006$.

Relationship avoidance. The omnibus interaction effect between condition and resolution status did not reach significance, $F(2, 635) < 1, p = .65, \eta_p^2 = .001$, nor was there a significant main effect of condition ($p = .52$). The main effect of resolution status, however, was significant, $F(2, 634) = 27.93, p < .001, \eta_p^2 = .04$.

Letter apologizing. The omnibus interaction effect between condition and resolution status did not reach significance, $F(2, 634) = 1.19, p = .30, \eta_p^2 = .004$, nor was there a significant main effect of condition ($p = .13$). The main effect of resolution status, however, was significant, $F(2, 634) = 91.57, p < .001, \eta_p^2 = .13$.

Defensiveness. Defensiveness significantly differed across the three conditions, $F(2, 635) = 8.06, p < .001, \eta_p^2 = .025$, and also as a function of resolution status, $F(1, 635) = 5.05, p = .03, \eta_p^2 = .008$. A marginally significant interaction effect between condition and resolution status also emerged, $F(2, 635) = 2.93, p = .054, \eta_p^2 = .009$.

Subsequent analyses of the three interaction contrasts revealed that only the comparison between the slopes of the conflict self-CF and resp-F conditions reached significance, $b = .15, t(635) = 2.41, p = .02$. Specifically, as tests of simple slopes revealed, those in the resp-F condition reported higher defensiveness when the conflict was relatively less resolved, $b = -.15, t(635) = -3.24, p = .001$, whereas levels of defensiveness did not significantly differ across the range of resolution status for those in the conflict self-CF condition, $p = .995$ (see Figure 10).

Discussion

Reflecting on how one's own actions were responsible for a certain outcome is the first step of counterfactual thinking. What makes these thoughts *counterfactual* is the subsequent mutation of those actions to what could have — but did not — actually happen. Thus, the findings from Study 4 supported our initial hypothesis that certain consequences of counterfactual thinking would overlap with consequences of simply reflecting on reasons to blame the self. After both types of thought processes, participants felt similar levels of guilt, relationship improvement motivations, and motivations to apologize to a significant other involved in the conflict in question. However, Study 4 also hinted at more nuanced conditions under which counterfactual thinking provides benefits beyond simply generating attributions of self-blame. Namely, under typical conditions, guilt and defensiveness depend on the extent to which conflicts have been resolved: people appear to feel more motivated to justify their stances when there is lingering animosity, and, on the flip side, feel less guilt. However, thinking counterfactually about relationship conflicts seems to temper this otherwise close association with resolution status, such that relatively unresolved conflicts allay defensiveness and continue inducing guilt.

Internal Meta-Analysis

Across several studies, and using several different comparison conditions, we probed the effects of self-counterfactual thinking on both emotions and relationship-reparatory motivations. To provide a summative conclusion, an internal meta-analysis (Goh, Hall & Rosenthal, 2016) was performed using data from the three studies (i.e., Studies 1, 3, and 4) that included both the conflict-focused self-counterfactual condition and the neutral factual condition. First, we

calculated Cohen's d effect sizes for the comparison for each of the 3 studies (Studies 1, 3, and 4) that contained both of the two conditions.

Method

Using the R package “meta” (function “metagen”) (Schwarzer, Carpenter, & Rucker, 2015), we pooled the study-specific results to estimate the mean effect sizes of counterfactual thinking on three key outcome variables: state guilt, relationship avoidance, and apologizing. This package provides estimates of meta-analytic effect sizes assuming both fixed and random effects. Under a fixed-effects assumption, all studies included in the analysis are designed to assess the same underlying effect—for example, by implementing the same treatment, sampling from the same population, or using the same inclusion/exclusion criteria. In contrast, random-effects meta-analyses assume high between-study variability—that is, the component studies target different underlying effects. Because the experimental manipulation and outcome instruments were identical in all three studies, we assumed fixed-effects models for all three meta-analytic calculations, though the results from random-effects models lead to the same conclusions (and are thus included, along with fixed model effect sizes, in Figure 11 for illustrative purposes).

Results

Compared to thinking factually about a neutral event, counterfactual thoughts about one's role in a relationship conflict induced more guilt, with a meta-analytic Cohen's d of .25, 90% CI [0.14, 0.36] (panel a in Figure 11). Meta-analyses also confirmed a significant common trend wherein counterfactual thinking increased participants' attempts to apologize to their conflict partners, Cohen's d = .19, 90% CI [0.08, 0.31] (panel c in Figure 11). In contrast, when coalescing results for avoidance-oriented relationship improvement motivations, the meta-analytic effect size supported the null hypothesis—that is, that counterfactual thinking does not reliably increase avoidance-oriented motivations for improving one's close relationships.

General Discussion

Four experiments tested the effects of counterfactual thinking in a context in which this type of thought process has received relatively little attention: interpersonal relationships. Overall, the results across these studies demonstrate that thinking counterfactually about one's role in negative interpersonal interactions has important affective, motivational, and behavioral consequences. Namely, counterfactual thinking leads to heightened emotions of guilt, increased desires to improve the relationship moving forward, and more apologetic behaviors expressed to those relationship partners.

In Study 1, participants who imagined changing their own actions in a past conflict with a close relationship partner felt increased guilt, but not increased shame or general negative affect. This finding supports our proposition that counterfactual thinking specifically influences the discrete emotional experience of guilt. Moreover, Study 1 investigated the downstream consequences of counterfactual thinking and demonstrated that this mode of thought can change motivational orientations toward the relationship partner involved in the conflict memory. Broadly, participants reported greater avoidance-oriented motivations to strengthen the relationship. Given a more specific opportunity to apologize to the partner, those who had engaged in counterfactual thinking reported stronger attempts to apologize, and indeed *did*

apologize more, as corroborated by objective observers. Mediation analyses further indicated that this apologizing was mediated by guilt: counterfactual thoughts about a conflict induced guilt, which, though a negative emotion, subsequently led participants to apologize to the conflict partner.

Study 2 tested alternative accounts for the findings from Study 1 in attempts to determine whether guilt, relationship improvement motivations, and apologizing occurred because of features that are involved in, but incidental to, counterfactual thinking — for instance, the abstract construal level on which it occurs. We also examined whether the counterfactual thoughts must needs focus on a relationship conflict: alternatively, might a general counterfactual mindset trigger relationship-specific affective, motivational, and behavioral consequences? Thinking counterfactually about one's role in a relationship conflict (conflict self-CF) and thinking counterfactually about a personal performance failure (neg self-CF) had statistically indistinguishable effects on guilt and apologizing. However, both of these conditions led to more guilt and apologizing compared to thinking counterfactually about a relationship partner's role in a past conflict (conflict other-CF). These results suggest that abstract thinking in and of itself cannot sufficiently account for the effects we observe, though counterfactual thinking as a broad mindset (i.e., regardless of the context of those thoughts) may in fact be sufficient.

In a close replication of Study 2, Study 3 also incorporated negative-CF and conflict other-CF conditions to again test our hypotheses regarding abstract thinking and content-neutrality of counterfactual thinking. However, Study 3 also re-incorporated the neutral-factual control condition and specifically homed in on close romantic relationship conflicts. In this study, participants across all four conditions did not significantly differ in guilt, relationship improvement motivations, or apologizing — save for the unexpected finding that neg self-CF participants claimed significantly greater attempts to apologize, but only compared to neutral-F participants. These null results in Study 3 are likely attributable to the nature of the recall task: we required participants to think of a conflict involving a current romantic relationship partner. Merely recalling such a threatening event likely automatically elicits guilt, relationship reparatory goals, and apologizing, thus leaving little room for our condition manipulation to further heighten these consequences.

Finally, Study 4 delved a more nuanced question regarding the mechanism by which self-focused counterfactual thinking leads to the affective, motivational, and behavioral cascade of effects herein documented. By definition, self-focused counterfactual thinking involves first focusing on reasons that one is responsible for an outcome, and then imagining alternative actions that were not pursued. Does this second step of imagining alternative realities provide any benefit, or might it be sufficient to simply reflect on reasons to blame the self, and stop the process there? Study 4 suggested that, indeed, self-counterfactual thinking may provide particular benefits for conflicts that are relatively less resolved. Among those in the two factual conditions (both neutral-F and resp-F), experiences of guilt and defensiveness depended on how resolved the conflict was — they tended to feel less guilt and more defensiveness about ongoing conflicts, and more guilt and less defensiveness only after reconciliation. However, among those who focused on self-counterfactuals about the conflict, levels of guilt and defensiveness did not depend on whether the conflict had been resolved. Thus, for unresolved conflicts (1 SD below the mean), participants who generated self-focused counterfactuals reported the highest levels of guilt and the lowest levels of defensiveness.

