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Distinct impacts of financial scarcity and natural resource scarcity on sustainable choices and motivations

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Abstract

The current study examined how financial scarcity and natural resource scarcity independently and interactively influence sustainable choices and motivations. Participants performed a shopping task where they chose between sustainable and conventional products, and rated their motivations for their choice. We found that financial scarcity reduced sustainable product choices, lowered pro-environmental motivations, but increased motivations to save financial costs (Experiment 1). In contrast, perceived scarcity of natural resources (i.e., water) increased sustainable choices and pro-environmental motivations (Experiment 2). By combining financial and water scarcity, we further replicated and highlighted the distinct impacts of financial scarcity and water scarcity on sustainable choices and motivations (Experiment 3). Our results suggest that the abundance of financial resources or perceived natural resource scarcity can increase green consumer choices and motivations. The findings provide implications for environmental initiatives and campaigns to promote sustainable choices for people with different socio-economic backgrounds and different levels of environmental resources.

1 | INTRODUCTION

There are significant psychological consequences associated with living under conditions of scarcity. Yet, when it comes to the conservation of shared natural resources, the relationship between the scarcity mindset and individual environmental choices remains unexamined. On the one hand, it seems straightforward that perceiving natural resources as scarce, as in the case of drought or decreased biodiversity, may increase conservation motivations and behaviors (Barnett & Morse, 2013; March, Domènech, & Saurí, 2013). On the other hand, a scarcity of financial resources, as with those living in conditions of poverty, may be a barrier for conservation behaviors due to a lack of access to tools and green infrastructure or a perception of "green" consumer goods as cost-prohibitive (Clark, Kotchen, & Moore, 2003; Gifford & Nilsson, 2014; Mullainathan & Shafir, 2013; Ottman, Stafford, & Hartman, 2006; Reames, Reiner, & Stacey, 2018). Although green behavior remains stubbornly associated with a higher socioeconomic status many green behaviors not only help save natural resources like fresh water but also help lower financial costs by reducing energy consumption. What explains this apparent paradox? The current work offers one possible answer—that the motivations to engage in green behavior may vary by perceived scarcity and may, therefore, impact the extent to which consumers make sustainable choices.

1.1 | Environmental motivations

A vast body of literature on sustainable behavior suggests that it is difficult to motivate people to conserve natural resources, as the immediate benefits of individual consumption often overshadow the long-term benefits of collective conservation (see Hardin, 1968). However, several factors can successfully foster pro-environmental behavior. These factors may be endogenous to the individual (e.g., values and beliefs; Steg & Vlek, 2009), exogenous (e.g., social norms and culture; Keizer & Schultz, 2018), or structural (e.g., nudges and incentives; Sachdeva, Jordan, & Mazar, 2015). One of the most widely studied value-belief-norm model proposed by Stern and

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colleagues links a range of beliefs and moral obligations to pro-environmental behavior, suggesting that moral convictions drive conservation behaviors (see also Kaiser, Hübner, & Bogner, 2005). Values expressed in terms of the biospheric or environmental benefits have been repeatedly linked to environmental concern and care relative to more anthropocentric values, such as concern for human health or valuing the aesthetic aspect of nature (De Groot & Steg, 2008; Schultz, 2001; Stern, Dietz, & Kalof, 1993). Furthermore, recent research suggests that people will sometimes consume sustainable products in a conspicuous way in order to signal altruism, which can elevate their public reputation (Griskevicius, Tybur, & Van den Bergh, 2010). Another example is that people are more likely to donate to proenvironmental organizations if they are primed to consider their legacy (Zaval, Markowitz, & Weber, 2015).

Conversely, financial incentives often fail to motivate sustainable behavior (Asensio & Delmas, 2015; Bolderdijk, Steg, Geller, Lehman, & Postmes, 2013). As Bolderdijk et al. (2013) found, when customers at a car service station were randomly assigned to either receive an economic appeal or an environmental appeal to check their tire pressure, participants in the latter group were significantly more likely to do so (almost 1 in 10 versus none!). One reason might be that even in cases where cost savings are a powerful motivator (e.g., purchasing a hybrid vehicle; Ozaki & Sevastyanova, 2011), these purchases require a large upfront cost and the savings accrue in small amounts over a long timescale. For example, retrofitting improved thermal roof insulation may have a payback period of between 15 and 30 years (Friedman, Becker, & Erell, 2014). Furthermore, green or sustainably produced products are often more expensive than their conventional counterparts (Griskevicius et al., 2010; Olson, 2013), adding to the perception that these are premium products, intended only for those with the means to pay for them. Whether or not this is accurate (Peattie, 2001) and the degree to which it may change with technological innovations (i.e., the declining cost of solar panels), a prevailing narrative is that sustainable products are often a luxury for those with scarce financial resource, and are out of reach for lower-income individuals (Viardot, 2013).

1.2 | Impacts of scarcity

The inefficacy of financial incentives presents a challenge for environmental conservation as chronic or episodic poverty is widespread (World Bank, 2016), even in developed countries. Indeed, a significant portion of the world population experiences some type of scarcity (e.g., time, money, or natural resources) at various points of their lives. Furthermore, as recent work has begun to show, living in conditions of scarcity, even temporarily, has direct and wide-ranging impacts on cognition (Mullainathan & Shafir, 2013). Scarcity creates a cognitive load by directing attention in domains where the scarcity is salient (Mullainathan & Shafir, 2013; Shah, Mullainathan, & Shafir, 2012). Specifically, scarcity may induce an attentional focus on the savings and costs at present (Zhao & Tomm, 2018), while preventing attention to future gains or losses (Shah et al., 2012; Tomm & Zhao, 2016). Outside of consumer behavior, scarcity can impact self-construal, specifically how connected or disconnected one feels from a group or community, which can affect prosocial attitudes and behaviors (Roux, Goldsmith & Bonezzi, 2015; Sharma, Mazar, Alter & Arieli, 2014).

