

WHEN CAN IMAGINING THE *SELF* INCREASE WILLINGNESS TO HELP *OTHERS*? INVESTIGATING WHETHER THE SELF-REFERENTIAL NATURE OF EPISODIC SIMULATION FOSTERS PROSOCIALITY

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Episodic simulation, the ability to imagine the self in a specific time and place, can be used to imagine future prosocial events. Recent work on episodic simulation indicates that imagining scenes of helping a person in need increases one's own intent to help. This work, however, leaves open the question of underlying mechanisms. While research on imagination points to the sensory quality of the imagined event as critical to the effect, research on moral cognition suggests that self-referential processing—imagining oneself versus another person—may be a key feature. Across three experiments, we investigated the role of self-referential processing and sensory quality on enhancing prosocial intentions via episodic simulation. The findings suggest that we are willing to help others, in part, because we can vividly imagine ourselves—or someone else—doing so.

Keywords: episodic simulation, memory, self-reference, prosociality, social decision making, helping

Humans possess the capacity for imagining the future via episodic simulation, the ability to imagine the self in a specific time and place. Drawing on a suite of cognitive processes (e.g., self-reference, scene construction, memory), episodic simulation allows us to imagine what the future could hold (Buckner & Carroll, 2007; Schacter et al., 2012). Theorists have focused on how future thinking may be used to guide planning and prediction of personal events (Atance & O'Neil, 2001; Gilbert & Wilson, 2007; see Schacter, 2012 for comprehensive review). Recent

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work on future thinking suggests that episodic simulation may also contribute to prosocial decision making (Gaesser, 2013; Gaesser & Schacter, 2014). Specifically, this work found that imagining oneself helping a person in a specific time and place increased one's intent to help that person compared to visualizing comments about how a person could be helped. Here we investigated whether a meaningful component of the prosocial effect of episodic simulation may be imagining *oneself* as the agent helping—as opposed to *someone else*—(self-reference hypothesis) or whether the prosocial effect of episodic simulation is primarily supported by the sensory quality of an imagined event specific in time and place (sensory hypothesis).

Self-referential processing is an important aspect of human thought. Broadly, self-referential processing enhances attention to and memory for information and is thought to play a role in motivating and attaining future goals (Bartels & Rips, 2010; D'Argembeau et al., 2010). Self-referential processing is particularly influential in shaping and motivating moral cognition (e.g., Janoff-Bulman, Sheikh, & Baldacci, 2008). Recent work suggests that people are motivated to act in line with their moral self-concept (i.e., whether people view themselves as individuals who engage in good or bad behavior; Mazar, Amir, & Ariely, 2008; Young, Chakroff, & Tom, 2012; see also Strohminger & Nichols, 2014). Indeed, one study found that when people recalled their own past good behaviors they made more generous donations to a charitable organization (Young et al., 2012). Abstractly reflecting on one's past good behavior leads people to perceiving their moral identity (i.e., self-concept) as “do-gooders,” which in turn motivates them to do more good (Conway & Peetz, 2012; Cornelissen, Bashshur, Rode, & Le Menestrel, 2013; Gneezy, Imas, Brown, Nelson, & Norton, 2012). Related work provides evidence that this moral identity effect emerges even when people reflect on the behaviors of others (i.e., a socially derived moral self-concept). Vicarious self-perception theory (Goldstein & Cialdini, 2007) suggests that people's sense of self includes similar or close others (Aron, Aron, Tudor, & Nelson, 1991). Thus, when people observe similar or close others engage in moral behavior they are more motivated to behave morally themselves (Gino & Galinsky, 2012; Goldstein, Cialdini, & Griskevicius, 2008).

While research on self-referential processing points to a possible role of self-reference in supporting the effect of episodic simulation on prosocial intentions, previous work on episodic simulation emphasized the role of sensory vividness in supporting this effect. In particular, the sensory quality of the imagined event (i.e., the coherence and detail of scene imagery) predicted the strength of participants' prosocial intentions: the more vividly participants imagined the scene in which they were extending a helping hand the more willing they were to extend it (Gaesser & Schacter, 2014). Imagining a helping event increases the scene imagery of that event, which in turn heightens the subjective plausibility that one will help in that situation. Indeed, previous work has found a reliable link between the sensory vividness of imagining the self in a future event and the subjective likelihood that the event will occur (D'Argembeau & Van der Linden, 2012; Husnu & Crisp, 2010; Szpunar & Schacter, 2013; Weiler, Suchan, & Daum, 2010; see related work on imagination inflation, Garry & Polaschek, 2000; Hyman & Pentland, 1996; Libby,

2003; Mazzoni & Memon, 2003). However, these studies did not tease apart the role of sensory vividness from the role of self-reference, as the conditions in these experiments always involved imagining the self as the agent in the event.

At first blush, previous findings on episodic simulation and prosocial intentions may be viewed as also supporting the self-reference hypothesis, given that these findings reveal that imagining the *self* helping a person in need increases intentions to help that person compared to visualizing comments about how a person could be helped (Gaesser & Schacter, 2014). However, the comments condition did not explicitly specify whether the helping comments should be generated by the self or someone else, and thus, on its own, provides a poor test of the role of self-reference. Moreover, these conditions were not matched for generating an event that is specific in time and place (i.e., an episodic experience). Therefore, it is entirely possible that sensory quality of the imagined helping scene specific in time and place accounts for the effect of episodic simulation on prosocial intentions. In other words, an alternative hypothesis to the self-reference account is that the prosocial effect of episodic simulation is supported by the sensory quality of the imagined scene regardless of who we imagine as the agent helping.

In three experiments, we investigated the impact of imagining the *self* as the agent helping others on prosocial intentions. Given the role of self-referential processing in moral cognition, one hypothesis (i.e., self-reference hypothesis) is that increasing the degree of self-reference in imagined events would increase the prosocial effect of episodic simulation. In Experiment 1, participants were instructed to imagine events featuring either the self or someone else as the agent helping a person in need. In Experiment 2, participants were instructed to imagine events featuring either a similar or dissimilar other as the agent helping a person in need. In Experiment 3, participants were instructed to imagine events featuring either the self or someone else as the agent helping or not helping a person in need. If self-reference plays a role in supporting the effect of episodic simulation on prosocial intentions, then willingness to help should be greater in the experimental conditions that involve greater self-referential processing (i.e., imagined oneself or similar other) compared to control conditions (i.e., imagined someone else or dissimilar other). If sensory quality of the imagined scene is supporting the effect of episodic simulation on prosocial intentions, then scene imagery should predict willingness to help independent of the identity of the imagined helper. That is, scene imagery should predict willingness to help for both self-related imagined events and other-related imagined events. In what follows, we provide new insight into whether self-referential processing and sensory quality contribute to the prosocial effect of episodic simulation.

