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# Relating Trait Self-Control and Forgiveness Within Prosocials and Proselfs: Compensatory Versus Synergistic Models

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The present research tested 2 competing models specifying how 2 traits (concern with the well-being of others and self-control) interact to predict forgiveness. According to the compensatory model, forgiveness requires being high on either trait; according to the synergistic model, forgiveness requires being high on both traits. Two preliminary studies demonstrated the main effect of trait (Study 1a) and primed (Study 1b) self-control on forgiveness. Three primary studies consistently supported the compensatory model in predicting willingness to forgive a partner who behaves noncooperatively in a 2-alternative prisoner's dilemma (Study 2), a continuous give-some dilemma (Study 3), and a 2-alternative maximizing difference game (Study 4). Among prosocials or those low in trait forgiveness, trait self-control positively related to forgiveness, suggesting that self-control can compensate for a lack of concern with others' well-being. Implications for theory and research on forgiveness are discussed.

*Keywords:* forgiveness, trait self-control, social value orientation, social dilemmas

Forgiveness is a linchpin in successful relationships (Karremans & Van Lange, 2008; McCullough et al., 1998; McCullough, Worthington, & Rachal, 1997; Tsang, McCullough, & Fincham, 2006; Worthington, Witvliet, Pietrini, & Miller, 2007) and an important determinant of psychological well-being (Bono, McCullough, & Root, 2008; Karremans, Van Lange, Ouwerkerk, & Kluwer, 2003; Lawler et al., 2003). One factor that influences willingness to forgive is an individual's personality.

Prior research linking personality with forgiveness has implicated a variety of traits. The majority of this work suggests that the forgivers of the world are basically "nice" people who are high in agreeableness (e.g., Leach & Lark, 2004; McCullough & Hoyt, 2002) or empathy (McCullough, Bellah, Kilpatrick, & Johnson, 2001; McCullough et al., 1997, 1998; for a recent review, see Fehr, Gelfand, & Nag, 2010). More recent work suggests that the world's forgivers may also be "smart" people who are high in trait self-control (Finkel & Campbell, 2001) or executive functioning (Pronk, Karremans, Overbeek, Vermulst, & Wigboldus, 2010).

Integrating these two lines of research, the present work poses the following questions: Can a high level of trait self-control predict higher levels of forgiveness even among people with a proself orientation? Can a prosocial orientation positively relate to forgiveness even among those with a low level of trait self-control? Or does forgiveness require both a prosocial orientation and high trait self-control?

To address these questions, we advance a *Trait × Trait Interactionist perspective* on forgiveness that gives rise to two competing theoretical models. Though both models are grounded in work on forgiveness and social interdependence theory, the models offer a notably different pattern of predictions. The *compensatory model* predicts that forgiveness requires a prosocial orientation or high self-control, and the *synergistic model* assumes that forgiveness requires both. We test these competing models across three primary studies exploring willingness to forgive an interaction partner who behaves noncooperatively in a social dilemma.

## Social Dilemmas: A Rich Context for Studying Forgiveness

Social dilemmas pose a conflict between short-term self-interest and long-term collective interests (Komorita & Parks, 1994). The best known paradigm for studying social dilemmas is the two-person prisoner's dilemma. In a prisoner's dilemma, the cooperative option appeals to altruists and cooperators because it maximizes the partner's gain, joint gain, and equality, and the noncooperative option appeals to individualists, competitors, and aggressors because it maximizes individual gain and relative gain and minimizes the partner's gain (Van Lange, De Cremer, Van Dijk, & Van Vugt, 2007).

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Laboratory-based models such as the prisoner's dilemma provide an exceptional context within which to study forgiveness, for at least two reasons (cf. Wallace, Exline, & Baumeister, 2008). First, the selfish-cooperative trade-off that they model is pervasive in real life. One can find social dilemmas at work (e.g., slacking on vs. contributing to a collaborative project) or at home (e.g., leaving vs. cleaning one's dirty dishes), in dyads (e.g., a husband and wife) or in groups (e.g., a large coalition). Across various settings, people must often choose between pursuing their own short-term self-interest or the long-term interests of a dyad or a group. Second, it is well known that when others fail to cooperate in social dilemma studies, people become angry (Dawes, McTavish, & Shaklee, 1977) and routinely adopt a tit-for-tat strategy, eventually assimilating to the noncooperative behavior of their partner (Kelley & Stahelski, 1970; Kuhlman & Marshello, 1975; Van Lange & Visser, 1999). Thus, noncooperative behavior in social dilemmas is likely to elicit a desire for revenge, which, by definition, is antithetical to forgiveness (McCullough et al., 1998, 2001). That said, if people never forgive interaction partners in social dilemmas, they may hurt the ones they love or prematurely terminate an otherwise rewarding relationship. In other words, noncooperation in social dilemmas gives rise to a host of competing motives (desire for revenge vs. concern with others and the long-term viability of a relationship) that offer a rich context in which to study forgiveness.

### Transformation of Motivation in Social Dilemmas

The majority of social dilemmas involve repeated interactions that play out over time. As such, most social dilemmas involve two distinct motivational conflicts of interest: a *social conflict* (between individual and collective interests) and a *temporal conflict* (between immediate and delayed interests; Messick & McClelland, 1983). According to interdependence theory (Kelley & Thibaut, 1978; Rusbult & Van Lange, 1996), when people are faced with mixed-motive situations such as social dilemmas, their gut reaction is to satisfy short-term self-interest. These immediate gut-level, self-interested preferences are contained in what Kelley and Thibaut referred to as the "given matrix." Although the given matrix may underlie the response of certain individuals, many people are assumed to base their response on a "transformed effective matrix" that takes into account broader social and temporal motivations (e.g., concern with the well-being of others and/or concern with the long-term consequences of one's actions). Several researchers have suggested that both forgiveness (Finkel, Rusbult, Kumashiro, & Hannon, 2002; Karremans & Van Lange, 2004; McCullough, 2001) and the closely related notion of accommodation (Finkel & Campbell, 2001; Perunovic & Holmes, 2008; Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991; Yovetich & Rusbult, 1994) depend significantly on an individual's willingness to transform the given matrix into an effective matrix on the basis of (a) broader social motivations, (b) broader temporal motivations, and/or (c) the ability to exert self-control (Finkel & Campbell, 2001; Finkel & Rusbult, 2008; Righetti, Finkenauer, & Finkel, 2011). Below, we discuss how these three factors give rise to two taxonomies underlying forgiveness and two competing models for predicting forgiveness.

## Taxonomies Underlying Forgiveness

### Social $\times$ Temporal Motivations

If we assume that social and temporal motivations are independent, it is possible to cross them within a 2 (social motivations)  $\times$  2 (temporal motivations) space. This 2  $\times$  2 space gives rise to the four distinct "motivational orientations" shown in the top left part of Figure 1. In this space, individuals high in social and temporal motivations are labeled future-oriented prosocials (upper right quadrant); those low in social motivations but high in temporal motivations are labeled future-oriented proselfs (lower right quadrant); those low in social motivations and low in temporal motivations are labeled present-oriented proselfs (lower left quadrant); and those high in social motivations and low in temporal motivations are labeled present-oriented prosocials (upper left quadrant).

### Motivation $\times$ Ability

An alternative interdependence-based approach to forgiveness suggests that forgiveness occurs when people have both the motivation and ability to forgive (Finkel & Campbell, 2001; Righetti & Finkenauer, 2011). Assuming that motivation and ability are independent, it is possible to cross them within a 2 (motivation)  $\times$  2 (ability) space. This 2  $\times$  2 space gives rise to the four distinct "orientations" shown in the top right part of Figure 1. Because half of the orientations assume low motivation, we do not refer to these as "motivational" orientations but rather as orientations in general. In this space, people are assumed to fall into one of four types: highly motivated and able to forgive (upper right quadrant); not motivated but able to forgive (lower right quadrant); not motivated and not able to forgive (lower left quadrant); and highly motivated but unable to forgive (upper left quadrant).

### Compensatory vs. Synergistic Models of Forgiveness

Both of the taxonomies just outlined predict an interaction between their respective dimensions. However, the nature of those interactions is notably different, and this difference has important implications for work on forgiveness. In particular, the Social  $\times$  Temporal taxonomy leads to a compensatory model, and the Motivation  $\times$  Ability taxonomy leads to a synergistic model. The compensatory model suggests that as long as individuals have high social motivations or high temporal motivations, they will be motivated to forgive. In other words, high social motivations can compensate for low temporal motivations (present-oriented prosocials will be motivated to forgive), and high temporal motivations can compensate for low social motivations (future-oriented proselfs will also be motivated to forgive). The synergistic model, by comparison, suggests that individuals must have both high motivation and high ability to forgive.