Considering these wide-ranging impacts of acute or chronic scarcity, it seems critical to also address how scarcity might impact conservation decisions. Conservation decisions often enlist intertemporal decision-making in which a person may sacrifice something in the present (e.g., effort, premium price, up-front investment, etc.) to reap future, and often abstract, environmental rewards. For those living under conditions of scarcity, these upfront costs may seem insurmountable, especially if they are framed as only advantageous for environmental good. Critically, for the current work, we propose that highlighting environmental reasons for engaging in sustainable behavior may decrease the motivations to engage in green consumerism for people living with financial scarcity (Malier, 2019). To engage in a costly action, broadly speaking, for an environmental or prosocial good, when there are other more pressing matters may seem gratuitously extravagant. On the other hand, framing these actions and choices as the pragmatic or responsible course of action may actually harness the tendency of scarcity to focus on the present into a future environmental good. In other words, rather than using an environmental frame to motivate sustainable choices, we propose that for those experiencing conditions of scarcity, a pragmatic frame of engaging in green behaviors might be more persuasive.

1.3 | Current study

While much of the previous research has concerned pathways to motivating sustainable behaviors, the literature has neglected to understand barriers to and motivators of sustainable behavior in not only lower-income groups but also under broader conditions of scarcity. In the current work, we consider two types of scarcity and examine how conditions of financial and natural resource scarcity might affect: (a) the choice of green consumer products relative to more conventional ones and (b) motivations for conservation (the reasons why people may engage in green consumer choices). As outlined above, we propose that while moral motivations might be an important pathway to sustainable behavior for some, for those living in conditions of financial scarcity, motivations that are more anthropocentric might carry greater weight. Financial scarcity may shape conservation choices and motivations by directing people's attention to the most urgent priority (e.g., saving money) while reducing the attentional pull of environmental or moral motivations.

There are three main goals of the current study: to examine how financial scarcity influences sustainable choices and motivations (Experiment 1), to examine how natural resource scarcity influences sustainable choices and motivations (Experiment 2), and to examine how financial scarcity and natural resource scarcity interact to influence sustainable choices and motivations (Experiment 3). In all experiments, participants first choose between a sustainable product and a conventional product and then indicate reasons why they make the

choice. We predict that people under financial scarcity versus abundance will make different choices, to give us insight into their motivations for their decision. We also predict that people under different natural resource scarcity versus abundance conditions will make different choices and have distinct motivations for making sustainable decisions. These predictions echo prior work showing that people from different socio-economic backgrounds are uniquely motivated by distinct moral values (Haidt & Graham, 2007) particularly concerning motivation toward environmentally friendly decisions (Feinberg & Willer, 2013; Vainio & Mäkiniemi, 2016).

2 | PILOT STUDY

The pilot study aims to explore factors that underlie motivations for making sustainable choices. We recruited 624 participants on Amazon Mechanical Turk to complete a brief survey where they read four scenarios in which they were considering whether to choose a sustainable product or a conventional one. After reading each scenario, participants were asked to rate the motivation for choosing the sustainable product. We provided a number of reasons for each choice that were in four categories: financial motivation (e.g., it will save money in the long run), environmental motivation (e.g., it will reduce carbon emissions), moral motivation (e.g., it is the responsible thing to do), and impression making motivation (e.g., it will impress my friends when they come to my house). Participants rated each motivation on a scale from 1 ("This is not relevant to my decision.") to 10 ("This is exactly why I would make the decision."). See Appendix S1 for the scenarios and the motivations. We ran a confirmatory factor analysis on the motivation ratings (see Appendix S2). The factor analysis showed two factors: environmental and moral motivations loaded onto the first factor and financial motivations loaded onto the second factor. This analysis confirmed the existence of environmental/moral and financial factors underlying the motivations for making sustainable choices. Since impression making motivation did not load onto any factor, we removed this item in subsequent experiments. Since environmental and moral motivations loaded onto the same factor, we only focused on financial and environmental motivations in the experiments.

3 | EXPERIMENT 1

This experiment aimed to examine the impact of financial scarcity on sustainable choices and motivations. To manipulate financial scarcity, we randomly assigned participants to complete a shopping task with either a small budget (scarcity condition) or a large budget (abundance condition). We also manipulated the framing of sustainable products by randomly assigning participants to a financial frame condition (i.e., sustainable products described as cost-saving) or an environmental frame condition (i.e., sustainable products described as environmentally friendly). The reason for using different framings was to distinguish the distinct motivations participants may have under the scarcity and abundance conditions. To measure sustainable choices, we tracked the number of sustainable products chosen by each participant. After each choice, participants reported their financial and environmental motivations for making the choice.

3.1 | Methods

3.1.1 | Participants

Participants were recruited on Amazon Mechanical Turk. Based on a prior effect size of financial scarcity (d = 0.43 based on a between-subjects comparison between scarcity and abundance conditions; Zhao & Tomm, 2017), a power analysis suggested a minimum sample size of N = 284 was required to achieve a power of .95 (α = .05), with a minimum of N = 142 in the scarcity or the abundance condition to detect the main effect of financial scarcity. Therefore, we collected responses from a total of 507 participants on Mturk, who were compensated with US$0.50 each for completing the experiment online. We excluded 16 participants who came from identical IP addresses (duplicates), and 131 participants for failing to follow task instructions (i.e., staying with the budget assigned), leaving a final sample size of N = 360 (195 male, 164 female, mean age = 36.26 years, mean annual personal income = US$30,129).

