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# Ego depletion reduces proselves' concern with the well-being of others

Daniel Balliet<sup>1</sup> and Jeff Joireman<sup>2</sup>

## Abstract

Previous research suggests that people predisposed toward a more cooperative orientation are stronger at self-control and, accordingly, are better able to ward off the adverse impact of ego depletion on self-regulation (Seeley & Gardner, 2003). Building on this research, we tested the hypothesis that ego depletion would lead to a reduction in concern with the well-being of others among proselves, but not among prosocials. Study 1 supported the basic proposition that prosocials are higher than proselves in trait self-control. In Study 2, participants originally classified as prosocials versus proselves based on mathematical games engaged in an ego depletion task or a control task and later completed a similar measure of prosocial versus prosself values. Supporting the primary hypothesis, ego depletion reduced proselves' concern with the well-being of others at time 2, but had no impact among prosocials. Theoretical and practical implications are discussed.

## Keywords

cooperation, ego depletion, self-regulation, social value orientation

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Beth and Tina have been roommates for about a month. After an initial adjustment period, both have agreed on a set of roles around the apartment. They have divided up the cleaning responsibilities and agreed that Beth will cook and Tina will clean the kitchen. This agreement is working well, until one evening when Tina claims she is so exhausted from work that she cannot possibly muster the energy to do the dishes. Having spent an hour on dinner, Beth is not terribly happy with Tina's decision, and begins to wonder whether she has made a mistake in deciding to room with Tina.

The friction felt between Beth and Tina is presumably quite common, and many readers

will likely be able to relate to each roommate's perspective. Like Tina, we occasionally have such a challenging day at work that we may become less concerned with the well-being of others and all we feel like doing is crashing on the couch. And, like Beth, we have all probably been disappointed when a relationship partner fails to live

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up to their part of a bargain. Anecdotal evidence notwithstanding, it is still important to ask: Do people, in fact, become less concerned with the well-being of others after a hard day at the office? And might this depend on a person's pre-disposition to cooperate in the first place? In the present study, we address these questions by integrating recent work on self-control, ego depletion, and individual differences in prosocial versus proself value orientations. Our analysis is based on three related assumptions, namely that (1) cooperation can be viewed as a form of self-control; (2) as such, prosocials are likely to be higher than proselfs in trait self-control; and (3) accordingly, prosocials should be less susceptible than proselfs to ego depletion effects, as reflected in their subsequent concern with the well-being of others.

### *Cooperation as self-control*

In interdependent relationships, two or more persons make a series of choices between behavioral options that affect the self and others. Frequently, those options pose a dilemma in that one option maximizes short-term self-interest (sitting on the couch) whereas the other option maximizes long-term collective interests (doing the dishes). As such, success in relationships often requires one or both partners to act in accordance with long-term collective interests (Kelley & Grzelak, 1972; Kelley & Thibaut, 1978; Messick & McClelland, 1983). Restated, cooperation in interdependent relationships often requires individuals to exert *self-control* (Dewitte & De Cremer, 2001; Rachlin, 2002), broadly defined as behavior that maximizes long-term interests (Baumeister, 2002; Rachlin, 2002). Unfortunately, recent research suggests that the ability to engage in self-control operates on a finite resource that can become depleted over time (Baumeister, Muraven, & Tice, 2000; Muraven, Tice, & Baumeister, 1998). This suggests that cooperation in interdependent relationships, framed as self-control, could potentially be adversely impacted when decision-makers' self-control resources have become depleted.

### *Self-control and resource depletion*

According to the strength model of self-regulation, self-regulation operates like a muscle. With use, the self-control muscle becomes fatigued, which can reduce an individual's ability to regulate their behavior in a subsequent domain (Baumeister & Heatherton, 1996; Muraven et al., 1998). Consistent with this model, many studies have shown that when people are required to regulate their behavior in one domain (e.g., via emotion or thought suppression), their ability to regulate in another domain diminishes (Muraven & Baumeister, 2000; Muraven et al., 1998; Schmeichel, Vohs, & Baumeister, 2003). Most directly relevant to the current study, recent research indicates that ego depletion increases the pursuit of immediate gratification (Baumeister, 2002; Hoffman, Rauch, & Gawronski, 2007; Muraven, Collins, & Neinhuis, 2002; Vohs & Heatherton, 2000) and the likelihood of aggression under provocation (DeWall, Baumeister, Stillman, & Gailliot, 2007; Stucke & Baumeister, 2006). Because cooperation frequently involves forgoing short-term interests, and because cooperation is incompatible with aggressive behavior (Van Lange, 2004), we hypothesized that ego depletion would lead people to become less cooperative. Stated more generally, we predicted that ego depletion would lead people to become less concerned with the well-being of others in interdependent settings.