Given somewhat mixed findings across these four studies, we heeded recent recommendations to embrace null findings and evaluate them as part of a string of similar studies (Lakens & Etz, 2017; Goh, Hall, & Rosenthal, 2016). Thus, an internal meta-analysis analyzed the pooled effect sizes of self-focused counterfactual thinking compared to neutral factual thinking on three key outcome variables: guilt, avoidance-oriented relationship improvement motivations, and self-reported apologizing. Coalescing across the three studies (Studies 1, 3, and 4) that contained data addressing these condition comparisons, our meta-analysis corroborates small-to-medium effect sizes of counterfactual thinking on increased state guilt and increased attempts to apologize to a relationship partner about a mutual conflict.

Contributions to Existing Research

Taken together, the results from the individual four studies and the internal meta-analysis contribute to an increasing body of evidence documenting the (often functional) consequences of counterfactual thinking across a wide variety of contexts, especially those involving performance domains such as the workplace and academics. By and large, this line of research has generated much insight into the utility of counterfactual thinking — namely, researchers now widely recognize the functional purposes of counterfactual thinking in future goal achievement. People typically imagine alternative realities when they have failed their own expectations in some way, and this process of mentally simulating “correct” actions does indeed help guide future behavior toward subsequent goal attainment (Rose, 1994; Pham & Taylor, 1999), partially aided through the emotional sting of regret, the “prototypical” emotion associated with counterfactual thinking.

The present investigation expands upon existing research by examining the consequences of counterfactual thinking in a relatively understudied domain: close interpersonal interactions. Certainly, people are prone to mutate memories of personal performance failures. However, people are just as (if not more) predisposed to imagine alternative roads down which their close relationships might have unfolded. Drawing from existing research on the functional perspective of counterfactual thinking, this social context raised key questions that we herein sought to address. Thus, the results from these four studies uncover new findings about the scope and consequences of counterfactual thinking.

For one, thinking counterfactually in the relationship domain clearly induces guilt. Though guilt is a close cousin of regret, research on counterfactual thinking has largely neglected to focus on this emotion simply because guilt is not as likely to occur in performance and achievement domains. The present work is one — to our knowledge — one of only a handful of studies documenting guilt as concomitant with counterfactual thinking. Though early research found that guilt and shame elicit different types of counterfactual ruminations (Niedenthal, Tangney, & Gavanski, 1994), nearly all research on the intersection of emotion and counterfactual thinking has focused on regret. (And, in fact, Niedenthal et al.’s study is more widely recognized as evidencing distinctions between guilt and shame, rather than as a demonstration of guilt being concomitant with counterfactual thinking.) In the meantime, only one study has further examined the connection between counterfactual and guilt, showing that counterfactually thinking about their crimes causes prisoners to experience more guilt. In the present study, we reemphasize this common theme guilt as an integral component of counterfactual thinking and also extend this line of inquiry into the realm of interpersonal relationships, a ripe but understudied domain in which counterfactual thinking occurs.

Second, given the existing functional perspective of counterfactual thinking repeatedly demonstrates its utility as a lesson-learning and performance-promoting tool, we assessed

whether counterfactuals similar provide benefits when thinking about close relationships. Indeed, we find evidence for its benefits in this novel context as well: counterfactual thinking increases motivations to improve a potentially damaged relationship. In the context of conflicts with a significant other, as was the focus in the present studies, this specifically meant increased self-reported desires to apologize, as well as more apologetic communications to the relationship partner (as perceived by outside observers). Thus, the present studies demonstrate that functional perspective of counterfactual thinking does hold traction for close relationships, though perhaps needs to be expanded to account for goals of both intra- and interpersonal varieties.

In addition to illuminating previously unexplored realms in which counterfactual thinking has important consequences, the current results also raise questions about the boundary conditions for the affective, motivational, and behavioral outcomes associated with self-focused counterfactuals. Though the incorporation of the other-focused counterfactual conditions in Studies 2 and 3 provide evidence against abstract thinking as the incidental root cause of the consequences that we claim to be specific to self-counterfactuals, the question regarding content-neutrality vs. –specificity remains unclear. Studies 2 and 3 add to existing research supporting the concept of counterfactual mindsets — i.e., that counterfactual thinking in one domain causes a cascade of effects that can spill over into contexts unrelated to the thoughts involved in imagining alternative realities. Yet, it remains unclear just how far these spillover effects might travel. For instance, would self-focused counterfactual thinking about relationships also induce people to behave prosocially toward a significant other who was not the target of the initial counterfactual thoughts?

Limitations and Future Directions

In our endeavor to examine counterfactual thinking in a novel context of interpersonal relationships, the present studies clearly provide novel insights but are also characterized by a number of limitations. Among them, we chose to assess the consequences of counterfactual thinking solely via online self-report measures. Although these measures incorporated a close proxy of behavioral manifestations — i.e., hypothetical letters to relationship partners involved in the conflict — behavioral data that is explicitly directed toward those conflict partners is necessary to provide stronger evidence that counterfactual thinking about interpersonal conflict truly does engender prosocial outcomes like apologizing. Thus, future research using diverse assessment methods will be valuable for deepening and perhaps expanding our knowledge of how counterfactual thinking operates — either functionally or not — in relationship contexts.

Not only were the present data mainly self-reported (complemented by objectively coded variables), but they also focused on the perspective of only one conflict interaction partner. Of course, given our attempt to extend the study of counterfactual thinking into social contexts, there is undeniable value in extracting the perspectives of all parties involved in such interactions. More multifaceted data about these social interactions would help answer some key questions — for instance, even if counterfactual thinking helps motivate apologetic behaviors, do interactions partners respond with equally benevolence? The present data only address one portion of this broader issue — that is, throughout our studies, we find support that counterfactual thinking creates a more general counterfactual mindset that subsequently increases the likelihood that people will use counterfactual statements in their own thinking and writing. Though our data were mixed (sometimes reaching levels of significance, but also marginally or nonsignificant in Studies 3 and 4), future research could focus extensively on examining the utility of using counterfactual statements in apologetic communications. Studies

on the communicative impact of counterfactual messages are relatively sparse, but a handful of studies provide foundational evidence for their functions. In a political context, certain types of counterfactuals are effective defense strategies, essentially helping politicians deflect blame and recast their actions in a more favorable light (Catellani, Bertolotti, & Covelli, 2010). In an occupational context, those who read upward counterfactual messages from an imagined coworker subsequently felt more motivated and persisted longer on a work task (Wong, 2007). How might apology recipients perceive apologies that incorporate counterfactual statements? Would these apologies be seen as more heartfelt and/or likely to be forgiven?

Although the studies presented here suggest a potential role for counterfactual statements in communicating apologies, current research has not explicitly examined this hypothesis. There is, however, extensive research on what constitutes effective apologies; various researchers have attempted to delineate specific elements of an impactful apology message, both in contexts of close relationships as well as in industrial-organizational, political, and marketing contexts. For instance, supervisors are seen as more supportive when physical contact (e.g., a pat on the back) accompanies apologies to their employees, and this makes the apology seem more sincere (Marler, Cox, Simmering, Bennett, & Fuller, 2011). In terms of the actual verbal content, Lewicki, Polin, & Lount (2016) argue that the minimal requirements of an effective apology include: a) an explanation for the transgression; b) an offer of repair; and c) an acknowledgement of responsibility. Expressions of guilt, regret, and asking for forgiveness are also frequent apology elements, but are not minimally necessary for effectiveness (also see Lewicki & Polin, 2012). Thus, to the extent that self-focused counterfactuals communicate that one accepts responsibility, understands what caused the transgression, feels guilt/regret, and knows what to do differently, these statements would seem critical and compelling elements of effective apologies.

