Taking a fresh perspective: Vicarious restoration as a means of recovering self-control

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A B S T R A C T

In the realm of self-regulation, recent work shows that the state of ego depletion can be vicariously transmitted from a target to a perceiver simply by imagining the perspective of a depleted target (i.e., vicarious depletion; Ackerman et al., 2009). The present study asked whether such vicarious effects can extend to the domain of self-regulatory recovery. In Experiment 1, depleted participants who took the perspective of someone engaging in a restorative activity showed recovered self-control on a later task. Experiments 2 and 3 expanded upon this effect by illustrating that such vicarious self-regulatory processes only emerge if the target is similar to the participant. Taken together, the present studies offer a powerful method by which mental resources can be replenished, and identify one critical boundary condition of its effectiveness.

Introduction

From controlling our food intake (Kahan, Polivy, & Herman, 2003) to facilitating intelligent responses (Baumeister, Twenge, & Nuss, 2002) to inhibiting racial prejudice (Gailliot, Peruche, Plant, & Baumeister, 2009), self-control allows us to act in ways that are better for ourselves and for society as a whole. With such practical and personal relevance to our everyday lives, researchers have been greatly interested in the stability of people's self-regulatory capacities across time and context. For over a decade, the depletion model of self-regulation has been one of the most prominent perspectives to consider these questions of self-control. In short, this model proposes that self-control is a limited resource that, when depleted, significantly impairs future self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Thus, when people self-regulate their behavior in one situation (e.g., resisting unhealthy food while on a diet), they are less able to self-regulate in a subsequent situation (e.g., inhibiting stereotypes when forming impressions of others).

Interestingly, recent work suggests that one need not even engage in a self-regulatory activity to experience ego depletion effects. Borrowing from the burgeoning literature of vicarious mood (e.g., Neumann & Strack, 2000), behavior (e.g., Chartrand & Bargh, 1999), and personality (e.g., Goldstein & Cialdini, 2007) effects, Ackerman, Goldstein, Shapiro, and Bargh (2009) showed that people can be vicariously depleted of their mental resources simply by imagining the self-control behaviors of another individual. Compared to individuals who took the perspective of a target that engaged in neutral behaviors, participants who took the perspective of a target that resisted his or her impulses showed poorer self-control on a subsequent task. These results imply that it is not the act of perspective-taking and the cognitive effort that act requires which leads to depletion effects; rather, it is the nature of the perspective one takes which has the ability to deplete mental resources.

Regardless of its actual or vicarious origins, the numerous negative impacts of depletion have led researchers to hypothesize methods by which this aversive state can be combated. Recent work on this issue has yielded increased understanding of how self-regulatory energy can be restored following an initial act of depletion. For instance, variables such as glucose (Gailliot et al., 2007), positive mood (Tice, Baumeister, Shmueli, & Muraven, 2007), self-affirmation (Schmeichel & Vohs, 2009), motivation (Muraven & Slessareva, 2003), and goal activation (Martijn, Tenbult, Merckelbach, Dreezen, & de Vries, 2002) have all been shown to positively impact an individual's overall level of self-control resources. The present paper seeks to expand this emerging line of literature by proposing that self-control restoration can take place vicariously. Thus, just as individuals can have their self-control restored via direct behavioral manipulations, we argue that this process of restoration may also emerge indirectly when individuals are asked to imagine a restorative experience from another person's perspective.

The power of perspective-taking

Several recent works in cognitive science and social neuroscience have shown that imagination and perspective-taking lead to a myriad of consequences akin to vicarious experience (e.g., Ackerman et al., 2009; Ames, Jenkins, Banaji, & Mitchell, 2008; Decety & Jackson, 2006; Goldman, 2006; Ruby & Decety, 2004; Weisbuch & Ambady,
2008). We attempt to outline some of these findings before ultimately tackling the question of vicarious restoration.

The most substantive evidence for the power of perspective-taking comes from studies on the neurological effects of imagining another's thoughts and behaviors. One central finding from such work is that perspective-taking actually increases self-referential processing within the brain (Ames et al., 2008). This implies that when we imagine the actions of another, we necessarily rely on bridging our own experiences with those of the social target. Thus, taking another's perspective should effectively put the perceiver “in the shoes” of the target, allowing the target's experiences and feelings to mentally transfer to the perceiver. Consistent with such theorizing, much recent work shows that taking the perspective of a social target's behaviors activates the same pattern of neural responses associated with the individual's own performance of such behaviors (Goldman, 2006; Ruby & Decety, 2004; see also Gutsell & Inzlicht, 2010). For example, Goldman's (2006) simulation theory argues that imagining the enactment of any particular behavior involves the same types of brain activation that are implicated in the perception and action of this behavior. Applied to vicarious restoration, such work would imply that taking another person's restored perspective is tantamount to observing or engaging in a particular restorative action oneself.

Other indirect evidence for the power of perspective-taking is derived from an examination of the action-perception literature. In particular, much emerging work suggests that the mere perception of another's actions causes the mammalian brain to neurologically mimic these actions on an unconscious level (e.g., Lui et al., 2008; see Cattaneo & Rizzolatti, 2009 for a review). Although controversial to some, these findings have a great deal of relevance for the effects of perspective-taking. Assuming that perspective-taking at minimum involves the perception of a particular action (if not the experience of this action; Goldman, 2006), this perception in and of itself should be entirely sufficient in promoting vicarious processes (Cattaneo & Rizzolatti, 2009). Thus, regardless of whether perspective-taking truly involves a veridical neurological experience of an overt behavior, or just the mental representation of this behavior's typical enactment, either of these processes should inherently allow the emergence of vicarious restoration for the perceiver.

