

On the Psychology of Scarcity: When Reminders of Resource Scarcity Promote Selfish (and Generous) Behavior

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Consumers often encounter reminders of resource scarcity. However, relatively little is known about the psychological processes that such reminders instantiate. In this article, we posit that reminders of resource scarcity activate a competitive orientation, which guides consumers' decision making towards advancing their own welfare. Further, we reveal that this tendency can manifest in behaviors that appear selfish, but also in behaviors that appear generous, in conditions where generosity allows for personal gains. The current research thus offers a more nuanced understanding of why resource scarcity may promote behaviors that appear either selfish or generous in different contexts, and provides one way to reconcile seemingly conflicting prior findings.

Keywords: resource scarcity, competitive orientation, welfare advancement, selfish, generous

Resource scarcity is a pervasive facet of human life. Mankind has regularly experienced periods of famine and draught (Chakravarthy and Booth 2004), modern economies often must cope with economic recessions

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(Griskevicius et al. 2013), and even in resource-rich environments consumers routinely encounter cues that emphasize the limited nature of products and resources (Cialdini 2009). As a consequence, consumers often think about, worry about and discuss scarcity-related concerns (Twist and Barker 2006). However, in spite of the frequency of cues and cognitions related to scarcity, relatively little is known about what psychological processes are activated in response to scarcity cues and how these processes influence subsequent decision making.

In this article, we build on previous research on scarcity and competition (Fülöp 2004; Griskevicius et al. 2009; Grossman and Mendoza 2003; Keller 1992) to suggest that reminders of resource scarcity promote a competitive orientation, which guides consumers' decision making toward advancing their own welfare (Van Lange et al. 2007; Van Lange and Kuhlman 1994; Van Lange et al. 1997). Importantly, although a desire to advance one's own welfare often leads to behaviors that appear selfish (e.g., retaining one's money as opposed to donating it to charity), our theoretical framework suggests that reminders of resource scarcity can also increase generosity toward others when such behavior indirectly allows for personal gains

(e.g., charitable giving in order to gain status, Griskevicius, Tybur, and Van den Bergh 2010). Through testing this hypothesis, the current research offers a more nuanced understanding of why resource scarcity may promote behaviors that appear either selfish or generous in different contexts, and provides one way to reconcile seemingly conflicting prior findings (e.g., Aarøe and Petersen 2013; Holland, Silva, and Mace 2012; Kraus et al. 2012; Piff et al. 2010; Sasson et al. 2012).

The remainder of this article is organized as follows. We first present a brief review of prior research relevant to the influence of perceived scarcity on consumer decision making. We then draw from this work in order to suggest that reminders of resource scarcity activate a competitive orientation, which guides consumers' decision making toward advancing their own welfare. Next, we test these predictions in five experiments involving both real and hypothetical decisions. We conclude with a discussion of the theoretical and practical implications of these findings, as well as suggestions for future research.

THEORETICAL BACKGROUND

Consumers often report feeling as though resources in their life are lacking (Fernbach, Kan, and Lynch 2015). Many people face chronic resource-shortages (Banerjee and Duflo 2007), and even people who live in relative abundance often feel that certain resources are insufficient to meet their needs (Hill, Martin, and Chaplin 2012; Mullainathan and Shafir 2013). Scarcity is thus a ubiquitous phenomenon and, accordingly, it has received considerable attention across a variety of academic disciplines, including marketing (e.g., Sharma and Alter 2012), psychology (e.g., Griskevicius et al. 2013), economics (e.g., Banerjee and Duflo 2011), sociology (e.g., Booth 1984), philosophy (e.g., Lerner and Lerner 1981), political science (e.g., Grossman and Mendoza 2003), biology (e.g., Fülöp 2004), and more.

Despite the plethora of research that has examined how scarcity influences consumer behavior, prior findings offer seemingly conflicting perspectives on one of the most central questions concerning the influence of scarcity on social behavior, namely how scarcity cues affect decisions that require making tradeoffs between outcomes that benefit the self and outcomes that benefit others (Cropanzano, Goldman, and Folger 2005; Gerbasi and Prentice 2013). On the one hand, certain prior findings suggest that resource scarcity may increase generosity towards others. For instance, research has shown that people with less material wealth and more restricted access to resources tend to be more generous and helpful (Kraus et al. 2012; Piff et al. 2010). This notion is consistent with data showing that the poorest (bottom 20%) Americans donate a greater proportion of their income (3.2%) than the wealthiest (top 20%) Americans (about 1.3%; Stern 2013).

On the other hand, other findings suggest that resource scarcity may decrease generosity towards others, and instead promote behaviors that benefit the self to the detriment of others (hereafter, selfish behaviors). For example, research shows that people living in low-socioeconomic status neighborhoods are less likely to spontaneously demonstrate altruistic behaviors (e.g., returning a "lost letter" to the intended recipient, performing bystander-initiated CPR) than those living in high-socioeconomic status neighborhoods (Holland et al. 2012; Sasson et al. 2012). These findings are also consistent with research showing that under time constraints (i.e., scarcity of time) people are less likely to engage in helping behaviors (Darley and Batson 1973), and that individuals experiencing hunger (i.e., scarcity of food) are less likely to share financial resources with an anonymous other (Aarøe and Petersen 2013; Petersen et al. 2014).

These seemingly divergent findings call for a deeper understanding of the psychological processes that are activated in response to resource scarcity, and how such processes influence decision making. For example, imagine two consumers who are waiting in line at a cash register. While waiting, one happens to notice a magazine with a headline highlighting the dangers of global commodity shortages. The other does not see the magazine. Upon check out, each consumer is asked whether she would like to add a dollar to her bill to benefit a local charity. How will the consumer's exposure to the reminder of resource scarcity affect her subsequent decision?

In this article, we suggest that reminders of resource scarcity promote a competitive orientation, and that this competitive orientation strategically guides consumers' decision making toward advancing their own welfare. As a consequence, consumers who are exposed to reminders of resource scarcity (vs. control) will be more likely to demonstrate behaviors that confer personal benefits. Notably, these can either be actions that offer direct benefits to the self at the expense of others (i.e., selfish behaviors) or actions that offer indirect benefits to the self through the assistance of others (i.e., seemingly generous behaviors).

Reminders of Resource Scarcity Activate a Competitive Orientation

In *Leviathan*, Thomas Hobbes states that limited resources, coupled with humans' selfish nature, result in merciless competition or a constant state of "war of all against all" (1985). This link between resource scarcity and competition for resources is supported by research across diverse areas of academic inquiry. Economics and evolutionary biology both hold that competition always involves scarce resources (Fülöp 2004; Keller 1992). For example, imbalances in sex ratios (i.e., when either males or females are scarce in the population) have been shown to result in greater intrasexual competition for mates, both in

animals and humans (Griskevicius et al. 2012). More generally, Grossman and Mendoza's (2003) work formalized the hypothesis that as a resource (e.g., food) becomes scarce, people will expend more time and effort competing with others for that resource. Thus, it is widely acknowledged that resource scarcity increases competition for the resource that is scarce.

Building on this work, in the current article we explore the novel proposition that mere reminders of resource scarcity are sufficient to activate a competitive orientation. This idea is important because it is common for consumers to encounter cues that trigger cognitions related to resource scarcity, regardless of whether their own resources are insufficient (Fülöp 2004; Greenberg 1981). To illustrate, in the scenario described previously, the consumer who was exposed to the magazine highlighting the dangers of global commodity shortages may have had thoughts related to resource scarcity, even though her own resources at that time may have been objectively adequate.