### Personality Dimensions Underlying Compensatory and Synergistic Models

Although the compensatory and synergistic models lead to different predictions, the personality dimensions assumed to underlie the two models are remarkably similar, namely, trait

concern with the well-being of others and trait self-control.<sup>1</sup> The bottom panel of Figure 1 illustrates the nature of the competing (Trait  $\times$  Trait) interactions predicted by the compensatory and synergistic models. In both models, the *x*-axis corresponds to trait self-control; its underlying interpretation, however, depends on the model. In the compensatory model on the left, trait self-control is thought to motivate forgiveness due to its association with a concern with the long-term consequences of one's actions. In the synergistic model on the right, trait self-control is thought to facilitate forgiveness as an ability to engage in self-regulation. In both models, the upper line denotes the predicted pattern for those high in trait concern with the well-being of others (i.e., prosocials or those high in trait forgiveness), and the lower line denotes the predicted pattern for those low in trait concern with the well-being of others (i.e., proselves or those low in trait forgiveness).

### Statistically Testing the Competing Models

Both of the models shown in the bottom of Figure 1 predict an interaction between trait self-control and trait concern with the well-being of others, but the pattern of simple slopes differs between the models. Support for the compensatory model holds if (a) self-control shows a positive relationship with forgiveness among proselves, (b) self-control shows no relationship with forgiveness among prosocials, (c) prosocials low in self-control are higher in forgiveness than proselves low in self-control, and (d) prosocials high in self-control show the same level of forgiveness as proselves high in self-control. Support for the synergistic model holds if (a) self-control shows a positive relationship with forgiveness among prosocials, (b) self-control shows no relationship with forgiveness among proselves, (c) prosocials high in self-control are higher in forgiveness than proselves high in self-control, and (d) prosocials low in self-control show the same level of forgiveness as proselves low in self-control.

### On the Viability of the Competing Models

In the present section, we briefly consider the viability of the competing models. Although no single study has directly compared the models' ability to predict forgiveness in social dilemmas, both models are well grounded in theory and research on social interdependence theory.

### Compensatory Model

The notion that temporal motivations can help motivate proselves to engage in prosocial behavior can be traced back to social interdependence theory (Kelley & Thibaut, 1978; Rusbult & Van Lange, 1996). Supporting this proposition, past research has shown that individualists (Kuhlman & Marshello, 1975; Van Lange, Klapwijk, & Van Munster, 2011) and even competitors (Sheldon, 1999) can act in a prosocial manner when they realize that it is in their long-term self-interest (cf. Axelrod, 1984; Kelley & Grzelak, 1972).

In addition, several recent studies have suggested that the transformation of motivation from the given to the effective matrix may be relatively automatic for prosocials. For example,

Balliet and Joireman (2010) recently showed that ego depletion reduced proselves' concern with the well-being of others but had no effect on prosocials, suggesting that cooperation may be automatic for prosocials and may thus not require additional trait self-control. In another study, Perunovic and Holmes (2008) showed that those high in agreeableness were more likely than those low in agreeableness to accommodate when their partner engaged in rude behavior and, more important, that the differences between those high versus low in agreeableness were largest when responses were made under time pressure. This further suggests that people who are predisposed to be concerned with the well-being of others are likely to engage in automatic accommodation (and, by extension, automatic forgiveness). Last, Karremans and Aarts (2007) found that forgiveness of a close other was unaffected by placing people under time pressure. However, forgiveness of a nonclose other was lower when people were placed under time pressure. This suggests that at least for some people (e.g., a close partner or friend), forgiveness does not require self-control. Taken together, these studies suggest that prosocials may forgive others in a relatively automatic fashion and that forgiveness by prosocials is not likely to be adversely impacted by low trait self-control. All in all, the studies just reviewed provide preliminary support for the compensatory model of forgiveness.

### Synergistic Model

The synergistic model's assumption that social concerns interact with ability to impact the transformation process is also deeply rooted in social interdependence theory (e.g., Kelley & Thibaut, 1978; Rusbult & Van Lange, 1996) and recent work on forgiveness and accommodation. For example, Pronk et al. (2010) stated,

Although being motivated sometimes—perhaps even oftentimes—may indeed lead to forgiveness, the motivation to forgive does not always equal actual forgiveness (i.e., the reduction of negative feelings and thoughts toward the offender reflected in the subjective experience of having forgiven an offender; Karremans & Van Lange, 2008). That is, although an individual may truly be motivated and willing to forgive an offending relationship partner (e.g., one's spouse), sometimes this person may simply not succeed in doing so, still experiencing relatively low levels of forgiveness toward an offender (Worthington, 2005). (p. 119)

<sup>1</sup> Although prior research has shown that agreeableness and conscientiousness predict trait forgiveness ( $r_s = .45$  and  $.17$ , respectively; Balliet, 2010), we chose to focus on how narrower band traits predict forgiveness. Because each of the Big Five dimensions consists of narrower facets (Costa & McCrae, 1992), it is possible that certain facets are more (or less) relevant within a given context (cf. John & Srivastava, 1999). For example, the relatively weak relationship just noted between conscientiousness and forgiveness may be due to the fact that certain facets of conscientiousness may be irrelevant to forgiveness (e.g., orderliness). If true, it is likely that the impact of other, more relevant facets of conscientiousness (e.g., self-control) is being masked by the less relevant facets. Therefore, we elected to focus on narrower band personality traits that are directly relevant to the two taxonomic systems shown in Figure 1 and have received attention in past research on forgiveness and social dilemmas.

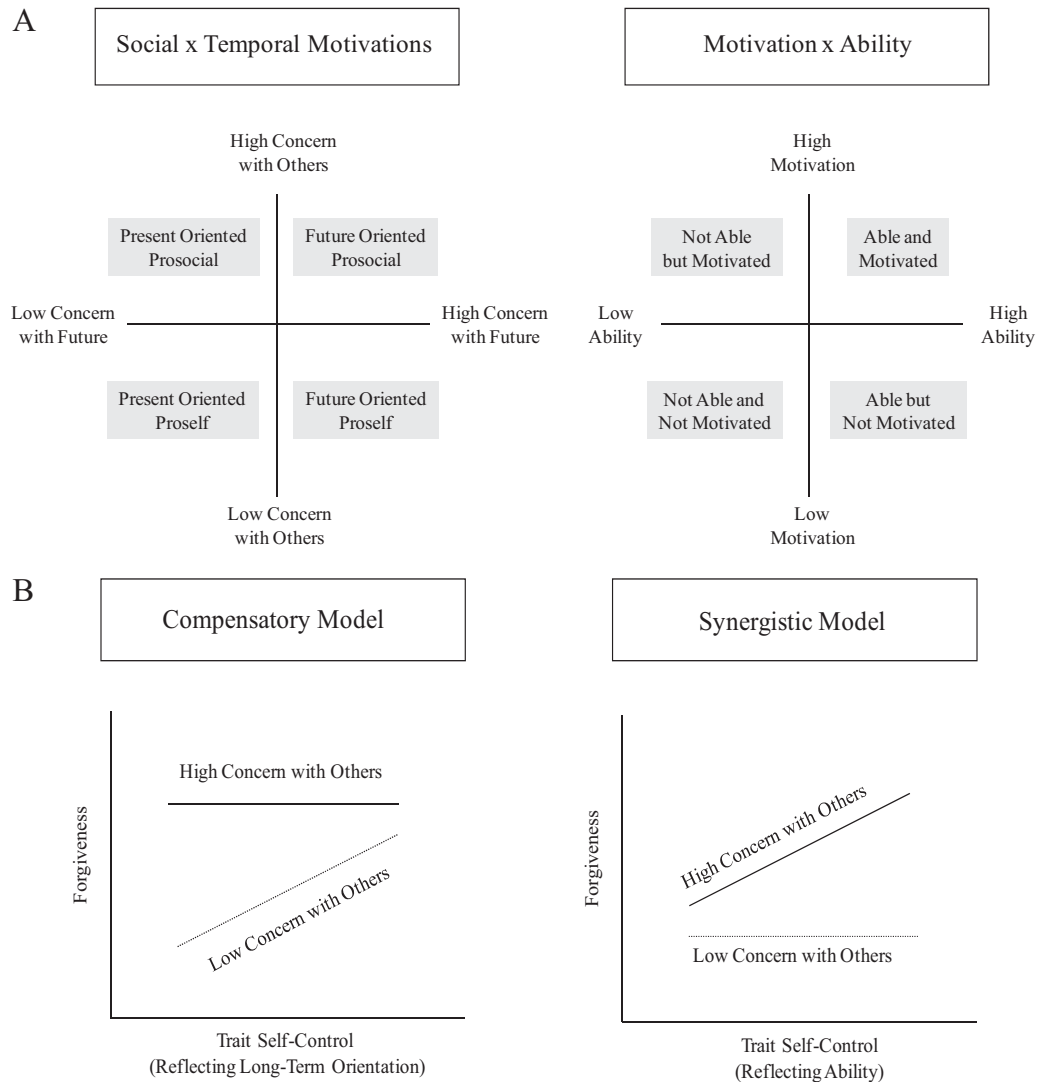


Figure 1. Alternate taxonomies (Panel A) giving rise to compensatory versus synergistic models of forgiveness (Panel B).