Another limitation of the present work is its focus on couple identities in a limited cultural context—namely, respondents predominantly from a Western culture. Differing values and social interaction patterns in collectivistic cultures may complicate the study of relationship-based counterfactual thinking. For instance, some researchers theorize that the lack of a clear counterfactual marker in the Chinese language (e.g., a Chinese analogue of the English “if only” or “I wish that”) may indicate a concomitant cognitive disadvantage in thinking counterfactually, relative to native English speakers (e.g., Gentner & Yeh, 2005). If this is indeed the case, our conclusions from the present studies may be overlooking the potential moderating factor of culture and its influences on the cognitive processes underlying counterfactual thinking. On the flip side, and adding a further complication to this specific topic, guilt is much more of a prominent emotion in Eastern cultures. Researchers have even identified seven discrete *types* of guilt in Chinese culture, each with its own separate vocabulary term (Bedford & Hwang, 2003). Thus, our novel investigation of how counterfactual thinking and guilt intersect highlights an under-studied perspective with which to examine and better understand counterfactual thinking across cultural contexts.

Conclusion

In a semi-facetious quip about the dissolution of a pop band, Stephen Hawking once noted that “one day, there may well be proof of multiple universes. It would not be beyond the realms of possibility that somewhere outside of our own universe lies another, different universe, and in that universe, Zayn is still in One Direction.”

In fact, multiple universes do indeed exist within every person’s imagination, in the form of counterfactual thoughts. The present set of studies examined the affective, motivational, and

behavioral consequences of counterfactual thinking in social contexts, which has been relatively understudied. Of the small body of research that has examined counterfactuals in interpersonal contexts, findings clearly demonstrate that people do indeed mentally mutate events in the relational domain, and that these thoughts are just as consequential as those that arise in personal contexts. Thus, in four studies, we provide evidence that regret is not the sole emotion that epitomizes counterfactual thinking; rather, guilt plays a powerful but understudied role. Moreover, our evidence emphasizes the functional perspective of counterfactual thinking yet further extends on existing theory by demonstrating that upward counterfactual thoughts also facilitate the pursuit of social goals. The ability to imagine multiple universes, some in which our relationships are better than they are in reality, can in fact have the power to bring those alternatives into existence.

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Footnotes

- ¹ Overall, seven participants chose not to write a letter to their close relationship partners (two in the counterfactual condition; five in the control condition).
- ² Further examining this marginally significant effect, a planned contrast revealed that relationship avoidance was significantly higher among those in the conflict self-CF condition compared to those in the neg self-CF condition, $F(1, 139) = 3.86$ $p = .05$, Cohen's $d = 0.38$. Conflict other-CF participants also reported higher levels of relationship avoidance motivations than those in the neg self-CF condition, although this finding was only marginally significant, $F(1, 139) = 3.39$, $p = .07$, Cohen's $d = 0.35$ (all other $ps > .24$). Conflict self-CF and conflict other-CF conditions did not differ from each other.
- ³ Responses on the thought-listing task were classified as contradictory to instructions if the counterfactuals focused on the wrong subject (e.g., generating other-focused counterfactuals instead of self-focused; generating counterfactuals about the conflict in the failure condition; listing factual statements instead of counterfactuals).
- ⁴ Unfortunately, analogous data on these variables were not collected in previous studies, so we were unable to test whether relationship quality significantly differed among participants in Study 3.
- ⁵ Levels of guilt as assessed by the single MDES item did, however, significantly differ among conditions, $F(1, 638) = 8.71$, $p < .001$, $\eta^2 = .03$. In particular, conflict self-CF and resp-F participants each reported greater degrees of guilt compared to N-F participants, $t(640) = 3.13$, $p = .01$ and $t(640) = 4.12$, $p < .001$. MDES guilt did not significantly differ between conflict self-CF and resp-F groups, $p = .68$.

Figure 1. Differences between conflict self-CF and neutral-F conditions on SSGS guilt in Study 1. Error bars represent 95% confidence intervals.

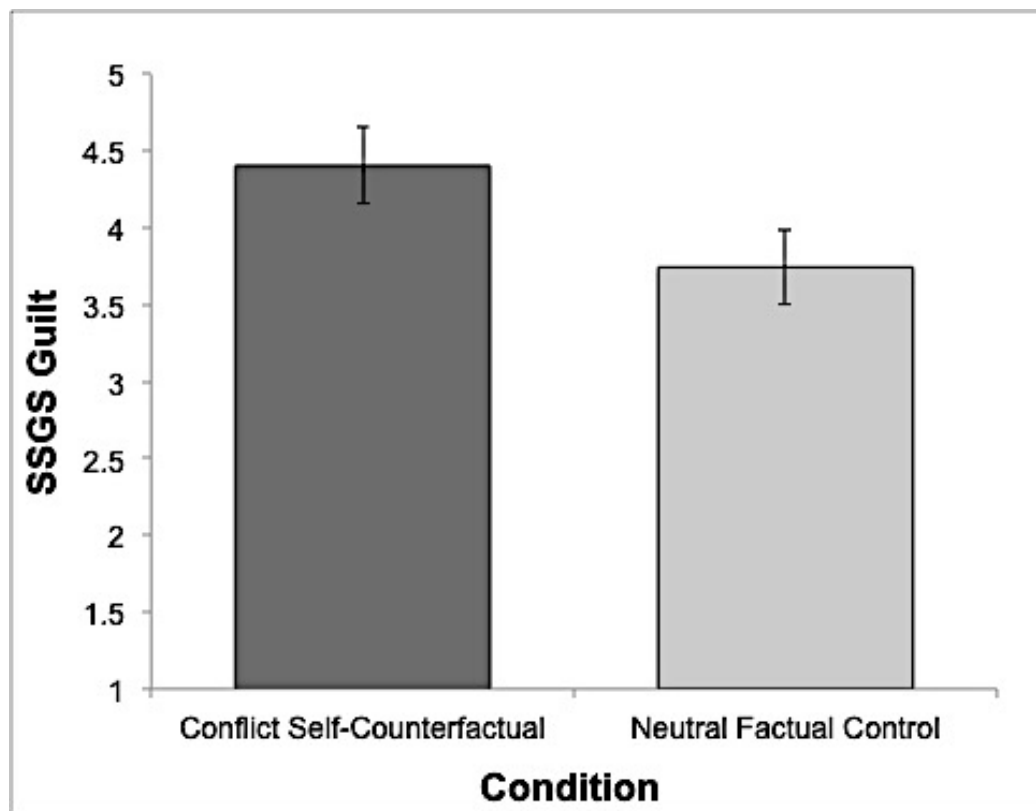
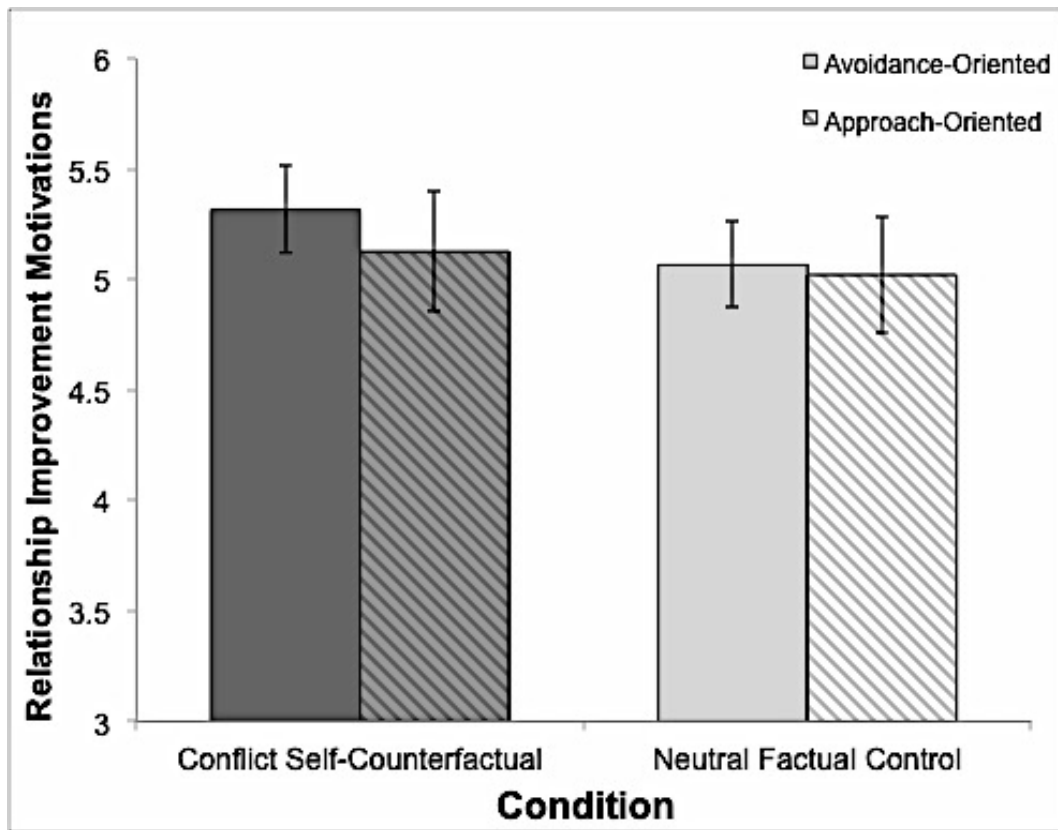


Figure 2. Differences between conflict self-CF and neutral-F conditions on avoidance- and approach-oriented relationship improvement motivations in Study 1. Error bars represent 95% confidence intervals.