EXPERIMENT 1

As an initial test of the self-reference hypothesis, Experiment 1 examined whether imagining *oneself* helping increased prosocial intentions compared to imagining *someone else* helping. Participants read stories depicting people in need (e.g., a pas-

senger being harassed on the subway). After reading each story, participants either imagined themselves helping the person in need in the future, or imagined someone else helping the person in need in the future. Once all trials were completed, stories were re-presented, and participants completed a survey assessing aspects of the phenomenology of imagined events and their intentions to help the people in need.

METHOD

Participants. We set our target sample size at 50 participants to allow for a reasonable level of

statistical power (Funder et al., 2014). A power analysis of the large effect size ($d = 1.32$) corresponding to the central contrast of interest in relevant prior work (i.e., the difference in willingness to help for episodic vs. control conditions, $n = 15$; Gaesser & Schacter, 2014) indicates that running 50 participants conservatively allows for detection of behavioral differences across conditions (power > .80).

We recruited subjects online through Amazon Mechanical Turk (MTurk) as an efficient and cost-effective means of collecting behavioral data. A large body of evidence has corroborated that data collected in online labor markets such as MTurk produces robust and reliable results (e.g., Goodman, Cryder, & Cheema, 2013; Horton, Rand, & Zeckhauser, 2011). While the flexibility of conducting studies online is a strength, online experimentation also requires prudence. Researchers have less control over online participants' attention, and researchers are not in a position to directly communicate to participants to verify that participants understand task instructions during practice trials. Thus, online participants may fail to pay adequate attention to the task or misunderstand task instructions, especially when tasks require close attention (Goodman et al., 2013, Study 2; Horton et al., 2011, Study 1; Rand, Greene, & Nowak, 2012, Study 6). Fortunately, however, the use of comprehension measures that require close attention has been shown to produce more reliable data and attenuate statistical noise (Goodman et al., 2013; Horton et al., 2011). Taking this rigorous approach and setting our target sample size at 50 participants, we ran the experiment until we had collected 50 participants who provided complete data sets that were then used for analysis. Critically, to ensure participants were paying attention and understood task instructions in the current study, we applied the same criteria as were previously used in related behavioral work on episodic processes and prosocial intentions (Gaesser & Schacter, 2014).

We recruited 105 participants through MTurk to participate in a study described as an investigation of how people respond to stories from the media. All participants agreed to participate using an informed consent document approved by the Boston College Internal Review Board. Participants were native English speakers (from the U.S. and Canada) and compensated \$4 for their time—this included participants whose data were not considered for analysis. Fifty-five participants (52%) who provided only partial data or responses that did not comply with task instructions (i.e., did not specify whether they imagined themselves or someone else helping, did not provide descriptions of imagined helping events, or answered

with the same response for every question), or who identified the study as an investigation concerned with willingness to help (and who might have provided responses reflecting demand characteristics) were not considered for data analysis. This exclusion rate is consistent with previous online research using comprehension measures and tasks requiring close attention (52.2% exclusion rate, Horton et al., 2011, Study 1; 44.8% exclusion rate, Goodman et al., 2013, Study 2; 47.8% exclusion rate, Rand, Greene, & Nowak, 2012, Study 6). In the current work, 50 participants provided a complete data set that was then used for analysis.

Procedure. Participants were presented with six short scenarios depicting everyday events of a person in need of help adapted from news and social media (e.g., “This person is locked out of their house”) using Qualtrics software. Scenarios were a subset of those used in previous work (Gaesser & Schacter, 2014; see Rameson, Morelli, & Lieberman, 2012 for related materials). Verbal instructions were provided as well as a visual example of what an imagined helping event might look like in the mind’s eye in order to increase participants’ comprehension. Prior to the experimental trials, participants completed two practice trials (one for each condition) in order to familiarize them with the general design. The scenarios were shown one at a time in plain text for 8 seconds to motivate close attention. Stories were then removed from the screen, and participants were prompted either to imagine themselves helping the person (Self condition) or to imagine someone else helping the person (Other condition) in a within-subjects design.

In both the Self and Other conditions, participants were given 45 seconds to imagine plausible helping events. They were then given an additional 4 seconds to clear their minds before the next scenario. Participants were instructed to closely follow the instructions and told they would be asked a series of questions about what they imagined at the conclusion of the experimental trials.

At the completion of all trials, stories were re-presented, and participants filled out a self-paced survey assessing aspects of the phenomenology of imagined events and their intentions to help the people in need. *Intentions to help* (how likely would you be to help in this situation?: 1 not at all, to 7 very willing) were reported for each scenario. To assess the sensory vividness of the imagined events and the related sensation of mentally visiting the event as though it were currently occurring (Gaesser & Schacter, 2014), participants were asked to rate their imagined events for *scene coherence* (the imagined scene in your mind was?: 1 vague, to 7 clear and coherent) and *scene detail* (the imagined scene in your mind was?: 1 simple, to 7 detailed). We also included measures of *pre-living* (the sensation of mentally visiting the event as though it were currently occurring, thought to arise in part from the sensory qualities of imagined events; Rubin, 2014; D’Argembeau & Van der Linden, 2012) and *theory of mind* (akin to mentalizing and perspective taking; see Supplemental Results in Appendix).

Following a conventional approach, within each condition (Self or Other), ratings were averaged across trials such that an average rating for each participant was entered into participant level analyses (e.g., paired-sample *t*-tests, and correlational analyses). Beyond these conventional analyses, we also used linear mixed-effects (i.e., multi-level) model regression analyses to assess possible effects at the

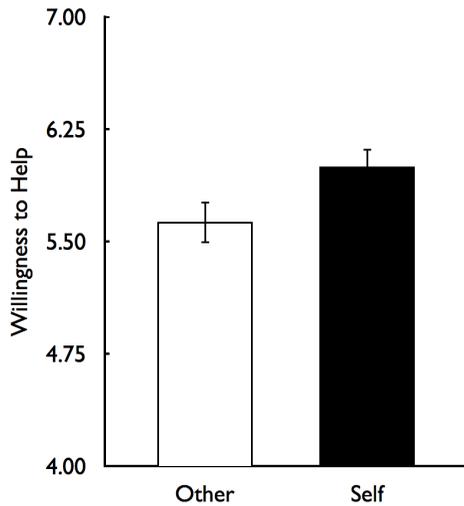


FIGURE 1. Willingness to help (1 = not at all willing; 7 = very willing) across conditions in Experiment 1, displayed here from 4 to 7 to graphically emphasize statistical similarities and differences across conditions. Error bars represent \pm standard error of the mean.

trial level. Such analyses account for effects nested within participant and allow us to explore effects on a trial-by-trial basis.