In their work on accommodation, Finkel and Campbell (2001) proposed more specifically that

one can easily imagine an individual who is committed to his or her romantic relationship but who fails to accommodate because of self-control failure . . . . Despite the fact that his heart is in the right place, his diminished ability resources might outweigh his motivation to accommodate; he may fail to accommodate despite his desire to do so. (p. 266)

Despite its clear articulation in the accommodation and forgiveness literatures, an interaction between ability and motivation, as the synergistic model predicts, has been directly tested for by very few studies. Empirical support for the synergistic model is based largely on the finding that self-control ability positively relates to forgiveness (e.g., Finkel & Campbell, 2001; Pronk et al., 2010; Righetti et al., 2011). Although promising, the majority of this work has focused on the main effect of self-control ability. To our

knowledge, Finkel and Campbell (2001, Study 3) are the only ones to have tested for an interaction between motivation and ability. Finkel and Campbell did not find the predicted (Motivation  $\times$  Ability) interaction, but additional tests of the model seem warranted for at least three reasons. First, the synergistic model is clearly guiding research on accommodation and forgiveness, attesting to its theoretical relevance and impact within these related fields. Second, it is possible that the synergistic model may garner stronger support when a different outcome is considered (e.g., forgiveness as opposed to accommodation), in different contexts (e.g., lab-based social dilemmas as opposed to retrospective accounts among dating couples), and with different operationalizations of motivation (e.g., trait concern with the well-being of others as opposed to relationship commitment). Finally, to date, no study has presented a competitive test of an alternative (compensatory) model of forgiveness. By clearly articulating the compensatory and synergistic models and pitting them against each other, the present



paper adds additional clarity to the different ways in which motivation, ability, and long-term orientation may interact to predict forgiveness.

### Trait Self-Control as Long-Term Orientation and Ability

Finally, when considering the viability of the models, it is important to note that trait self-control is associated with a concern for the long-term consequences of one's actions (a key assumption of the compensatory model) as well as a heightened ability to regulate one's behavior (a key assumption of the synergistic model). For example, in line with the compensatory model, those scoring high on trait self-control score higher on Strathman, Gleicher, Boninger, and Edwards' (1994) consideration of future consequences scale (e.g., Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008). Moreover, in line with the synergistic model, those scoring high on trait self-control have been shown to have a stronger ability to engage in actual self-control behavior (Schmeichel & Zell, 2007). Thus, trait self-control is equally relevant to the compensatory and synergistic models.

### Overview of Studies

Our primary goal in the present paper was to test the competing interaction models shown in Figure 1. Prior to testing those models, we report two preliminary studies addressing the relationship between self-control and forgiveness. In Study 1a, we evaluated whether trait self-control predicts trait forgiveness, beyond trait empathic concern and perspective taking, two important proximate mechanisms of forgiveness (McCullough et al., 1997). In Study 1b, we examined whether priming self-control can increase self-reported tendencies to forgive in a variety of hypothetical transgression scenarios. In Studies 2 thru 4, we tested the competing compensatory and synergistic models of forgiveness by examining how trait self-control interacts with trait forgiveness (Study 2) and social value orientation (Studies 3 and 4) to predict state forgiveness of a noncooperative response in a two-alternative prisoner's dilemma, a continuous give-some dilemma, and a two-alternative maximizing difference game, respectively.

#### Study 1a: Does Trait Self-Control Predict Forgiveness After Controlling for Empathy?

McCullough et al. (1997) identified empathic concern and perspective taking as the two most important intrapersonal causes of forgiveness. The present analysis—consistent with both the synergistic and compensatory models—suggests that an understanding of forgiveness can be further advanced by recognizing the role of trait self-control. Accordingly, Study 1a tested whether trait self-control predicts higher trait forgiveness, once variance in empathic concern and perspective taking has been statistically controlled.

### Method

**Participants and protocol.** Students at a business school in Singapore ( $N = 391$ ) completed three personality questionnaires in groups ranging between 10 and 20 in exchange for course credit.

The questionnaires were stapled together and counterbalanced. In each of the studies reported in this paper, prior to completing any scales, participants signed an informed consent form. After they had completed the study, participants were debriefed and thanked for their participation.

**Trait self-control.** Trait self-control was assessed with Tangney, Baumeister, and Boone's (2004) 36-item self-control scale ( $\alpha = .80$ ). Two sample items include "I am good at resisting temptation" and "I am self-indulgent at times" (recoded). Participants responded to each item on a 5-point scale (1 = *not at all like me* to 5 = *very much like me*). After recoding, higher scores reflect higher levels of trait self-control ( $M = 3.12$ ,  $SD = 0.47$ ).

**Trait empathy scale.** Trait empathy was assessed with two seven-item subscales from Davis' (1983) interpersonal reactivity index (empathic concern and perspective taking). Empathic concern taps feelings of warmth and tender concern for others (e.g., "I would describe myself as a pretty soft-hearted person";  $\alpha = .73$ ). Perspective taking measures the ability to take another's point of view (e.g., "I look at everybody's side of a disagreement before I make a decision";  $\alpha = .76$ ). Participants responded to each item on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). After recoding, higher scores reflect higher levels of trait empathic concern ( $M = 3.76$ ,  $SD = 0.51$ ) and perspective taking ( $M = 3.57$ ,  $SD = 0.56$ ).

**Trait forgiveness scale.** The criterion variable was assessed with Berry, Worthington, Parrott, O'Connor, and Wade's (2005) 10-item trait forgiveness scale ( $\alpha = .83$ ; all alphas reported in this paper are based on data from the relevant study). Two example items are "I am a forgiving person" and "If someone treats me badly, I treat him or her the same" (recoded). Participants responded to each item on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). After recoding, higher scores reflect greater trait forgiveness ( $M = 3.23$ ,  $SD = 0.73$ ).

### Results and Discussion

Our primary goal in the present study was to determine whether trait self-control would predict trait forgiveness once variance in empathic concern and perspective taking had been statistically controlled. To test this hypothesis, we conducted a two-step regression analysis. On Step 1, we entered empathic concern and perspective taking. As expected, empathic concern and perspective taking explained a significant amount of the variance in trait empathy,  $R^2 = .12$ ,  $F(2, 389) = 25.46$ ,  $p < .001$ . On Step 2, we entered trait self-control. After controlling for empathic concern and perspective taking, trait self-control explained an additional 4% of the variance in trait forgiveness,  $\beta = .21$ ,  $t(388) = 4.12$ ,  $p < .001$ , and empathic concern and perspective taking continued to show a significant positive relationship with trait forgiveness,  $\beta = .13$  and  $.21$ ,  $t(388) = 2.66$  and  $4.17$ ,  $ps < .008$ , respectively. Adding the interactions between perspective-taking and empathic concern with self-control did not explain any additional variation in trait forgiveness. The present results reconfirm that trait empathy is an important predictor of forgiveness and show that trait self-control plays an additional role in predicting forgiveness. Nevertheless, due to the correlational nature of the findings, it is unclear whether self-control actually leads to forgiveness. In Study 1b, we evaluated this assumption directly by priming self-control

and measuring tendencies to forgive in hypothetical transgression scenarios.

### Study 1b: Does Priming Self-Control Increase Forgiveness?

#### Method

**Participants and protocol.** Students at a business school in Singapore ( $N = 49$ ) participated for course credit. Participants arrived at the lab in groups of eight and were seated in private cubicles. Participants were randomly assigned to a control condition or a self-control prime condition in which they were instructed to write about some aspect of their life. Participants in the control condition were told, “For the next 10–12 minutes, please think carefully about and describe in detail what you did yesterday.” Participants in the self-control prime condition were told, “For the next 10–12 minutes, please think carefully about and describe in detail a time when you demonstrated good self-control. This would be an experience when you were tempted to do something that might not have been good for you, but you were able to be level-headed, cautious, and patient, allowing you to overcome those temptations.” After 10 minutes of writing, all participants completed the Transgression Narrative Test of Forgiveness.

**Transgression Narrative Test of Forgiveness.** Berry, Worthington, Parrott, O’Connor, and Wade’s (2001) Transgression Narrative Test of Forgiveness presents five hypothetical scenarios that ask the respondent to imagine a known other committing a specific transgression against the respondent. For example, in one scenario, participants are asked to imagine that a fellow classmate copies and turns in as their own work a paper that the participant had already finished for a class. When the instructor notices the plagiarized work, she calls them both in and reprimands them. Following each scenario, the respondent indicates how likely he or she would be to forgive the other on a 5-point scale (1 = *definitely not forgive* to 5 = *definitely forgive*). Higher scores indicate greater amounts of forgiveness. Originally, the scale was developed as a measure of trait forgiveness. We reasoned, however, that because it deals with specific hypothetical transgressions, it could also be used as a measure of state forgiveness that might be susceptible to manipulation. We averaged over the five scenarios on the forgiveness scale prior to analysis to create a single willingness to forgive index ( $\alpha = .63$ ).