### *Other-oriented concern as a self-regulation buffer*

As just noted, research on the depletion model of self-regulation has often focused on how ego depletion can reduce an individual's ability to self-regulate. However, just as a muscle can become fatigued after use, it can also be built up through regular use over time. Accordingly, it has been speculated that people can, through repeated acts of self-regulation, build up their self-regulation resources, thus making them less susceptible to ego depletion effects. Several studies support this idea by showing that experimentally-manipulated training in self-regulation enhances an individual's

ability to regulate in a subsequent domain (Baumeister, Galliot, DeWall, & Oaten, 2006; Muraven, Baumeister, & Tice, 1999; Oaten & Cheng, 2007). Using a similar line of argument, Seeley and Gardner (2003) recently proposed that individuals with a prosocial orientation are more likely to exercise self-control on a regular basis (i.e., in the context of on-going relationships), and may therefore have built up a stronger capacity for self-control and, hence, a stronger ability to buffer the negative impact of ego depletion on self-control. Seeley and Gardner tested this hypothesis in two studies. In both studies, Seeley and Gardner first measured traits related to a prosocial orientation (i.e., collectivism and other-directed self-monitoring, respectively). Seeley and Gardner then randomly assigned participants to a thought suppression (ego depletion) task or a control condition, and later had all participants perform a self-regulation task (squeezing a handgrip device as long as possible). Seeley and Gardner found that the thought suppression task reduced handgrip performance, relative to the control condition, among individuals who scored low on collectivism or other-directed self-monitoring. By comparison, the thought suppression task had no effect on handgrip performance among individuals high on collectivism or other-directed self-monitoring. Seeley and Gardner took these findings as evidence that other-oriented concern (i.e., a prosocial orientation) can buffer the negative impact of ego depletion on self-control.

### *Social value orientation and self-control*

The current research aimed to extend Seeley and Gardner's (2003) work by examining whether individual differences in social value orientation moderate the impact of ego depletion on decision-makers' concern with the well-being of others. Social value orientation is a trait-level preference for distributions of outcomes to the self and others in settings of interdependence (McClintock, 1972; Messick & McClintock, 1968). While an infinite number of orientations are possible, studies typically distinguish between *pro-socials* (concerned with maximizing joint gain and

equality) and *proselfs* (concerned with maximizing own or relative gain). Many studies support the predictive validity of social value orientation (for reviews, see Au & Kwong, 2004; Balliet, Parks, & Joireman, 2009; Bogaert, Boone, & Declerck, 2008; Van Lange, De Cremer, Van Dijk, & Van Vugt, 2007). Despite this, little is known about the how social value orientation overlaps with other personality traits (such as trait self-control). As such, recent reviews have called for additional research in this area (e.g., Bogaert et al., 2008).

There are several reasons to believe that prosocials are more likely than proselfs to engage in self-control. First, while the standard (decomposed games) measure of social value orientation (Van Lange, Otten, De Bruin, & Joireman, 1997) does not directly measure self-control, it is often argued that prosocials are (in theory) more motivated than proselfs to maximize *long-term* collective benefits (e.g., Kelley & Grzelak, 1972; Kelley & Thibaut, 1978), an orientation clearly linked with self-control (Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008). Second, a long line of studies shows that social value orientation predicts cooperation in social dilemmas involving a conflict between short-term self-interest and long-term collective interests (for reviews, see Au & Kwong, 2004; Balliet et al., 2009; Bogaert et al., 2008; Van Lange et al., 2007). Though primarily indirect, these findings are consistent with the idea that prosocials are interested in maximizing long-term collective well-being. Third, at least one previous study indicates that prosocials are more likely than proselfs to be concerned about the future consequences of their actions (Joireman, Lasane, Bennett, Richards, & Solaimani, 2001).<sup>1</sup> Taken together, theory and research suggest that prosocials are likely to be higher than proselfs in trait self-control.