We suggest that mere reminders of resource scarcity will activate a competitive orientation due to a cognitive association between scarcity and competition, which may form one of two ways. First, a competitive orientation may become associated with the idea of resource scarcity through repeated personal experiences (Ross and Nisbett 1991) over time, such as through the repeated experience of having to compete for scarce resources throughout life (e.g., competing for grades or jobs, or competing for mates; Griskevicius et al. 2012). Put differently, as with other cognitive associations (e.g., the link between guilt and pleasure; Goldsmith, Cho, and Dhar 2012), a cognitive association between resource scarcity and a competitive orientation may become established over time due to repeated co-activation (Bargh and Chartrand 1999; Ramanathan and Menon 2006).

Second, a competitive orientation may become associated with resource scarcity through repeated exposure to instances in which resource scarcity lead to competition (Morris, Menon, and Ames 2001). For example, history provides countless accounts of global entities competing intensely (e.g., going to war) over scarce resources (Pinker 2011), and the popular press regularly showcases instances when product shortages have led to violent competitive reactions among consumers (e.g., Baldwin 2011; Goldberg 2011). Accordingly, it can be expected that many, if not most, consumers will have been exposed to situations in which resource scarcity engendered a competitive response.

Importantly, once an association between a concept and a certain motivational orientation is established, activating the concept also activates the motivational orientation (Keinan and Kivetz 2011). Building on this notion, we posit that reminders of resource scarcity will activate a competitive orientation, which will then guide subsequent decision making. In particular, we suggest that this competitive orientation will promote the desire to advance one's own welfare,

which can manifest in either selfish or generous behavior, as a function of the associated benefits to the self.

A Competitive Orientation Prompts Consumers to Advance Their Own Welfare through Selfish and Generous Behaviors

As mentioned previously, understanding how resource scarcity affects consumers' propensity to engage in selfish versus generous behavior is important given the seemingly conflicting predictions suggested by prior work. We propose that because resource scarcity activates a competitive orientation, consumers will seek to advance their own welfare following exposure to reminders of resource scarcity (McClintock 1977; Van Lange 2000). Logically, this suggests that resource scarcity will often increase selfish behaviors (i.e., behavior that benefits the self at the expense of others), because such behaviors often confer the most direct benefit to the self. For example, in the consumer scenario described previously, the individual exposed to the magazine headline highlighting the dangers of global commodity shortages may be more likely to retain her money, and less likely to donate her money to charity, in order to advance her own welfare.

However, the same theorizing suggests that reminders of resource scarcity will likewise increase generous behaviors, when such behaviors offer an indirect means to advance one's own welfare through the assistance of others (Frimer et al. 2011). Although no research has tested this hypothesis to date, some findings may be interpreted as offering indirect support for this prediction. For example, Aarøe and Petersen (2013) manipulated whether or not participants were experiencing hunger (i.e., scarcity of food) and found that while individuals experiencing hunger expressed greater support for social welfare, they also demonstrated more selfish behavior (e.g., allocating less money to an anonymous other in a dictator game). This disparity between expressed preferences and behaviors suggests that, when resources are scarce, people may express preferences that are seemingly generous in order to increase their odds of accruing self-benefits. Said otherwise, although resource scarcity may increase generosity in some instances, it is possible that this generosity reflects self-interested motives, or "impure altruism" (Andreoni 1990), wherein behavior that seems generous is in fact driven by a self-serving motive to achieve personal gains (Petersen et al. 2014), as opposed to being driven by other-focused motives such as empathy or altruism. Reflecting on our prior example, this would mean that if donating to charity was construed as a way to benefit the self, for example through social signaling (Griskevicius et al. 2010), the consumer exposed to the magazine headline highlighting the dangers of global commodity shortages might be *more* likely to make a donation, as compared to the consumer who did not

see the magazine, due to the increased desire to advance one's own welfare.

This theorizing leads to three key hypotheses: First, we hypothesize the existence of a learned association between scarcity and competition, such that reminders of resource scarcity activate a competitive orientation. Second, we hypothesize that reminders of resource scarcity shift people's preferences toward advancing their own welfare as opposed to advancing the welfare of others. Third, we hypothesize that reminders of resource scarcity need not produce exclusively selfish outcomes, and may also prompt consumers to become more generous when being generous indirectly benefits the self (Frimer et al. 2011; Gerbasi and Prentice 2013).

By testing these hypotheses, this research provides an important theoretical advancement to the understanding of the psychology of scarcity. In particular, this research offers a novel theoretical perspective to understand the motivational processes associated with resource scarcity, as well as their behavioral implications. Further, this research provides relevant practical insights into the factors that can promote and inhibit prosocial behaviors, in contexts where cues and cognitions related to scarcity may be present.

OVERVIEW OF THE EXPERIMENTS

We next present five experiments that test our hypotheses. Experiment 1 provides evidence for the cognitive association between the concepts of scarcity and competition using a Lexical Decision Task. Experiment 2 demonstrates that reminders of resource scarcity heighten individuals' competitive orientation, which then prompts them to behave selfishly in conditions where such behavior confers direct personal benefits. Experiment 3 shows that reminders of resource scarcity shift consumers' preferences toward advancing their own welfare and away from advancing the welfare of others. Experiment 4 replicates these results and demonstrates that one's selfish or prosocial orientation moderates the effect of reminders of resource scarcity on behavior. Finally, experiment 5 reveals that reminders of resource scarcity can prompt both selfish and generous behaviors. Specifically, it shows that, in the context of charitable giving, scarcity cues increase donation intentions when the donation offers an opportunity to advance one's own welfare through social signaling; however, the same cues decrease donation intentions in contexts where the donation offers no social signaling value.

EXPERIMENT 1: THE COGNITIVE ASSOCIATION BETWEEN SCARCITY AND COMPETITION

We posit that reminders of resource scarcity activate a competitive orientation because of a cognitive association

between scarcity and competition. Accordingly, experiment 1 was designed to test for this cognitive association.

Method

Seventy-one undergraduate students (26.8% male; $M_{\text{age}} = 20.4$; $SD = 3.0$) participated in a laboratory session in exchange for a small monetary compensation. Participants were randomly assigned to one of two experimental conditions where exposure to reminders of resource scarcity (vs. a control condition) was the manipulated factor.

Participants first completed an episodic recall task adapted from Fischhoff et al. (2003). Specifically, in the scarcity condition, participants were asked to describe three or four episodes when they felt like they "didn't have enough of something" or "resources were scarce." They were next asked to pick two of the episodes they mentioned and describe each of them in detail, explaining what was lacking and what they experienced. In the control condition, participants were first asked to think about and write down three or four things that they did during the past week, then to focus on and describe in detail two of these events.

To test whether recalling past experiences of scarcity activated cognitions related to scarcity, a separate sample of participants drawn from Mechanical Turk, a national online participant pool maintained by Amazon.com ($n = 142$; 57.0% male; $M_{\text{age}} = 31.4$; $SD = 10.8$), was exposed to the manipulation used in the main study and then asked to indicate the extent to which they agreed with the following statements: "My resources are scarce," "I don't have enough resources," "I need to protect the resources I have," and "I need to acquire more resources" (scale: 1 = Strongly disagree to 7 = Strongly agree). Responses to these items were averaged to form an index of experienced scarcity ($\alpha = .89$). Participants in the scarcity condition provided higher ratings on the experienced scarcity index ($M = 5.15$, $SD = 1.20$), compared to those in the control condition ($M = 3.94$; $SD = 1.54$; $F(1, 141) = 24.57$, $p < .001$; $\eta_p^2 = .15$), thus providing evidence that the manipulation was effective.