#### Results and Discussion

As expected, participants in the self-control prime condition were more willing to forgive ( $M = 3.00$ ,  $SD = 0.51$ ) than those in the control condition ( $M = 2.65$ ,  $SD = 0.70$ ),  $t(48) = 2.03$ ,  $p = .04$ ,  $d = 0.57$ . In short, the present findings provided more direct evidence for the claim that self-control promotes forgiveness.

### Study 2: Trait Self-Control $\times$ Trait Forgiveness $\rightarrow$ State Forgiveness

Consistent with both the compensatory and synergistic models, our two preliminary studies showed that trait and primed self-control positively relate to forgiveness. In our three primary studies, we move beyond the main effect of self-control to address our

key goal, which is to test two competing models regarding how trait self-control interacts with trait concern for the well-being of others (i.e., trait forgiveness or social value orientation) to predict forgiveness. To reiterate, the compensatory model suggests that trait self-control positively relates to forgiveness even in the absence of a concern for the well-being of others. Likewise, concern for the well-being of others positively relates to forgiveness even in the absence of trait self-control. In contrast, the synergistic model suggests that high levels of trait self-control will predict higher levels of forgiveness only among those also high in trait concern for the well-being of others and vice versa (refer to the bottom panel of Figure 1). To enhance the generalizability of our results, we tested these competing models by utilizing several mixed-motive interactions, including a two-alternative prisoner’s dilemma (Study 2), a continuous give-some dilemma (Study 3), and a two-alternative maximizing difference game (Study 4).

#### Method

**Participants and protocol.** Students ( $N = 95$ ) at a business school in Singapore participated for course credit. Participants came to the lab in groups of four and were seated in separate rooms. Participants first completed the trait forgiveness ( $M = 3.32$ ,  $SD = 0.61$ ) and trait self-control ( $M = 3.13$ ,  $SD = 0.49$ ) scales described in Study 1a ( $\alpha = .89$  and  $.79$ , respectively). As we explain below, participants next made a decision in a two-person prisoner’s dilemma, received false feedback that their partner had defected, and then completed a state measure of willingness to forgive their partner.

**Prisoner’s dilemma.** In the prisoner’s dilemma, participants were told that they would be randomly assigned to make this decision with another person in the lab but would not be told which of the three other students was their partner. In the prisoner’s dilemma, participants chose between two options: Option A (cooperation) and Option B (noncooperation). Though we label these options as “cooperation” and “noncooperation,” at no time in any study were the options referred to as “cooperation” or “noncooperation” to the participants. Participants were told that if both chose Option A, then both would get 60¢. However, if the participant chose Option A and the partner chose Option B, the participant would get 0¢ and the partner would get 100¢. Similarly, if the participant chose Option B and the partner chose Option A, the participant would get 100¢ and the partner would get 0¢. Last, if both chose Option B, each would get 40¢. To build in the anticipation of future interactions, we told participants that they would make the same decision several times and that it was possible for them to earn much money over the several trials. In fact, participants made the decision on only two trials (cooperation rates were 49% and 39%, for Trials 1 and 2, respectively).

In Studies 2–4, after the experimenter described the dilemma to participants, participants responded to four questions assessing their understanding of the dilemma. The experimenter checked that all participants answered these questions correctly before participants made their decisions. Participants were asked to indicate their choice on a piece of paper, which was collected by the experimenter, and were then informed of their partner’s choice, which was always Option B (noncooperation). In addition, participants were told how much they earned on each trial. In each study, participants were paid according to the outcomes of each decision.

**State forgiveness.** As an assessment of state forgiveness, participants completed McCullough et al.'s (1998) Transgression-Related Interpersonal Motivations Inventory (TRIM) following the first trial feedback. The TRIM contains subscales measuring revenge and avoidance thoughts and feelings. In the current study, participants did not complete the avoidance scale, as it was technically impossible for the participant to avoid (interacting anonymously with) the partner. For a similar reason, participants did not complete a measure of (warmth-based, approach-oriented) benevolence motives (cf. McCullough, Fincham, & Tsang, 2003). Thus, participants completed only the five-item revenge scale (e.g., "I'll make him/her pay" and "I'm going to get even";  $\alpha = .80$ ), responding to each item on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). To facilitate a consistent focus on "forgiveness" throughout the paper, we reverse coded the TRIM revenge scores so that higher scores could be interpreted as higher levels of forgiveness (lower thoughts and feelings of revenge;  $M = 3.71$ ,  $SD = 0.86$ ).

## Results and Discussion

To test the compensatory and synergistic models, we used a two-step hierarchical regression analysis. On Step 1, we entered trait self-control and trait forgiveness scores. On Step 2, we entered their interaction. Prior to the analysis, trait self-control and trait forgiveness were centered (Aiken & West, 1991). Results on Step 1 revealed a significant main effect of trait self-control,  $\beta = .24$ ,  $t(93) = 2.22$ ,  $p < .05$ , but no effect of trait forgiveness,  $\beta = .14$ ,  $t(93) = 1.30$ ,  $p = .20$ . More important, on Step 2, results revealed a marginally significant interaction between trait self-control and trait forgiveness,  $\beta = -.19$ ,  $t(92) = -1.77$ ,  $p = .08$ . As Figure 2 shows, the interaction matched predictions based on the compensatory model. To further explore the interaction, we first tested the simple relationship between trait self-control and state forgiveness at low ( $-1 SD$ ) and high ( $+1 SD$ ) levels of trait forgiveness. Results revealed a significant positive relationship between trait self-control and state forgiveness among those low in trait forgiveness,  $\beta = .36$ ,  $t(92) = 2.83$ ,  $p = .006$ , but no significant relationship among those high in trait forgiveness,  $\beta = .01$ ,  $t(92) = 0.07$ ,  $p = .94$ . Also consistent with the compensatory model, a second set of simple slope analyses revealed that trait

forgiveness showed a significant positive relationship with state forgiveness among those low ( $-1 SD$ ) in trait self-control,  $\beta = .33$ ,  $t(92) = 2.18$ ,  $p = .03$ , but no significant relationship with state forgiveness among those high ( $+1 SD$ ) in trait self-control,  $\beta = -.02$ ,  $t(92) = -.11$ ,  $p = .91$ .<sup>2</sup>

We also conducted a two-step logistic regression to evaluate whether trait self-control and trait forgiveness predicted participants' choices on Trial 2 of the prisoner's dilemma. When entered on the first step, the centered trait self-control and trait forgiveness scores (as a set) explained a marginally significant amount of variation in Trial 2 choices,  $\chi^2(2) = 5.34$ ,  $p = .054$ . An examination of the individual predictors revealed that cooperation on Trial 2 was not related to trait self-control (Wald = 0.05,  $p = .82$ ) but was positively related to trait forgiveness (Wald = 3.39,  $p = .047$ ). When added on a second step, the interaction between trait self-control and trait forgiveness did not explain any additional variation in cooperation on Trial 2,  $\chi^2(1) = 0.14$ ,  $p = .74$ .

If we focus on the forgiveness results, the present findings provide initial support for the compensatory model, which states that forgiveness requires being high on either concern with others (trait forgiveness) or trait self-control but does not require being high on both traits, as the synergistic model would predict. Additional analyses showed that trait forgiveness was also associated with higher levels of cooperation on Trial 2, but (for reasons we consider in the General Discussion) analysis of the choice data did not support either interactionist model shown in Figure 1. As we explain below, Studies 3 and 4 were designed to test the generalizability of these findings using a conceptually related trait tapping concern with the well-being of others (social value orientation) and two additional social dilemma contexts.

### Study 3: Trait Self-Control $\times$ Social Value Orientation $\rightarrow$ State Forgiveness (I)

Study 3 complements and extends Study 2 in two ways. First, we considered an alternative prosocial orientation that is not so highly conceptually related to the outcome measure of state forgiveness. Second, to enhance the generalizability of our findings, we examined forgiveness in a continuous give-some social dilemma.

## Method

**Participants and protocol.** Students ( $N = 61$ ) at a business school in Singapore participated for course credit. Participants

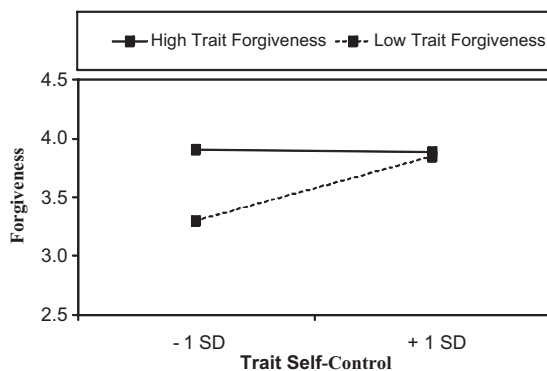


Figure 2. State forgiveness following defection in a two-alternative prisoner's dilemma as a function of trait forgiveness and trait self-control.  $SD$  = standard deviation.