### *Social value orientation $\times$ ego depletion*

The link between a prosocial orientation and high self-control is important, because prior research has shown that those scoring high on personality traits related to the exertion of self-control (e.g., trait self-control, collectivism, and other-directed self-monitoring) are less susceptible to ego depletion effects (DeWall et al., 2007; Seeley &

Gardner, 2003). Previous research has not, however, explored whether this pattern applies to decision-makers' concern with the well-being of others, per se (cf. DeWall et al., 2007). Nor has previous research explored whether social value orientation moderates ego depletion effects. While social value orientation has a long history in the literature (Messick & McClintock, 1968), questions remain about the conditions under which it is more or less predictive of behavior. By exploring the interaction between social value orientation and ego depletion, we sought to fill several of these gaps in the literature. In line with previous theory and research, just reviewed, we predicted that social value orientation and ego depletion would interact such that ego depletion would lead proselves to become less concerned with the well-being of others, whereas ego depletion would have little to no impact on prosocials.

### *Hypotheses*

In sum, we propose the following three hypotheses:

*Hypothesis 1:* Prosocials will report greater trait self-control, relative to proselves.

*Hypothesis 2:* Ego depletion will reduce concern with the well-being of others.

*Hypothesis 3:* Ego depletion will reduce proselves' concern with the well-being of others, but will have little to no impact on prosocials' concern with others' well-being.

### *Current studies*

To test the preceding hypotheses, we conducted two studies. In Study 1, we assessed whether prosocials score higher than proselves on trait self-control. In Study 2, several weeks after assessing their social value orientation, we randomly assigned prosocials and proselves to a control or ego depletion condition and later administered a similar measure of social value orientation that allowed us to assess participants' concern with the well-being of others.

## **Study 1**

We first conducted a survey examining the relationship between social value orientation and trait self-control (Tangney, Baumeister, & Boone, 2004). We hypothesized that prosocials would report higher levels of trait self-control, relative to proselves (*Hypothesis 1*).

### *Method*

**Participants and protocol** Ninety-six participants from a business school in Singapore completed the survey study for course credit. All participants signed an informed consent form prior to completing the survey. Participants came to the lab in groups of four. Each participant was seated in a separate room. Participants completed two questionnaires relevant to the current study, as well as other unrelated questionnaires.

**Triple dominance measure of social value orientation** To classify participants as prosocials or proselves, participants completed a set of nine, three-alternative decomposed games (Van Lange et al., 1997). As an example, in one game participants chose among three options offering points to Self and Other: *Option A* = 480 points to Self, 80 points to the Other (i.e., a competitive choice, as it maximizes the relative gain between one's own and the other's outcomes); *Option B* = 540 points to Self, 280 points to the Other (i.e., an individualistic choice, as it offers the highest gain to self); *Option C* = 480 points to Self, 480 points to the Other (i.e., a prosocial choice, as it offers the highest joint gain, highest other gain, and smallest difference between one's own and the other's outcomes). To be classified, participants had to demonstrate a consistent preference for one of the three orientations in at least six of the nine games. Using this classification system, 49 participants were classified prosocial, 36 participants classified as proselves (individualists and competitors combined), and 11 participants were unclassified.

**Trait self-control** Participants completed Tangney et al.'s (2004) self-control scale which contains 36 items. Two sample items include "I am self-indulgent at times" (reverse coded) and "I am good at resisting temptation". Participants responded to these questions using a 5-point Likert scale ranging from 1 (*not at all like me*) to 5 (*very much like me*). After reverse scoring, higher scores indicated a greater level of trait self-control. This scale demonstrated adequate reliability,  $\alpha = .90$ .