Figures 3a and 3b. Differences between conflict self-CF and neutral-F conditions on self-reported (3a) and observer-coded (3b) apologizing in hypothetical letters written to conflict partners. Error bars represent 95% confidence intervals.

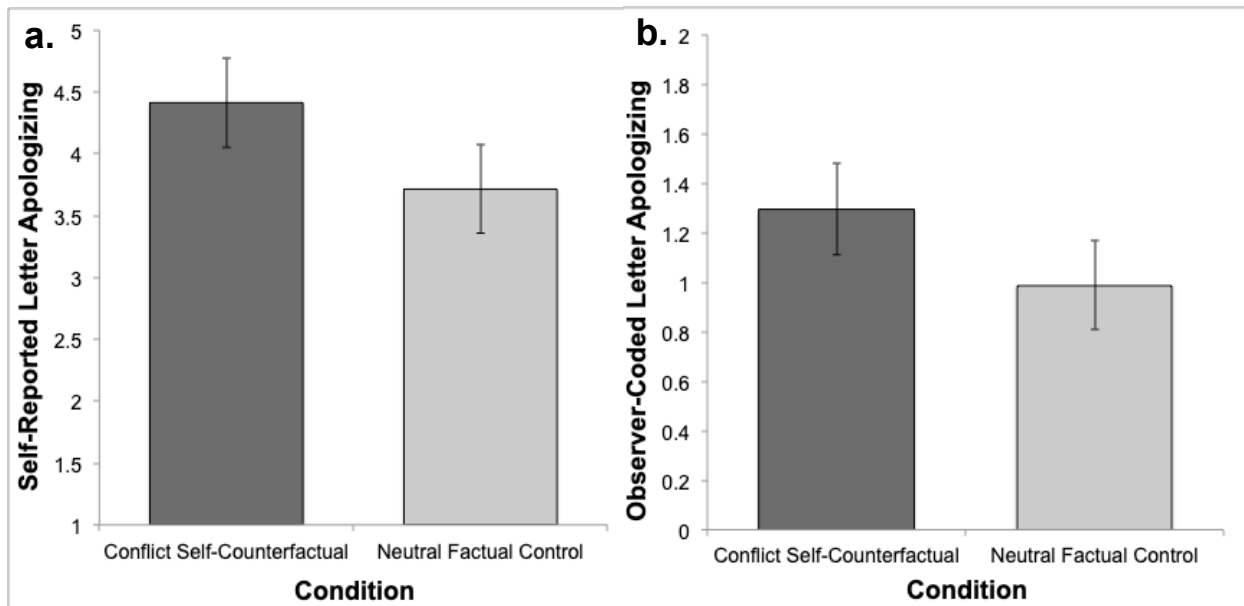


Figure 4. Differences among conflict self-CF, conflict other-CF, and negative self-CF conditions on SSGS guilt in Study 2. Error bars represent 95% confidence intervals.

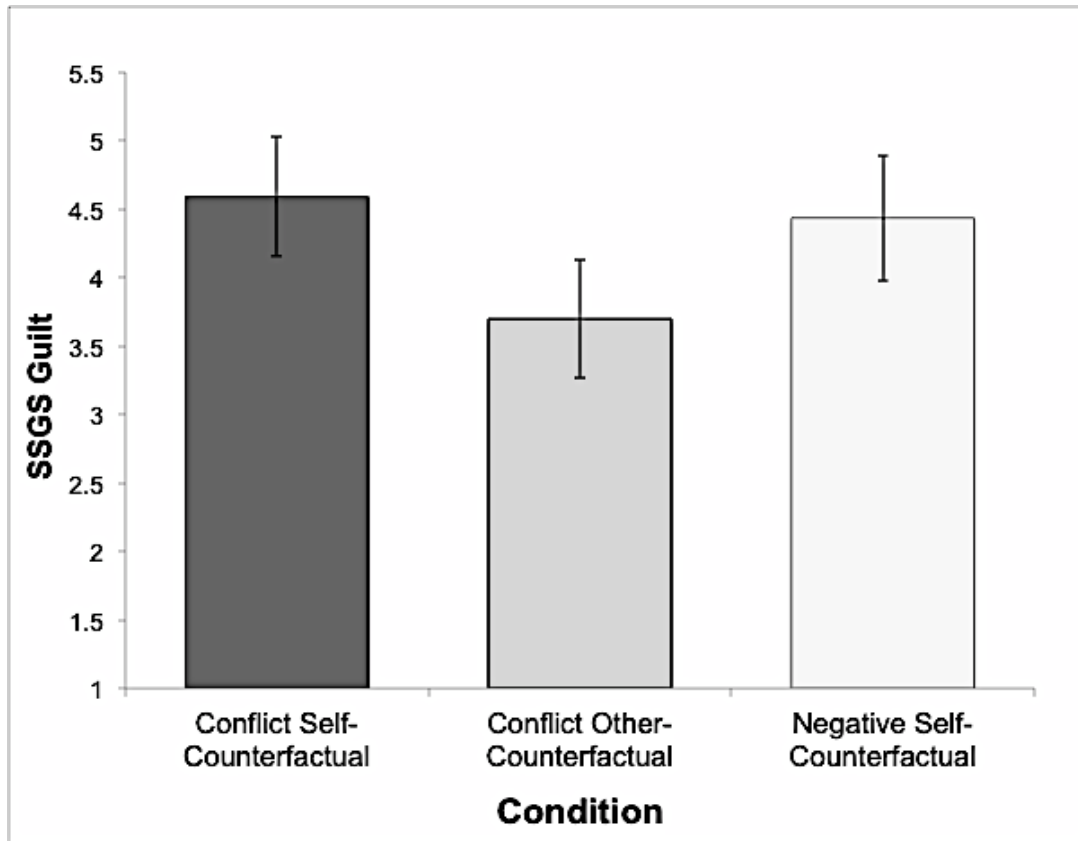
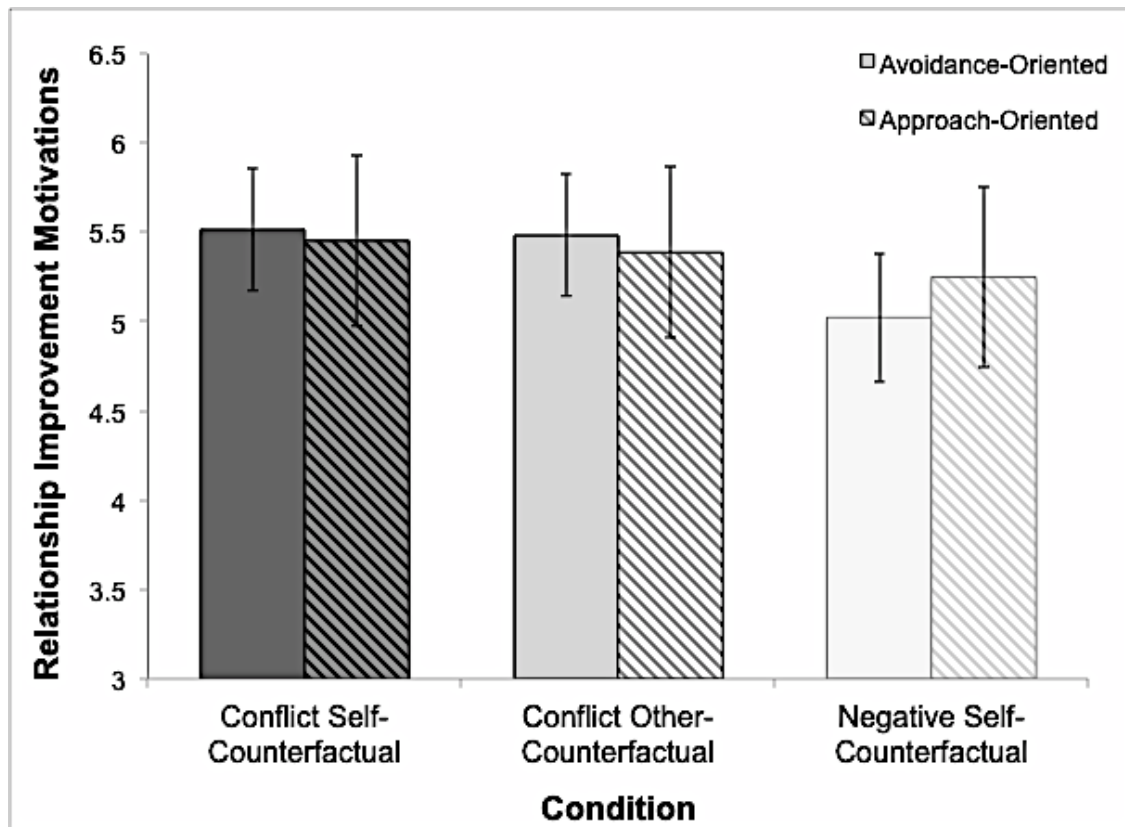