Overview

Given the direct (e.g., Goldman, 2006) and indirect (e.g., Cattaneo & Rizzolatti, 2009; Gutsell & Inzlicht, 2010) links between perspective-taking and direct neurological experiences, it follows that taking another's perspective can lead to emotional (e.g., Weisbuch & Ambady, 2008), behavioral (e.g., Ackerman et al., 2009), and even personality (e.g., Goldstein & Cialdini, 2007) convergence between a social perceiver and a social target. The current work seeks to expand this perspective-taking literature by examining whether such vicarious effects can also be obtained in the realm of self-regulatory recovery. In other words, if one imagines another person engaging in energy restoration, can the restorative feelings of the target spontaneously transfer to the perceiver?

Three experiments attempt to answer the question of vicarious restoration. In Experiment 1, we test our initial hypothesis of vicarious restoration by asking already depleted participants to take the perspective of (or simply read about) a target who does or does not engage in a restorative behavior. In Experiment 2, we attempt to further illustrate the generalizability of this vicarious restoration effect, as well as delineate the potential moderating role of target-participant similarity. Finally, Experiment 3 attempts to rule out one possible alternative explanation of Experiment 2 while expanding the scope of our vicarious effects.

In addition to testing the effects of perspective-taking on self-regulatory recovery, we also seek to investigate whether such vicarious effects are potentially mediated by various state measures that have been previously associated with ego depletion and restoration effects. In particular, we attempt to examine mood, perceived depletion, and motivation as possible mediators of vicarious restoration effects. However, in line with a direct neural account of vicarious restoration (e.g., Cattaneo & Rizzolatti, 2009; Goldman, 2006), we anticipate that such transient state measures will be relatively unaffected by our experimental manipulations.

Experiment 1

The purpose of Experiment 1 was to examine whether participants could be vicariously restored by taking the perspective of a target who engaged in a restorative activity. To test this hypothesis, we first depleted participants, then asked them to take the perspective of (or read about) a target who did (or did not) restore energy via resting. By including a reading comparison condition, we hoped to isolate the specific effects of perspective-taking that are not due to simple priming mechanisms. After this task, we gave participants a series of problems to solve, some of which (unbeknownst to participants) were unsolvable. The amount of time participants persisted on these unsolvable problems was used as our index of self-control (e.g., Muraven, Tice, & Baumeister, 1998).

Method

Participants

105 Indiana University (IU) students (51 female) participated for partial course credit.

Design

Participants were randomly assigned to one of four conditions using a 2 (task: perspective-taking or reading) × 2 (story: restorative or non-restorative) between-subjects design. Two control conditions (i.e., a depleted and a non-depleted control) were also included for comparison purposes.

Procedure

Participants were first presented with a thought-listing task for 5 min (e.g., Tice et al., 2007). Depleted controls and all experimental conditions were asked to avoid thinking about a white bear during this task, whereas non-depleted controls were allowed to think freely about anything they wished (Wegner, Schneider, Carter, & White, 1987).

Following the thought-listing task, the experimental conditions were then directed to a restorative (or non-restorative) story. The control conditions did not complete this task. At the outset, some participants were informed that the objective of the task was to put themselves in the shoes of the target in an upcoming story and attempt to imagine what it would be like to perform the same actions as the target (perspective-taking condition). The remainder of participants were simply asked to read the story carefully (reading condition).

The story in question described a student (matched to the participant’s gender) who was working at a local office and attempting to finish a work project by the end of the day. Participants in the non-restorative condition read that the student continued working on the project as the day went on. Participants in the restorative condition read that, in the middle of the day, the student decided to take a 30-minute nap and then continued working. Importantly, neither story implied that the target was currently experiencing high levels of mental depletion; the restorative condition simply read that the target napped and worked, whereas the non-restorative condition read that the target worked.

After completing this story, participants were asked several questions regarding their current state, as numerous transient state measures have been shown to predict the emergence of restorative effects (e.g., Clarkson, Hirt, Jia, & Alexander, 2010; Tice et al., 2007). First, participants completed several items regarding their current mood, adapted from the Brief Mood Introspection Survey (BMIS: Mayer & Gaschke, 1988). Specifically, the items asked participants how much
they were feeling particular emotions (e.g., active, happy, sad, content). Responses to these items were combined to form scales of emotional arousal ($\alpha=.75$) and emotional valence ($\alpha=.81$). Second, participants completed four items regarding their current state of perceived mental depletion (adapted from Smets, Garssen, Bonke, & De Haes, 1995; see also Clarkson et al., 2010). These items ($\alpha=.75$) assessed how much participants were feeling particular facets of mental fatigue at the present moment (e.g., tired, unable to concentrate). All mood and mental fatigue indices were obtained on a scale ranging from 1 (not at all) to 9 (very much).

Next, participants were presented with seven 6-letter anagrams (e.g., G M Y H I T — MIGHTY), two of which were impossible to solve (e.g., G W U R A E). Participants were asked to take as much time as they needed to solve each anagram; if they were unable to come up with a solution, they were told to skip to the next anagram.

Our dependent measure was the amount of time (in seconds) participants spent on the unsolvable anagrams before deciding to move on to the next task. All else being equal, participants with higher self-regulatory energy should persist for a longer amount of time on these unsolvable anagrams, reflecting their heightened ability to persist in the face of difficulty (e.g., Muraven et al., 1998).