### Results & discussion

An independent *t*-test revealed that prosocials ( $M = 3.22$ ,  $SD = .52$ ) scored higher on trait self-control compared to proselves ( $M = 3.0$ ,  $SD = .46$ ),  $t(85) = 1.99$ ,  $p = .049$ ,  $d = .44$ , thus supporting Hypothesis 1. While an important component of our argument, we were more interested in determining whether ego depletion leads to a reduced concern with the well-being of others (Hypothesis 2), and whether this effect is moderated by social value orientation, such that ego depletion reduce proselves' concern for the well-being of others, but has little to no impact on prosocials' concern with the well-being of others (*Hypothesis 3*).

## Study 2

To test Hypotheses 2 and 3, we first assessed social value orientation (time 1). Several weeks later (time 2), individuals classified as prosocials or proselves arrived at the lab, were randomly assigned to an ego depletion or control condition, and subsequently completed a second measure to assess their concern with the well-being of others.

### Method

**Participants** One hundred and seventy-six students from a large state university in the United States participated in exchange for class credit. All participants signed an informed consent form prior to participation.

**Time 1: Triple dominance measure of social value orientation** Participants completed the triple dominance measure of social value orientation described in Study 1. Based on the procedures outlined in Study 1, at time 1, 120 participants were classified as prosocial and 28 as prosself.

**Time 2: Ego depletion manipulation** Several weeks after completing the initial social value orientation measure, participants took part in the lab-based portion of the study. After providing written consent, participants were seated approximately six feet from a VHS recorder and told that they would watch a short video clip and that during the video their facial expressions would be video recorded. All participants watched an amusing five-minute video clip taken from a 1982 Robin Williams stand-up comedy act (Vohs & Schmeichel, 2003). To ensure that the experimenter remained blind to the experimental condition, instructions were provided on a folded slip of paper that the experimenter could not read.

Participants in the *ego depletion condition* read the following instructions:

This part of today's study is aimed at understanding facial expression of emotions. As you watch the video, we'd like you to remain completely neutral on the inside and out. Please try your best not to let any feelings or responses you may have show on your face, and to the best of your ability, try to keep all of your internal reactions suppressed.

Participants in the *control condition* read the following instructions:

This part of today's study is aimed at understanding facial expression of emotions. As you watch the video, we'd like you to be as natural as possible, both on the inside and out. If you have any feelings or reactions to the video, let them flow naturally.

**Time 2: Manipulation checks** After the video clip ended, participants described what they were instructed to do while watching the video, rated on a 7-point scale the difficulty of the task, and completed the positive and negative affect schedule (PANAS), a measure of positive and negative mood (Watson, Clark, & Tellegen, 1988). On the PANAS, participants indicated on a 5-point scale the extent to which each word described their current feeling (1 = very slightly or not at all, to 5 = extremely). Examples of the positive mood items include inspired, lively, interested, and enthusiastic. Examples of the negative mood items include hostile, tired, and upset. Both positive and negative mood scales had adequate reliability in the current study ( $\alpha = .86$  and  $.78$ , respectively).

**Time 2: Allocation of points to self and others** After completing the PANAS, participants completed the ring measure of social value orientation (Liebrand & McClintock, 1988; Roch & Samuelson, 1997). The instructions were similar to those for the original set of decomposed games completed at time 1. There were, however, two differences between the original set games used to classify participants and the ring measure used as our primary dependent variable: the ring measure involved a series of 24 choices between two options (rather than nine choices between three options), and, unlike the original set of decomposed games (which had only positive points), the ring measure included positive and negative points. Traditionally, the ring measure is used to classify participant's social value orientation "angle" based on points allocated to the self and other. In our study, we were more interested in the extent to which ego depletion would impact allocation of points to others. Thus, the total amount of points allocated to the other person, as opposed to the social value orientation angle, was our primary dependent measure. Because the ring measure had positive and negative values, it was possible for the sum of points to self and the other to be negative; indeed, based on their location in the two-dimensional

(self-other) space (below zero degrees) (Liebrand & McClintock, 1988), it was fully expected that proselves would have a negative sum for points to others.