<sup>2</sup> We also explored how our primary results on state forgiveness were impacted when Trial 1 dilemma choice was included as a covariate in the regression models reported in the text. To begin, Trial 1 choice was a significant predictor of forgiveness in Study 2 ( $p = .006$ ), but not in Studies 3 and 4 ( $ps = .13$  and  $.73$ , respectively). In addition, entering Trial 1 choice as a covariate into the primary regression analyses reported in the text did not fundamentally alter our conclusions. For example, in Study 2, the marginally significant interaction between trait self-control and trait forgiveness ( $p = .08$ ) remained marginally significant when trial 1 choice was entered into the equation ( $p = .10$ ), and in Studies 3 and 4, the significant interaction between trait self-control and social value orientation ( $ps = .001$  and  $.02$ , respectively) remained significant when trial 1 choice was entered into the equation ( $ps < .02$ , respectively).



came to the lab in groups of four and were seated in separate rooms. Participants first completed the trait self-control scale described in Study 1a ( $\alpha = .90$ ;  $M = 3.13$ ,  $SD = 0.52$ ) and a measure of social value orientation (described below). Next, participants made a decision in a two-person give-some social dilemma (described below), received false feedback that their partner had behaved noncooperatively, and then completed the TRIM measure of state forgiveness described in Study 2 ( $\alpha = .88$ ;  $M = 3.40$ ,  $SD = 0.91$ ).

**Give-some dilemma.** After completing the two trait measures, participants made a decision in a two-person, continuous give-some dilemma. Participants were told that they would be randomly assigned to make this decision with another person in the lab but would not be informed which of the three other students was their partner. Participants were told that they would make the same decision several times with the same person and would not know the number of decision trials. As reinforcement of this idea, a piece of paper with a column containing 30 rows to indicate the outcome of each future trial was placed on the participant's desk, leading the participant to believe he or she would make 30 decisions. However, each participant made the decision only twice.

In the dilemma, each participant received an endowment of 50¢ and had to decide how much to give to the other person. Participants were informed that their partner was endowed with the same amount of money and would be making the same decision simultaneously. Participants were told they could give their partner 0, 10, 20, 30, 40, or 50¢ and that any amount given would be doubled before being allocated to the partner. This is a social dilemma because the best individual option is to give the partner 0¢ and claim any amount that the partner gives, but if both partners give 0¢, each one gets only 50¢. This outcome is lower than if each gives 50¢, which (after doubling) results in 100¢ for each participant. Participants indicated their decision privately on a small piece of paper, which was collected by the experimenter. Next, the experimenter provided false feedback about the choice of the other person and told the participant the amount that he or she had earned on that trial. In fact, each participant was told that the partner decided to give 10¢ (a relatively noncooperative choice; mean cooperation for Trials 1 and 2,  $M = 4.43$ ,  $SD = 1.68$  and  $M = 3.66$ ,  $SD = 1.72$ , respectively).

**Triple dominance measure of social value orientation.** As a measure of their prosocial or proself values, participants responded to a set of nine, three-alternative decomposed games (Van Lange, Otten, De Bruin, & Joireman, 1997). In one game, participants chose among three options. Each option provided points to the Self and the Other: Option A = 500 points to Self, 100 points to the Other (i.e., a competitive choice, as it offers the biggest relative gain between one's own and the other's outcomes); Option B = 560 points to Self, 300 points to the Other (i.e., an individualistic choice, as it offers the highest individual gain to self); Option C = 490 points to Self, 490 points to the Other (i.e., a prosocial choice, as it offers the highest joint gain, highest other gain, and smallest difference in self–other outcomes).

Although researchers often categorize participants into prosocials versus proselfs, it is possible to treat social value orientation as a continuous variable. To maximize the variance in social value orientation responses, we elected to treat social value orientation as a continuous variable, computed as (points allocated to Other minus points allocated to Self). Calculated as such, higher scores

reflect a greater prosocial orientation ( $M = -129.97$ ,  $SD = 121.90$ ). As anticipated, the continuous measure was highly correlated with the categorical measure,  $r = .96$ ,  $t(54) = 26.75$ ,  $p < .001$ , and it showed a high internal reliability ( $\alpha = .95$ ).

## Results and Discussion

Our primary goal in Study 3 was to further test the compensatory model within a more continuous give-some social dilemma and with a different measure of concern with others (social value orientation). We were interested in testing for the hypothesized interaction between trait self-control and social value orientation in predicting forgiveness. Prior to our analysis, we again reverse scored the revenge scale from the TRIM measure of state forgiveness so that higher scores would reflect higher levels of forgiveness.

As before, to test for the hypothesized interaction, we conducted a two-step hierarchical regression analysis. On the first step, we entered the continuous variables of trait self-control and social value orientation, which had been centered prior to analysis (Aiken & West, 1991). On the second step, we entered their interaction. Results on Step 1 revealed that neither main effect was significant ( $ps \geq .33$ ). However, conceptually replicating the findings from Study 2, results on Step 2 indicated that the two-way interaction between trait self-control and social value orientation was significant,  $\beta = -.46$ ,  $t(57) = 3.88$ ,  $p < .001$ . As shown in Figure 3, the interaction matched predictions based on the compensatory model. To further explore the interaction, we first tested the simple relationship between trait self-control and state forgiveness at low ( $-1 SD$ ; proself) and high ( $+1 SD$ ; prosocial) levels of social value orientation. Results revealed a significant positive relationship between trait self-control and state forgiveness among proselfs,  $\beta = .47$ ,  $t(57) = 3.21$ ,  $p = .002$ . Results also revealed a significant negative relationship between trait self-control and state forgiveness among prosocials,  $\beta = -.39$ ,  $t(57) = -2.19$ ,  $p = .03$ . Also consistent with the compensatory model, a second set of simple slope analyses revealed a significant positive relationship between social value orientation and state forgiveness among those low ( $-1 SD$ ) in trait self-control,  $\beta = .55$ ,  $t(57) = 3.45$ ,  $p = .001$ . Results also revealed a marginally significant negative relationship

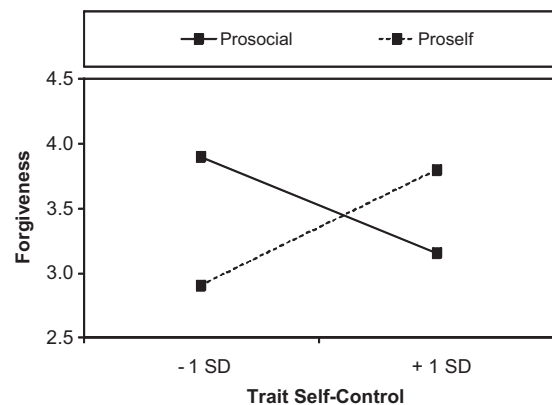


Figure 3. State forgiveness following defection in a continuous give-some dilemma as a function of social value orientation and trait self-control.  $SD$  = standard deviation.

between social value orientation and forgiveness among those high (1 SD) in trait self-control,  $\beta = -.33, t(57) = -1.97, p = .053$ .

We also conducted a two-step regression analysis to evaluate whether trait self-control and social value orientation predicted participants' choices on Trial 2 of the give-some dilemma. When entered on the first step, the centered trait self-control and social value orientation scores (as a set) explained a significant amount of variation in Trial 2 choices,  $R^2 = .20, F(2, 58) = 7.40, p = .001$ . An examination of the individual predictors revealed that cooperation on Trial 2 was not related to trait self-control,  $\beta = -.07, t(58) = -0.62, p = .54$ , but was positively related to social value orientation,  $\beta = .46, t(58) = 3.85, p < .001$ . When added on a second step, the interaction between trait self-control and social value orientation did not explain any additional variation in cooperation on Trial 2,  $\Delta R^2 = .01, F(1, 57) = 0.71, p = .40$ .

The state forgiveness results of Study 3 provide additional support for the compensatory model. The hypothesized positive relationship between trait self-control and state forgiveness occurred only among individuals with a prosocial value orientation. Among prosocials, interestingly, there was an unpredicted significant negative relationship between trait self-control and state forgiveness. Although we find this to be an interesting result, we refrain from speculating about it until this somewhat counterintuitive effect can be replicated. Also, conceptually similar to Study 2, analysis of the choice data revealed a significant relationship between social value orientation and Trial 2 choices but no effect for trait self-control or the interaction between self-control and social value orientation (an issue to which we return in the General Discussion).

**Study 4: Trait Self-Control × Social Value Orientation → State Forgiveness (II)**

Our goal in Study 4 was to provide a more stringent test of the compensatory and synergistic models within a relatively stronger situation. Recall that Study 2 tested the two models in the context of a two-person prisoner's dilemma, and Study 3 tested the models in the context of a two-person give-some game. Although the two games differed in the way people made their choice (selecting one of two options vs. giving money to a partner), both games had the underlying structure of a prisoner's dilemma. That is, in both games, noncooperation "dominated" cooperation for individualists, competitors, and aggressors, but mutual noncooperation led to suboptimal joint outcomes.