Following the manipulation, participants completed a computerized Lexical Decision Task (LDT), programmed in Inquisit 3 by Millisecond software. The LDT is designed to provide an implicit measure of semantic associations (Fazio 1990). The more strongly associated the concepts of scarcity and competition are, the faster participants should be at recognizing competition-related words after being exposed to reminders of resource scarcity. Following the procedure from Lepore and Brown (2002), participants were presented with a series of letter strings and were told that their task was to categorize the letter strings as real words (e.g., Tuesday) or non-words (e.g., cudiao) as quickly and accurately as possible. Participants performed 6 practice

trials and then responded to 10 competition-related words (i.e., combative, compete, competing, contest, fight, rival, rivalry, struggle, opponent, battle), 10 neutral words (e.g., beige, Wednesday, plain, etc.), and 30 non-word trials (e.g., fohdib, azbt, roxg, etc.). The order in which these trials were presented was randomized. The main dependent variable was participants' speed of recognition (in milliseconds) for each word.

Finally, all participants completed a mood measure and answered standard demographic questions. Because the scarcity manipulation did not produce any consistent significant effect on mood in this experiment or the subsequent experiments, all information relevant to the mood measures used in these experiments will not be reported in the main text for the sake of brevity. However, all mood measures, along with a statistical analysis of the effects of the scarcity manipulations on the mood measures, are reported in the online appendix.

Results and Discussion

Prior to analysis, incorrect identifications of real words as non-words (and vice versa) were removed from the data set (Fazio 1990). To reduce the impact of outliers, reaction times were then subjected to a natural log transformation, and reaction times exceeding three standard deviations from their cell mean were eliminated from the analysis, following prior work (Bargh and Chartrand 2000; Fazio 1990). Reaction times were then averaged to generate one score for each type of word for each participant. For the ease of interpretation, raw reaction times are presented for descriptive purposes only.

We then conducted a 2 (prime: scarcity vs. control) \times 2 (word type: competition vs. neutral) repeated-measures analysis of variance to test for the effect of reminders of resource scarcity on reaction times. The results showed a significant interaction between the scarcity and word type manipulations ($F(1, 69) = 4.61$; $p = .03$; $\eta_p^2 = .06$). Pairwise comparisons revealed that participants exposed to reminders of resource scarcity were faster to identify words related to competition ($M = 202.81$; $SD = 69.79$) than neutral words ($M = 217.97$; $SD = 65.98$; $F(1, 69) = 6.33$; $p = .01$; $\eta_p^2 = .08$). Conversely, among those in the control condition, there was no significant difference in terms of reaction times between the competition ($M = 218.18$; $SD = 58.73$) and the neutral words ($M = 223.84$; $SD = 60.97$; $F(1, 69) = .18$; $p > .6$; $\eta_p^2 < .01$). These results suggest that competition-related concepts were indeed more accessible among participants in the scarcity condition than among participants in the control condition. Neither the scarcity ($F(1, 69) = 1.36$; $p > .2$; $\eta_p^2 = .02$) nor the word type ($F(1, 69) = 2.50$; $p > .1$; $\eta_p^2 = .03$) manipulations produced a significant main effect on reaction time.

Experiment 1 demonstrated that reminders of resource scarcity activated concepts related to competition, thus providing evidence in support of the cognitive association between scarcity and competition. Experiment 2 builds on these results by testing for convergence on whether reminders of resource scarcity activate a competitive orientation, as well as testing for downstream consequences for this shift in orientation on actual choice behavior.

EXPERIMENT 2: A COMPETITIVE ORIENTATION MEDIATES THE EFFECT OF SCARCITY ON BEHAVIOR

The goal of experiment 2 was to examine if reminders of resource scarcity increase selfish behavior when such behavior confers the most direct benefit to the self, using a consequential financial decision: the decision to donate US\$1 of their participant payment to charity versus keep the money for oneself. We expected that exposing participants to reminders of resource scarcity would increase their competitive orientation, which would reduce their likelihood of donating the money to charity (i.e., increasing their likelihood of keeping the money for themselves).

Method

Fifty-two undergraduate students (32.7% male; $M_{\text{age}} = 20.2$; $SD = 1.6$) participated in a laboratory session in exchange for a monetary compensation of US\$6. Participants were randomly assigned to one of two experimental conditions, where exposure to reminders of resource scarcity (vs. a control condition) was the manipulated factor.

All participants first completed the same episodic recall task as in experiment 1. Next, participants were presented with a real donation opportunity. They were reminded that they would be compensated US\$6 for their participation in the laboratory session and were offered the opportunity to donate US\$1 of their compensation to charity (UNICEF's Relief Fund for the Children of Sudan's Darfur). Following the procedure used in Savary, Goldsmith, and Dhar (2015), in order to frame the decision as private and anonymous, all participants were given their compensation inside an unsealed envelope placed at their workstation prior to beginning the experiment. The envelope was discreetly marked with a code that corresponded to their identification number. During the experiment, participants were asked to indicate their donation decision on the computer and, upon completing the experiment, those who wished to donate were instructed to leave \$1 in the envelope at their workstation. If they chose not to donate, participants were instructed to simply leave the empty envelope at their workstation.

Finally, participants completed a variety of filler scales assessing their feelings and attitudes towards the charity (e.g., “I think that this is a worthwhile cause”), before completing a measure of competitive orientation. Participants indicated their agreement with five items taken from the Hypercompetitive Attitude Scale (Ryckman et al. 1990) that assess competitive tendencies (e.g., “Competition inspires me to excel” and “If I can disturb my opponent in some way in order to get the edge in competition, I will do so;” scale: 1 = Strongly disagree to 5 = Strongly agree). The scores on these five items were averaged to obtain a competitive orientation index ($\alpha = .63$). These items were chosen because none of them mentioned attitudes toward retaining or gaining money, thus limiting the likelihood of any unintended direct associations between the proposed mediator and the dependent variable (i.e. donating money).

Results and Discussion

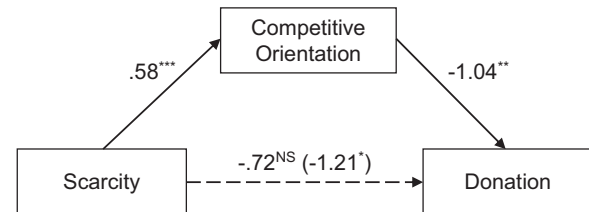
Chi-square analysis revealed that participants in the scarcity condition were significantly more likely to retain the money (i.e., not donate), as compared to participants in the control condition. Specifically, participants exposed to reminders of resource scarcity chose to retain the \$1 at a higher rate (47.4%) than participants in the control condition (21.2%; $\chi^2(1) = 3.87$; $p = .05$; $d = .57$), suggesting that scarcity increased participants’ likelihood of engaging in behavior that advanced their own welfare (here, retaining the money for themselves). Note, no effect of the scarcity manipulation was observed on any of the filler scales ($ps > .2$).

We then tested whether reminders of resource scarcity increased participants’ competitive orientation. An analysis of variance revealed that participants in the scarcity condition reported a higher competitive orientation ($M = 3.71$; $SD = .77$) as compared to participants in the control condition ($M = 3.14$; $SD = .72$; $F(1, 51) = 7.37$; $p = .01$; $\eta_p^2 = .13$).