Figure 5. Differences among conflict self-CF, conflict other-CF, and negative self-CF conditions on avoidance- and approach-oriented relationship improvement motivations in Study 2. Error bars represent 95% confidence intervals.



Figures 6a and 6b. Differences among conflict self-CF, conflict other-CF, and negative self-CF conditions on self-reported apologizing (6a) and observer-coded apologizing (6b) in Study 2. Error bars represent 95% confidence intervals.

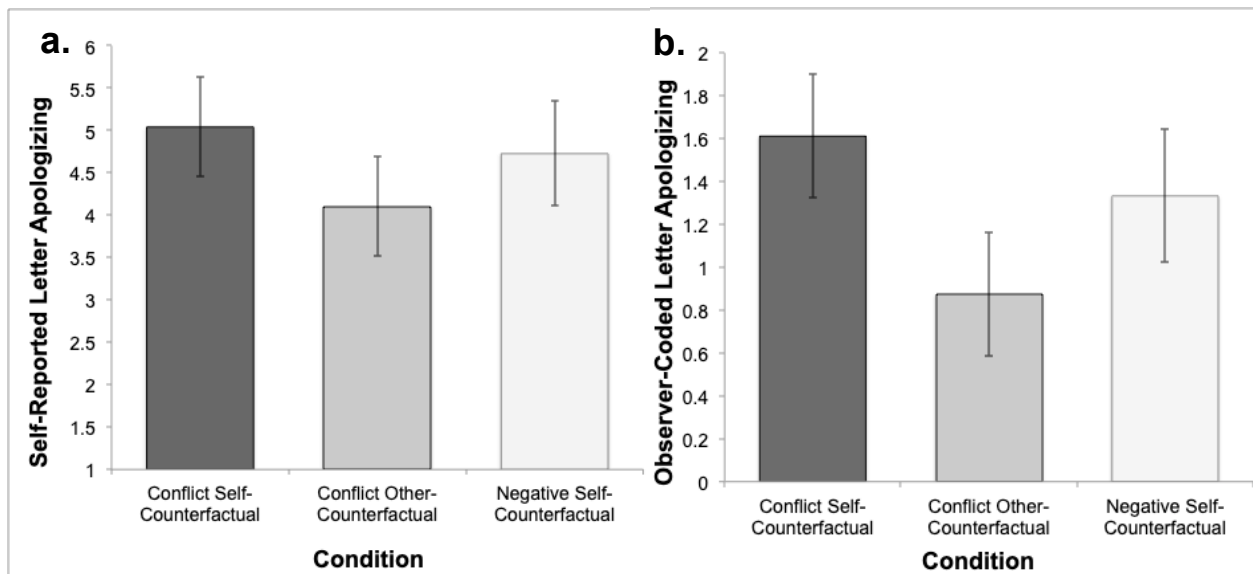


Figure 7. Multicategorical mediation model depicting effects of condition (decomposed into two pairwise contrasts) on apologizing via the effects on state guilt.

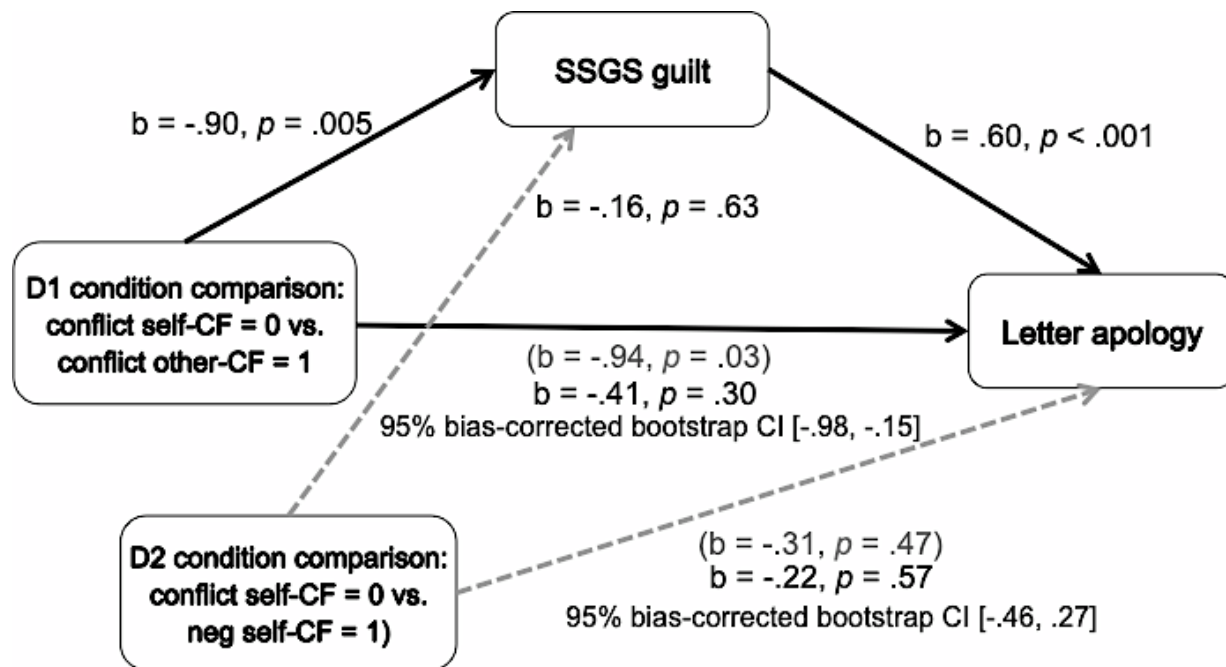


Figure 8. Differences among conflict self-CF, conflict other-CF, negative self-CF, and neutral-F conditions on key dependent variables in Study 3. Error bars represent 95% confidence intervals.