In Study 4, we tested the compensatory versus synergistic models in the context of a maximizing difference game (McClintock & McNeel, 1966), which can be viewed as a stronger situation. To illustrate why we consider the maximizing difference game a "stronger situation" than the prisoner's dilemma, Figure 4 presents the two-person, two-alternative versions of the prisoner's dilemma game from Study 2 and the two-person, two-alternative maximizing difference game from Study 4 (the most directly comparable games). As noted in the introduction, in a prisoner's dilemma, the cooperative option appeals to altruists and cooperators because it maximizes the partner's gain, joint gain, and equality, and the noncooperative option appeals to individualists, competitors, and aggressors because it maximizes individual gain and relative gain and minimizes the partner's gain (Van Lange, De Cremer, et al., 2007). By comparison, in a maximizing difference game, the

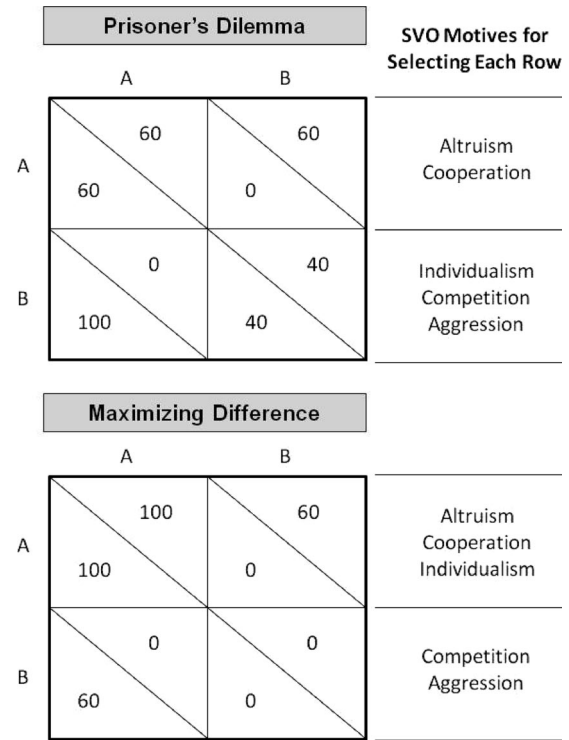


Figure 4. Social value orientation (SVO) motives for selecting top and bottom rows in prisoner's dilemma and maximizing difference games.

cooperative option appeals to altruists, cooperators, and individualists because it maximizes the partner's gain, joint gain, equality, and own gain, but the noncooperative option appeals to competitors and aggressors only because it maximizes relative gain and minimizes the partner's gain. Restated, in the prisoner's dilemma, noncooperation could mean that a partner is individualistic, whereas in the maximizing difference game noncooperation is much more pernicious because it implies that the partner is either competitive or aggressive. In fact, previous research supports this argument, as the noncooperative alternative in the maximizing difference game is judged to be much less moral than the noncooperative alternative in the prisoner's dilemma (Joireman, Kuhlman, Van Lange, Doi, & Shelley, 2003). Moreover, based purely on the base rates for different social value orientations (Au & Kwong, 2004), nearly everyone should chose to cooperate in the maximizing difference game, making noncooperation a quite unusual and salient form of "norm violation." Given this, we reasoned that forgiveness should be harder in the maximizing difference game, which might work against our ability to support the compensatory interaction (and might lead to stronger support for the synergistic model, given that it assumes that both traits are needed for forgiveness). Thus, it is reasonable to ask, does self-control positively relate to forgiveness among proselves even when noncooperation implies competition or aggression? Study 4 was designed to find out.

**Method**

**Participants and protocol.** Students ( $N = 66$ ) from a business school in Singapore participated for course credit. Participants

came to the lab in groups of four and were seated in separate rooms. Participants first completed the trait self-control scale (described in Study 1a;  $\alpha = .90$ ;  $M = 3.12$ ,  $SD = 0.48$ ) and the decomposed games measure of social value orientation (described in Study 3;  $M = -124.29$ ,  $SD = 127.05$ ). As in Study 3, the continuous measure was highly correlated with the categorical measure,  $r = .96$ ,  $t(55) = 23.74$ ,  $p < .001$ , and it showed a high internal reliability ( $\alpha = .95$ ). Next, participants made a decision in a two-person maximizing difference game, received false feedback that their partner had defected, and then completed the revenge scale from the TRIM measure of state forgiveness described in Study 2 ( $\alpha = .76$ ;  $M = 3.12$ ,  $SD = 0.73$ ).

**Maximizing difference game.** In the maximizing difference game, participants were told that they would be randomly assigned to make this decision with another person in the lab but would not be informed which of the three other students was their partner. In the maximizing difference game, participants chose between two options: Option A (cooperation) and Option B (noncooperation). Participants were told that if both people chose Option A, then both would get 100¢. However, if the participant chose Option A and the partner chose Option B, the participant would get 0¢ and the partner would get 60¢. Similarly, if the participant chose Option B and the partner chose Option A, the participant would get 60¢ and the partner would get 0¢. Last, if both chose Option B, each would get 0¢. The arrangement of payoffs meant that the only motives for choosing Option B were to maximize the relative gain over the partner (competition) or minimize the partner's outcomes (aggression).

To build in the anticipation of future interactions, we told participants that they would make the same decision several times and that it was possible for them to earn much money over the several trials. In fact, participants made the decision twice (cooperation rates were 95% and 76%, for Trials 1 and 2, respectively).

## Results and Discussion

**Primary analysis.** Our goal in Study 4 was to offer a final test of the compensatory model within the context of a maximizing difference game. Prior to our analysis, we again reverse scored the revenge scale from the TRIM measure of state forgiveness, so that higher scores would reflect higher levels of forgiveness, and we tested for the hypothesized interaction using a two-step hierarchical regression analysis. On the first step, we entered the continuous variables of trait self-control and social value orientation, which had been centered prior to analysis (Aiken & West, 1991). On the second step, we entered their interaction. Results on Step 1 revealed that neither main effect was significant ( $ps \geq .15$ ). However, conceptually replicating the findings from Studies 3 and 4, on Step 2, the two-way interaction between trait self-control and social value orientation was significant,  $\beta = -.31$ ,  $t(60) = -2.46$ ,  $p < .02$ . As shown in Figure 5, the interaction matched predictions based on the compensatory model. To further explore the interaction, we first tested the simple relationship between trait self-control and state forgiveness at low ( $-1 SD$ ; prosself) and high ( $1 SD$ ; prosocial) levels of social value orientation. Results revealed a significant positive relationship between trait self-control and state forgiveness among proselves,  $\beta = .44$ ,  $t(60) = 2.77$ ,  $p = .008$ , and no significant relationship between trait self-control and state forgiveness among prosocials,  $\beta = -.15$ ,  $t(60) = -0.82$ ,  $p = .41$ .

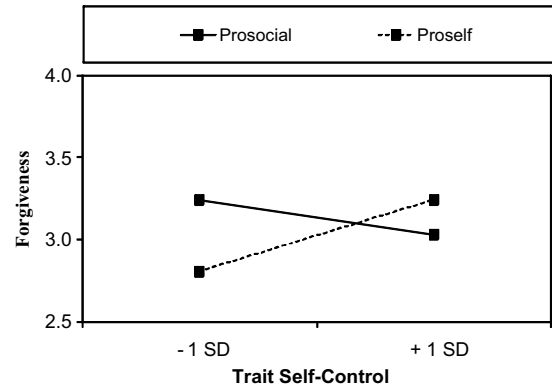


Figure 5. State forgiveness following defection in a two-alternative maximizing difference game as a function of social value orientation and trait self-control.  $SD$  = standard deviation.

Also supporting the compensatory model, a second set of simple slope analyses indicated that social value orientation showed a positive relationship with state forgiveness among those low ( $-1 SD$ ) in trait self-control,  $\beta = .30$ ,  $t(60) = 1.71$ ,  $p = .09$ , and self-control showed a negative relationship with state forgiveness among those high ( $1 SD$ ) in trait self-control,  $\beta = -.29$ ,  $t(60) = -1.76$ ,  $p = .09$ , though neither simple slope met traditional levels of significance.

We also conducted a two-step logistic regression analysis to evaluate whether trait self-control and social value orientation predicted participants' choices on Trial 2 of the maximizing difference game. When entered on the first step, the centered trait self-control and social value orientation (as a set) did not explain a significant amount of variation in Trial 2 choices,  $\chi^2(2) = 1.76$ ,  $p = .42$ . However, when added on a second step, the interaction between trait self-control and social value orientation did explain significant variation in Trial 2 choices,  $\chi^2(1) = 4.16$ , Wald = 3.84,  $p = .05$ . When we examined the simple slopes, at high levels of social value orientation, self-control had a marginally significant positive relation with cooperation ( $b = 0.32$ ,  $p = .06$ ). At low levels of social value orientation, however, self-control did not predict cooperation ( $b = -0.14$ ,  $p = .42$ ).