3.1.2 | Stimuli and procedure

Participants were asked to make a series of six choices between a sustainable product and a conventional product in a hypothetical shopping task. They were told to stay within a specified budget when purchasing the six items. To manipulate financial scarcity, we randomly assigned participants with a small budget ($220; the scarcity condition) or a large budget ($2,200; the abundance condition; see Appendix S3 for the instructions of the shopping task). We also manipulated the prices where the sustainable product costed more than the conventional one for half of the time, and the conventional product costed more for the other half of the time. The price manipulation was to reflect the natural variations in prices in real-world products. Participants were again randomly assigned to the two pricing conditions. With the small budget in the scarcity condition, the choices were constrained in that participants could not always choose the more expensive products. However, in the abundance condition, the choices were not constrained in that participants could always afford the more expensive products. For each of the six decisions, the two products were presented with their pictures and prices (see Appendix S4). To investigate the effect of product framing on sustainable choices and motivations, participants were randomly assigned to one of the two framing conditions. In the financial frame condition, all sustainable products were described as cost-saving. In the environmental frame condition, all sustainable products were described as environmentally friendly (see Appendix S5). In sum, this experiment

used a 2 (condition: scarcity vs. abundance) × 2 (framing: financial vs. environmental) × 2 (pricing: sustainable product costs more vs. conventional product costs more) between-subjects design.

We counted the number of sustainable products each participant chose, resulting in possible scores ranging from a minimum of 0 and a maximum of 6. To measure motivation, we asked participants to rate their motivations after making each choice on a scale from 1 (this is not relevant to my decision) to 10 (this is exactly why I made this decision) with the prompt: "How relevant were these reasons in your decision?" As part of this measure, participants were asked to rate their financial and environmental motivations using the same scale (see Appendix S6).

After the shopping task, participants answered demographic questions including age, gender, subjective socio-economic status (SES), political orientation, and environmental concern measured by the New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000).

3.2 | Results

3.2.1 | Manipulation check

We included a manipulation check to assess the effectiveness of the scarcity manipulation. A manipulation check was thought to be indispensable in the current study, as there was no explicit penalty for participants to exceed their budget. Therefore, to ensure that participants in the scarcity condition, felt some degree of pressure, we asked participants to respond to the following question at the end of the shopping task: "Considering all your decisions on the previous task, how difficult was it for you to stay under the total budget?" Participants responded on a scale from 1 (not difficult at all) to 10 (extremely difficult). One participant failed to respond to this item and was removed from the manipulation check. We found that participants in the scarcity condition reported significantly higher difficulty (M = 4.86) compared to participants in the abundance condition (M = 2.94; $t(488) = 5.90$, $p < .001$, $d = 0.63$). This suggests that the shopping task was subjectively more difficult for the participants with a smaller budget compared to a larger budget. Thus, our scarcity manipulation was successful.

3.2.2 | Product choices

We counted the number of sustainable products that each participant chose in the shopping task (see Figure 1). To analyze the choices, we conducted an analysis of covariance (ANCOVA) that examined the impact of financial scarcity, framing, and pricing on sustainable choices while controlling for environmental concern (measured by New Ecological Paradigm), subjective SES, and political orientation (see Table 1). The measures of environmental concern and political orientation were included as control variables because these constructs have been shown to have a strong effect on baseline conservation measures, that is, people who rate higher on the NEP are more likely to engage in conservation behaviors overall (Pickett-Baker & Ozaki, 2008), as do people who rate higher on liberal values on the political orientation scale (Olli, Grendstad, & Wollebaek, 2001; Straughan & Roberts, 1999). To account for these baseline differences, we employed these measures as controls. The subjective SES measure was used as a control because our pilot study (see Appendix S1) had shown that participants' income level (and their own perception of being wealthy or not) affected their financial versus environmental motivations. As these were meaningful dependent variables, we decided to control for the effect of SES on these motivations while assessing the impact of our scarcity manipulations. All measures were continuous variables.

The ANCOVA showed that participants in the scarcity condition choose significantly fewer sustainable products than participants in the abundance condition. Framing had no effect on product choices, and as expected, participants chose more sustainable products when they were less expensive than the conventional products. In addition, there was a significant two-way interaction between scarcity and