## Results

**Manipulation checks** Supporting our experimental manipulation, participants in the ego depletion condition reported that the task was more difficult ( $M = 3.24$ ,  $SD = 1.79$ ) compared to those in the control condition ( $M = 1.93$ ,  $SD = 1.19$ ),  $t(117.06) = 5.24$ ,  $p < .001$ ,  $d = .86$  (for unequal variances). As a second check on our manipulation, a coder blind to the experimental condition made ratings for each participant at one-minute intervals during the video. The four ratings were then used to create an average for each participant. In support of our manipulation, participants in the ego depletion condition were judged to be less expressive ( $M = 1.28$ ,  $SD = 0.52$ ) than those in the control condition ( $M = 1.89$ ,  $SD = 0.82$ ),  $t(56) = -3.40$ ,  $p = .001$ ,  $d = -.89$ .<sup>2</sup>

To explore an alternative account for our findings, we examined whether ego depletion affected mood. However, ego depletion did not significantly relate to either positive mood,  $t(174) = .43$ ,  $p = .67$ , or negative mood,  $t(173) = -1.22$ ,  $p = .22$ . Social value orientation (SVO) at time 1 also did not significantly predict the perceived task difficulty, coded facial expressions, or mood ( $ps > .10$ ).

**Points allocated to the other at time 2** To test our primary hypotheses, we conducted a 2 (SVO at time 1: prosocial vs. prosself)  $\times$  2 (Ego Depletion: ego depletion vs. control) analysis of variance treating points to other at time 2 as the dependent variable. As expected, social value orientation at time 1 predicted points allocated to the other during the second session,  $F(1, 144) = 25.12$ ,  $p < .001$ ,  $\eta_p^2 = .15$ , with prosocials allocating more points to others ( $M = 5.91$ ,  $SD = 9.98$ ) than proselves ( $M = -4.00$ ,  $SD = 9.79$ ). Though in the expected direction, participants in the ego depletion condition did not allocate significantly fewer points to the other ( $M = 3.98$ ,  $SD = 10.74$ )

than those in the control condition ( $M = 4.08$ ,  $SD = 10.62$ ),  $F(1,144) = 1.97$ ,  $p = .16$ . Most importantly, and consistent with Hypothesis 3, results revealed a significant interaction between social value orientation at time 1 and the ego depletion condition,  $F(1, 144) = 4.13$ ,  $p = .04$ ,  $\eta_p^2 = .03$ . Figure 1 presents a graph of the means. Follow-up analyses revealed that proselves allocated significantly fewer points to the other in the ego depletion condition ( $M = -8.10$ ,  $SD = 9.58$ ) than in the control condition ( $M = -.91$ ,  $SD = 9.02$ ),  $t(26) = -2.03$ ,  $p = .05$ ,  $d = -.78$ . In contrast, prosocials did not demonstrate a statistically significant drop in points allocated to the other in the ego depletion condition ( $M = 6.61$ ,  $SD = 9.09$ ) compared to the control condition ( $M = 5.31$ ,  $SD = 10.69$ ),  $t(118) = -0.71$ ,  $p = .48$ ,  $d = .13$ .

We also evaluated the effect of SVO in both the control and ego depletion conditions. In the control condition, prosocials ( $M = 5.31$ ,  $SD = 10.69$ ) allocated more points to the other than did proselves ( $M = -.91$ ,  $SD = 9.02$ ),  $t(79) = 2.15$ ,  $p = .035$ ,  $d = .60$ . In the ego depletion condition, prosocials ( $M = 6.61$ ,  $SD = 9.09$ ) also allocated more points to the other than did proselves ( $M = -8.10$ ,  $SD = 9.58$ ), but the difference was much larger than in the control condition,  $t(65) = 5.03$ ,  $p < .001$ ,  $d = 1.60$ .<sup>3</sup>

### Discussion

In line with our key hypothesis, ego depletion led to a decrease in concern with the well-being

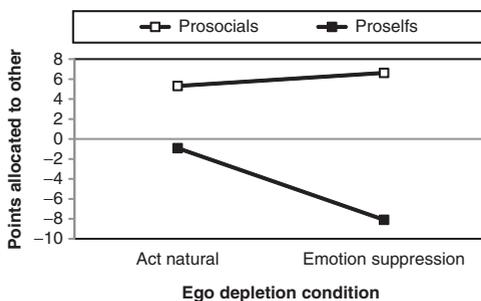


Figure 1. Mean points allocated to the other as a function of social value orientation and ego depletion manipulation.

of others among those initially classified as proselves, but not among those initially classified as prosocials. The current findings complement our initial findings, that prosocials score higher in trait self-control than proselves, and extend work by Seeley and Gardner (2003) on the interaction between ego depletion and other-oriented concerns (collectivism and other-oriented self-monitoring) on self-control (persistence at a handgrip exercise).