**Prisoner's dilemma vs. maximizing difference game.** One of our main goals in the present study was to determine whether the interaction uncovered in Studies 2 and 3 (based on a prisoner's dilemma game structure) would generalize to the maximizing difference game. We judged this to be an interesting question because, as we explained earlier, noncooperation in the maximizing difference game should be harder to forgive than noncooperation in the prisoner's dilemma game, primarily because people should expect more cooperation in the maximizing difference game; thus, noncooperation should be seen as quite counternormative. As an evaluation of these assumptions, in Studies 2 and 4, just prior to making their first choice, participants indicated if they expected their partner to choose Option A (cooperate) or Option B (defect).

As anticipated, participants were significantly more likely to expect their partner to cooperate in the maximizing difference game (85%) than in the prisoner's dilemma game (45%),  $r_{\phi} = .43$ ,  $\chi^2 = 27.47$ ,  $p < .001$ , and cooperation was significantly higher in

the maximizing difference game (95%) than in the prisoner's dilemma game (50%),  $r_{\phi} = .52$ ,  $\chi^2 = 38.04$ ,  $p < .001$ . Also consistent with our reasoning, state forgiveness was significantly lower in the maximizing difference game ( $M = 3.11$ ,  $SD = 0.73$ ) than in the prisoner's dilemma game ( $M = 3.71$ ,  $SD = 0.82$ ),  $t(169) = 4.67$ ,  $p < .001$ ,  $d = 0.75$ . Finally, a mediation analysis (Preacher & Hayes, 2008) indicated that the differences between the maximizing difference and prisoner's dilemma games on forgiveness was mediated by expected cooperation (indirect effect = .15,  $p = .03$ ), indicating that higher expectations of cooperation in the maximizing difference (vs. the prisoner's dilemma) game contributed to the lower levels for forgiveness in the maximizing difference game in Study 4. In sum, a comparison of the prisoner's dilemma and maximizing difference games used in Studies 2 and 4 suggests that forgiveness was indeed more difficult in the maximizing difference game, due to the fact that noncooperation in the maximizing difference game was judged to be much less likely than noncooperation in the prisoner's dilemma game. Despite this, the compensatory model was again upheld.

Study 4 provides additional support for the compensatory model. In particular, the hypothesized positive relationship between trait self-control and state forgiveness occurred only among individuals with a proself value orientation. That the interaction generalized to the maximizing difference game is important because, as we have argued, the maximizing difference game represents a "stronger situation." As illustrated in Figure 4, noncooperation in the maximizing difference game (Study 4) constitutes a stronger norm violation than noncooperation in the prisoner's dilemma game (Study 2), because (based on its incentive structure) virtually everyone should cooperate in the maximizing difference (as cooperation dominates noncooperation for altruists, cooperators, and individualists). Supporting this line of argument, expected and actual levels of cooperation were significantly higher in the maximizing difference game used in Study 4 than they were in the prisoner's dilemma game used in Study 2; forgiveness was significantly lower in the maximizing difference than the prisoner's dilemma game; and mediation analysis showed that heightened expectations of cooperation in the maximizing difference game helped to explain why forgiveness was lower in the maximizing difference game. All of this suggests that the maximizing difference game used in Study 4 was a "stronger situation." Again, this is important, because if a strong situation elicits a relatively uniform set of expectations and behavior, as occurred in the maximizing difference game, this can reduce the impact of personality on behavior (Cooper & Withey, 2009; Mischel, 1977). Despite this, using the maximizing difference game, we replicated the interaction between trait self-control and social value orientation in predicting willingness to forgive a noncooperative partner.

### General Discussion

The present research tested two competing models specifying how trait concern with the well-being of others (trait forgiveness, social value orientation) and trait self-control interact to predict forgiveness. The compensatory model predicts that forgiveness requires being high on concern for others or on self-control, whereas the synergistic model predicts that forgiveness requires both high concern for others and high self-control. Two initial studies confirmed the basic importance of self-control, showing

that trait and primed self-control predict forgiveness. Three additional studies showed that willingness to forgive a noncooperative partner in a prisoner's dilemma, a give-some game, and a maximizing difference game was best predicted by the compensatory model. Among proselves or those low in trait forgiveness, trait self-control was positively related to forgiveness, suggesting that self-control can compensate for a lack of concern with others' well-being. The present findings advance our understanding of forgiveness and highlight several promising directions for future research.

### Contribution to the Forgiveness Literature

The current research extends the forgiveness literature in at least three ways. First, we provide evidence that higher levels of trait self-control predict higher levels of forgiveness. Although Worthington, Berry, and Parrott (2001) have implicated conscientiousness-based virtues, including self-control, as vital motivational determinates of forgiveness, most prior research has examined warmth-based virtues, such as empathy (McCullough et al., 1997, 1998; Worthington et al., 2000) and relationship commitment (Finkel et al., 2002; Karremans, Van Lange, & Holland, 2005). Relatively little research has explored the role of self-control (for exceptions, see Finkel & Campbell, 2001; Pronk et al., 2010; Righetti et al., 2011). Across five studies, using varied methodologies, we provided consistent support that trait self-control positively relates to forgiveness.<sup>3</sup>

Second, applying an interdependence theoretical framework, we advanced and tested two competing models concerning how self-control and concern with the well-being of others interact to predict forgiveness. To date, most research on the forgiving personality has focused on the main effect of concern for others (Brose, Rye, Lutz-Zois, & Ross, 2005; Leach & Lark, 2004; for a review, see Mullet, Neto, & Riviere, 2005) or self-control (Finkel & Campbell, 2001; Pronk et al., 2010; Righetti et al., 2011) on forgiveness. More recently, personality researchers have acknowledged the importance of considering how multiple personality traits interact to predict stable patterns of thought, feeling, and behavior. To our knowledge, we are the first to apply such a framework to understanding the forgiving personality.

Third, the social dilemma paradigm we employed provides much needed insight into forgiveness immediately following an actual transgression. To date, the majority of research on forgiveness has been based on retrospective self-reports or intentions to forgive in hypothetical scenarios. In light of this trend, Pronk et al. (2010) have argued that researchers should begin exploring the relationship between personality and forgiveness immediately following a transgression. The lab-based social dilemmas we used offer one promising methodology for addressing this call. As we outlined in the introduction, social dilemmas offer a rich context within which to study forgiveness, due to their pervasive nature and ability to elicit competing motives relevant to forgiveness (such as a desire for revenge vs. forgiveness). Although lab-based

<sup>3</sup> Because the main effect of self-control on state forgiveness was inconsistent across studies, we utilized a meta-analytic technique to estimate the average correlation across studies. Averaging across the three studies, we found a significant positive relationship between self-control and the state measure of forgiveness,  $r = .26$ , 95% CI [.14, .38].



social dilemmas are an experimentally created game, as we have noted, people become quite angry when others do not cooperate in these social dilemmas, which speaks to the ecological validity of this paradigm. Moreover, by using three different types of dilemmas, we enhanced the generalizability of our findings across multiple settings. Despite these advantages, future research should examine if the patterns we observed in the lab using a social dilemma paradigm extend to other settings using additional methodologies for assessing forgiveness.

### Compensatory vs. Synergistic Models

As noted, we found consistent support for the compensatory model of forgiveness, suggesting that self-control can compensate for an individual's lack of concern for others. These findings hold several implications for our understanding of forgiveness. McCullough (2000, 2001) viewed forgiveness as a fundamentally motivational process. The compensatory model assumes, importantly, that the two underlying dimensions driving forgiveness are both related to motivational processes (social and temporal motivations; see Figure 1). The synergistic model, by comparison, assumes that only one of its underlying dimensions reflects motivation; the other reflects an ability to self-regulate behavior but does not necessarily include a motivation to forgive. Therefore, the synergistic model predicts that a proself individual with high self-control will show low levels of forgiveness, given that self-control provides the ability (but not the motivation) to forgive. Conversely, the (consistently supported) compensatory model assumes that a proself individual with high self-control will show high levels of forgiveness, given that his or her self-control reflects a concern with his or her own long-term self-interest.