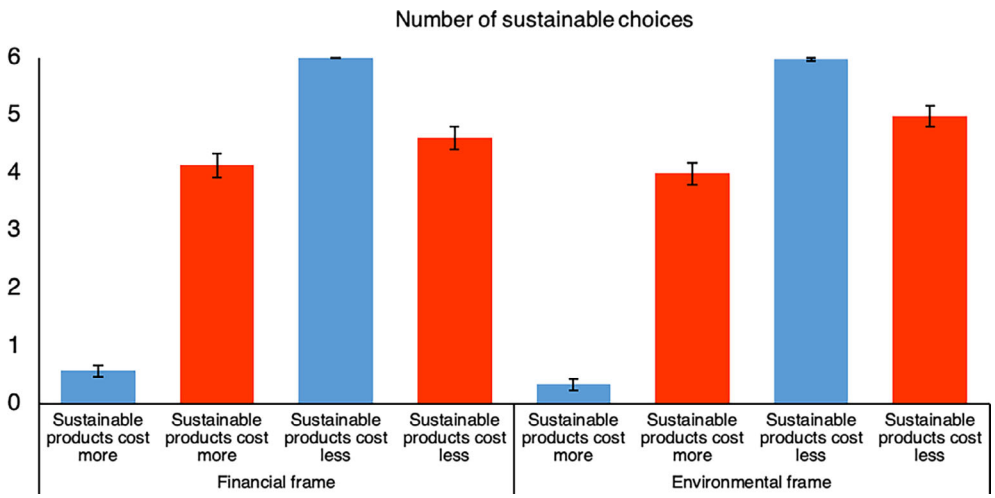

FIGURE 1 Sustainable product choices in Experiment 1. Blue bars represent the scarcity condition ($220). Red bars represent the abundance condition ($2,200) [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Analysis of covariance results in Experiment 1

Dependent variable	Predictors	*df*	*F*	*p*	η_p^2
Number of sustainable choices	Scarcity condition	1	48.84	<.001	.07
	Framing condition	1	0.01	.90	<.001
	Price condition	1	182.01	<.001	.27
	Scarcity × framing	1	0.80	.37	<.001
	Scarcity × price	1	46.11	<.001	.07
	Framing × price	1	0.13	.72	<.001
	Scarcity × framing × price	1	4.92	.03	<.001
Financial motivation	Scarcity condition	1	3.74	.05	.009
	Framing condition	1	.01	.93	<.001
	Price condition	1	28.58	<.001	.07
	Scarcity × framing	1	11.06	<.001	.03
	Scarcity × price	1	0.02	.87	<.001
	Framing × price	1	0.37	.54	<.001
	Scarcity × framing × price	1	10.98	<.001	.03
Environmental motivation	Scarcity condition	1	5.16	.02	.01
	Framing condition	1	3.98	.047	.009
	Price condition	1	38.57	<.001	.09
	Scarcity × framing	1	0.29	.59	<.001
	Scarcity × price	1	5.42	.02	.01
	Framing × price	1	0.72	.40	<.001
	Scarcity × framing × price	1	1.29	.26	<.001

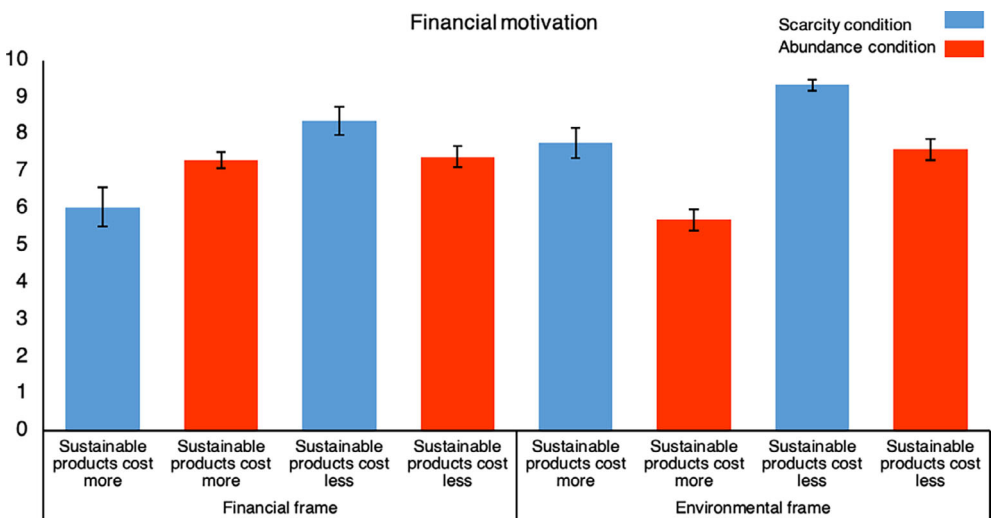

FIGURE 2 Financial motivation in Experiment 1. Blue bars represent the scarcity condition ($220). Red bars represent the abundance condition ($2,200) [Color figure can be viewed at wileyonlinelibrary.com]

pricing, suggesting that participants under scarcity reasonably made fewer sustainable choices than those in the abundance condition when sustainable products were more expensive than conventional products. However, scarcity also increased sustainable choices relative to abundance when the sustainable products were less expensive. Finally, there was a significant three-way interaction between scarcity, framing, and pricing, suggesting that the financial frame further boosted the effect of scarcity in the two-way interaction than the environmental frame.

3.2.3 | Financial motivation

To analyze motivations, we ran the same ANCOVA to examine the impact of financial scarcity, framing, and pricing on financial or environmental motivations, while controlling for NEP score, subjective SES, and political orientation. Participants in the scarcity condition reported higher financial motivation than those in the abundance condition (Figure 2), suggesting that financial scarcity increased the motivation to save costs. Financial motivation was also higher when the sustainable products were

cheaper. There was a significant two-way interaction between scarcity and framing, suggesting that participants in the scarcity condition reported higher financial motivation than those in the abundance condition under the environmental frame, but they reported similar financial motivation under the financial frame. In addition, there was a significant three-way interaction between scarcity, framing, and pricing, such that participants in the scarcity condition reported higher financial motivation than those in the abundance condition, except when sustainable products cost more under the financial frame.

3.2.4 | Environmental motivation

Participants in the scarcity condition reported lower environmental motivations than those in the abundance condition (Figure 3), suggesting that financial scarcity decreased the motivation to choose environmentally friendly products. Environmental motivation was also higher when the sustainable products were presented under the environmental frame than under the financial frame, or when the sustainable products were cheaper than conventional ones. There was a significant two-way interaction between scarcity and pricing, suggesting that participants in the scarcity condition reported higher environmental motivation than those in the abundance condition when sustainable products were cheaper, but they reported lower environmental motivation when sustainable products were more expensive.