Following this anagram task, participants were asked several questions about their motivation to work (e.g., “How motivated were you to find all the correct answers for the anagrams?”) and conserve energy (e.g., “How much were you trying to save some of your energy for future tasks?”) on the anagram task, as such motivations have been previously offered as mechanisms by which self-regulatory restoration can be initiated (Muraven, Shimueli, & Burkley, 2006; Muraven & Slessareva, 2003). Upon completion of these items, participants were debriefed and dismissed from the study.

Results

Preliminary analyses

We conducted several planned contrasts against our control conditions to assess the absolute level of restoration for participants who engaged in perspective-taking. Because participants in the read-only condition did not show any evidence of restoration, they were not included in these contrasts. Our first contrast revealed that the overall persistence time of participants who took the restored perspective was not significantly different from that of non-depleted controls, $F<1$. A second contrast showed that the overall persistence time of participants who took the non-restored perspective was not significantly different from that of depleted controls, $F<1$. Critically, a third contrast revealed that non-depleted controls and restorative perspective participants spent significantly more time on unsolvable anagrams than both depleted controls and non-restorative perspective participants, $F(1,66)=4.16$, $p<.05$, $\eta^2=.06$. For participants who were asked to read the story, there was no difference in persistence as a function of whether the target engaged in restorative or non-restorative activities, $t<1$. Conversely, for participants who were asked to take the perspective of the target, persistence was significantly higher when the target engaged in restorative (as opposed to non-restorative) activities, $t(32)=2.87$, $p<.01$, $d=0.87$. Thus, these results imply that taking a restored perspective can positively impact one’s level of mental resources (see Fig. 1).

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Discussion

Overall, participants who took the perspective of a target who rested during the day appeared to reap the benefit that such rest would have on the target, namely, restored self-regulatory ability. Conversely, participants who took the perspective of a target who did not rest showed no evidence of self-control recovery. Previous studies on self-control restoration have focused primarily on specific situational manipulations (e.g., motivation, self-affirmation, glucose) which lead to the recovery of depletion; however, these initial results imply that just putting oneself in a replenished other’s shoes is sufficient for recovery to take place.

![Fig. 1. Persistence on unsolvable anagrams as a function of condition in Experiment 1.](image)

Higher persistence indicates greater self-regulatory effort. Error bars indicate standard error. Control conditions are abbreviated on the right-hand side: NDC = non-depleted control and DC = depleted control.

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1 Results for individual emotion items (e.g., “happy,” “sad”) were similarly non-significant. However, because the subscales of arousal and valence offer the most concise and coherent form of analysis, they are emphasized across all experiments.

2 Because the persistence data for unsolvable anagrams was skewed, we first log-transformed the data to obtain a normal distribution. The pattern of results remains unchanged regardless of whether log-transformed or untransformed data are used.
In addition to evidencing a vicarious restoration effect, our data showed that participants who simply read these same stories without any perspective-taking instructions did not differ as a function of whether the target engaged in restorative or non-restorative activities. This secondary result helps to rule out one potential alternative explanation of these findings: that merely engaging in mental processing about a restorative activity leads to self-regulatory restoration via simple priming mechanisms. Indeed, it appears that only when such restorative behaviors are mentally visualized and enacted by the participant (via perspective-taking) do the beneficial effects of these behaviors begin to be transmitted from the target to the self. These findings are consistent with a neural activation account of vicarious restoration, which would argue that mentally simulating a restorative action is tantamount to perceiving or performing that action oneself (Goldman, 2006). Given the fact that perceiving actions often activates the same neural responses implicated in performing an action (Cattaneo & Rizzolatti, 2009), and that performing various restorative actions can spontaneously restore self-regulatory resources (e.g., Schmeichel & Vohs, 2009; Tice et al., 2007), perspective-taking appears to be a relatively straightforward route by which mental depletions can be offset by the sheer power of imagination.

**Experiment 2**

Although vicarious restoration would be a useful activity to engage in when one is depleted, it is unclear from the results of Experiment 1 whether this process is ubiquitously successful. Thus, we sought to replicate the effects of our first experiment, as well as explore one potential boundary condition under which perspective-taking instructions may not yield any restorative benefit.

If vicarious restoration indeed takes place by spontaneously activating neural responses associated with the experience of restoration (e.g., Cattaneo & Rizzolatti, 2006; Goldman, 2006), it seems likely that a variable which decreases the amount of neural activation associated with perspective-taking will lead to the attenuation of our restorative effect. Recently, Gutsell and Inzlicht (2010) identified one such moderating variable: the group status of the social target. In particular, their research showed that observing the behaviors of an ingroup member elicited neural responses that were parallel to those engaged during the enactment of this behavior, whereas watching the actions of an outgroup member did not. Although this work utilized behavioral observation rather than perspective-taking, the results nonetheless highlight the power of group status to moderate vicarious effects on a neurological level. Such modulation of immediate neurological responses may be one reason why researchers have found group status to be a consistent moderator of vicarious effects (Weisbuch & Ambady, 2008; for a related discussion, see Frantz & Janoff-Bulman, 2000).

With these findings in mind, we hypothesized that taking the perspective of a similar other who engages in a restorative behavior should lead to the vicarious restoration of self-control, but that taking the perspective of a dissimilar other should have no effect on self-regulatory resources. Experiment 1 utilized a social target who was presumably perceived as an ingroup member (i.e., a college student); therefore, Experiment 2 attempted to compare the effects of perspective-taking using this ingroup target and a respective outgroup target. As such, participants were asked to take the perspective of either a college student or a college professor who engaged in a restorative activity.