### General discussion

Deciding whether or not to cooperate with one's partner, or a larger group, can be framed as a self-control dilemma (Dewitte & De Cremer, 2001). Given this, we reasoned that cooperation would likely be adversely impacted by ego depletion (DeWall et al., 2007), especially among those with a prosel self value orientation (Seeley & Gardner, 2003). Consistent with our reasoning, in Study 1, prosocials reported higher levels of trait self-control relative to proselves. More importantly, in Study 2, ego depletion reduced proselves' concern with the well-being of others, but had no impact among prosocials.

Our research offers three unique contributions to the literature. First, complementing Seeley and Gardner's (2003) focus on collectivism and other-oriented self-monitoring, we utilized a different measure to tap an individual's prosocial value orientation which has a long history in the literature on cooperation in social dilemmas (i.e., the decomposed game; Messick & McClintock, 1968; Van Lange et al., 1997). Second, and more important, we extended Seeley and Gardner's (2003) work by focusing on how social value orientation moderates the impact of ego depletion on concern with others' well-being, thus extending their argument from self-control in general (on a handgrip exercise) to cooperation (as measured via mathematical games). Third, we extended work on social value orientation, which has devoted little attention to the potential overlap between social value orientation and self-control. Below, we discuss the theoretical and practical implications of our findings.

### *Social value orientation and trait self-control*

As noted, in Study 1, prosocials reported greater amounts of trait self-control, relative to proselves. There may be several explanations for this result. One potentially problematic interpretation is that social desirability is driving the correlation between social value orientation and self-control. While there is some evidence that trait self-control positively relates to social desirability (Tangney et al., 2004), research also suggests that social value orientation is not related to social desirability (Platow, 1994). Taken together, these findings suggest that social desirability is not a likely explanation for the observed correlation between self-control and social value orientation.

Two other explanations focus on similarities between self-control and a prosocial orientation. First, according to the self-regulation strength hypothesis, it may be that over the course of many interpersonal interactions, prosocials have developed a greater capacity for self-regulation resources which strengthens their ability for self-control in diverse contexts. Second, some researchers have suggested that, like those high in self-control, prosocials are more likely to consider the delayed consequences of their behavior (Bogaert et al., 2008; Joireman et al., 2001; see also Footnote 1). This is in line with Dewitte and De Cremer's (2001) prediction that cooperation and self-control are both facilitated by an indirect perspective (which considers features of the decision beyond the immediate situation) as opposed to a direct perspective (which focuses on the immediate situation). Future research more directly exploring differences between prosocials and proselves in various psychological processes involved in self-control will advance our understanding of this important topic.

### *Social value orientation as an ego depletion buffer*

While the link between social value orientation and trait self-control was an important first step in our investigation, more important in our view was the finding that social value orientation

moderated the impact of ego depletion on points allocated to others in an interdependent decision-making task. We consider three explanations for this result. First, as just noted, it is possible that prosocials have, over numerous social interactions, developed greater amounts of resources required for self-regulation. This is important, because past research has suggested that those high in self-control are less adversely impacted by ego depleting tasks. Consistent with this line of reasoning, our first study revealed that prosocials scored higher on trait self-control than proselves. Second, it may be that prosocials are more *motivated* to regulate behavior in social contexts, given that ego depletion effects are eliminated when participants are sufficiently motivated to perform well in the subsequent self-regulation task (Muraven & Slessareva, 2003). Based on this motivation model, prosocials and proselves may both be depleted to the same extent. Yet prosocials may be more motivated than proselves to engage in cooperation when depleted. Future research might test this hypothesis by systematically varying incentives for cooperation under ego depletion conditions. A third possible explanation is that prosocials require less mental effort to cooperate. Here again, it may be that prosocials and proselves are both depleted. Yet ego depletion only affects proselves, as prosocials cooperate in a heuristic fashion which requires little to no cognitive resources. Though an interesting possibility, this explanation seems somewhat inconsistent with past research which has shown that prosocials take longer than individualists to respond to the decomposed games measure of social value orientation (Dehue, McClintock, & Liebrand, 1993; Liebrand & McClintock, 1988). Liebrand and McClintock (1988) suggest that prosocials take longer than individualists, because they calculate and compare joint gain across both options instead of just comparing the more straightforward individual gain. These findings suggest that it is prosocials who have a more complicated mental exercise prior to cooperating, and if depleted, it would be prosocials who should show a reduction in concern for others.