In sum, Experiment 1 suggests that financial scarcity reduced sustainable product choices, but this effect seemed to be constrained by the price of sustainable products. In fact, people under scarcity chose more sustainable products when the products were cheaper than conventional ones. This suggests that interventions to alleviate conditions of scarcity, for example, with a larger financial budget or decreasing the price of sustainable products, can increase green consumer choices. This also suggests that the mere context of scarcity can change sustainable behaviors. Experiment 1 also showed that financial scarcity increased the motivation to save financial costs but reduced the motivation to be environmentally friendly. Again, environmental motivation under scarcity seemed to be constrained by prices. These results collectively demonstrate that having a small financial budget is not conducive to making sustainable choices.

4 | EXPERIMENT 2

The results from Experiment 1 suggested that financial scarcity negatively impacted green consumer choices. Experiment 2 was designed to examine how a different type of scarcity, namely, natural resource scarcity, would influence sustainable choices. Though previous work looked at the impacts of different types of scarcity (e.g., time versus money, Shah et al., 2012), little work has examined the impact of perceived natural resource scarcity (e.g., drought). For the current work, this type of scarcity seems particularly relevant as the consideration of depleting natural resources may have direct relevance to green consumer decisions and motivations. Moreover, from a theoretical standpoint, this also seems like a relevant question to examine as concerns about scarce natural resources necessarily expand the temporal frame under consideration compared to concerns about scarce financial resources. That is, a person who is experiencing financial scarcity might be more inclined to focus on the "here and now," but a person who is experiencing natural resource scarcity may become more concerned about distal impacts. In addition, financial scarcity concerns the individual but natural resource scarcity tends to be relevant to a collective, rather than just the individual. Therefore, it seems likely that perceived natural resource scarcity may have distinct impacts on green consumer decisions and motivations than those revealed in Experiment 1.

4.1 | Methods

4.1.1 | Participants

In this experiment, we used natural resource scenarios which were specific to the United States population. Accordingly, we recruited

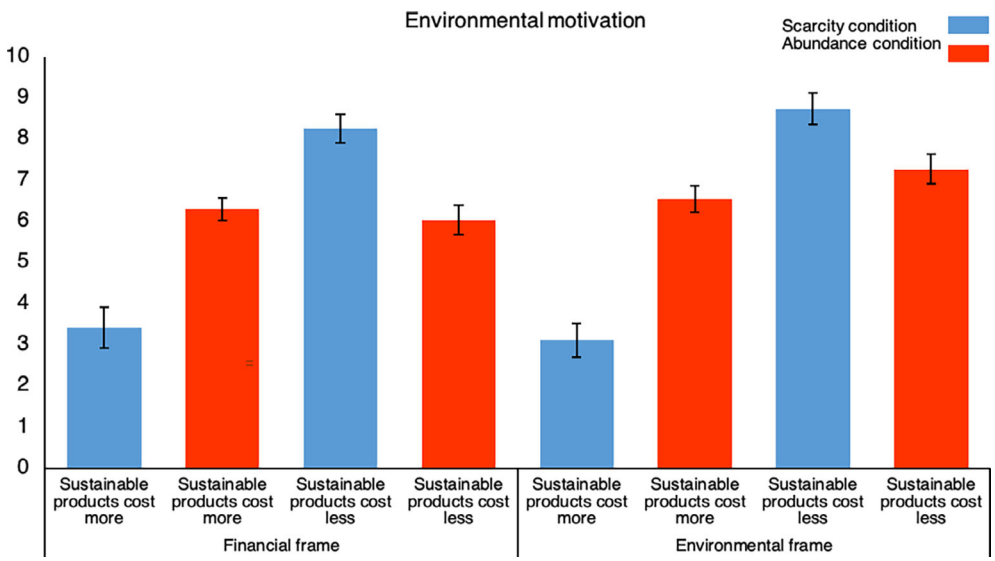

FIGURE 3 Environmental motivation in Experiment 1. Blue bars represent the scarcity condition ($220). Red bars represent the abundance condition ($2,200) [Color figure can be viewed at wileyonlinelibrary.com]

participants exclusively from the United States on Amazon Mechanical Turk to ensure that the stimuli were perceived in a geographically appropriate way. Each participant was compensated with US$0.50 for their time. We excluded 16 responses which came from duplicate IP addresses, leaving a final sample size of N = 663 (344 male, 319 female, mean age of participants = 37.27 years, mean annual personal income = US$36,792).

4.1.2 | Stimuli and procedure

To manipulate natural resource scarcity, participants first read a scenario describing either a severe water shortage (water scarcity condition) or water abundance (water abundance condition). The scenarios used are listed in Appendix S3. After reading the scenario, participants were asked to keep the scenario in mind while making a series of product choices and reporting their motivation for each choice as in Experiment 1. Since this experiment involved natural resource scarcity, the financial budget remained the same for all participants. Specifically, all participants were given a $280 budget, which did not constrain any product choices. To counterbalance the pricing of the products, we again manipulated whether the sustainable or conventional product cost less (same pricing manipulation as in Experiment 1). Thus, we used a 2 (condition: water scarcity vs. water abundance) × 2 (framing: financial vs. environmental) × 2 (pricing: sustainable products cost more vs. conventional products cost more) between-subjects design.