To test whether a competitive orientation mediated the effect of the scarcity manipulation on donation, we ran a mediation analysis using the bootstrapping technique suggested by Preacher and Hayes (2008). The results, based on 5,000 bootstrapped samples, indicated that reminders of resource scarcity had a significant positive effect on the competitive orientation measure ($\beta = .58$; $SE = .21$; $t = 2.71$; $p = .01$) and that a higher score on this measure had a significant negative effect on the donation rate ($\beta = -1.04$; $SE = .49$; $Z = -2.11$; $p = .03$). Moreover, while the main effect of scarcity on donation was significant ($\beta = -1.21$; $SE = .63$; $p = .05$), the direct effect was not ($\beta = -.72$; $SE = .69$; $p > .2$). Because the 95% bias corrected confidence interval for the indirect effect did not

FIGURE 1

EXPERIMENT 2: A COMPETITIVE ORIENTATION MEDIATES THE EFFECT OF SCARCITY ON DONATION



NOTE.—* indicates $p < .1$; ** indicates $p < .05$; *** indicates $p < .01$; NS indicates not significant

include 0 (95% CI = $[-2.03; -.03]$), the mediation was significant (Preacher and Hayes 2008). A competitive orientation therefore fully mediated the relationship between exposure to reminders of resource scarcity and behavior, thus providing evidence for our proposed psychological mechanism, consistent with the results observed in experiment 1.

EXPERIMENT 3: SCARCITY PROMPTS CONSUMERS TO ADVANCE THEIR OWN WELFARE

Thus far we have demonstrated that consumers who were exposed to reminders of resource scarcity experienced a heightened competitive orientation (experiments 1 and 2), which increased behavior that advanced their own welfare (retaining the money, as opposed to donating it; experiment 2). In order to provide convergent evidence that reminders of resource scarcity shift consumers’ preferences toward options that advance their own welfare and away from those that advance the welfare of others, in experiment 3 we utilized the Triple-Dominance Measure (TDM; Van Lange et al. 2007; Van Lange et al. 1997), which assesses the extent to which an individual is willing to sacrifice personal gains in order to benefit others.

Method

Sixty-nine undergraduate students (30.4% male; $M_{age} = 19.9$; $SD = 1.2$) participated in a laboratory session in exchange for a small monetary compensation. Participants were randomly assigned to one of two experimental conditions where exposure to reminders of resource scarcity (vs. a control condition) was the manipulated factor. Participants first completed an episodic recall task, adapted from Rucker, Dubois, and

Galinsky (2011). Specifically, in the scarcity condition, participants were asked to recall an episode in which they experienced a sense of scarcity, that is, a situation in which they felt that resources were scarce. They were instructed to take a moment to vividly recall what happened and what it felt like to be in the situation, and were then asked to describe the episode in detail. In the control condition, participants were asked to recall an episode in which they went to the grocery store and provided with the same instructions.

After completing the manipulation, participants completed the 9-item Triple-Dominance Measure (Van Lange et al. 2007; Van Lange et al. 1997; see online appendix for stimuli). The TDM is based on a series of decomposed games, wherein participants are asked to allocate points between themselves and an unknown, anonymous other (Messick and McClintock 1968; Van Lange et al. 2007; Van Lange and Kuhlman 1994; Van Lange et al. 1997). For each game, respondents were asked to choose one of three possible allocations: one allocation option offering the greatest overall gain for both parties (i.e., joint outcome maximization), one offering the greatest personal gain in absolute terms (i.e., absolute outcome maximization), and one offering the greatest relative gain for the self over the gain earned by the other party (i.e., relative outcome maximization; Van Lange and Kuhlman 1994; Van Lange et al. 1997). As an example, one item gave participants the choice between an option of allocating 80 points for self and 80 points for other (providing the largest joint outcome), an option of allocating 92 points for self and 40 points for other (providing the greatest personal gain in absolute terms), and an option of allocating 80 points for self and 0 points for other (providing the greatest relative gain for the self over the gain earned by the other party; Van Lange et al. 2007). The order in which the options were presented was varied across items.

Allocation options that increase one's absolute or relative gains demonstrate a greater drive to advance one's own welfare as compared to the welfare of others, whereas allocation options that offer the largest joint outcome demonstrate a drive to advance others' welfare as well as one's own. Thus, we expected that participants in the scarcity condition would express allocation preferences that were less consistent with joint outcome maximization and more consistent with absolute and relative outcome maximization as compared to the control condition, due to a heightened competitive orientation.

Following the measure's instructions (Murphy, Ackermann, and Handgraaf 2011; Van Lange et al. 1997), prior to making their point-allocation decisions, participants were asked to imagine that the points had value to themselves as well as to the other person. The other was

said to be someone whom participants did not know, whom they would never knowingly meet in the future, and whom would also make choices.

Results and Discussion

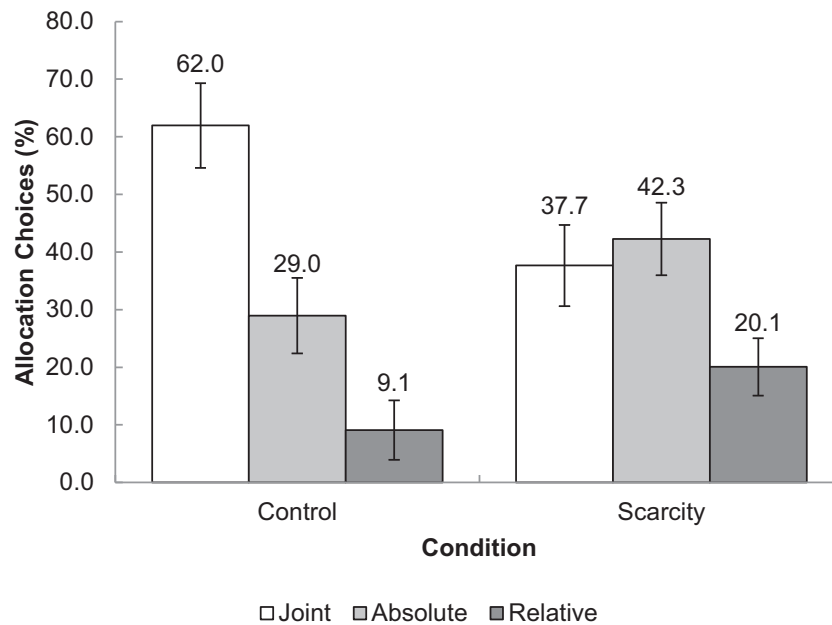
The repeated nature of the data has led researchers using the TDM to simplify their analyses by creating scoring rules (Murphy et al. 2011; Van Lange et al. 1997). These scoring rules entail counting the number of joint, absolute and relative outcome maximizing allocations each participant selects. If the participant chooses six or more allocations from a particular category (e.g., joint outcome maximizing), then she is designated as being of that "type" (e.g., a joint outcome maximizer). If a participant does not choose at least six options from one category, then she is not categorized (i.e., coded as missing data). The data is thus reduced to one categorical variable, and the analyses are then conducted on that categorical variable, with observations that cannot be classified being excluded from the analysis.

However, in order to account for the repeated nature of the measure, and preserve the richness of the data by retaining all observations, we instead chose to perform a hierarchical multinomial logistic regression on the disaggregated data (see online appendix for the regression model and coefficients). Using the nine choices per participant, the model empirically assumes that the probability that each participant makes relative (ϕ_1), absolute (ϕ_2), and joint ($1-\phi_1-\phi_2$; baseline category) outcome maximizing allocations is unobserved and must be estimated. The model then uses two equations and our manipulation of scarcity (vs. control) to predict 1) the probability that each participant is making relative outcome maximizing allocations (ϕ_1 ; over joint), and 2) the probability that each participant is making absolute outcome maximizing allocations (ϕ_2 ; over joint).