With minimal experimental evidence comparing the effects of ingroup and outgroup-level perspective-taking (see Weisbuch & Ambady, 2008), we also sought to speculate on one potential mediator that could explain the differential effects of ingroup and outgroup social targets. Because perspective-taking has been shown to facilitate vicarious effects via an increased sense of merged identity between the target and perceiver (Goldstein & Cialdini, 2007; see also Ames et al., 2008), we hypothesized that ingroup targets may promote vicarious effects by instantiating a high level of merged identity. Thus, the present experiment also asked participants to indicate their level of identification with the target in the story. If merged identity is indeed an important predictor of vicarious effects, we would expect that this variable can predict the emergence of restoration over-and-above any group-level target differences.

In addition to examining the moderating influence of group status and the mediating influence of merged identity, Experiment 2 also employed several changes to our original paradigm to provide a more robust test of vicarious restoration. Specifically, we included a different manipulation of ego depletion (i.e., response inhibition), a different restorative behavior in the target’s story (i.e., consuming caffeine), and a different measure of self-control (i.e., handgrip persistence) than Experiment 1.

**Method**

**Participants**

85 IU students (55 female) participated for partial course credit.

**Design**

Participants were randomly assigned to one of four conditions: two control conditions (i.e., a depleted and a non-depleted control), and two experimental conditions. For the experimental conditions, participants were first depleted and then asked to take the perspective of either a student or a professor who engaged in a restorative activity.

**Procedure**

Participants were first asked to complete a baseline handgrip task. Specifically, they squeezed a handgrip for as long as possible while holding a small piece of paper within the grip (Tice et al., 2007). The experimenter timed how long participants were able to hold the grip closed using a stopwatch. Next, participants were directed to the depletion manipulation, which asked them to read through two photocopied textbook pages while crossing out every instance of the letter e. Although both non-depleted and depleted participants completed the same procedure for the first page of text, depleted participants were given more complex instructions on the second page. Specifically, depleted participants were asked to only cross out the letter e on the second page if it was two or more letters removed from another vowel. Conversely, non-depleted participants were again asked to cross out every letter e. Research shows that inhibiting one’s dominant response on the second page requires a greater amount of self-regulatory resources than simply adhering to the same instructions on both pages (e.g., Baumeister et al., 1998; Clarkson et al., 2010; Tice et al., 2007).

Participants then completed a perspective-taking task (control participants did not complete this task). As in Experiment 1, participants were asked to put themselves in the shoes of the target in an upcoming story. This story focused on an ingroup or outgroup social target (student or professor respectively; gender matched to the participant) who was up late at night working on an important research paper. The target needed to continue working to finish the paper before tomorrow’s deadline. To obtain the energy needed to persevere, the target decided to “drink [his or her] favorite caffeinated beverage” near the end of the story. Besides the manipulation of the words “student” or “professor,” the wording of the story was exactly the same across conditions.

Following the perspective-taking task, participants completed a series of mood (valence, $\alpha = .78$; arousal, $\alpha = .82$) and perceived depletion ($\alpha = .81$) measures, identical to those completed in Experiment 1. Upon completion of these transient state measurements, participants were asked to indicate their sense of merged identity with the target in the story.1 Our primary interest was a metric of

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1 We also assessed participants’ overall level of self-other overlap using other scalar measures (e.g., “To what extent do you consider yourself similar to the actor in the story?”), which combined to form a highly reliable 5-item index of identification ($\alpha = .88$). This index showed a similar pattern of results to that obtained using the IOS measure.
interpersonal closeness known as the Inclusion of Other in Self scale (IOS; Aron, Aron, & Smollan, 1992). This scale asks participants to select one of seven increasingly overlapping Venn diagrams, in which one circle corresponds to the self’s identity and the other circle corresponds to the target’s identity. IOS scores were coded such that higher scores corresponded to a higher level of self-other overlap (i.e., 1 = minimal overlap, 7 = maximal overlap). Upon finishing these identification measures, participants completed a second handgrip task, answered questions concerning their motivation to exert effort on the handgrip task (similar to those used in Experiment 1), and were subsequently debriefed and dismissed.

Results

Preliminary analyses

As in Experiment 1, we wanted to first ensure that our experimental manipulations were not unexpectedly influencing other affective or motivational measures. Thus, we examined the mood and motivation of participants in the experimental conditions using a series of simple t-tests. The results revealed that our manipulations had no effects on emotional arousal (t<1.16, p>0.25), emotional valence (t<1.12, p>0.26), perceived depletion (t<1), or motivation to exert effort on the persistence task (all ts<1).

In addition, we again examined the persistence data of our control conditions to ensure that our depletion manipulation worked effectively. To calculate participant’s handgrip persistence, we subtracted their persistence (in seconds) at Time 1 from their persistence at Time 2, and calculated a difference score, with higher scores indicating greater persistence. We then submitted the handgrip scores of our depleted and non-depleted control groups to a t-test. As expected from prior research (e.g., Tice et al., 2007), depleted controls showed a significantly greater drop in persistence from Time 1 to Time 2 than did non-depleted controls, t(39) = 3.84, p<0.001.

Restoration effect

We first calculated relative restoration by comparing the persistence scores of the experimental conditions using an independent-samples t-test. The results showed that participants who took the student’s perspective declined in persistence significantly less than participants who took the professor’s perspective, t(36) = 2.82, p<0.01, d = 0.79.