In addition to delivering ratings for the phenomenology of imagined events and their intentions to help the people in need, participants typed out a description of their imagined events. Previous research and pilot testing indicated that participants can reliably recall events of a similar nature generated during the experiment (e.g., Addis, Wong, & Schacter, 2007). Descriptions of events were used to ensure task compliance (e.g., specifying whether they imagined themselves or someone else helping). To address possible order effects of scenario and condition, we ran three versions of the study with the order of the scenarios and conditions varied across versions.

RESULTS

To test the hypothesis that imagining the self as the helpful agent contributes to facilitating prosocial intentions, we first conducted a paired-samples *t*-test (Self vs. Other). We found evidence supporting this hypothesis: participants were more willing to help after imagining themselves helping a person in need (Self: $M = 6.00$, $SE = .12$) compared to imagining someone else helping a person in need (Other: $M = 5.63$, $SE = .14$), $t(49) = 2.73$, $p = .009$, $\eta_p^2 = .132$; Figure 1. Linear mixed-model regression analysis did not find a significant effect of condition (Self vs. Other) at the trial level ($B = .19$), $t(297) = 1.34$, $p = .183$, suggesting that the effect of condition was driven by participant level responses.

Consistent with prior work (Gaesser & Schacter, 2014), we also observed that the more vividly participants imagined themselves helping (Self) the more willing they were to help. That is, the sensory quality of scene imagery predicted willingness to help in the Self condition: coherence, $r(48) = .32$, $p = .025$; detail, $r(48) =$

.32, $p = .024$. Interestingly, this effect was also found when imagining someone else helping, as in the Other condition: coherence, $r(48) = .57, p < .001$; detail, $r(48) = .29, p = .040$, providing initial evidence that the sensory quality of an imagined event might contribute to intentions to help a person in need independent of self-reference. Reliability analyses showed that measures of scene imagery (i.e., scene coherence, scene detail) were highly related (Cronbach's Alpha, Self = .906; Other = .845). However, partial correlation analyses revealed only a significant relationship between scene coherence and willingness to help controlling for the other measure of the imagined scene, $pr(58) = .40, p < .001$, suggesting that the coherence of scene imagery in particular might be driving willingness to help.

While these correlational analyses suggest that the sensory quality of the imagined scene contributes to intentions to help across self-reference conditions, it is also possible that self-reference may heighten the sensory quality of an imagined scene, which in turn contributes to the effect of self-reference on willingness to help. Thus, we directly examined whether manipulating self-reference (Self vs. Other) altered the quality of scene imagery. We found that scene coherence differed across conditions (Self: $M = 5.57, SE = .14$; Other: $M = 5.13, SE = .15$), $t(49) = 3.05, p = .004, \eta_p^2 = .16$, though scene detail did not (Self: $M = 5.25, SE = .16$; Other: $M = 5.12, SE = .16$), $t(49) = .746, p = .459, \eta_p^2 = .01$. To examine the potential role of scene coherence in the effect of condition on willingness to help, we conducted a mediation analysis with scene coherence as the mediator. This analysis was run for only scene coherence and not detail, since a significant relationship between the independent and mediating variables is a prerequisite for this analysis (Lee & Preacher, 2013). The effect of the self-reference condition (Self = 0, Other = 1) on willingness to help was partially mediated by scene coherence (Sobel $z = 2.01, p = .048$). The direct path coefficient from self-reference condition to willingness to help decreased in the model after including scene coherence as a mediator (i.e., from $B = .38, p = .040$, to $B = .20, p = .235$). These results suggest that the self-reference of the imagined helpful agent directly impacts willingness to help and may also alter the coherence of the imagined scene, which in turn further impacts intentions to help.

Experiment 1 provided initial evidence for the hypothesis that self-referential processing in imagining events can contribute to prosocial intentions. Imagining the self helping a person in need increased intentions to help compared to imagining someone else helping a person in need. Increases in intentions to help across self-reference conditions were partially but not fully attributable to differences in sensory quality. Mediation analyses revealed that differences in scene coherence (but not scene detail) of self-related imagined events versus other-related events might account for part of the effect of condition on willingness to help. Further in line with the sensory hypothesis, which proposes that the sensory quality of the imagined event predicts willingness to help independent of the identity of the imagined helper, scene coherence predicted willingness to help for both self-related imagined events and other-related imagined events.

EXPERIMENT 2

In Experiment 2, we further examined the prosocial effect of episodic simulation. Social cognition research has shown that representations of someone else are based, in part, on representations of the self to the extent that the target is similar to the self (Jenkins, Macrae, & Mitchell, 2008; Mobbs et al., 2009; Rilling, Dagenais, Goldsmith, Glenn, & Pagnoni, 2008). Vicarious self-perception theory (Goldstein & Cialdini, 2007) suggests that people's sense of self includes similar or close others (Aron, Aron, Tudor, & Nelson, 1991). Accordingly, in Experiment 2, we manipulated the degree of self-reference by varying perceived self-similarity to the imagined helpful agent. Given prior work showing that the influence of moral self-concept extends to observing similar others (i.e., a socially derived moral self-concept; Gino & Galinsky, 2012; Goldstein et al., 2008), we predicted participants would be more willing to help to the extent that they imagined a similar versus dissimilar other helping.

The same stories, experimental design, analytic approach from Experiment 1 were used in Experiment 2. After reading each story, participants imagined events with either someone similar to the self as the agent helping a person in need or someone dissimilar to the self as the agent helping a person in need. Once all trials were completed, stories were re-presented, and participants completed a survey.

METHOD

Participants. We recruited 103 participants following the procedures of Experiment 1. The same inclusion criteria were used in Experiment 2; 53 participants (51%) were not considered for data analysis. Fifty participants provided complete data sets that were used for analysis.

Procedure. Immediately after consenting, participants took a self-paced "personality test" that consisted of five questions (e.g., I am a very organized person and prefer to live and work in a tidy environment: 1 = strongly disagree, to 7 = strongly agree). Participants were told they were of a certain personality color (red or blue) based on their responses to these questions (Krienen, Tu, & Buckner, 2010; Rilling, Dagenais, Goldsmith, Glenn, & Pagnoni, 2008). Assignment to a personality color type was, in fact, arbitrary.

Participants were then presented with the same six short scenarios from Experiment 1 depicting a person in need. After reading each scenario, participants were prompted either to imagine a helpful other with a personality color that matched their own, "Imagine someone with a similar personality (::same color as participant::) as you helping the person" (Similar Other) or to imagine a helpful other with a personality color that differed from their own, "Imagine someone with a different personality (::different color as participant::) than you helping the person" (Dissimilar Other) in a within-subjects design.