Results show that when participants were exposed to reminders of resource scarcity their preferences shifted away from joint outcome maximizing allocations and toward both absolute ($\beta = 1.69$; $SE = .74$; $t(67) = 2.28$; $p = .03$) and relative ($\beta = 2.40$; $SE = 1.07$; $t(67) = 2.25$; $p = .03$) outcome maximizing allocations, as compared to the control condition. Specifically, while the proportion of joint outcome maximizing allocations (62.0%) was higher than the proportion of both absolute (29%; $\beta = -1.04$; $SE = .46$; $t(67) = 2.24$; $p = .03$) and relative (9.1%; $\beta = -3.33$; $SE = .73$; $t(67) = 4.54$; $p < .001$) outcome maximizing allocations in the control condition, this result shifted in the scarcity condition. Indeed, there was no difference between the proportion of joint and absolute outcome maximizing allocations (37.7% vs. 42.3% respectively; $\beta = .64$; $SE = .58$; $t(67) = 1.12$; $p > .2$), or between the joint and

FIGURE 2

EXPERIMENT 3: OUTCOME MAXIMIZING ALLOCATIONS AS A FUNCTION OF SCARCITY



NOTE.—Error bars represent ± 1 standard error.

relative outcome maximizing allocations (37.7% vs. 20.1% respectively; $\beta = -.92$; $SE = .78$; $t(67) = 1.19$; $p > .2$) among those who were exposed to reminders of resource scarcity.

In summary, the distribution of the different types of allocations was significantly skewed toward joint outcome maximizing allocations in the control condition. However, it shifted toward allocations that focused on one's own welfare (absolute and relative outcome maximizing) in the scarcity condition. Hence, consistent with the results of experiment 2, reminders of resource scarcity shifted individuals' preferences toward outcomes that advance their own welfare, and away from outcomes that advance the welfare of others.

Our theoretical framework suggests that the shift in preferences observed in experiment 3 can be explained by an underlying shift in competitive orientation, with reminders of resource scarcity increasing preferences for outcomes that advance one's own welfare due to an increase in one's competitive orientation (experiments 1 and 2). Having shown support for this, the next experiment tests for a theoretically relevant boundary condition to the observed effects, people's prosocial or selfish tendencies, in order to provide further convergence on our theory. Additionally, experiment 4 utilizes a different means to manipulate exposure to reminders of resource scarcity and tests for convergence with prior results.

EXPERIMENT 4: PROSOCIAL VERSUS SELFISH TENDENCIES MODERATE THE EFFECT OF SCARCITY ON BEHAVIOR

Prior research has demonstrated that individual differences exist in the extent to which people value the welfare of others in relation to their own (Messick and McClintock 1968), a preference typically referred to as social value orientation (SVO). Individuals that exhibit a prosocial orientation have a tendency to make decisions that maximize their own gains, showing less concern for others' gains and losses. In contrast, individuals that exhibit a prosocial orientation have a tendency to consider not only their own gains but also others' gains and losses when making decisions (Murphy et al. 2011; Van Lange et al. 2007).

The goal of experiment 4 is to provide convergence on our theoretical account by testing whether individual differences in SVO moderate the effect of reminders of resource scarcity on behavior. If, as we argue, reminders of resource scarcity motivate people to engage in behaviors that benefit the self, this effect should be particularly pronounced among individuals who are predisposed to prioritize their own welfare over that of others. Thus, we expect that selfish behavior in response to a scarcity prime will be accentuated for individuals that exhibit a prosocial orientation, and attenuated for individuals that exhibit a prosocial orientation (Giacomantonio et al. 2010). We base this

prediction on prior work demonstrating that motivational orientations are often most effectively primed among individuals for whom the orientation (e.g., competitiveness) is more cognitively accessible (e.g., Bargh 1989; Lisjak, Molden, and Lee 2012).

Method

One hundred and fifty-seven individuals (41.4% male; $M_{\text{age}} = 35.4$, $SD = 12.4$) recruited from Amazon Mechanical Turk participated in a series of experiments in exchange for a small monetary compensation. In order to activate cognitions related to scarcity, participants in the scarcity condition were sequentially shown five different resources (gasoline, sugar, water, wheat and electricity) and asked to list three things they would not be able to do if those resources were unavailable. In the control condition, participants were sequentially shown the same five resources and asked to list three things they could do with each resource.

This manipulation allowed us to expose participants to reminders of resource scarcity while keeping the content of the manipulation broadly consistent across conditions. A separate pre-test conducted on a different sample of participants drawn from Amazon Mechanical Turk ($n = 41$; 36.6% male; $M_{\text{age}} = 31.2$, $SD = 12.7$), confirmed that participants indeed listed similar activities in both conditions. To illustrate, the top three responses to “sugar” (i.e., sweetening food or drinks, baking or cooking, and enjoying food) represented about 86% of all responses and did not significantly differ between conditions ($ps > .6$).

To test whether the listing task activated thoughts related to resource scarcity, another separate sample of different participants drawn from Amazon Mechanical Turk ($n = 196$; 61.2% male; $M_{\text{age}} = 31.2$, $SD = 10.8$) was exposed to the manipulation used in the main study and then asked to indicate the extent to which they agreed with the following statements: “My resources are scarce,” “I don’t have enough resources,” “I need to protect the resources I have,” and “I need to acquire more resources” (scale: 1 = Strongly disagree to 7 = Strongly agree). Responses to these items were averaged to form an index of experienced scarcity ($\alpha = .85$). Participants in the scarcity condition provided higher ratings on the experienced scarcity index ($M = 4.32$; $SD = 1.33$) than those in the control condition ($M = 3.85$; $SD = 1.50$; $F(1,195) = 5.19$, $p = .02$; $\eta_p^2 = .02$), thus providing evidence that the manipulation was effective.

After completing the scarcity manipulation, participants played a simulated dictator game. They were instructed to imagine that they were about to play a game on the computer with another anonymous individual. The goal of the game was for them to allocate US\$5 between themselves and the other player. These instructions were based on standard instructions used in the literature (Camerer and

Thaler 1995). All participants used a scale anchored at \$0 and \$5 (in \$1 increments) to indicate the amount of money they were willing to allocate to the other person.

Participants then completed an unrelated study lasting approximately 5 minutes before completing the Social Value Orientation Slider Measure (Murphy et al. 2011), a six-item measure designed to assess individual differences in resources allocation preferences between oneself and another person. This measure uses a series of decomposed games (Messick and McClintock 1968) that involve making choices between different combinations of outcomes for oneself and for a hypothetical other. Specifically, each item gives participants a choice among nine alternatives, each corresponding to different resource allocation choices over a defined continuum of joint payoffs (see online appendix for stimuli; Murphy et al. 2011). Outcomes were presented in terms of points and participants were asked to imagine that the points had value to themselves as well as to the other person. The other person was said to be someone whom participants did not know, whom they would never knowingly meet in the future, and whom would also make choices, which framed the choice situations as ones involving some interdependence between the participant and the other (Murphy et al. 2011).