As is typical in research on social value orientation, our focus has been on the distinction between prosocials and proselves (individualists and competitors combined). The distinction between individualists to competitors could be interesting to explore in future research. As one reviewer pointed out, it is possible that just as prosocials must self-regulate (via repeated calculations and comparisons of joint gain), so too might competitors, in the sense that they must calculate differences in self–other payoffs. If this comparison process requires self-regulation, it is possible that competitors may have developed similar levels of self-regulation (as prosocials) and should therefore be less susceptible to ego depletion effects (than individualists). Our sample included too few competitors to examine this possibility. However, if true, this pattern would actually make our conclusions even stronger, since competitors, who were categorized with individualists in the present analysis, would have counteracted the ego depletion observed amongst individualists. Subsequent research will benefit by considering the effect of ego depletion on competitors. This research might illuminate a potential reason why social value orientation relates to self-control. If it is the more complicated mental exercise of comparing self and other outcomes that result in greater self-control capacity, then we should expect no difference between prosocials and competitors in response to ego depletion. However, if calculating the long-term benefits of cooperation results in greater levels of self-control, then we should only expect greater levels of self-control amongst prosocials, since competitors seem to have difficulty understanding that their long-term self interest is best served via cooperation during iterated social dilemmas (Sheldon, 1999).

### *Generalizability to groups*

For the sake of simplicity, our initial test of our hypothesis focused on a two-person decision-making task. Our results should, however, readily extend to cooperation within groups, given that our dependent measure of concern for others in Study 2 (the ring measure), and measures like it

(other sets of decomposed games) have been shown to predict cooperation in a variety of group-level social dilemmas (e.g., Budescu, Au, & Chen, 1997; De Cremer, 2000; De Cremer & Van Dijk, 2002; De Cremer & Van Vugt, 1999; Kramer, McClintock, & Messick, 1986; Liebrand, 1984; Liebrand & Van Run, 1985; Loomis, Samuelson, & Sell, 1995; Offerman, Sonnemans, & Schram, 1996; Roch & Samuelson, 1997) (for a review, see Balliet et al., 2009). Extending these findings to the real world, we would argue that ego depleted proselves should be less likely (than non-depleted proselves) to engage in proenvironmental behavior, volunteer in organizations, or donate to charity, all decisions that have been theoretically-linked with decision-making in social dilemmas. Future research attempting to replicate our findings in more naturalistic settings, in both dyadic and group contexts, would offer an important complement to our lab-based findings.

### *Strengths, limitations and future directions*

The current research is not without its limitations. First, our initial study was self-report and correlational. To address the self-report issue, subsequent research could explore whether prosocials and proselves differ in self-control based on observer ratings. There is some evidence that people can accurately identify their roommate's social value orientation (Bem & Lord, 1979). It is possible that self-control is one signal that helps observers in the identification of a person's social value orientation. A second limitation is that the interaction between social value orientation and ego depletion is open to several alternative explanations (self-regulatory strength, motivation, heuristic processing). Nevertheless, our results are very much in line with those reported by Seeley and Gardner (2003), and can serve as a springboard for future research in this area. A third limitation concerns the generalizability of the results. Our outcome measure represents a broad tendency to be prosocial or prosself, rather than a specific prosocial act. As such, future studies exploring the more applied aspects of our findings are encouraged.