In addition to the survey questions used in Experiment 1, we also included a measure of the degree of self-reference: ratings of perceived self-similarity to the imagined helper were collected at the end of the survey as a manipulation check

(e.g., How similar do you think someone with a red personality is to you?: 1 = not at all, to 7 = highly similar; How similar do you think someone with a blue personality is to you?: 1 = not at all, to 7 = highly dissimilar). We ran four versions of the study varying the order of the scenarios and conditions and the arbitrary personality color assigned to participants (in two versions, Similar Other = self red/other red, Dissimilar Other = self red/other blue; in the other two versions, Similar Other = self blue/other blue, Dissimilar Other = self blue/other red).

RESULTS

Ratings of perceived self-similarity validated our manipulation of self-reference: perceived self-similarity to the imagined helpful other was greater in the Similar Other condition ($M = 5.86$, $SE = .16$) compared to the Dissimilar Other condition ($M = 3.56$, $SE = .20$), $t(49) = 8.34$, $p < .001$, $\eta_p^2 = .586$. In terms of the sensory quality of imagined scenes, scene coherence in particular was related to willingness to help in the Similar Other condition: coherence, $r(48) = .40$, $p = .004$; detail, $r(48) = .18$, $p = .21$, but not the Dissimilar Other: coherence, $r(48) = .20$, $p = .160$; detail, $r(48) = .04$, $p = .78$. This pattern suggests the association between scene imagery and willingness to help may be limited to situations where the helpful agent is relatively close to the self. However, Steiger's test for comparing the difference in correlational coefficients showed that the association between scene coherence and willingness to help in the Similar Other condition was not significantly stronger than the association between scene coherence and willingness to help in the Dissimilar Other condition ($z = 1.34$, $p = .182$; Lee & Preacher, 2013). Therefore, conclusions about the relationship between scene imagery and willingness to help contingent on self-reference should be drawn with caution.

Reliability analyses showed that these measures of scene imagery (i.e., scene coherence, scene detail) were highly related (Cronbach's Alpha, Similar Other = .781; Dissimilar = .840). However, partial correlation analyses again revealed only a significant relationship between scene coherence and willingness to help controlling for the other measure of the imagined scene, $pr(58) = .31$, $p = .002$, further suggesting that the coherence of scene imagery in particular might drive willingness to help. Notably, though, our manipulation of self-reference in Exp. 2 did not affect scene imagery across conditions in the case of scene coherence (Similar Other: $M = 5.63$, $SE = .16$; Dissimilar Other: $M = 5.45$, $SE = .16$), $t(49) = 1.54$, $p = .131$, or scene detail (Similar Other: $M = 5.10$, $SE = .18$; Dissimilar Other: $M = 4.89$, $SE = .20$), $t(49) = 1.43$, $p = .159$. This pattern indicates that this manipulation may have affected the self-referential nature of the imagined event more than its sensory quality.

To test whether similarity to self of the imagined helpful other contributes to prosocial intentions, we first conducted a paired-samples t -test (Similar Other vs. Dissimilar Other). We found that participants were more willing to help after imagining a similar other helping a person in need (Similar Other: $M = 6.07$, $SE = .13$) compared to imagining a dissimilar other helping (Dissimilar Other: $M = 5.72$, $SE = .18$), $t(49) = 2.15$, $p = .037$, $\eta_p^2 = .086$; Figure 2. Correlational analyses further

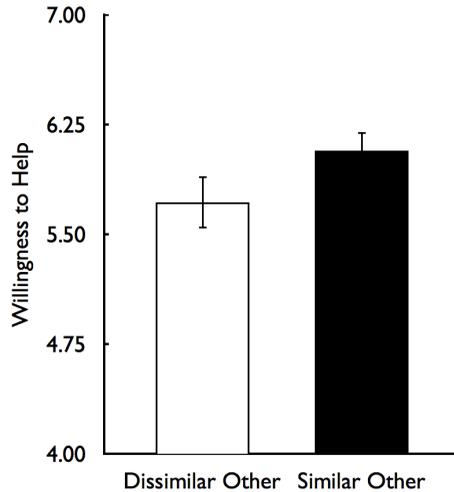


FIGURE 2. Willingness to help (1 = not at all willing; 7 = very willing) across conditions in Experiment 2, displayed here from 4 to 7 to graphically emphasize statistical similarities and differences across conditions. Error bars represent \pm standard error of the mean.

revealed that participants who rated imagined helpful others as more similar to the self (i.e., perceived self-similarity across conditions) were more willing to help a person in need, $r(48) = .37, p = .008$.

Next, we examined the relationship between scene imagery and perceived self-similarity as well as the association between these variables and willingness to help. Correlational analyses showed that scene coherence was trending toward a significant relationship with self-similarity, $r(48) = .25, p = .078$; scene detail, $r(48) = .19, p = .190$. Controlling for scene coherence on the relationship between self-similarity and willingness to help revealed significant partial correlation for self-similarity and willingness to help, $pr(48) = .30, p = .040$.

Additional evidence that the self-reference of the imagined helpful other influenced willingness to help comes from linear mixed-effects model regression analyses. Such analyses account for effects nested within participant, and allow us to examine whether the degree of self-reference of the imagined helpful other predicts willingness to help on a trial-by-trial basis. Entering condition (Similar Other vs. Dissimilar Other) into a model as a fixed-effects predictor variable revealed that imagining a similar other helping a person in need increased willingness to help compared to imagining a dissimilar other helping, $B = .35, t(294) = 2.02, p = .044$.

Next, we ran linear mixed-effects models with measures of scene imagery as a fixed-effect predictor variable. Scene coherence ($B = .28, t(292) = 4.51, p < .001$, and detail ($B = .14, t(291) = 2.74, p = .006$, predicted willingness to help. However, the relationship between scene imagery and willingness to help was mostly independent of our manipulation of self-reference. Whereas self-reference condition (Similar Other vs. Dissimilar Other) significantly predicted perceived self-similarity of the imagined helpful other ($B = 2.3, t(298) = 15.78, p < .001$, self-reference condition did not predict scene coherence ($B = .17, t(295) = 1.08, p < .278$, or detail ($B = .21, t(295) = 1.08, p = .283$). Thus, the sensory quality of the imagined event could

not have mediated the effect of self-reference condition on willingness to help in Experiment 2, since a significant effect of the independent variable on the proposed mediator is required for the possibility of a mediation effect.

To further investigate the possibility of a self-reference-specific mechanism underlying increases in willingness to help, we ran a linear mixed-effects model with perceived self-similarity of the imagined helpful other as a fixed-effect predictor variable. This analysis revealed that perceived self-similarity predicted willingness to help on a trial-by-trial basis, $B = .12$, $t(294) = 2.37$, $p = .019$, further demonstrating that the degree of self-reference contributes to willingness to help. Interestingly, when scene coherence was entered as a possible mediator of the effect of perceived self-similarity on willingness to help, the effect of self-similarity was marginally, but not significantly, mediated by scene coherence (Sobel $z = 1.73$, $p = .084$).