Results and Discussion

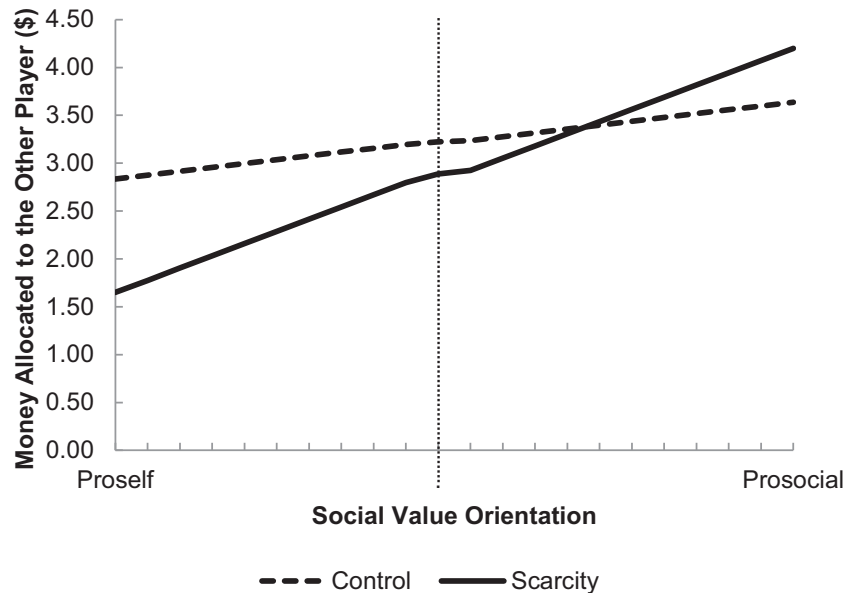
An analysis of variance testing for the effect of the scarcity manipulation on allocation behavior revealed that, after being exposed to reminders of resource scarcity, participants allocated less money to the other player ($M = \$2.86$; $SD = 1.25$) than participants in the control condition ($M = \$3.24$; $SD = 1.01$; $F(1, 156) = 4.46$; $p = .04$; $\eta_p^2 = .03$). This pattern replicates the results observed in experiments 2 and 3 by demonstrating that exposure to reminders of resource scarcity can promote behavior that advances one’s own welfare at the expense of others.

A SVO score was then computed for each participant following the procedure specified in Murphy et al. (2011), where lower scores indicate a more proself orientation and higher scores indicate a more prosocial orientation. Because the SVO measure was administered at the end of the same experimental session, we first examined whether the initial scarcity manipulation had any effect on this measure, using an analysis of variance. The results confirmed that the scarcity manipulation did not produce any significant effect on the SVO measure ($p > .3$), which therefore was used as a moderator in the subsequent analysis.

To test for the moderating effect of social value orientation on the effect of reminders of resource scarcity on allocation behavior, we regressed the amount of money allocated to the other player on (i) scarcity (dummy coded: -1 = control, 1 = scarcity), (ii) SVO (continuous measure), and their interaction (Hayes and Matthes 2009). The results

FIGURE 3

EXPERIMENT 4: AMOUNT OF MONEY ALLOCATED TO THE OTHER PLAYER AS A FUNCTION OF SCARCITY AND SVO



showed a significant main effect of scarcity on the amount of money allocated to the other player ($\beta = -.38$; $SE = .14$; $t = 2.83$; $p = .005$), which suggests that, overall, participants exposed to reminders of resource scarcity subsequently allocated less money to the other player compared to participants in the control condition. This main effect replicates the results documented in studies 2 and 3. Moreover, the results showed a significant effect of SVO on the amount of money allocated to the other player ($\beta = .02$; $SE = .005$; $t = 4.07$; $p < .001$), which suggests that the more participants exhibited a prosocial orientation, the more money they allocated to the other player. Most importantly, there was a significant interaction between the scarcity manipulation and SVO on the allocation measure ($\beta = .01$; $SE = .005$; $t = 2.12$; $p = .04$), as predicted.

We conducted two additional steps to further examine this interaction. First, we tested for the effect of scarcity on monetary allocations at the mean value of the SVO. Here, we observed a marginally significant effect of scarcity ($\beta = -.16$; $SE = .08$; $t = 1.90$; $p = .06$) revealing that participants exposed to reminders of resource scarcity allocated less money to the other player ($M = \$2.90$) compared to participants in the control condition ($M = \$3.22$), at the mean value of SVO. Next, a floodlight analysis (Spiller et al. 2013) was performed to decompose the interaction. Specifically, we used the Johnson-Neyman technique to identify the range(s) of SVO for which the simple effect of the scarcity manipulation was significant (Hayes 2013). This analysis revealed that there was a significant negative effect of the scarcity manipulation on the amount of

dollars allocated to the other player for any value of SVO less than 21.27 ($\beta = -.17$; $SE = .08$; $t = 1.97$; $p = .05$), but not for any value of SVO greater than 21.27 (see online appendix).

Finally, we examined the slope of SVO at each level of the scarcity manipulation (Aiken and West 1991). The slope of SVO was significant in the scarcity condition ($\beta = .03$; $SE = .007$; $t = 4.52$; $p < .001$), but not in the control condition ($\beta = .009$; $SE = .007$; $t = 1.33$; $p > .1$), suggesting that allocations differed by SVO in the scarcity but not the control conditions.

Taken together, these results provide additional support for our theoretical account, by demonstrating that individual differences in proself versus prosocial orientations moderate the effect of reminders of resource scarcity on behavior. Specifically, we find that reminders of resource scarcity generally increased selfishness. However, this effect was particularly pronounced among participants who were predisposed toward behaving more selfishly, and was not observed among those who were predisposed toward being prosocial. This suggests that even though exposure to reminders of resource scarcity generally promotes the desire to advance one's own welfare across individuals, there may be contexts in which selfish outcomes are not always pursued as a result, such as cultures that are characterized by a prosocial orientation (Markus and Kitayama 1991).

Having demonstrated robust support for the prediction that reminders of resource scarcity promote a competitive orientation (experiments 1 and 2), which increases behaviors that advance one's own welfare (experiments 2, 3 and

4), experiment 5 next addresses the important question of whether there are conditions under which reminders of resource scarcity can promote behaviors that are not exclusively selfish. Specifically, we test if there are conditions under which reminders of resource scarcity can significantly increase generosity, as compared to a control condition. Through testing this, experiment 5 provides convergence on the underlying psychological mechanism and suggests important policy implications as to how governmental and non-governmental organizations may be able to promote behavior in the interest of the greater good (e.g., pooling resources) in contexts where reminders of resource scarcity might be particularly salient (e.g., times of economic recession or commodity shortages).

EXPERIMENT 5: WHEN SCARCITY PROMOTES SELFISH VERSUS GENEROUS BEHAVIOR

The goal of experiment 5 is to test the proposition that reminders of resource scarcity can lead to both selfish and generous behavior, under different conditions. We test this hypothesis in the context of charitable giving, because charitable giving is, by definition, a generous act; however, it can also be associated with benefits to the self (Harbaugh, Mayr, and Burghart 2007). In experiment 2, we observed that when faced with a private and anonymous donation decision, participants who had been exposed to reminders of resources scarcity were less likely to donate a portion of their payment to charity, as compared to those in the control condition. We have argued that this occurred because in this context (i.e., a private decision), retaining the money for oneself offers the most direct means to advance one's own welfare. However, prior research also suggests that when one's decisions are observable by an immediate audience (e.g., the cashiers and other customers waiting in line at a cash register), individuals who are motivated to advance their own welfare (e.g., gain status) are often *more* likely to engage in costly altruism (e.g., spend money on goods that benefit others), due to the associated social signaling benefits (Griskevicius et al. 2010). This suggests that the nature of the decision context (public vs. private) should moderate the previously observed effect of reminders of resource scarcity on charitable donation intentions.

In experiment 5, we test this prediction by manipulating whether or not participants were exposed to reminders of resource scarcity in addition to manipulating whether or not a charitable donation decision was described as public versus private. We propose that reminders of resource scarcity should decrease charitable donation intentions when the donation decision is private, replicating the results of experiment 2, yet increase charitable donation intentions when the donation decision is public and thus can yield social signaling benefits.

Method

Three hundred and sixty undergraduate students (28.3% male; $M_{age} = 22.7$; $SD = 4.9$) participated in the experiment. Participants either completed the experiment as part of a laboratory session in exchange for US\$6 (46.9% of the sample), or completed the experiment as part of an online experimental session in exchange for a chance to win US\$25 (53.1% of the sample). The nature of their participation (in the laboratory vs. online) did not affect any of the statistical outcomes described subsequently and hence this variable is not discussed further.