Fourth, on a related note, we did not measure the presumed mediator (depleted self-control). Thus, we cannot say for certain that depleted self-regulatory resources were driving our results. We chose not to measure the mediator since many previous studies had already demonstrated that ego depletion reduces self-control (DeWall et al., 2007; Hoffman et al., 2007; Muraven et al., 1999; Muraven et al., 2002; Muraven et al., 1998; Schmeichel et al., 2003; Seeley & Gardner, 2003; Stucke & Baumeister, 2006; Vohs & Heatherton, 2000; Vohs & Schmeichel, 2003) (for a review, see Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000). Moreover, as just noted, one of the primary studies that served as a basis for our predictions had already demonstrated an interaction between ego depletion and “other orientation” on a standard measure of self-control (handgrip task; Seeley & Gardner, 2003). Had we used a novel manipulation of ego depletion, we believe it would have been more important to include a measure of self-control as a check on the mediating process. However, in Study 2, we simply used a well-established method for manipulating ego depletion (i.e., emotion suppression; Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven et al., 1998; Vos & Schmeichel, 2003). Still, future studies may wish to include the mediator to provide stronger support for the underlying process.

Finally, contrary to our hypothesis, we did not observe a main effect of ego depletion on points allocated to others in the decision-making task. There may be several reasons why we did not observe the effect. First, our study may have lacked the power to detect a small effect. The effect was in the predicted direction, but was not significant. Second, it may be that the large number of prosocial participants in the sample is masking the effect we would observe in a more heterogeneous sample (given that ego depletion only had an effect among proselves). However, in most prior research samples, prosocials do outnumber proselves. Our sample, though, was more uneven than what is often observed in these studies (Balliet et al., 2009). Third, it may be that the current manipulation of ego depletion was not strong enough. However, we used a standard ego depletion manipulation,

and participants in the emotion suppression condition did self-report greater perceived difficulty of the task, relative to participants in the act “natural” condition. Subsequent studies with a more even distribution of prosocials and proselves, and/or a stronger ego depletion manipulation, may be more successful in revealing the expected main effect of ego depletion.

Despite these limitations, our key hypothesis was supported, helping to extend work on ego depletion, self-control, and social value orientation. This suggests that future research along these lines can help shed additional light on the conditions under which people become less concerned with the well-being of others, and may help to illuminate intervention strategies that can prevent a reduction in prosocial behavior due to ego depletion.

## Notes

1. In an independent sample involving 136 prosocials and 111 proselves, we sought to replicate Joireman et al.'s (2001) finding. Participants completed Van Lange et al.'s (1997) nine-item decomposed games measure of social value orientation and Strathman, Gleicher, Boninger, & Edwards' (1994) 12-item consideration of future consequences (CFC) scale (using a 7-point scale). In line with Joireman et al.'s (2001) finding, prosocials scored significantly higher on CFC ( $M = 4.76$ ,  $SD = 0.84$ ) than did proselves ( $M = 4.52$ ,  $SD = 0.82$ ),  $t(244) = 2.23$ ,  $p < .05$ , providing further support for the argument that prosocials are likely to score higher on self-control than proselves.
2. Due to technical difficulties, facial recordings were only available for 58 participants. Despite this, all participants believed their facial expressions were being video-taped while they watched the stimulus video.
3. We conducted the same analysis of variance using points allocated to self as the dependent variable. This analysis only resulted in a significant main effect for social value orientation,  $F(1, 144) = 9.79$ ,  $p = .002$ ,  $\eta_p^2 = .06$ , with prosocials allocating fewer points to self ( $M = 15.54$ ,  $SD = 7.53$ ) compared to proselves ( $M = 20.64$ ,  $SD = 6.43$ ).

It may seem counterintuitive that ego depletion did not interact with social value orientation to affect points allocated to self. However, it should be kept in mind that all three of the primary social value orientations (cooperation, individualism, and

competition) have a positive concern for the self. What most distinguishes the orientations is concern for others, which is positive for cooperators, neutral for individualists, and negative for competitors. Consistent with this line of reasoning, the effect of social value orientation (at time 1) on points to others (at time 2) is larger than it is on points to self (at time 2) ( $\eta_p^2 = .15$  vs.  $\eta_p^2 = .06$ , respectively). As such, it is to an extent understandable that, with concern with self as a given, and concern with others as an “option”, an effect emerges on concern with others but not on concern with self.

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