Next, to calculate absolute restoration, we submitted the difference scores of all conditions (i.e., experimental and control) to a one-way ANOVA, which was also significant, F(3,84) = 7.07, p<0.001, η² = .18. Planned contrasts showed the expected pattern of results between specific conditions. The persistence scores of participants who took the student’s perspective were not significantly different from those of non-depleted controls, F<1. In addition, the persistence scores of participants who took the professor’s perspective were not significantly different from those of depleted controls, F=1. Finally, we found that participants who took the student’s perspective and non-depleted controls had significantly lower difference scores than participants who took the professor’s perspective and depleted controls, F(1,84) = 20.60, p<0.001, ²η = .18 (see Fig. 2).

Effect of merged identity

Because we hypothesized that the restorative impact of the student’s perspective would be driven primarily by an increased sense of merged identity associated with this perspective, we sought to determine the motivational impact of merged identity (i.e., participants’ IOS scores) on the restorative effect outlined above. Thus, we conducted a series of regression analyses following the recommendation of Baron and Kenny (1986). As can be seen in Fig. 3, the perspective-taking manipulation significantly predicted both one’s IOS score, β = −.49, t(42) = −3.62, p = .001, and handgrip persistence, β = −.40, t(42) = 2.82, p<0.01. Additionally, one’s IOS score significantly predicted handgrip persistence, β = −.44, t(42) = −3.25, p<0.01, such that higher self-other overlap predicted smaller declines in persistence. Importantly, when the perspective-taking manipulation and IOS score were simultaneously entered in a regression predicting handgrip persistence, the IOS score continued to predict persistence, β = −.33, t(41) = −2.14, p<0.05, whereas the perspective-taking manipulation did not, β = .24, t(41) = 1.52, p = .14. To test the significance of this mediating pathway, we computed a 95% confidence interval (CI) around the indirect effect using bootstrapping methods (Shrout & Bolger, 2002). Consistent with the regression analyses, the indirect pathway from perspective-taking to handgrip persistence through IOS did not include zero (CI: .61 to 22.73).

To further explore the effects of merged identity, we separately analyzed the effects of IOS scores for each of our experimental conditions. Although IOS scores did not predict the persistence of participants who took a student’s perspective (β = .24, t<1, ns), these scores did predict the persistence of participants who imagined a professor’s perspective (β = −.44, t(20) = 2.11, p = .05). Thus, while out-group targets tended to promote minimal amounts of restoration, the amount of restoration elicited by such targets was nonetheless contingent upon the perceived similarity of these targets to the self. In fact, participants who reported relatively high levels of self-other overlap in the professor condition (i.e., IOS scores over 3) showed levels of persistence on the handgrip task (M = −5.67) that rivaled those of the student condition (M = −5.70).

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*In both Experiment 2 and Experiment 3, persistence scores at Time 1 were not significantly different across experimental conditions (t(42) = 1.34, p = .19 in Experiment 2, and t(25) = 1.84, p = .08 in Experiment 3). Thus, the use of difference score data is justified. Other methods of analyzing the handgrip persistence data (e.g., using only Time 2 persistence, using Time 2 with Time 1 included as a covariate) do not change the overall pattern of findings.*
Discussion

Overall then, taking the perspective of a similar other who performed a restorative act (i.e., a fellow college student) yielded both relative and absolute levels of self-control restoration, whereas taking the perspective of a dissimilar other who performed an identical act (i.e., a professor) led to no discernible improvement in self-regulatory ability. These findings expand upon the vicarious restoration effect from Experiment 1 while utilizing a different manipulation of depletion and a different measure of self-regulation. Specifically, such findings show that the act of taking a restored individual’s perspective is insufficient in promoting a spontaneous increase in one’s self-regulatory ability. One also needs to be relatively similar to the target to experience vicarious effects (Goldstein & Cialdini, 2007). These findings compliment recent work on the importance of group membership in moderating various types of vicarious effects (e.g., Gutsell & Inzlicht, 2010; Weisbuch & Ambady, 2008).

In addition to outlining the general importance of group status, the findings of the present work also highlight one particular mediating mechanism that links these group-level differences to vicarious restoration. In particular, the mediational analysis of Experiment 2 showed that participants who were similar to the actor felt a stronger sense of self-other overlap, which led to a more effectual perspective-taking experience. Although this finding may be interpreted as an inevitable result of our manipulations (i.e., a similar target should invariably lead to higher self-other overlap), we point out that this measure of self-other overlap continued to predict the emergence of vicarious restoration even when our experimental manipulation was controlled for. In other words, regardless of condition, participants who felt a stronger sense of merged identity to the target (student or professor) showed greater evidence of vicarious restoration. We believe that this finding nicely illustrates the power of self-other overlap in vicarious effects (e.g., Goldstein & Cialdini, 2007). Specifically, as long as people perceive themselves as similar to a target, then taking that target’s perspective should lead to a relatively powerful perspective-taking experience, ultimately resulting in vicarious effects (Cattaneo & Rizzolatti, 2009; Goldman, 2006).

Experiment 3

Taken together, the findings of Experiment 2 suggest that taking a similar (dissimilar) other’s perspective facilitates (inhibits) the emergence of vicarious restoration because of a high (low) level of self-other overlap. However, some questions still remain before we can confidently conclude that similarity was the only variable driving this vicarious restoration effect. In particular, the group distinctions utilized in Experiment 2 (i.e., professor vs. student) differ not only in target-participant similarity, but also in other important respects. For instance, one can assume that a college professor is quite a bit older than a college student, and research on stereotypes of the elderly suggests that older individuals are perceived as relatively slower, less energetic, and less competent than their younger counterparts (e.g., Bargh, Chen, & Burrows, 1996; Cuddy, Norton, & Fiske, 2005).