This experiment used a 2 (prime: scarcity vs. control) \times 2 (decision context: private vs. public) between-participants design. All participants first completed the episodic recall task described in experiment 1. Next, all participants read the following scenario about charitable giving:

"Imagine that you have started a new job. Your new company has a donation program, where they encourage employees to donate to charity. When you arrive, they ask you whether you would be interested in making a donation. You can choose any charitable cause to donate to and you can donate as much or as little money as you would like. There will be no work-related consequences based on whether or not you choose to donate and/or how much you give."

In the *private decision context* condition, participants then read: "Donations are entirely anonymous; no one in the company will be able to know whether you made a donation or not." In the *public decision context* condition, participants instead read: "However, your name, picture and the amount of money you donated will be posted on the 'Donation Page' of your company's newsletter the following month, if you do give." The main dependent variable was participants likelihood of making a donation (scale: 1 = Very unlikely to 7 = Very likely).

Finally, two items were embedded within the demographics questions at the end of the experiment in order to measure participants' general attitudes and behaviors towards charitable giving (i.e., "Donating to charity is important to me" and "I regularly make donations to charitable organizations I care about;" scale: 1 = Strongly disagree to 7 = Strongly agree). These items were averaged to form a predisposition toward charitable giving index ($\alpha = .82$), which was used as a covariate in the analyses in order to control for participants' baseline charitable donation preferences, in line with previous work (Kleber et al. 2013; LaTour and Manrai 1989; see online appendix for the analyses without this covariate).

Results and Discussion

We conducted a 2 (prime: scarcity vs. control) \times 2 (decision context: private vs. public) ANCOVA to predict donation intentions, including predisposition toward charitable giving as a covariate (Kleber et al. 2013; LaTour and

Manrai 1989). Consistent with our predictions, the results showed a significant interaction between the scarcity and decision context manipulations ($F(1, 359) = 14.38$; $p < .001$; $\eta_p^2 = .04$). Pairwise comparisons revealed that, when charitable giving did not offer a means to advance one's own welfare, because the donation decision was private, participants who were exposed to reminders of resources scarcity reported being less likely to donate ($M = 4.08$; $SE = .16$) than those in the control condition ($M = 4.84$; $SE = .16$; $F(1, 359) = 10.86$; $p = .001$; $\eta_p^2 = .03$), providing a conceptual replication of the results of experiment 2, and showing convergence with the results of experiments 3 and 4. Conversely, when one's own welfare could be advanced through the act of charitable giving, because the donation decision was public, participants who were exposed to reminders of resource scarcity reported being more likely to donate ($M = 4.50$; $SE = .17$) than those in the control condition ($M = 4.05$; $SE = .14$; $F(1, 359) = 4.14$; $p = .04$; $\eta_p^2 = .01$). Hence, when one's own welfare could be advanced through the act of charitable giving, exposure to reminders of resource scarcity increased generosity.

Neither the scarcity manipulation nor the decision context manipulation produced a significant main effect on the donation intention measure ($ps > .2$). As expected, the effect of the covariate (predisposition toward charitable giving) had a significant positive effect on donation intentions ($F(1, 359) = 147.55$; $p < .001$; $\eta_p^2 = .29$). Importantly, however, there was no effect of the scarcity manipulation ($p > .9$), the decision context manipulation ($p > .5$) or their interaction ($p > .7$) on the predisposition measure.

These results thus offer one possible explanation as to why, under certain conditions, individuals lacking resources may be more likely to engage in generous behavior, as compared to those whose resources are more abundant (Kraus et al. 2012; Piff et al. 2010). When resources are scarce, people may be dependent on others for valuable commodities (Kraus et al. 2012). As a result, they may behave in a seemingly generous way in order to ultimately advance their own welfare (Aarøe and Petersen 2013). Indeed, in an additional study (see online appendix), we found that exposure to reminders of resource scarcity increased generosity in gift-giving (i.e., gift-giving intentions and willingness to spend on a gift), as compared to a control condition, when the personal benefits associated with gift-giving (i.e., securing future favors from the gift recipient) were made salient (vs. not).

Although not central to our prediction, it is interesting to note that, in this experiment, participants in the control condition expressed lower donation intentions in the public (vs. private) decision context condition. Certain prior findings have shown that charitable giving increases when one's behavior is publically observable (Ariely, Bracha, and Meier 2009; Karlan and McConnell 2014), a finding that appears to be in contrast with our results. However, other researchers

have qualified these results, by illustrating important conditions under which this effect is attenuated or reversed (e.g., Ariely et al. 2009; Griskevicius et al. 2010), consistent with what we observe. In particular, work by Griskevicius and colleagues (2010) demonstrated that consumers are more motivated to engage in costly prosocial behaviors in a public (vs. private) decision context only when a self-enhancement goal, such as gaining status, is active. In the absence of the self-enhancement goal, the authors observed that this effect reversed, similar to what we observed in the control condition. These findings may be explained in part by the fact that consumers often refrain from engaging in public prosocial behavior (e.g. donating money to charity when the donation is visible), when this behavior could be perceived as being motivated by self-interest (i.e. publicly donating money to show off and/or gain status), rather than altruism (Ariely et al. 2009; Newman and Cain 2014).

GENERAL DISCUSSION

The current research contributes to advancing the understanding of the psychological processes instantiated by reminders of resource scarcity. Specifically, we show that exposure to scarcity-related cues prompts consumers to engage in behaviors that advance their own welfare, through the activation of a competitive orientation. In support of our theoretical account, experiment 1 provides evidence for a cognitive association between scarcity and competition. Next, experiment 2 shows that reminders of resource scarcity can have implications for consumer decision making, through a shift in competitive orientation. This competitive orientation manifests in an increased desire to advance one's own welfare, which can produce behaviors that prioritize benefits to the self over benefits to others (e.g., selfish behaviors, experiments 2 and 3). Consistent with this account, experiment 4 shows that this tendency toward selfish behavior following exposure to reminders of resource scarcity occurs across individuals, and is particularly pronounced among individuals with a prosocial (versus prosocial) orientation. Finally, experiment 5 builds on these results by showing that this competitive orientation need not exclusively produce selfish outcomes. Reminders of resource scarcity can in fact promote generous behaviors when the connection between such behaviors and advancing one's own welfare is made salient.

In doing so, the current research provides three important theoretical contributions. First, it offers a novel theoretical account that may help reconcile prior conflicting findings regarding how scarcity-related cues affect social behavior. Prior research has provided mixed evidence as to whether reminders of resource scarcity induce individuals to become more selfish (Holland et al. 2012; Sasson et al. 2012), or more generous towards others (Kraus et al. 2012; Piff et al. 2010). Our research suggests that when

consumers are exposed to reminders of resource scarcity, they adopt a competitive orientation. This competitive orientation promotes the advancement of one's own welfare, a motive that can manifest either in increased selfishness or in increased generosity as a function of the associated benefits to the self. Thus, the current findings offer a first step towards understanding why scarcity-related cues may promote different behavioral responses in different contexts.

Second, the present research adds to the existing literature on scarcity and competition (Fülöp 2004; Griskevicius et al. 2009; Grossman and Mendoza 2003; Keller 1992). Prior research has widely acknowledged that resource scarcity increases competition for the resource that is scarce. However, less is known about whether mere reminders of resources scarcity can activate a competitive orientation that is more general, and thus capable of producing subsequent behavioral consequences with respect to resources that are not actually scarce. The current research is the first to our knowledge to provide evidence that reminders of resource scarcity (e.g., listing things one could not do without gasoline, sugar, water, etc.) can cognitively activate a more general competitive orientation, which then affects subsequent decision making (e.g., charitable giving) in behavioral contexts that are not explicitly linked to the resource that was described as scarce.