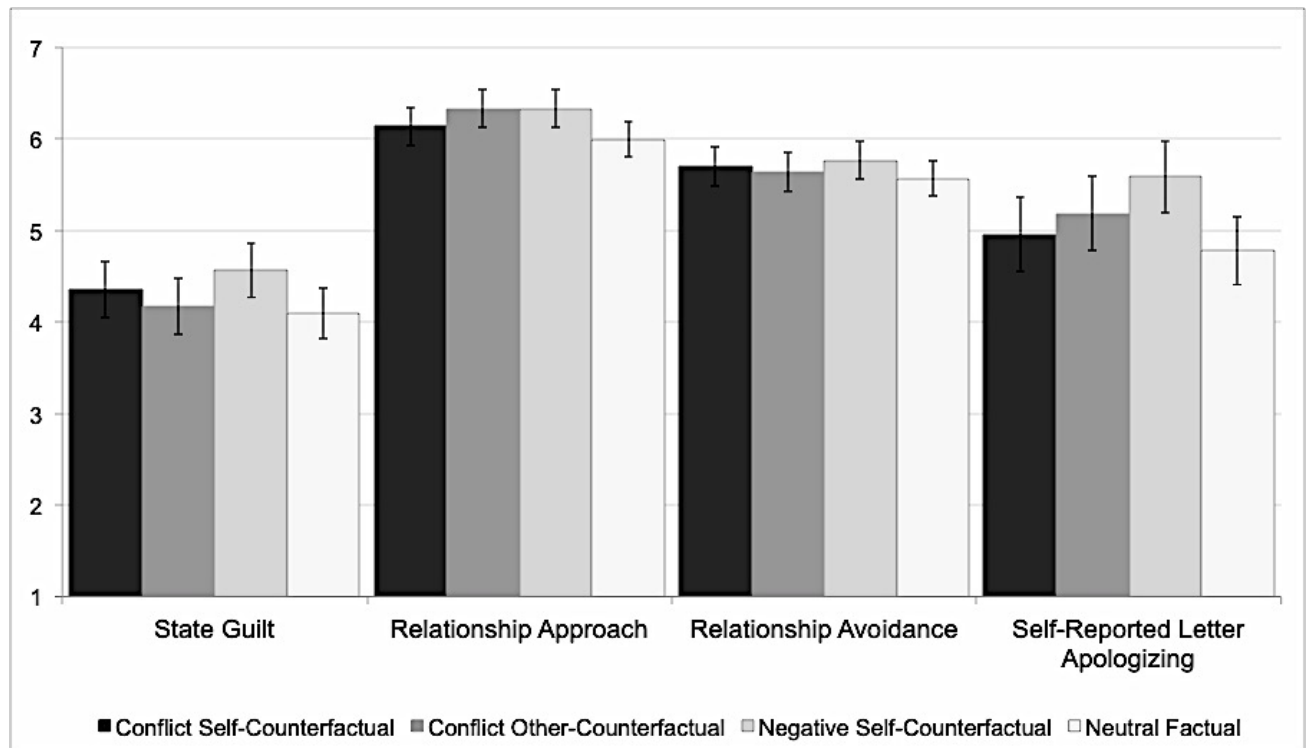


Figure 9. Interaction effect between condition and resolution status in predicting state guilt in Study 4.

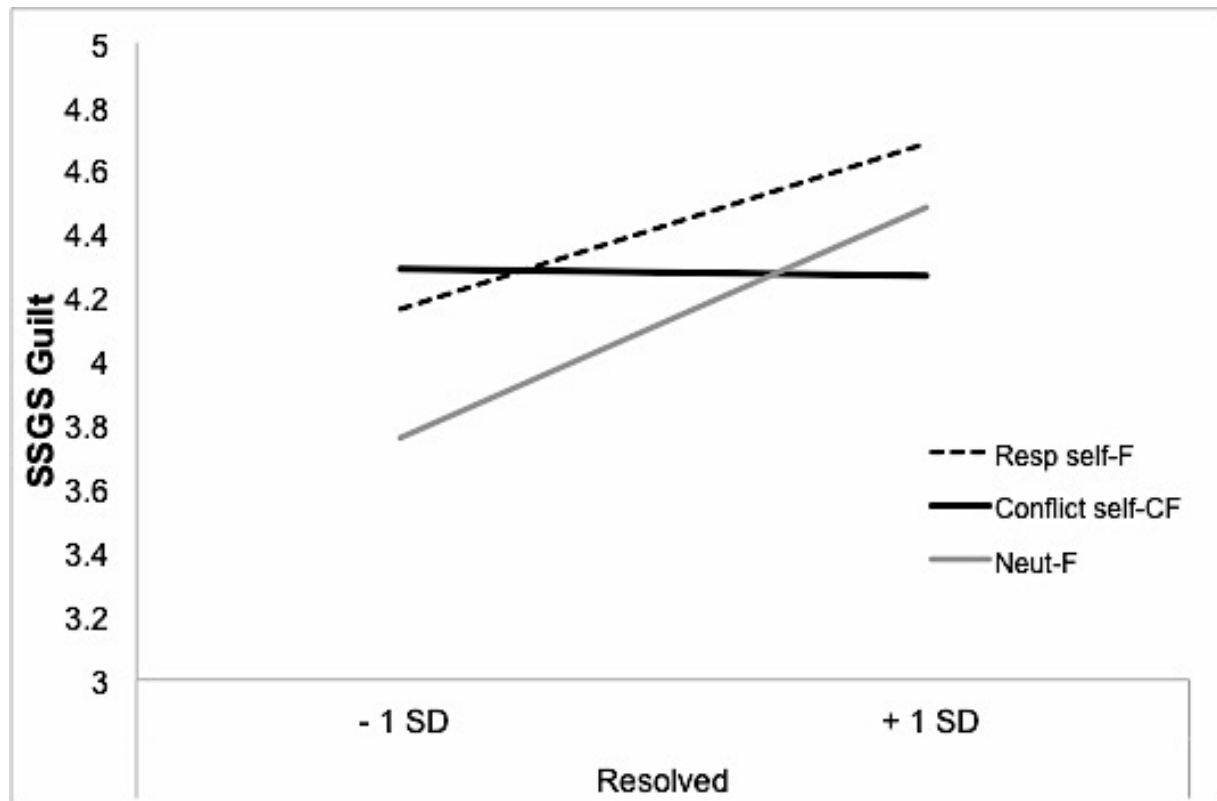


Figure 10. Interaction effect between condition and resolution status in predicting defensiveness in Study 4.