The present findings suggest that researchers interested in understanding the relationship between self-control and forgiveness should consider the possibility that self-control is both an enabler and a motivator of forgiveness. Prior research on the relationship between self-control and forgiveness has typically viewed self-control as a mental capacity/ability/resource that facilitates self-regulated behavior (Finkel & Campbell, 2001; Pronk et al., 2010; Righetti et al., 2011). We do not dispute that these capacities, abilities, and resources may aid in the process of forgiveness. Indeed, an abundance of research demonstrates that trait and state self-control can impact an individual's ability to self-regulate thoughts, feelings, and behavior (Hagger, Wood, Stiff, & Chatzisarantis, 2010). That said, we argue that there is an additional motivating component to trait self-control that has been overlooked in prior research on forgiveness. Beyond a general mental capacity, self-control, broadly defined, is related to other mental processes, such as setting goals, monitoring progress toward goals, and thinking about the future consequences of behavior. In the present paper, we tested one important implication of this reasoning, reflected in the compensatory model: namely, that trait self-control could motivate forgiveness even among those who were not concerned with the well-being of others.

At the same time, we did not test the mechanisms responsible for this effect. Accordingly, future research could profitably build on our work by digging more deeply into how, exactly, self-control relates to forgiveness among proselfs. Worthington et al. (2001) suggested that self-control may relate to forgiveness either by inhibiting destructive impulses or by regulating negative emotions.

One way that proselfs high in self-control may inhibit revenge motives is by thinking about how others are instrumental in attaining valued goals (e.g., Fitzsimons & Shah, 2009). Consistent with this hypothesis, one of the more intriguing findings in the social value orientation literature is that the link between relationship commitment and willingness to sacrifice in close relationships is stronger among proselfs (individualists) than it is among prosocials (Van Lange, Rusbult, et al., 1997). This pattern of findings, in combination with our own, reinforces the idea that individualists can be motivated to behave cooperatively when it is in their long-term self-interest.

Viewing the compensatory model from a different perspective, we found that a prosocial orientation buffers the negative impact of low self-control. It may be that prosocials (or those high in trait forgiveness) forgive in an heuristic/automatic fashion or possess emotion regulation strategies that require few if any regulatory resources. This view is bolstered by recent research showing that those concerned with the well-being of others do not require self-control resources to value another's outcomes (Balliet & Joireman, 2010), to accommodate (Perunovic & Holmes, 2008), or to forgive an interaction partner (Karremans & Aarts, 2007). Future research could profitably extend our work by examining precisely how a prosocial orientation enhances forgiveness in the absence of self-control.

### Can Forgiveness Be Selfish?

Another direction for future research would be to further explore whether forgiveness can be motivated by selfish concerns. Richards (1988) argued that forgiveness can occur only out of concern for others and that self-interest cannot motivate forgiveness. Similarly, the idea that forgiveness can be motivated by long-term self-interest may seem inconsistent with the common conception that forgiveness is fundamentally a moral response that advances the well-being of one's partner (e.g., an altruistic gift, Worthington, 1998) or a volitional decision to free the partner from an implied debt (Baumeister, Exline, & Sommer, 1998). These points notwithstanding, there is nothing included in contemporary psychological definitions of forgiveness that rules out self-interest as a possible motivator. By providing consistent support for the compensatory model of forgiveness, our results suggest that trait self-control can indeed motivate forgiveness due to a concern with one's own long-term interest (i.e., among proselfs). However, we recognize that our reasoning is speculative and in need of further testing. In particular, as we noted earlier, future research is needed to tease out the mechanism responsible for self-control's relationship with forgiveness. In addition, it would be interesting to explore how forgiveness is perceived by the transgressor when it is acknowledged that forgiveness results from self-interest motives. Because people tend to respond positively and trust others more when a partner's behavior is perceived to deviate from self-interest (e.g., Murray & Holmes, 2009; Righetti & Finkenauer, 2011), the effectiveness of forgiveness for deterring repeated offenses may decrease when forgiveness is perceived to have resulted from self-interest motives.

### Limitations and Future Directions

Before closing, we consider three limitations of the present research and outline several directions for future research. To start,



although we tested the compensatory versus synergistic models in both weaker situations (prisoner's dilemma games in Studies 2 and 3) and stronger situations (maximizing difference game in Study 4), noncooperation in the maximizing difference game might still be considered a weak situation relative to other, more severe transgressions (e.g., a marital affair). Under more extreme circumstances, it is possible that individuals require both a prosocial orientation and self-control in order to forgive. For example, in these more severe transgressions, prosocial individuals may not be able to rely on their heuristic response to a partner's transgression under such extreme circumstances. Under such conditions, their self-control is instrumental in overriding their impulse to exact revenge. More generally, this raises the question of whether lab-based experimental games can prove to be viable paradigms with which to study responses to norm violations in relationships. Even though these paradigms have been used to predict behaviors outside the lab (Bem & Lord, 1979; Van Lange, Bekkers, Schuyt, & Van Vugt, 2007), future research should test the generalizability of our reports using responses to even more severe transgressions outside the lab.

Second, it is important to note that we used state revenge as an index of forgiveness but that prior measures of forgiveness have also incorporated avoidance and (approach-based) benevolence motives (McCullough et al., 2003). As we explained in Study 2, we believed that avoidance and benevolence motives were not highly relevant in our social dilemma paradigms because, technically, participants would never actually meet, and it was thus impossible for them to avoid (or approach) their partner. Additionally, positive and negative dimensions of forgiveness are moderately correlated (e.g., between  $-.40$  and  $-.50$ ; McCullough et al., 1997; Rye et al., 2001). This suggests that the patterns observed in the present study (using avoidance) could generalize to a broader array of forgiveness contexts. Still, the lack of avoidance and benevolence motives potentially limits the generalizability of our findings, and future researchers are encouraged to incorporate these additional dimensions of forgiveness. For example, McCullough et al. (2003) suggested that benevolence may require more self-control than do avoidance and revenge motives. If so, then the synergistic model may find stronger support when forgiveness is defined in terms of benevolence motives after a transgression.

On that note, it is relevant to recall that although the compensatory model consistently explained self-reported revenge motives, it did not predict Trial 2 social dilemma choice behavior. Several aspects of the dilemma paradigm may explain this. First, it is possible that a single subsequent social dilemma trial was not long enough to translate revenge motives into behavior. Second, although self-reported thoughts and feelings of revenge may be relatively immediate, a variety of additional factors may have influenced Trial 2 behavior, including the possibility that people attributed their partner's noncooperative choice on Trial 1 to "noise" and/or misunderstandings and were thus willing (at least temporarily) to extend some generosity on Trial 2 (e.g., Van Lange, Ouwerkerk, & Tazelaar, 2002). Accordingly, future research testing the compensatory and synergistic models across a variety of different contexts, including those containing noise, could greatly add to the insights provided by our initial test of these models. One interesting paradigm, in particular, would be the dictator's game (e.g., Shariff & Norenzayan, 2007). In this game,

participants are given full control over how much money to allocate to their anonymous partner, who simply must accept whatever amount is allocated. Because the partner has no ability to retaliate (or reject the offer, as in the ultimatum game), it is possible that in this context, forgiveness may require both the motivation and the ability to forgive.

A final issue to consider is whether desire to respond in a socially desirability manner, or mood, may have led to relationships between our constructs. In line with the former, each of the traits studied here has been linked with higher tendency to respond in a socially desirable fashion (e.g., Iedema & Poppe, 1994; Tangney et al., 2004; Thompson et al., 2005). On the other hand, the fact that a given trait correlates with scores on a social desirability scale does not necessarily mean that a person is lying (McCrae & Costa, 1983). Nevertheless, future research controlling for social desirability would shed additional light on this question. With regard to mood effects, state forgiveness is positively related to positive moods ( $r = .13$ ) and negatively related to negative moods ( $r = -.27$ ; Fehr et al., 2010). To the extent that our manipulation in Study 1b or our constructs of interest relate positively with positive mood (or inversely with negative mood), such mood effects may partly account for our findings. Future research assessing mood as a potential mediator would help advance our understanding of how self-control and a prosocial orientation combine to predict forgiveness.

## Conclusion

Building on interdependence theory analyses of accommodation and forgiveness (Finkel & Campbell, 2001; Finkel & Rusbult, 2008; Pronk et al., 2010), we identified individual differences in concern with the well-being of others and self-control as motivators of forgiveness. In prior research, self-control has been treated as an ability. In the present studies, we argued that self-control may also reflect future-oriented, self-interested motivation. Because trait self-control underlies both concern for the future and self-regulatory ability, we were able to test two competing models of how these personality factors may jointly predict forgiveness, the compensatory and synergistic models. Across five studies, trait self-control was, as expected, positively related to forgiveness. More important, this relationship existed only among individuals with a low concern for the well-being of others (proselfs or those low in trait forgiveness). These findings support a compensatory model of forgiveness, suggesting that self-control can motivate forgiveness among people with a low concern with the well-being of others. Given that a notable percentage of the population can be characterized as "proselfs" (i.e., 38%; Au & Kwong, 2004), this is good news for forgiveness. In light of these findings, future research should explore ways to promote forgiveness by enhancing self-control (e.g., Muraven, Baumeister, & Tice, 1999). Given the many benefits of forgiveness, such work could go a long way in promoting healthy and satisfying relationships, even among those not dispositionally concerned with the well-being of others.

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