4.2 | Results

4.2.1 | Manipulation check

To check the effectiveness of water scarcity manipulation, we asked participants to rate "How concerned are you about running out of water?" on a scale from 1 = not at all concerned to 10 = very much concerned, after reading the scenario about water resources. We found that participants in the water scarcity condition reporting greater concern about water resources running out compared to water abundant participants ($t(661) = 25.79$, $p < .001$, $d = 2.00$). Therefore, the water scarcity manipulation was successful.

4.2.2 | Product choices

We counted the number of sustainable products that each participant chose in the shopping task (see Figure 4). We ran the same ANCOVA as in Experiment 1 to examine the impact of water scarcity, framing, and pricing on sustainable choices, while controlling for environmental concern, subjective SES, and political orientation (Table 2).

The ANCOVA showed that participants in the water scarcity condition choose significantly more sustainable products than participants in the water abundance condition. Framing had no effect on product choices, and as expected, participants chose more sustainable products when they were less expensive than conventional ones.

4.2.3 | Financial motivation

The ANCOVA showed that financial motivation was not affected by water scarcity, but by framing and pricing (Figure 5). Specifically, financial motivation was higher under the financial frame than the environmental frame, or when the sustainable products cost less than conventional ones. There was a significant two-way interaction between framing and pricing, suggesting that financial motivation was equally high under the financial frame regardless of price, but was higher when sustainable products were cheaper under the environmental frame.

4.2.4 | Environmental motivation

Participants in the water scarcity condition reported higher environmental motivations than those in the water abundance condition (Figure 6), suggesting that water scarcity increased the motivation to

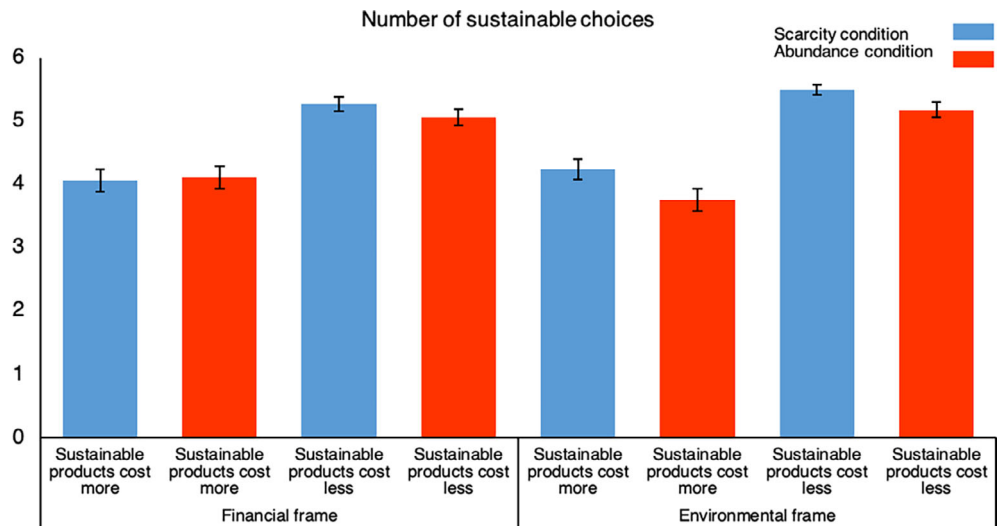

FIGURE 4 Product choices in Experiment 2. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 2 Analysis of covariance results in Experiment 2

Dependent variable	Predictors	*df*	*F*	*p*	η_p^2
Number of sustainable choices	Scarcity condition	1	5.44	.02	.007
	Framing condition	1	0.06	.80	<.001
	Price condition	1	135.69	<.001	.17
	Scarcity × framing	1	2.34	.13	<.001
	Scarcity × price	1	0.06	.80	<.001
	Framing × price	1	1.53	.22	<.001
	Scarcity × framing × price	1	1.04	.31	<.001
Financial motivation	Scarcity condition	1	1.74	.19	<.001
	Framing condition	1	15.72	<.001	.02
	Price condition	1	68.27	<.001	.09
	Scarcity × framing	1	0.17	.68	<.001
	Scarcity × price	1	0.81	.37	<.001
	Framing × price	1	7.98	.005	.01
	Scarcity × framing × price	1	0.02	.89	<.001
Environmental motivation	Scarcity condition	1	12.30	<.001	.02
	Framing condition	1	0.82	.36	<.001
	Price condition	1	24.86	<.001	.04
	Scarcity × framing	1	0.17	.68	<.001
	Scarcity × price	1	0.30	.59	<.001
	Framing × price	1	0.21	.64	<.001
	Scarcity × framing × price	1	0.50	.48	<.001