Experiment 2 provided additional support for the hypothesis that the self-referential processing involved in imagining helping events can contribute to facilitating prosocial intentions. Imagining events featuring a similar other as the helpful agent increased intentions to help compared to imagining events featuring a dissimilar other as the helpful agent. Moreover, manipulating the degree of self-referential processing impacted the perceived self-similarity of the helpful agent: as the degree of self-reference increased so too did prosocial intentions. Lastly, Experiment 2 extended previous work showing that the sensory quality of the imagined scene featuring the self as the agent helping was associated with willingness to help (Gaesser & Schacter, 2014). The current work suggests the association between scene imagery, particularly scene coherence, and willingness to help is largely independent of whether the imagined event features the self or someone else as the agent helping. However, scene imagery predicted willingness to help in the case of a similar but not dissimilar other, suggesting that perhaps the relationship between scene imagery and willingness to help may be attenuated if the helpful agent is too distant from the self. That said, the absent association between scene coherence and willingness to help was not *significantly* weaker in the dissimilar other condition. Thus, the results do not support definitive claims about the limited effects of scene imagery.

EXPERIMENT 3

So far we have examined whether episodic simulation can be used to facilitate prosocial decision making with an emphasis on investigating the roles of self-reference and sensory quality of the imagined scene in supporting this effect. Results from Experiments 1 and 2 provide evidence that scene imagery robustly underlies this prosocial effect and that self-reference may also contribute. Although we have focused on how these mechanisms can promote prosocial decision making, it is possible that these mechanisms can, under certain circumstances, hinder prosocial decision making.

In regard to sensory quality, perhaps the more vividly one imagines not helping in a particular situation, the less willing one would be to help. Given previous work documenting a link between the sensory vividness of imagined events and the subjective likelihood that the event will occur (D'Argembeau & Van der Linden, 2012; Garry & Polaschek, 2000; Husnu & Crisp, 2010; Hyman & Pentland, 1996; Libby, 2003; Mazzoni & Memon, 2003; Szpunar & Schacter, 2013; Weiler, Suchan, & Daum, 2010), it is possible that the sensory vividness of imagined events increases the subjective likelihood of those events regardless of the content. One caveat though is that these studies have tended to focus on neutral or positive everyday events, and thus it is unknown whether this effect would extend to antisocial or egocentric events such as not helping someone in need. In regards to self-reference, given that people are motivated to act in line with their moral self-concept (i.e., whether people view themselves as individuals who engage in good or bad behavior; Mazar et al., 2008; Young et al., 2012; see also Strohminger & Nichols, 2014), perhaps imagining oneself not helping decreases willingness to help relative to imagining someone else not helping (Gino, Norton, & Ariely, 2010).

In Experiment 3, we examined whether the same mechanisms that can promote prosocial decision making (i.e., sensory quality and self-reference) can also backfire when the content of the imagined event involves antisocial behavior. The same stories, experimental design, and analytic approach from Experiments 1 and 2 were used in Experiment 3. After reading each story, participants imagined events in which they themselves were helping a person in need, someone else was helping, they themselves were not helping, or someone was not helping. Once all trials were completed, stories were re-presented, and participants completed a survey in the same fashion as in Experiments 1 and 2.

METHOD

Participants. We recruited 36 participants from Boston College undergraduate psychology classes in need of research participation credit for introductory level classes. Participants were run in the laboratory instead of online given that Experiment 3 included four conditions (two more conditions than in Experiments 1 and 2), and doubling the duration of the study would have made the study unduly burdensome for MTurk participants whose comprehension and compliance tend to decline after 20 minutes for tasks requiring close attention in our experience. The same inclusion criteria from Experiments 1 and 2 were used in Experiment 3; 6 participants (16.6%) were not considered for data analysis. The reduced exclusion rate for a study run in the lab compared to online is not surprising given that running a study in the lab provides participants with the opportunity to receive clarifying feedback including during practice trials. Thirty participants provided complete data sets that were used for analysis.

Procedure. Participants were presented with 24 short scenarios depicting everyday events depicting a person in need of help adapted from news and social media using E-prime software. Scenarios included the same scenarios as in Experiments

1 and 2, and additional scenarios were a subset of those used in previous work (Gaessar & Schacter, 2014). Prior to the experimental trials, participants were provided instructions and completed four practice trials (one for each condition) in order to familiarize them with the general design. They were given feedback on their responses, and additional practice trials were performed until the subject demonstrated task comprehension. Participants were then presented with scenarios depicting a person in need. After reading each scenario, participants were prompted either to imagine themselves helping the person (Self Helping), to imagine someone else helping the person (Other Helping), to imagine themselves as unavailable to help (Self Not Helping), or to imagine someone else as unavailable to help (Other Not Helping condition) in a within-subjects design. To minimize social demand characteristics, Helping and Not Helping conditions were framed as differing primarily in *availability to help*. In the Not Helping conditions, participants were instructed, "Imagine the event in the story occurring, and you being unavailable to help. Imagine a plausible way you would be unavailable to help and what you would be doing instead." For example, participants were encouraged to imagine witnessing the scenario and then whatever event was preventing them from helping (e.g., if they imagined being late to a meeting and not having time to help, they should imagine walking by the person in need and the events surrounding the meeting).

At the completion of all trials, stories were re-presented, and participants filled out a self-paced survey assessing aspects of the phenomenology of imagined events and their intentions to help the people in need. The same questions used in Experiment 1 were used in Experiment 3.

Within each condition (Self Helping, Other Helping, Self Not Helping, Other Not Helping), ratings were averaged across trials such that an average rating for each participant was entered into participant-level analyses (e.g., paired-sample *t*-tests, and correlational analyses). Beyond these conventional analyses, we also used linear mixed-effects (i.e., multi-level) model regression analyses to assess possible effects at the trial level. To address possible order effects of scenario and condition, we randomized the order of the stories and their pairings with conditions.

