



Original Articles

Moral imagination: Facilitating prosocial decision-making through scene imagery and theory of mind

Brendan Gaesser^{a,*}, Kerri Keeler^b, Liane Young^b

^a Department of Psychology, University at Albany, State University of New York, Albany, NY, United States

^b Department of Psychology, Boston College, Chestnut Hill, MA, United States



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ABSTRACT

How we imagine and subjectively experience the future can inform how we make decisions in the present. Here, we examined a prosocial effect of imagining future episodes in motivating moral decisions about helping others in need, as well as the underlying cognitive mechanisms. Across three experiments we found that people are more willing to help others in specific situations after imagining helping them in those situations. Manipulating the spatial representation of imagined future episodes in particular was effective at increasing intentions to help others, suggesting that scene imagery plays an important role in the prosocial effect of episodic simulation. Path modeling analyses revealed that episodic simulation interacts with theory of mind in facilitating prosocial responses but can also operate independently. Moreover, we found that our manipulations of the imagined helping episode increased actual prosocial behavior, which also correlated with changes in reported willingness to help. Based on these findings, we propose a new model that begins to capture the multifaceted mechanisms by which episodic simulation contributes to prosocial decision-making, highlighting boundaries and promising future directions to explore. Implications for research in moral cognition, imagination, and patients with impairments in episodic simulation are discussed.

1. Introduction

Central to leading moral lives, maintaining meaningful relationships, and existing in a sophisticated large-scale society is our capacity to cooperate with and help others (Greene, 2013; Nowak & Highfield, 2011; Preston, 2013; Rand, Arbesman, & Christakis, 2013; Stavrova & Ehlebracht, 2015; Young & Durwin, 2013). Research in social psychology has focused on investigating how our perceptions of people in need, our ability and motivation to infer their mental states, and our emotional reactions to them contribute to decisions to help or not (Chakroff & Young, 2014; Lim & Desteno, 2016; Marsh, 2016; Morelli, Rameson, & Lieberman, 2014; Singer & Lamm, 2009; Warneken & Tomasello, 2009; Zaki & Ochsner, 2012). Yet helping consists of more than responding to a person in a vacuum but rather a specific event unfolding in time and place, within which the person is embedded. Does the way that we experience the surrounding environment and episodic details of a helping event also inform our willingness to engage in the helping behavior in the first place?

1.1. Episodic simulation: mechanics and relevance to morality

Understanding the mechanisms supporting episodic simulation, that is, our ability to imagine future events in specific time and place, has become a topic of growing interest in cognitive psychology and neuroscience (for reviews, see Atance & O'Neil, 2001; Buckner & Carroll, 2007; Gaesser, 2013; Schacter, Benoit, & Szpunar, 2017; Seligman, Railton, Baumeister, & Sripada, 2013; Suddendorf & Corballis, 2007; Szpunar, Spreng, & Schacter, 2014). Much progress has been made uncovering how episodic simulation draws on similar component processes as episodic memory, revealing how memory provides the source of details (e.g., places, people, and objects) that are flexibly recombined into imagined events of future social interactions (Schacter & Addis, 2007; Schacter et al., 2012; see Szpunar, 2010 and Irish & Piguet, 2013 for discussion of semantic memory).

Much less is known, however, about how episodic simulation can inform social cognition (Hassabis et al., 2013; Madore & Schacter, 2014; Rubin, Watson, Duff, & Cohen, 2014; Sheldon et al., 2011; Spreng & Mar, 2012), and, more specifically, moral decisions about whether we should help others in need. Across a series of recent studies, we have found that people make more prosocial decisions (i.e., report being

* Corresponding author at: Social Sciences 395, 1400 Washington Ave, Albany, NY 12222, United States.
E-mail address: bgaesser@albany.edu (B. Gaesser).

more willing to help a person in need) after imagining helping in that situation in the future (Gaesser et al., 2017; Gaesser et al., 2017; Gaesser, Horn, & Young, 2015; Gaesser & Schacter, 2014). Specifically, we have found that the more vividly participants represent the helping scene the more subjectively plausible it becomes that they will help (Gaesser & Schacter, 2014; Gaesser et al., 2017; Gaesser et al., 2015). This finding converges with previous research on imagination inflation and related phenomena, in which vividly imagining an event also increases event likelihood (Carroll, 1978; Crisp & Turner, 2009; D'Argembeau & Van der Linden, 2012; Garry & Polaschek, 2000; Husnu & Crisp, 2010; Hyman & Pentland, 1996; Mazzoni & Memon, 2003; Szpunar & Schacter, 2013; Weiler, Suchan, & Daum, 2010). No study, however, has directly manipulated the vividness of scene imagery of the helping episode and examined a subsequent impact on a willingness to help others.