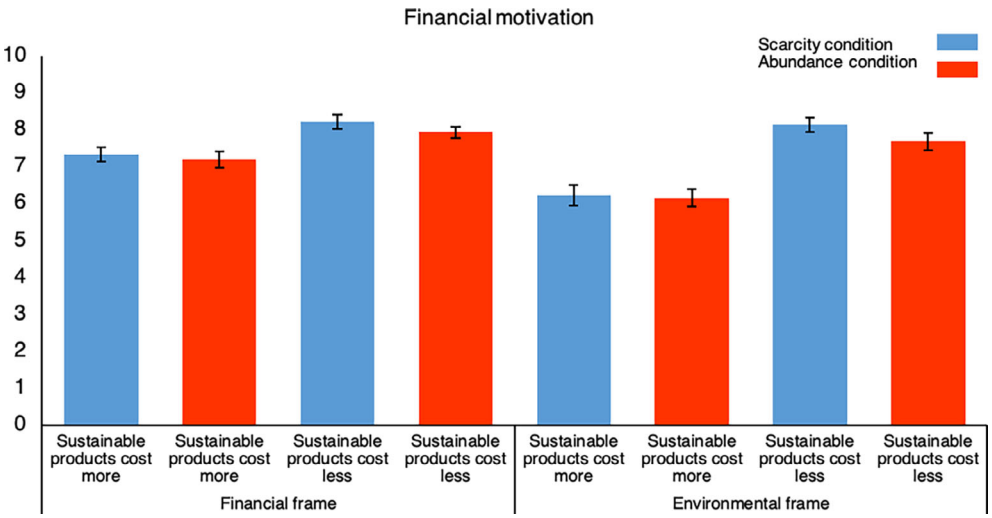

FIGURE 5 Financial motivation in Experiment 2. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

choose environmentally friendly products. Environmental motivation was also higher when the sustainable products were cheaper than conventional ones.

In sum, Experiment 2 suggests that water scarcity increased sustainable product choices, in contrast to the effect of financial scarcity in Experiment 1. Water scarcity did not influence financial motivation but increased the motivation to be environmentally friendly. Thus, it appears that the scarcity mindset may exert different cognitive and behavioral influences depending on the resource that is perceived scarce. Financial scarcity appears to make consumers less willing to purchase sustainable products, whereas the perception of natural resource scarcity increases the desire to choose green products.

5 | EXPERIMENT 3

Experiment 1 showed that financial scarcity reduced green consumer choices, while Experiment 2 showed that natural resource scarcity increased green consumer choices. This apparent contradiction raises an interesting question of how these two types of scarcity interact to

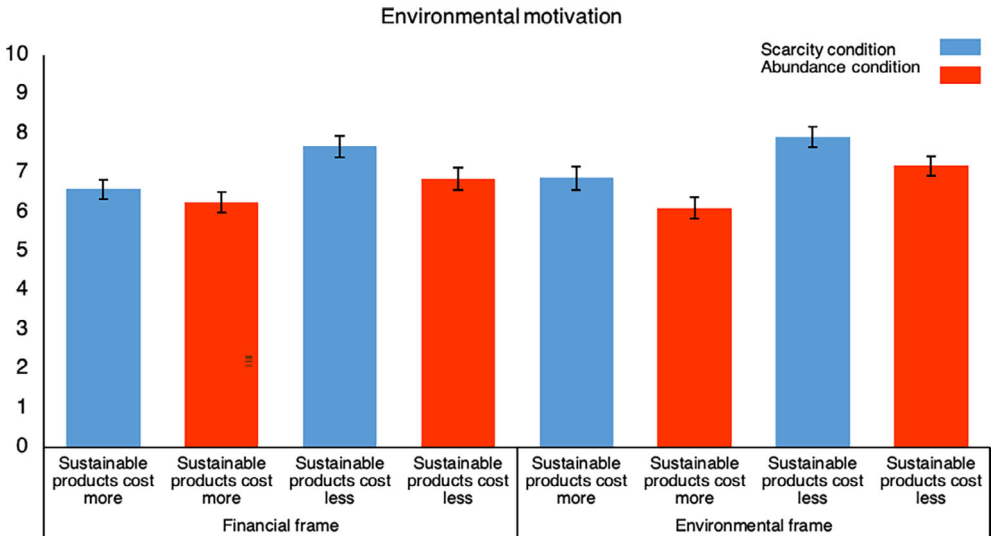

FIGURE 6 Environmental motivation in Experiment 2. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

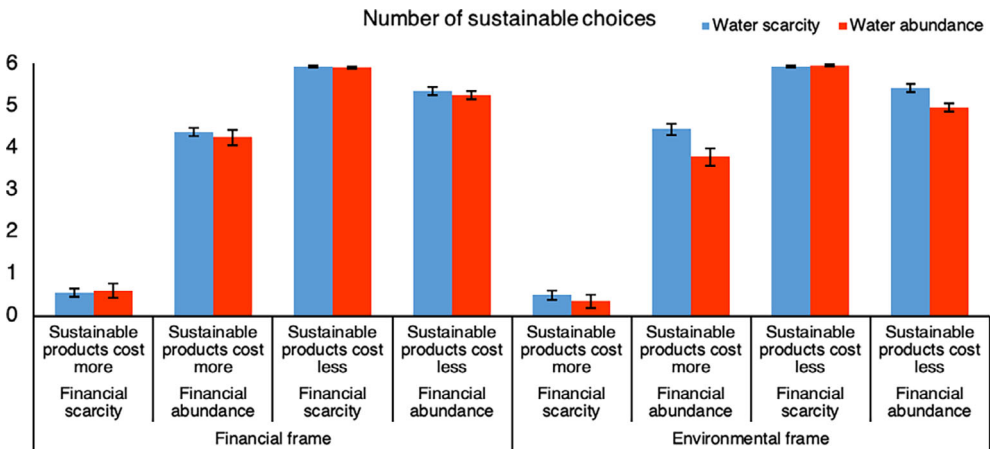

FIGURE 7 Product choices in Experiment 3. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

influence green consumer choices. Thus, the final experiment examined the combined effects of financial scarcity and natural resource scarcity on sustainable choices and motivations.