RESULTS

To test whether imagining the self as the agent helping or not helping affects prosocial intentions, we conducted a 2 (Self vs. Other) \times 2 (Helping vs. Not Helping) ANOVA with willingness to help as the dependent variable. This analysis revealed no main effect of self-reference condition (Self vs. Other), $F(1, 29) = .01, p = .913, \eta_p^2 = .00$, a main effect of helping condition (Helping vs. Not Helping), $F(1, 29) = 11.83, p = .002, \eta_p^2 = .29$, and no interaction, $F(1, 29) = .01, p = .919, \eta_p^2 = .00$. In other words, participants were more willing to help after imagining themselves (Self Helping, $M = 5.24, SE = .16$) or someone else (Other Helping, $M = 5.26, SE = .16$) helping a person in need compared to imagining themselves (Self Not Helping, $M = 4.72, SE = .21$) or someone else (Other Not Helping, $M = 4.72, SE = .20$) not helping a person in need; Figure 3. Considered together with the results from

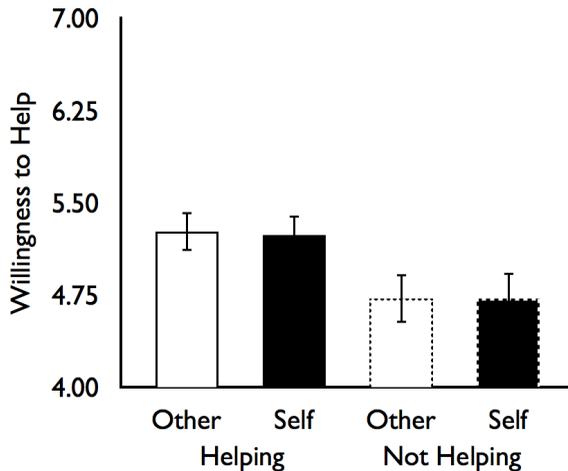


FIGURE 3. Willingness to help (1 = not at all willing; 7 = very willing) across conditions in Experiment 3, displayed here from 4 to 7 to graphically emphasize statistical similarities and differences across conditions. Error bars represent \pm standard error of the mean.

Experiments 1 and 2, the results from Experiment 3 suggest that an effect of self-reference on prosocial decision making through episodic simulation may be limited to instances when the difference in self-reference is the most salient contrast between conditions. Here, the most salient contrast may have been the contrast between helping and not helping, thereby minimizing any specific influence of self-reference on subjects' prosocial decision making.

Next we examined the relationship between conditions and scene imagery. We ran two separate 2 (Self vs. Other) \times 2 (Helping vs. Not Helping) ANOVAs with scene coherence and detail as the dependent variables. Self-reference condition did not affect the sensory quality of imagined scenes in the case of scene coherence, $F(1, 29) = .32, p = .58, \eta_p^2 = .01$, or detail, $F(1, 29) = 1.44, p = .241, \eta_p^2 = .05$. However, helping condition did affect scene coherence, $F(1, 29) = 22.65, p < .001, \eta_p^2 = .44$, and detail, $F(1, 29) = 14.52, p < .001, \eta_p^2 = .33$. Specifically, imagined helping events were rated as significantly higher in sensory imagery (Helping: coherence, $M = 5.09, SE = .16$; detail, $M = 4.55, SE = .15$) than imagined not helping events (Not Helping: coherence, $M = 4.35, SE = .19$; detail, $M = 4.09, SE = .16$). There was no interaction of self-reference and helping for either coherence, $F(1, 29) = .132, p = .719, \eta_p^2 = .005$, or detail, $F(1, 29) = 2.24, p = .145, \eta_p^2 = .07$.

Reliability analyses showed that measures of scene imagery (i.e., scene coherence, scene detail) were related (Cronbach's Alpha, Helping = .851; Not Helping = .831). However, we again observed differences in these measures in predicting willingness to help. As in the previous experiments, scene coherence, $r(28) = .40, p = .027$, but not detail, $r(28) = .11, p = .579$, predicted willingness to help when imagining helping. Steiger's test of the difference in correlational coefficients showed that the association between scene coherence and willingness to help was significantly stronger than the association between scene detail and willingness to help ($z = 2.30, p = .022$; Lee & Preacher, 2013). Interestingly, the scene coherence, $r(28) = .10, p = .597$, and detail, $r(28) = .08, p = .688$, of imagined *not* helping events did

not predict reduced willingness to help. We can draw two conclusions from these results. First, these results provide further support that not all aspects of sensory quality contribute equally to the effect of imagined events on prosocial decision making. Scene coherence in particular seems to underlie this effect. Second, scene coherence is asymmetrically related to supporting prosocial decision making (i.e., being more willing to help) compared to more antisocial or egocentric decision making (i.e., being less willing to help). In particular, we found that scene coherence of imagined helping events was positively associated with willingness to help, whereas scene coherence of imagined not helping events did not affect willingness to help, and, notably, did not decrease willingness to help.

Linear mixed-effects model regression analyses provided additional tests of an influence of self-reference and type of helping event on willingness to help. These analyses account for effects nested within participant and enable us to examine whether self-reference and type of helping event predict willingness to help on a trial-by-trial basis. Entering self-reference condition (Self vs. Other) into a model as a fixed-effects predictor variable did not show an effect on willingness to help ($B = .01$), $t(672) = .08$, $p = .937$. Entering helping condition (Helping vs. Not Helping) into a model as a fixed-effects predictor variable revealed that imagining a helping event increased willingness to help compared to imagining a not helping event ($B = .58$), $t(672) = 4.57$, $p < .001$.

Consistent with the sensory hypothesis, linear mixed-effects models with measures of scene imagery as a fixed-effect predictor variable found that scene coherence ($B = .30$), $t(699) = 7.99$, $p < .001$, and detail ($B = .22$), $t(700) = 5.76$, $p < .001$, predicted willingness to help on a trial-by-trial basis. Next, we examined the relationship between self-reference (Self vs. Other) and helping (Helping vs. Not Helping) conditions and scene imagery. Linear mixed-effects models with self-reference or helping conditions as a fixed-effect predictor variables and measures of scene imagery as dependent variable, revealed the manipulation of self-reference did not affect scene coherence ($B = .003$), $t(671) = .03$, $p = .979$, or detail ($B = .19$), $t(671) = 1.57$, $p = .116$, of the imagined event. Similar to the participant level results, scene coherence ($B = .80$), $t(671) = 6.58$, $p < .001$, and detail ($B = .51$), $t(672) = 4.19$, $p < .001$, were affected by helping condition. In sum, imagined helping events were more coherent and detailed than imagined not helping events.

Next, we examined the relationship between helping condition and scene imagery in predicting willingness to help. Specifically, we were interested to know whether the sensory quality of the imagined scene was preferentially driving willingness to help for imagined helping events compared to imagined not helping events. We ran a single linear mixed-effects model with helping condition, scene coherence, detail, as well as interaction terms for scene coherence and detail with helping condition as a fixed-effect predictor variables and willingness to help as the dependent variable. This analysis revealed a significant interaction between scene coherence and helping condition in predicting willingness to help ($B = .23$), $t(682) = 2.41$, $p = .016$. In particular, scene coherence of the imagined event was preferentially driving willingness to help for imagined helping events ($B = .46$), $t(350) = 8.90$, $p < .001$, compared to imagined not helping events ($B = .14$), $t(345) =$

2.60, $p = .010$. This interaction with sensory quality was specific to scene coherence, as no interaction between scene detail and helping condition was observed ($B = .05$), $t(679) = .49$, $p = .628$.