Finally, the current research makes related contributions to the growing literature on scarcity (e.g., Mullainathan and Shafir 2013). Prior work in this area has demonstrated (i) that resource scarcity shifts one's attentional focus toward the resource that is scarce (e.g., a poor individual's mind will be more occupied by money-related thoughts than a rich individual; Shah, Mullainathan, and Shafir 2012) and (ii) that resource scarcity increases the value associated with the resource that is scarce (e.g., money will be more valuable to a poor individual; Shah, Shafir, and Mullainathan 2015; Spiller 2011). As described, we provide evidence demonstrating that resource scarcity can have implications for judgments and decisions that are not directly linked to the resource that is scarce, through the activation of a competitive orientation. In doing so, we extend this work by demonstrating that resource scarcity can have more general and further reaching behavioral consequences than previously considered.

In addition to offering evidence for our predicted effect and our proposed process, the current data also addresses certain possible alternative explanations for the results. First, one might argue that these results could have occurred because reminders of resource scarcity increased negative affect and/or negative mood, which could have explained the ensuing behavioral consequences. Although it might be logical to assume that reminders of resource scarcity would increase negative mood, we observe that a shift in negative affect/mood cannot account for any of the observed results (see online appendix).

A second alternate account for the observed results might suggest that exposure to reminders of resources scarcity increased one's focus on the present as opposed to the future, which shifted preferences toward outcomes offering the most direct benefit to the self. However, this account is not supported by the results of experiment 5 (public decision context), which revealed that participants in the scarcity condition were willing to sacrifice more resources in the present (i.e., higher donation intentions) than those in the control condition in order to accrue a self-benefit that would only be reaped in the future (i.e., social signaling rewards). This suggests that reminders of resource scarcity might induce a strategic and forward-looking response to resource constraint, which is not strictly present-focused.

A third and final alternate account for our findings might suggest that reminders of resource scarcity increased one's focus on the self as opposed to others, which drove the observed shift in preferences. However, the results of experiments 5 (public decision context) again demonstrate that consumers who are exposed to reminders of resource scarcity strategically considered how others would react to their decisions (i.e., likelihood of valuing the social signal) when forming their preferences. This suggests that reminders of resource scarcity may favor a focus both on the self as well as on others, in order to facilitate the identification of behaviors that allow for the advancement of one's own welfare.

Limitations and Future Research Directions

Despite the robustness of the results presented in this article, this research has limitations that offer fruitful opportunities for further research. First, future research might extend the marketing implications of this work by testing if scarcity marketing tactics (e.g., promotions that emphasize how few items are left or how little time remains to buy them; Cialdini 2009; Inman, Peter, and Raghubir 1997) might produce parallel behavioral effects to the more generalized cues of resource-scarcity used in the present experiments. Although the two types of scarcity cues differ qualitatively in terms of whether they are attached to a specific object (scarcity marketing) or not (generalized scarcity cues), researchers have yet to examine whether these different types of scarcity might effectively instantiate the same psychological processes. Through testing these effects, one could form a more general framework for understanding the relationship between different types of scarcity and a competitive orientation.

Further, having observed that exposure to reminders of resource scarcity promotes behavior that advances one's own welfare through the activation of a competitive orientation, another interesting extension of this work would be to compare the effects of abundance-related cues on similar dependent measures. This is particularly interesting to consider given that throughout history, periods of recession

and scarcity have typically alternated with periods of economic expansion and abundance (Chakravarthy and Booth 2004; Griskevicius et al. 2013). While some research has investigated how being raised in environments of deprivation versus abundance affects choice patterns later in life (e.g., Griskevicius et al. 2013; Laran and Salerno 2013), little is known about the psychological processes that are instantiated in response to abundance-related cues and what effects they might have on decision making. Future research might examine this by contrasting how cues of resource abundance versus cues of resource scarcity affect consumer decision making.

Finally, another interesting extension of this work might be to test if reminders that others experience resource scarcity instantiate similar or different psychological processes as compared scarcity cues that are relevant to the self. On the one hand, being reminded that others experience scarcity could cause consumers to mentally simulate themselves experiencing scarcity, and thus the two manipulations may promote similar results. On the other hand, reminders that others experience scarcity could cause consumers to consider their own (relative) abundance, which might instantiate different psychological processes.

Practical Implications

The current research suggests several important practical implications. First, our results offer implications for policy makers designing communications intended to promote communal behaviors in service of the greater good. For example, in contexts where scarcity-related cues are present (e.g., times of recession or commodity shortages) communications should emphasize the personal benefits associated with contributing to the greater good (e.g., paying taxes) in an effort to promote compliance. For instance, paying taxes might be framed as a means to demonstrate one's economic success. The same recommendation extends to contexts where cognitions related to scarcity may be situationally triggered, such as the workplace (e.g., due to time constraints). Here, in order to promote communally oriented behaviors (e.g., assisting colleagues), a manager may wish to offer personally rewarding incentives for doing so, in order to cater to the desire to advance one's own welfare that is triggered by reminders of scarcity.

Our results also suggest implications for marketers of products that are positioned around prosocial benefits, such as "green" products (i.e., environmentally sustainable goods) or charitable giving. Despite the fact that people often express support for prosocial causes, products with prosocial benefits are often unsuccessful in the marketplace (Devinney, Auger, and Eckhardt 2010). We argue that one reason this may be is that such products are often designed to address scarcity-related concerns. To illustrate, hybrid automobiles were designed in part to address concerns about the limited supply of oil. To the extent that these products

are associated with scarcity or scarcity-related concerns, it is possible that such items could activate cognitions related to scarcity in the mind of the consumer (Lang, Bradley, and Cuthbert 1998) and, as a result, activate a competitive orientation. If so, marketing communications that highlight the prosocial benefits of the product (e.g., reduced greenhouse gas emissions) may be less effective than communications emphasizing the personal benefits one can accrue through purchase (e.g., saving money at the pump).

In summary, the findings presented here advance our understanding of how being exposed to scarcity-related cues affects consumers' motivational orientation and, as a consequence, subsequent behavior. Across five studies, we demonstrate that reminders of resource scarcity induce a shift in competitive orientation, which in turn motivates people to advance their own welfare. Although further research is necessary to fully understand the boundaries of these effects, this research provides an important step towards a better understanding of the psychology of scarcity.

DATA COLLECTION INFORMATION

The first author supervised the collection of data for the first experiment by research assistants at the Northwestern University Kellogg School of Management Behavioral Research Lab in the spring of 2013 and analyzed these data. The first and second authors jointly managed the collection of data for the second experiment by research assistants at the Northwestern University Kellogg School of Management Behavioral Research Lab in the spring of 2012. The first and second authors jointly analyzed these data. The third author managed the collection of data for the third experiment by research assistants at the New York University Stern School of Business Center for Behavioral Research in the spring of 2013. These data were analyzed by the first author with the support of two other marketing professors at Northwestern University. The second author conducted the collection of data for the fourth experiment using Amazon Mechanical Turk, as described in the methods section, in the fall of 2011. The first author analyzed these data. The first and third authors managed the collection of data for the fifth experiment. The first author supervised the collection of data by research assistants at the Northwestern University Kellogg School of Management Behavioral Research Lab, and the third author conducted the collection of data using the New York University Stern School of Business Center for Behavioral Research's online panel, in the winter of 2015. The first author analyzed these data.

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