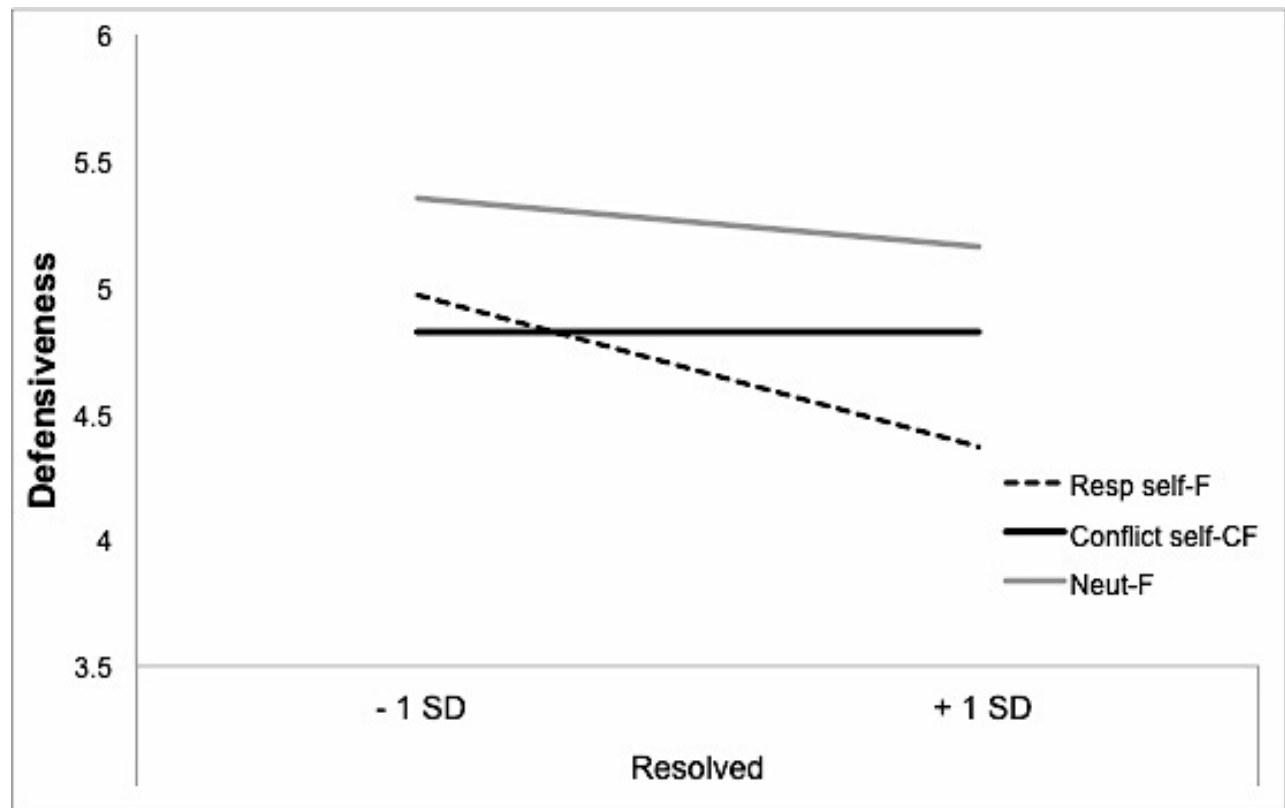


Figure 11. Effect sizes (Cohen's d) of counterfactual thinking versus neutral factual thinking on: a. state guilt; b. relationship avoidance; and c. letter apologizing across Studies 1, 3, and 4. The horizontal lines indicate the 90% CI for the three studies; the squares in the middle of the lines indicate the mean effect of the study. The red diamonds at the bottom indicate the 90% CI for the pooled effects given fixed- and random-effects models.

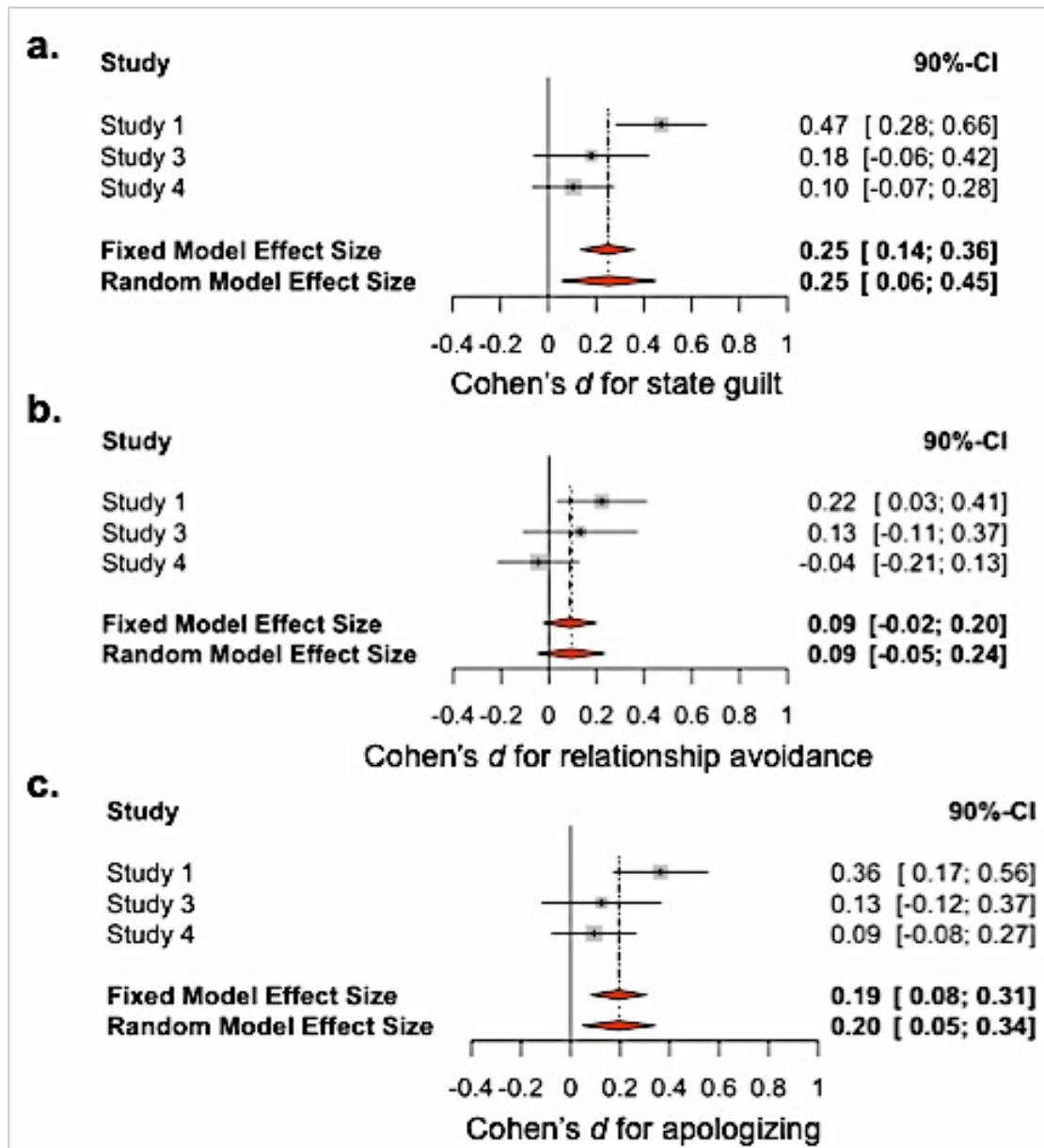


Table 1.
Study 1 Correlations Among Affect, Apologizing, and Relationship Motivations

	1	2	3	4	5	6
1. MDES NA composite	—	.58**	.34**	-.02	-.12*	.11 [†]
2. SSGS shame		—	.65**	.21**	.14*	.27**
3. SSGS guilt			—	.52**	.30**	.24**
4. Letter apologizing				—	.36**	.13*
5. Relationship approach					—	.34**
6. Relationship avoidance						—

[†] $p < .10$. * $p < .05$. ** $p < 0.01$.

Table 2.

Study 1 Results of Testing Potential Mediators of the Effect of Condition on Self-Reported and Observer-Coded Apologizing

Outcome	Mediator	Conflict self-CF (=0) vs. neutral-F (=1)	
		<i>b</i>	95% BCB CI
Self-reported apologizing	Guilt	-.53	[-.80, -.27]
	Guilt (contr. shame)	-.51	[-.78, -.27]
	Shame (contr. guilt)	-.06	[-.17, .02]
	Guilt (contr. global NA)	-.47	[-.75, -.20]
	Global NA (contr. guilt)	.10	[-.01, .23]
	Parallel:		
	Guilt	-.66	[-1.01, -.34]
Coder-rated apologizing	Shame	.08	[-.02, .21]
	Guilt	-.27	[-.41, -.15]
	Guilt (contr. shame)	-.32	[-.46, -.18]
	Shame (contr. guilt)	-.06	[-.14, .02]
	Guilt (contr. global NA)	-.25	[-.39, -.12]
	Global NA (contr. guilt)	.05	[.002, .12]
	Parallel:		
	Guilt	-.41	[-.60, -.23]
	Shame	.08	[-.01, .18]

Note. BCB = bias-corrected bootstrap; contr. = controlling for.
Statistically significant indirect effects appear in bold font.

Table 3.
Study 2 Descriptive Statistics for Dependent Variables

Variable	Mean (SD)		
	Conflict self-CF	Conflict other-CF	Neg self-CF
MDES NA composite	3.68(1.43) ^a	3.82(1.72) ^a	3.67(1.62) ^a
SSGS shame	3.34(1.52) ^a	3.10(1.68) ^a	3.73(1.73) ^a
SSGS guilt	4.59(1.51) ^a	3.70(1.65) ^b	4.44(1.45) ^a
Letter apologizing	5.04(1.93) ^a	4.10(2.12) ^b	4.73(2.19) ^{ab}
Relationship approach	5.45(1.57) ^a	5.39(1.71) ^a	5.25(1.80) ^a
Relationship avoidance	5.52(1.03) ^a	5.48(1.04) ^a	5.02(1.53) ^b

Within a row, columns with differing superscripts are significantly different at the .05 level

Table 4.
Study 2 Correlations Among Affect, Apologizing, and Relationship Motivations

	1	2	3	4	5	6
1. MDES NA composite	—	.53**	.37**	-.04	-.22**	.14
2. SSGS shame		—	.67**	.18*	.11	.08
3. SSGS guilt			—	.47**	.23**	.13
4. Letter apologizing				—	.42**	.29**
5. Relationship approach					—	.49**
6. Relationship avoidance						—

[†] $p < .10$. * $p < .05$. ** $p < 0.01$.