Thus, regardless of whether a college student engages in restorative activities or not, it may be the case that taking a student’s perspective yields more restoration than taking a [less energetic] professor’s perspective. If a professor’s perspective simply primes lower effort/energy relative to a student’s perspective, one would expect that taking a professor’s perspective is relatively depleting regardless of whatever actions the professor is engaging in. Thus, in Experiment 3, we asked participants to take the perspective of a depleted professor or a depleted student. According to a target-based explanation, participants should simply adopt the stereotypical states of the target in the story, such that those taking the perspective of a depleted professor should be more depleted than those taking a student’s perspective. However, we argue that this is not the case. Rather, we predict that for college students, taking the perspective of a depleted college professor is not depleting at all. Because college student participants are relatively unlikely to experience a state of merged identity with a college professor (see Experiment 2), they will be less able to adopt the professor’s perspective, leading to a relative lack of vicarious depletion.

Method

Participants

27 IU students (16 female) participated for partial course credit. Participants were randomly assigned to one of two vicarious depletion conditions (i.e., student’s perspective or professor’s perspective).

Procedure

After completing a baseline handgrip measure (see Experiment 2), participants were asked to take the perspective of a professor or student (matched to the participant’s gender) who had worked on an important paper for a few hours late at night. Neither the professor nor the student rested; they simply continued to persist at writing throughout the night in the face of noticeable mental fatigue. Upon completion of the perspective-taking task, participants were given mood (valence, $\alpha = .84$; arousal, $\alpha = .86$) and perceived depletion ($\alpha = .85$) assessments, identical to those utilized in Experiment 1. Afterwards, participants completed a second handgrip measurement, the same motivation items as in Experiment 2, and were finally debriefed and dismissed from the study.

Results/discussion

Preliminary analyses

Again, we attempted to test the effects of our experimental conditions on mood, perceived depletion, and motivation. Consistent with our prior experiments, there was no difference in mood arousal ($t < 1$), mood valence ($t < 1$), perceived depletion ($t < 1$) or motivation to exert effort on the persistence task (all $t < 1$) as a function of our manipulation.

Main analyses

To calculate handgrip persistence, we again computed a difference score for each subject from the beginning to the end of the experiment (Time 1–Time 2). To calculate relative depletion, we submitted these difference scores to an independent samples $t$-test. As expected, participants who mentally simulated the actions of a depleted student ($M = 38.62, SD = 46.58$) exhibited a greater drop in persistence than participants who simulated the actions of a depleted professor ($M = –5.64, SD = 24.31$), $t(25) = 3.13, p < .01, d = 1.04$.

The results of Experiment 3 parallel those of Experiment 2 using a vicarious depletion (rather than vicarious restoration) paradigm. Not only do such findings extend the work of vicarious dejection to an ingroup/outgroup distinction (Ackerman et al., 2009), they also refute a potential alternative explanation of Experiment 2 in which a professor’s perspective is simply seen as less energetic (or less positive) than a student’s perspective. In contrast to such reasoning, our data definitively show that taking a professor’s perspective is somewhat ineffectual when the perceiver is a college student; a perceiver who tends to have little self-other overlap with college professors (see Experiment 2). Thus, across Experiments 2 and 3, students who were asked to take the perspective of a professor tended to show no evidence of vicarious effects (depletion or restoration).

General discussion

Self-control is a crucial process that allows one to withhold prepotent responses in favor of more productive long-term goals (for a
review, see Schmeichel & Baumeister, 2004). Exhibiting high self-control in various situations thus has important functional value. Interestingly, the present study suggests that one way of recovering these important mental resources is via vicarious restoration. By mentally engaging in the restorative actions of another person, one can experience the energy-enhancing benefits of restoration without needing to engage in any overt behavior.

Experiment 1 illustrated our general vicarious restoration effect, such that taking the perspective of a person who engaged in a restorative behavior yielded restorative benefits on a later self-control task. Irrespective of mood, perceived depletion, and motivation, participants who were initially depleted of their mental resources exhibited a renewed level of self-control after taking the perspective of a person who rested. Conversely, participants who were first depleted but then took the perspective of an individual who did not rest showed no evidence of recovery. Perspective-taking thus appears to be one of many potential routes to self-control restoration.

In addition to replicating the vicarious restoration effect of Experiment 1, Experiment 2 was able to illustrate one important contextual factor that moderates this vicarious restoration effect: the group status of the target. It is our contention that vicarious restoration is not a mechanistic process that emerges as the result of taking any restored person's perspective, nor is it a process emerging from the simple priming of restorative ideas; rather, it appears that these restorative effects are limited to situations in which a person imagines the behaviors of a target who is deemed similar to the self. Indeed, targets that were perceived as dissimilar to the self promoted a minimal priming of restorative ideas; rather, it appears that whatever state the outgroup member is experiencing is not easily transferred to the social perceiver. Only when the target is sufficiently similar to the self does a target's state of mental depletion transmit onto the perceiver, regardless of whether this state is one of mental depletion (Experiment 2) or mental exhaustion (Experiment 3).