Experiment 3 provided additional support for the hypothesis that the sensory quality of imagined helping scene, scene coherence, in particular, contributes to facilitating prosocial intentions. The effect of scene coherence was independent of self-reference and more strongly related to supporting prosocial compared to antisocial decision making at both the participant and trial levels of data analysis. Furthermore, our findings in Experiment 3 qualify the self-reference hypothesis, suggesting that an effect of self-reference for the imagined agent may be limited to situations in which self-reference is the most prominent feature of subjects' prosocial judgments. In Experiment 3, the stark difference between imagining helping versus not helping may have overshadowed any possible influence of self-reference, compared to Experiments 1 and 2, in which self-reference was the only feature manipulated across conditions.

DISCUSSION

Across three experiments we investigated the potential roles of self-reference and sensory vividness in supporting the effect of episodic simulation on prosocial decision making. Are we more willing to help others when we vividly imagine ourselves doing so? Given the role of self-reference in moral cognition, one possibility is that the degree of self-reference of imagined helping events tracks with the degree of prosocial intent. An alternative and mutually compatible possibility is that the sensory quality of the imagined helping scene drives the effect on prosocial intent regardless of whether we imagine ourselves or someone else as the agent helping.

Three experiments provided evidence that the sensory quality of imagined helping events, particularly scene coherence, was consistently associated with increasing willingness to help. Notably, in Experiment 3, scene coherence selectively contributed to willingness to help when imagining prosocial events (i.e., helping) and was not negatively associated with willingness to help when imagining antisocial events (i.e., not helping). We also found some evidence supporting a more restricted role for self-reference. When participants imagined self-referential events, their intentions to help tended to, but not always, increase. In Experiment 1, imagining the *self* helping modestly increased prosocial intentions relative to imagining *someone else* helping. In Experiment 2, imagining someone else *similar* to the self helping modestly increased prosocial intentions relative to imagining someone else *dissimilar* to the self helping. In Experiment 3, however, self-reference did not affect prosocial intentions when this contrast was embedded within a larger design that included differences between helping versus not helping a person in need. Such varied results temper a role for self-reference in supporting a prosocial effect of episodic simulation, suggesting that the influence of self-reference for the imagined agent may be limited to situations in which self-reference is the most

salient feature of subjects' prosocial judgments. In other words, the role of self-reference specifically in supporting a prosocial effect of episodic simulation seems to be relatively modest and malleable depending on other factors at play.

Our results build and expand upon past findings on the relationship between episodic simulation and prosocial decision making. Reinforcing previous work (Gaesser & Schacter, 2014), here we observed greater intentions to help a person in need after participants imagined themselves helping in a future event. The current work provides at least two important novel insights, described below.

First, it appears that the sensory quality of the imagined scene is associated with intentions to help largely independent of the self-reference of the imagined helpful agent. The more vivid the imagined helping scene, the more willing people are to help others. Interestingly, there was one piece of evidence hinting at possible limitations on the effect of scene imagery on willingness to help. Scene imagery predicted willingness to help when imagining the self (Experiments 1 and 3), someone else (Experiments 1 and 3), a similar other (Experiment 2), but not when imagining a dissimilar other (Experiment 2). This overall pattern suggests the effect of scene imagery on willingness to help may be attenuated in the case that the helpful agent is too far from the self, though we note that the association between scene coherence and willingness to help was not *significantly* weaker in the dissimilar other condition compared to the similar other condition.

Second, the current work suggests that self-reference may be used to facilitate prosocial intentions in certain situations, specifically when self-reference is the most prominent feature of subjects' prosocial judgments. Findings from Experiment 3 suggest that whether self-reference of the imagined agent has an effect on willingness to help may be modified by other contrasts in participants' focus. Indeed, consistent with this interpretation, results from Experiments 1 and 2 suggest a malleable effect of self-reference, given that willingness to help is nearly identical when comparing the self condition in Experiment 1 (Self, $M = 6.00$, $SE = .12$) to the similar other condition in Experiment 2 (Similar Other, $M = 6.07$, $SE = .13$), independent-samples $t(98) = .37$, $p = .711$. If absolute self-reference mattered, then one would expect willingness to help in the similar other condition to be lower than in the self condition, given the difference in degree of self-reference between these conditions. The current findings therefore provide a starting point for work at the intersection of moral self-concept, future thinking, and prosociality. In what follows, we consider some of the implications and limitations of the current findings, which reflect what we take to be fruitful directions for future investigations.

While measures of scene imagery (i.e., scene detail and scene coherence) have been shown to be highly associated with each other and willingness to help (Gaesser & Schacter, 2014), here partial correlational analyses suggests that scene coherence was particularly influential in contributing to willingness to help. Moreover, scene coherence was more consistently associated with willingness to help across conditions. Indeed, extensive prior work has shown that scene coherence is an important feature of imagined events. Specifically, it is thought that scene coherence serves as an index of how well imagined events are formed in a spatial context, which requires binding together disparate pieces of information into a

coherent whole (Hassabis, Kumaran, Vann, & Maguire, 2007; Mullaly, Intraub, & Maguire, 2012; Summerfield, Hassabis, & Maguire, 2010). Presently, it is difficult to disentangle the effects of these highly related measures of scene imagery with certainty. Future research will be needed to directly investigate how particular sensory aspects of the imagined scene come to impact prosocial decision making.

It is worth noting that while the evidence across three experiments suggests that episodic simulation can be used to facilitate prosocial intentions we do not expect episodic simulation to facilitate prosocial intentions in all circumstances. Work on imagination inflation and related effects (D'Argembeau & Van der Linden, 2012; Garry & Polaschek, 2000; Husnu & Crisp, 2010; Hyman & Pentland, 1996; Libby, 2003; Mazzoni & Memon, 2003; Szpunar & Schacter, 2013; Weiler et al., 2010) suggests that imagining an event increases perceived likelihood that the event will occur regardless of content in the event, though this work typically focused on neutral or positive everyday events, and thus it was previously unknown whether this effect would extend to antisocially charged events such as not helping someone in need. The findings from Experiment 3 provide some evidence for this showing that imagining not helping is associated with a lower willingness to help than imagining helping. Indeed, beyond an imagination inflation like effect, we suspect there may be other situations when episodic simulation can reduce prosocial intentions, such as when the content of the imagined event is focused on the dangers and possible damage to oneself when helping (see Gaesser, 2013 for related discussion). Thus, we make the more modest claim that episodic simulation *can* be used to facilitate prosocial responses rather than it *always or exclusively* will facilitate prosocial responses. Interestingly though, in Experiment 3, we found that the effect of scene imagery was asymmetrically related to prosocial decision making (i.e., more willing to help) compared to more antisocial decision making (i.e., less willing to help), suggesting that this mechanism may uniquely support prosocial responses. The scene imagery for events that involve not helping did not affect willingness to help. Elucidating the specific circumstances under which episodic simulation enhances or possibly inhibits prosocial decision making will be an important avenue for future research.