Table 5.

Study 2 Results of Testing Potential Mediators of the Effect of Condition on Self-Reported and Observer-Coded Apologizing

Outcome	Mediator	Pairwise condition comparison					
		Conflict self-CF (=0) vs. neg self-CF (=1)		Conflict self-CF (=0) vs. conflict other-CF (=1)		Neg self-CF (=0) vs. conflict other-CF (=1)	
		<i>b</i>	95% BCB CI	<i>b</i>	95% BCB CI	<i>b</i>	95% BCB CI
Self-reported apologizing	Guilt	-.09	[-.47, .27]	-.53	[-.98, -0.15]	-.44	[-.88, -.05]
	Guilt (contr. shame)	-.32	[-.76, .04]	-.60	[-1.09, -.20]	-.28	[-.75, .12]
	Shame (contr. guilt)	-.12	[-.37, .02]	-.15	[-.41, .01]	.03	[-.16, .22]
	Guilt (contr. global NA)	-.11	[-.53, .27]	-.69	[-1.19, -.26]	-.58	[-1.04, -.14]
	Global NA (contr. guilt)	-.02	[-.22, .18]	-.16	[-.41, .02]	-.14	[-.40, .05]
	Parallel:						
Observer-coded apologizing	Guilt	-.13	[-.95, .34]	-.72	[-1.34, -.19]	-.60	[-1.19, -.08]
	Shame	-.12	[-.62, -.36]	.07	[-.14, .31]	.19	[-.03, .53]
	Guilt	-.04	[-.18, .11]	-.19	[-.36, -0.05]	-.16	[-.32, -.01]
	Guilt (contr. shame)	-.11	[-.28, .02]	-.21	[-.39, -.06]	-.09	[-.26, .05]
	Shame (contr. guilt)	-.03	[-.13, .02]	-.04	[-.15, .02]	.01	[-.05, .08]
	Guilt (contr. global NA)	-.04	[-.20, .11]	-.25	[-.44, -.09]	-.21	[-.40, -.05]
Observer-coded apologizing	Global NA (contr. guilt)	-.001	[-.08, .08]	-.06	[-.18, .01]	-.06	[-.18, .02]
	Parallel:						
	Guilt	-.04	[-.24, -.06]	-.24	[-.46, -.06]	-.20	[-.42, -.01]
	Shame	-.03	[-.15, .03]	.02	[-.05, .11]	.05	[-.03, .19]

Note. BCB = bias-corrected bootstrap; contr. = controlling for. Statistically significant indirect effects appear in bold font.

Table 6.
Study 3 Descriptive Statistics for Dependent Variables

Variable	Mean (SD)			
	Conflict Self-Counterfactual	Conflict Other-Counterfactual	Negative Self-Counterfactual	Neutral-Factual
MDES NA composite	3.25(1.59) ^a	3.22(1.57) ^a	3.39(1.76) ^a	3.25(1.51) ^a
SSGS shame	3.30(1.41) ^a	3.10(1.45) ^a	3.38(1.55) ^a	3.22(1.40) ^a
SSGS guilt	4.35(1.47) ^{ab}	4.17(1.44) ^{ab}	4.56(1.35) ^a	4.10(1.38) ^b
Letter apologizing	4.95(1.85) ^{ab}	5.18(2.04) ^b	5.58(1.56) ^{bc}	4.78(2.00) ^{ab}
Relationship approach	6.14(1.14) ^{ab}	6.33(0.75) ^b	6.33(0.73) ^b	5.99(1.16) ^a
Relationship avoidance	5.69(0.92) ^a	5.64(0.98) ^a	5.76(1.03) ^a	5.57(1.01) ^a

Within a row, columns with differing superscripts are significantly different at the .05 level.

Table 7.
Study 3 Correlations Among Affect, Apologizing, and Relationship Motivations

	1	2	3	4	5	6
1. MDES NA composite	—	.50**	.23**	-.16**	-.25**	.06
2. SSGS shame		—	.58**	.08	-.02	.08
3. SSGS guilt			—	.42**	.24**	.22**
4. Letter apologizing				—	.27**	.21**
5. Relationship approach					—	.51**
6. Relationship avoidance						—

[†] $p < .10$. $*p < .05$. $**p < 0.01$.

Table 8.
Study 4 Descriptive Statistics for Dependent Variables

Variable	Mean (SD)		
	Conflict Self-Counterfactual	Responsibility-Factual	Neutral-Factual
MDES NA composite	3.98(1.57) ^a	3.84(1.59) ^a	3.83(1.83) ^a
SSGS shame	3.55(1.61) ^a	3.30(1.58) ^{ab}	3.22(1.50) ^b
SSGS guilt	4.28(1.50) ^a	4.44(1.49) ^a	4.13(1.51) ^b
Letter apologizing	4.45(2.16) ^a	4.86(2.06) ^b	4.26(2.25) ^a
Relationship approach	5.41(1.56) ^a	5.55 (1.52) ^a	5.56(1.54) ^a
Relationship avoidance	5.52(1.08) ^a	5.44(1.02) ^a	5.57(1.07) ^a

Within a row, columns with differing superscripts are significantly different at the .05 level.

Table 9.
Study 4 Correlations Among Affect, Apologizing, and Relationship Motivations

	1	2	3	4	5	6
1. MDES NA composite	—	.50**	.25**	-.06	-.08*	.05
2. SSGS shame		—	.56**	.19**	.10**	.11**
3. SSGS guilt			—	.54**	.39**	.28**
4. Letter apologizing				—	.48**	.29**
5. Relationship approach					—	.57**
6. Relationship avoidance						—

[†] $p < .10$. * $p < .05$. ** $p < 0.01$.

Table 10.

Study 4 Results of Testing Potential Mediators of the Effect of Condition on Self-Reported and Observer-Coded Apologizing

Pairwise condition comparison							
Outcome	Mediator	Conflict self-CF (=0) vs. resp-F (=1)		Conflict self-CF (=0) vs. neut-F (=1)		Neut-F (=0) vs. resp-F (=1)	
		<i>b</i>	95% BCB CI	<i>b</i>	95% BCB CI	<i>b</i>	95% BCB CI
Self-reported apologizing	Guilt	.12	[-.09, .32]	-.11	[-.35, .12]	.24	[.002, .48]
	Guilt (contr. shame)	.26	[.07, .46]	.02	[-.19, .26]	.24	[.01, .47]
	Shame (contr. guilt)	.07	[.02, .14]	.05	[-.01, .13]	.02	[-.04, .09]
	Guilt (contr. global NA)	.16	[-.06, .38]	-.10	[-.35, .14]	.26	[.01, .51]
	Global NA (contr. guilt)	.05	[-.02, .13]	.03	[-.06, .12]	.02	[-.08, .12]
Parallel:							
Observer-coded apologizing	Guilt	.14	[-.09, .38]	-.13	[-.40, .14]	.13	[-.15, .41]
	Guilt (contr. shame)	.05	[-.01, .13]	.07	[.001, .16]	-.02	[-.09, .05]
	Shame (contr. guilt)	.05	[-.04, .14]	-.06	[-.16, .05]	.11	[.005, .05]
	Guilt (contr. global NA)	.11	[.03, .20]	.01	[-.10, .11]	.11	[.001, .21]
	Global NA (contr. guilt)	.04	[.01, .08]	.03	[-.001, .07]	.01	[-.02, .04]
Parallel:							
Observer-coded apologizing	Guilt	.07	[-.03, .17]	-.05	[-.16, .06]	.12	[.002, .23]
	Guilt (contr. global NA)	.03	[-.01, .07]	.02	[-.03, .07]	.02	[-.04, .06]
	Shame (contr. guilt)	.06	[-.05, .17]	-.07	[-.20, .06]	.13	[.003, .26]
	Guilt (contr. global NA)	.03	[-.004, .07]	.04	[.005, .09]	-.01	[-.61, .55]
	Global NA (contr. guilt)	.03	[-.01, .07]	.02	[-.03, .07]	.02	[-.04, .06]

Note. BCB = bias-corrected bootstrap; contr. = controlling for
Statistically significant indirect effects appear in bold font.