Taken together then, the present findings imply that people can spontaneously restore their self-regulatory resource simply by imagining the enactment of a restorative behavior. Although such findings may be perceived as simply another instantiation of vicarious effects that are already replete within social psychology (e.g., Ackerman et al., 2009; Chartrand & Bargh, 1999; Neumann & Strack, 2000), we argue that these restorative effects present a uniquely powerful test of vicarious processes. For one, vicarious restoration may represent the strongest test of vicarious effects within the self-regulatory domain. In the absence of motivational incentives, it is theoretically more difficult to demonstrate people expending resources that they have already depleted (i.e., vicarious restoration) than to show people withholding resources that they may or may not be conserving (e.g., Muraven et al., 2006) for later tasks (i.e., vicarious depletion). Secondly, much past evidence of vicarious effects relies upon relative comparisons between two groups, without any absolute level of comparison to determine the overall strength of a vicarious effect. For instance, vicarious depletion is evidenced by comparing the persistence of groups that take a depleted or a neutral perspective (Ackerman et al., 2009). With these types of comparison conditions, it is difficult to determine the overall extent of vicarious effects, such as whether they are similar in strength to other non-vicarious manipulations. In contrast, to assess the process of vicarious restoration, it is necessary to acquire both relative (i.e., a neutral perspective-taking condition) and absolute (i.e., a non-depleted control group) levels of comparison. Thus, even if vicarious restoration effects increase the self-regulatory abilities of one perspective-taking group relative to another, in order for true restoration to take place, the “restored” group must return to baseline and exert as much self-control as a non-depleted comparison group. Because the present study was able to obtain evidence for both relative and absolute restoration, we believe that our findings exemplify the true power of vicarious processes to not just change one’s neutral state, but to actually overturn a negative state.

Process of vicarious restoration

With converging evidence for the overall phenomena of vicarious restoration, the critical question emerges as to how this process takes place. Across both studies, we found no evidence that perspective-taking influences self-control via emotional, perceptual, or motivational mechanisms, all of which have been previously shown to predict self-regulatory effort in other experimental paradigms (e.g., Clarkson et al., 2010; Muraven & Slessareva, 2003; Tice et al., 2007). Although these null findings do not rule out the possible influence of these well-established mediating mechanisms, they nonetheless offer tentative support for a relatively direct process of vicarious restoration. Specifically, in line with prior research on perspective-taking (Goldman, 2006) and vicarious experiences (e.g., Ackerman et al., 2009; Chartrand & Bargh, 1999; Goldstein & Cialdini, 2007), we argue that the simple act of imagining a close other engaging in restorative processes is sufficient to activate relevant restorative processes within the perceiver.

Support for this argument derives from examining the differences between conditions that did and did not produce vicarious restoration in the present experiments. In Experiment 1, taking the perspective of a restored actor was sufficient in producing vicarious restoration, whereas reading about this actor was not. We believe that the null effect of reading is due to the inherent difference in mental processes associated with reading instructions compared to perspective-taking instructions. Prior work on self-regulation has shown that reading about a particular individual's actions tends to elicit goal contagion effects, in which a perceiver vicariously adopts the overall goal(s) of the target (Aarts, Gollwitzer, & Hassin, 2004; see also Ackerman et al., 2009). Thus, reading about a target's behavior appears to elicit a qualitatively different type of mental process in comparison to perspective-taking. Whereas perspective-taking is concerned with experiencing the concrete perceptions and behaviors of the target, reading is concerned with understanding the abstract content of the passage and building a contextual representation of the target's situation. Not surprisingly then, these two types of processes have drastically different effects on the overall affective outcome for the perceiver. Whereas perspective-taking encourages affective convergence and neural mimicry (Goldman, 2006), reading encourages the adoption of higher-level goals and comprehension (Aarts et al., 2004).5

In the second experiment, we found that imagining the restorative actions of an ingroup member was sufficient in promoting vicarious restoration, whereas taking an outgroup member's perspective was not. Unlike in Experiment 1, the null effect of an outgroup member's perspective was not due to a qualitative difference in processing style (i.e., both conditions followed perspective-taking instructions), but rather to a quantitative difference in the salience of the ingroup and outgroup perspectives. Because outgroup members tend to promote a lower level of neural activation in brain areas relevant for behavioral engagement (e.g., Gutsell & Inzlicht, 2010), imagining an outgroup

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5 It is interesting to note that no evidence for goal contagion effects was found in the reading conditions from Experiment 1, whereas other studies on vicarious effects have found evidence for such effects in their own reading conditions (see Ackerman et al., 2009, Experiment 2). However, part of the reason for this null effect may be due to the fact that the goals of the restored and non-restored target were relatively identical. That is, both targets were attempting to finish a work project by the end of the day, and the story implied that both continued to have that goal at the end of the story. Thus, both of these conditions can be seen as having a relative goal of working, which may also explain why both of these conditions fell somewhere in-between a state of pure depletion and a state of restoration on the final dependent measure (see Fig. 1).
member's perspective should not implicate the same level of spontaneous neural mimicry (Cattaneo & Rizzolatti, 2009; Goldman, 2006) as an ingroup member's perspective. In support of this reasoning, the vicarious restoration effects associated with the student's perspective were mediated by the self-reported sense of merged identity between the perceiver and the target (for related findings, see Goldstein & Cialdini, 2007; Weisbuch & Ambady, 2008). Thus, whenever someone considers a social target as similar to the self, the effects of perspective-taking seem to be relatively spontaneous and relatively powerful.