1.2. Episodic simulation: setting the scene

Beyond its basic visual features (Kosslyn, Ganis, & Thompson, 2001), a scene is a space with objects and people integrated into a coherent and vivid whole that unfolds over time as a specific event or episode (Hassabis, Kumaran, Vann, & Maguire, 2007; Maguire & Hassabis, 2011; Mullally, Intraub, & Maguire, 2012; Summerfield, Hassabis, & Maguire, 2009; Summerfield, Hassabis, & Maguire, 2010; Zeidman & Maguire, 2016). Spatial processing is broadly thought to be an important component of imagining vivid scenes (a view most prominently developed by Maguire and colleagues (see Maguire & Mullally, 2013 for review, but see also Addis & Schacter, 2012; Andrews-Hanna, Reidler, Huang, & Buckner, 2010; Rubin & Umanath, 2015; Schacter & Addis, 2007 for related ideas).

The spatial context serves as a platform upon which fragmented details can be constructed into an integrated and vivid scene (Addis & Schacter, 2012; Andrews-Hanna et al., 2010; Suddendorf & Corballis, 2007). Notably, past work has found that the more familiar the location of the imagined future episode, the more vividly the imagined future episode is experienced (Arnold, McDermott, & Szpunar, 2011; De Vito, Gamboz, & Brandimonte, 2012; Robin and Moscovitch, 2014)—a finding we leverage in the current work. Setting imagined events in familiar locations facilitates scene imagery, affording a richer spatial representation for constructing vividly imagined events.

1.3. Overview and aims of present studies

In the present studies, we tested the effect of vividness of scene imagery on willingness to help others by setting imagined future helping episodes in either familiar locations (strong spatial contexts) or unfamiliar locations (weak spatial contexts) (Experiments 1–3), controlling for individual differences in empathic and prosocial personality traits (Experiment 2), and controlling for possible effects on attributions of experience and agency to a person in need (Experiment 3). Furthermore, we explored whether an effect on willingness to help would extend to costly prosocial behavior in the form of economic donations to help people in need (Experiment 3).

We also tested whether scene imagery exerted its effect on willingness to help via theory of mind (akin to mentalizing, cognitive empathy, perspective taking). In other words, are people more likely to help after vividly imagining the helping scene because they are subsequently more likely to consider the mental states (i.e., thoughts and feelings) of the person in need? The role of theory of mind in decisions to help others has been well established within social psychology (Chakroff & Young, 2014; Coke, Batson, & McDavis, 1978; Decety, 2005; Zaki & Ochsner, 2012). Indeed, more recent work suggests that subjective experience of scene imagery and theory of mind may be dynamically correlated when imagining future helping episodes (Gaesser et al., 2017). An alternative possibility is that theory of mind does not mediate the effect of scene imagery on willingness to help but

is more generally recruited when imagining a helping episode, regardless of spatial context. Thus, while the primary focus of the present studies was on manipulating scene imagery (i.e., strength of the spatial context of the helping episode) and observing subsequent effects on willingness to help, a secondary aim was to examine the role of theory of mind to gain greater insight into the cognitive mechanisms and their potential interaction underlying the relationship between episodic simulation and prosocial decision-making.

2. Experiment 1: strength of spatial context (lab-based experiment)

As an initial test of the effect of vivid scene imagery on prosocial response, we manipulated the underlying spatial representation of the imagined helping episode. We set the imagined helping events in either familiar locations (i.e., strong spatial context) or unfamiliar locations (i.e., weak spatial context). We hypothesized that imagining helping events in a strong spatial context would increase one's willingness to help, compared to imagining events in a weak spatial context, as a direct result of the increased vividness of the scene imagery of the helping episode.

2.1. Method

2.1.1. Participants

A total of 44 participants were recruited for this study. All participants were provided written informed consent in accordance with the Boston College Institutional Review Board. Participants were primarily undergraduate students from Boston College and Boston University. We also recruited participants from Craigslist; however, all six Craigslist participants failed to comply with task instructions. Participants either received course credit or were paid \$15 as compensation. We ran the experiment until we had collected 30 participants (21 female, $M = 22.83$ years, $SD = 3.72$), who provided complete data sets that were then used for analysis. A power analysis of the 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 30 participants in the lab conservatively allows detection of behavioral differences across conditions (power > 0.80). To ensure participants paid attention and comprehended task instructions in the present study, we applied the same criteria as used in related behavioral work on episodic processes and prosocial intentions (Arnold et al., 2011; Gaesser & Schacter, 2014). Specifically, participants who provided only partial data or inappropriate responses (e.g., imagined helping on No Helping control condition trials) on more than 20% of the trials (more than 4 of the 21 trials), or who failed to provide appropriate descriptions of what they generated were not considered for data analysis. Thirty participants provided data sets used for analysis. Data sets for each study can be found on the Open Science Framework here.

2.1.2. Procedure

Participants read study instructions and completed two practice trials to familiarize them with the study design. After each practice trial, participants were given feedback on their performance by the experimenter and had the opportunity to ask questions concerning the practice trials. If necessary, practice trials continued until participants demonstrated task comprehension. Participants were asked to closely follow instructions during the experimental trials and told that they would later be asked a series of questions regarding the responses they generated. Participants were then presented with a series of 21 brief stories describing everyday events featuring a person in need of help (e.g., This person is locked out of their house, This person's dog has not returned home) using Eprime software. Scenarios were a subset of those used in previous work (Gaesser & Schacter, 2014; see Rameson, Morelli,

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