While the current findings underscore the role of sensory quality in supporting the effect of episodic simulation on prosocial decision making, the findings also point to a role for self-referential processing. It is well known that self-referential processing can be influential in a moral context (e.g., Janoff-Bulman et al., 2008). Our current results largely align with studies on moral self-concept, which show that people are motivated to act more generously if they view themselves (or similar others) as individuals who engage in good behavior (Gino & Galinsky, 2012; Young et al., 2012). A possible account for this effect is that deviating from one's self-concept as a helpful individual leads to an unpleasant state of dissonance, which then motivates one to endorse intentions to help, consistent with how one views oneself (Stone & Cooper, 2001). Another possibility is that imagining the self helping is more rewarding than imagining others helping. While self-knowledge and self-enacted prosocial behavior are intrinsically rewarding (Moll et al., 2006; Tamir & Mitchell, 2012), an open question is how these effects shape the impact

of imagined helping on prosocial intentions. Furthermore, the current results suggest that these mechanisms may exert an influence on prosocial intentions only through imagining events when the contrast between self and other is salient.

The effects examined here are likely to extend beyond the domain of imagination. Previous work has shown that imagining and remembering personal events can facilitate prosocial intentions to the same degree (Gaesser & Schacter, 2014). Although here we did not examine the role of scene imagery or self-reference in supporting the prosocial effect of remembering helping events, we suspect such effects may exist given that imagining the future and remembering the past are thought to recruit overlapping component processes, including scene imagery and self-reference (Addis et al., 2007; Schacter et al., 2012; Szpunar, Watson, & McDermott, 2007; Tulving, 2005). Two studies from the moral self-concept literature may provide traction on this issue. In some situations, people who recalled their own past good behaviors made more generous donations to charities (Young et al., 2012) and were more willing to volunteer (Conway & Peetz, 2012). While these studies highlight a potential role for memory in motivating prosocial behavior, these studies did not directly control for the phenomenology of remembered events or measure willingness to help for the particular event being remembered.

Finally, of applied importance is how these findings might translate to actual helping behavior. While we await empirical evidence to address this issue, previous studies have shown that imagining an action increases the likelihood that the action will be taken in the future (Gregory, Cialdini, & Carpenter, 1982; Libby, Shaeffer, Eibach, & Slemmer, 2007). These findings suggest the imagined intentions reported here may in fact translate into actual behavior.

CONCLUSION

Episodic simulation draws on a suite of cognitive processes that enable humans to imagine future events. The current findings support the notion that episodic simulation can be used to enhance prosocial decision making. More than that though the present studies broaden our understanding of the underlying mechanisms, highlighting the importance of scene imagery as well as a possible role for self-referential processing. It seems we are more willing to help others especially when we vividly imagine ourselves doing so.

APPENDIX. SUPPLEMENTAL RESULTS

The sensory quality measures previously shown to impact intentions to help (i.e., subjective scene coherence and scene detail) did not fully account for the impact of self-reference on the prosocial effect of episodic simulation in the present study. However, considering that studies on future thinking have shown the self-reference of imagined future events sometimes modulate additional phenomenological qualities of events such as personal detachment (de Vito, Gamboz, & Brandimon-

te, 2012; Grysmann, Prabhakar, Anglin, & Hudson, 2013; Summerfield, Hassabis, & Maguire, 2009; Szpunar et al., 2007), we hypothesized that directly manipulating the phenomenological qualities that arise from differences in self-reference might heighten the impact of imagined events on prosocial intentions. Although we did not include a direct measure of personal detachment in the present study, we did include a measure of *pre-living* (how strongly did you experience the imagined event in your mind?: 1 not at all, to 7 vividly, as if you were currently there), which could relate to personal detachment (e.g., how personally involved were you in the imagined event?). Interestingly, *pre-living* tended to track with willingness to help in Experiment 1 (between-participant level: $r[48] = .538, p < .001$; within-participant level: $B = .31, t[296] = 5.64, p < .001$) and Experiment 2 (between-participant level: $r[48] = .286, p = .044$; within-participant level: $B = .40, t[294] = 7.01, p < .001$). However, *pre-living* was not significantly different across self-reference conditions in Experiment 1 (between-participant level: Self $M = 5.58, SE = .15$, Other $M = 5.40, SE = .14$; $t[49] = 1.29, p = .205$; within-participant level: $B = .18, t[297] = 1.25, p = .213$) or Experiment 2 (between-participant level: Similar, $M = 5.45, SE = .16$, Dissimilar Other, $M = 5.27, SE = .16, t[49] = 1.58, p = .12$; within-participant level: $B = .17, t[298] = 1.06, p = .292$). A potentially fruitful direction for future work will be to directly examine how personal detachment (and similar phenomenological qualities) tracks with self-reference and the prosocial effect of episodic simulation.

In the present study we also included a measure of *theory of mind* (akin to mentalizing and perspective taking) for each person in need (did you consider the person's thoughts and feelings?: 1 not at all, to 7 strongly considered). Theory of mind did track with willingness to help in Experiment 1 (between-participant level: $r[48] = .293, p = .039$; within-participant level: $B = .15, t[297] = 2.60, p = .010$) and in Experiment 2 (between-participant level: $r[48] = .286, p = .044$; within-participant level: $B = .20, t[293] = 3.69, p < .001$). Theory of mind was significantly different across self-reference conditions at the between-participant level in Experiment 1 (Self $M = 6.03, SE = .13$, Other $M = 4.99, SE = .18, t[49] = 6.18, p < .001$) but not in Experiment 2 (Similar $M = 5.53, SE = .16$, Dissimilar Other $M = 5.16, SE = .21, t[49] = 1.80, p = .078$). At the within-participant level, theory of mind varied across conditions (Experiment 1: $B = .49, t[298] = 3.41, p = .001$; Experiment 2: $B = .38, t[297] = 2.13, p = .034$). To assess the potential role of theory of mind in the effect of condition on willingness to help, we conducted a mediation analysis with theory of mind as the mediator. The result was trending but not significant (Sobel $z = 1.85, p = .065$).

Broadly, these results are consistent with past work revealing a role for theory of mind in enhancing prosocial intentions. However, given the pattern of results, it is difficult to discern the precise role of theory of mind in the prosocial effect of self-referential episodic simulation. An interesting direction for future work will be to explicitly delineate the interaction and independence of theory of mind and episodic processes in facilitating prosocial decision making.

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