The relation between vicarious restoration and other mediating variables

Even though the present research obtained evidence for vicarious restoration in the absence of changes in mood, perceived depletion, and motivation, we believe it is worth speculating on the conditions under which such mediating variables are related to vicarious effects. For one, it is important to note that the present work employed a conventional “multiple experiment” cover story in order to test the effects of perspective-taking while minimizing people’s expectations about the interrelatedness of our various tasks. However, given the fact that expectations can often modulate depletion effects in substantial ways (Job, Dweck, & Walton, 2010), it may be the case that engaging in vicarious restoration in an overtly purposeful manner promotes restoration via these aforementioned transient states. In other words, if people engage in perspective-taking because they expect it to have restorative effects, their heightened awareness and expectations may lead to more attention being devoted to subtle changes in mood, perceived depletion, or motivation that could indirectly underlie vicarious restoration.

Another instance in which these transient states (e.g., mood, motivation, perceived depletion) would be critical in the vicarious restoration process is when one experiences a sense of perceptual ease associated with effortlessly imagining another person's perspective. For instance, if it is relatively easy to imagine a target's behaviors or feelings (particularly an ingroup target), this sense of perceptual fluidity (e.g., Gordon & Holyoak, 1983) may promote a more positive mood (Winkielman & Cacioppo, 2001), or even the attribution that one is mentally refreshed (Clarkson et al., 2010). Given the ability of positive mood and perceived depletion to modulate ego depletion effects in past work (Clarkson et al., 2010; Tice et al., 2007), such effects of perceptual ease may be shown to mediate the influence of vicarious restoration in certain instances. For example, individuals who are relatively high in need for cognition (Cacioppo & Petty, 1982) may be more likely to have the effects of vicarious restoration moderated by introspective self-reports and perceptual ease, especially when they are motivated to track changes in their current state of mental depletion (e.g., in an lengthy testing session).

Future directions

Although vicarious restoration may be able to minimize the effects of depletion in the short-term, it would be useful for subsequent investigations to examine whether these temporary gains in self-control are offset by greater depletion effects later on. Much work suggests that people are able to actively “turn off” and “turn on” their self-regulatory performance, given the proper motivational circumstances (e.g., Muraven & Tice, 2006). Thus, vicarious restoration may have led to an artificial state of heightened self-regulation in the short-term while potentially hindering later self-control performance. Conversely, it is possible that vicarious restoration may have led to the veridical experience of restoration on a neural (e.g., Gutsell & Inzlicht, 2010), embodied (e.g., Chartrand & Bargh, 1999), or emotional level (e.g., Neumann & Strack, 2000). Given the wealth of empirical evidence for vicarious effects, people’s general ability to effectively simulate past and future events (e.g., Goldman, 2006; Szpunar & McDermott, 2008), and the fact that priming restorative behaviors did not lead to the emergence of restorative effects (see Experiment 1), we argue that vicarious restoration may well be a veridical form of mental restoration that extends well past the immediate situation.

Nonetheless, we look to future research to assess the temporal effects of this and other restorative manipulations in order to develop a more dynamic understanding of self-control restoration. Given the fact that most research on restorative effects are limited to one-time assessments of self-regulatory improvement (e.g., Gailliot et al., 2007; Schmeichel & Vohs, 2009; Tice et al., 2007, but see DeWall, Baumeister, Mead, & Vohs, 2011), it is difficult to speculate on whether any restorative effects are more or less effectual than others in affording long-lasting self-regulatory improvements. For instance, a highly salient perspective-taking episode may be useful for quickly mobilizing some level of self-regulatory energy in the short-term, whereas an ambiguous glueladen beverage may offer a less pronounced, less immediate, but longer-lasting restorative experience (Gailliot et al., 2007).

By understanding how the present vicarious effects are similar to and/or different from other restorative manipulations, researchers may be able to expand the theoretical and applied understanding of mental restoration in a way that promotes productive future investigations. With numerous manipulations already established as restorative in nature, it seems critical for future research to begin assessing not only if a given variable leads to self-regulatory changes, but also how this variable is having its effect on self-control. Indeed, there may be many manipulations that have their restorative effects without many noticeable changes in other relevant constructs (i.e., mood, motivation, etc.). Conversely, as recent research has shown (e.g., Schmeichel & Vohs, 2009), there are also certain restorative manipulations that appear to affect self-regulation indirectly via well-established cognitive mechanisms (e.g., construal level — Fujita, Trope, Liberman, & Levin-Sagi, 2006; working memory — Clarkson, Hirt, Chapman, & Jia, 2011). By bringing these disparate restorative manipulations together and parsing apart their independent contributions, future research may be able to more closely pin down the exact nature of self-regulatory recovery, as well as self-regulatory depletion.

Conclusion

Irrespective of its temporary or long-term nature, the notion that we can spontaneously obtain mental resources by imagining the act of restoration has clear practical relevance to numerous domains. For example, in sports settings, where mental and physical fatigue are relatively commonplace, mental simulation may be one way to overcome the deleterious effects of fatigue during important game-time situations. Additionally, in academic settings, students who face myriad sources of mental fatigue (e.g., back-to-back classes, lengthy tests, finals week) may also be able to benefit from vicarious restoration effects that promote increased persistence and productivity. Finally, in organizational settings, which require lengthy work shifts or extensive amounts of directed attention (e.g., air-traffic controllers, medical professionals), perspective-taking may offer an efficient method to boost the performance of depleted employees who are on the verge of making critical errors. In any case, by furthering our understanding of mental simulation and the potential effects of vicarious restoration, the findings of the present study represent a promising new avenue of self-regulatory recovery.

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