5.1 | Methods

5.1.1 | Participants

We recruited 1,784 United States participants from Amazon Mechanical Turk and Prolific. A total of 174 responses originated from duplicate IP addresses so these responses were excluded. We also excluded 536 participants since they failed to follow task instructions (i.e., staying with the budget assigned), leaving a total sample size of N = 1,074 (482 male, 588 female, 4 other, mean age = 36.66 years, mean annual personal income = US$33,700).

5.1.2 | Stimuli and procedure

To investigate how financial scarcity and water scarcity interact to shape sustainable choices and motivations, we used the same financial scarcity scenarios, framing, and pricing manipulations as in Experiment 1. In addition, we also used the same water scarcity manipulation as in Experiment 2. In other words, this experiment was identical to Experiment 2 except that participants were randomly assigned with a small budget ($220) or a large budget ($2,200) as in Experiment 1. Thus, we used a 2 (financial scarcity vs. abundance) × 2 (water scarcity vs. abundance) × 2 (framing: financial vs. environmental) × 2 (pricing: sustainable products cost more vs. conventional products cost more) between-subjects design.

5.2 | Results

5.2.1 | Product choices

We counted the number of sustainable products that each participant chose in the shopping task (see Figure 7). Similar to previous experiments, we ran the ANCOVA to examine the impact of financial scarcity, water scarcity, framing, and pricing on sustainable choices while controlling for environmental concern, subjective SES, and political orientation (Table 3).

TABLE 3 Analysis of covariance results in Experiment 3

Dependent variable	Predictors	*df*	*F*	*p*	η_p^2
Number of sustainable choices	Financial scarcity condition	1	21.75	<.001	.01
	Water scarcity condition	1	5.27	.02	.002
	Framing condition	1	3.72	.05	.002
	Price condition	1	362.95	<.001	.19
	Financial scarcity × water scarcity	1	0.40	.53	<.001
	Financial scarcity × framing	1	0.59	.44	<.001
	Financial scarcity × price	1	82.59	<.001	.04
	Water scarcity × framing	1	1.82	.18	<.001
	Water scarcity × price	1	3.78	.05	.002
	Framing × price	1	0.19	.66	<.001
	Financial scarcity × water scarcity × framing	1	0.26	.61	<.001
	Financial scarcity × water scarcity × price	1	1.40	.24	<.001
	Financial scarcity × framing × price	1	0.97	.33	<.001
	Water scarcity × framing × price	1	0.35	.56	<.001
	Financial scarcity × water scarcity × framing × price	1	1.31	.25	<.001
Financial motivation	Financial scarcity condition	1	0.17	.68	<.001
	Water scarcity condition	1	0.72	.40	<.001
	Framing condition	1	38.64	<.001	.02
	Price condition	1	113.46	<.001	.06
	Financial scarcity × water scarcity	1	0.74	.39	<.001
	Financial scarcity × framing	1	5.22	.02	.003
	Financial scarcity × price	1	7.88	.005	.004
	Water scarcity × framing	1	1.82	.18	<.001
	Water scarcity × price	1	0.10	.75	<.001
	Framing × price	1	0.19	.66	<.001
	Financial scarcity × water scarcity × framing	1	0.22	.64	<.001
	Financial scarcity × water scarcity × price	1	0.51	.47	<.001
	Financial scarcity × framing × price	1	2.59	.10	<.001
	Water scarcity × framing × price	1	2.49	.12	<.001
	Financial scarcity × water scarcity × framing × price	1	0.10	.76	<.001
Environmental motivation	Financial scarcity condition	1	18.02	<.001	.01
	Water scarcity condition	1	7.34	.007	.004
	Framing condition	1	5.90	.02	.003
	Price condition	1	88.11	<.001	.05
	Financial scarcity × water scarcity	1	1.08	.30	<.001
	Financial scarcity × framing	1	0.007	.93	<.001
	Financial scarcity × price	1	9.46	.002	.006
	Water scarcity × framing	1	2.18	.14	<.001
	Water scarcity × price	1	0.11	.74	<.001
	Framing × price	1	2.06	.15	<.001
	Financial scarcity × water scarcity × framing	1	0.33	.57	<.001
	Financial scarcity × water scarcity × price	1	0.04	.83	<.001
	Financial scarcity × framing × price	1	0.38	.54	<.001
	Water scarcity × framing × price	1	3.65	.06	.002
	Financial scarcity × water scarcity × framing × price	1	<.001	.98	<.001

The ANCOVA showed that participants in the financial scarcity condition choose significantly fewer sustainable products than those in the financial abundance condition. In contrast, participants in the water scarcity condition chose significantly more sustainable products than those in the water abundance condition. Framing had a marginal effect on product choices, and as expected, participants chose more sustainable products when they were less expensive than conventional ones. In addition, there was a significant two-way interaction between financial scarcity and pricing, suggesting that participants in the financial scarcity condition made fewer sustainable choices than those in the financial abundance condition when sustainable products were more expensive than conventional ones, but they made more sustainable choices than those in the financial abundance condition when sustainable products were less expensive. Finally, there was a marginal two-way interaction between water scarcity and pricing. These findings largely replicate those in Experiments 1 and 2.

5.2.2 | Financial motivation

The ANCOVA showed that neither financial scarcity nor water scarcity had an effect on financial motivation (Table 3). However, financial motivation was higher under the financial frame than under the environmental frame, or when the sustainable products were cheaper than conventional ones (Figure 8). There was a significant two-way interaction between financial scarcity and framing and also between financial scarcity and price.

5.2.3 | Environmental motivation

Participants in the financial scarcity condition reported lower environmental motivations than those in the financial abundance condition (Figure 9), suggesting that financial scarcity decreased the motivation to choose environmentally friendly products.

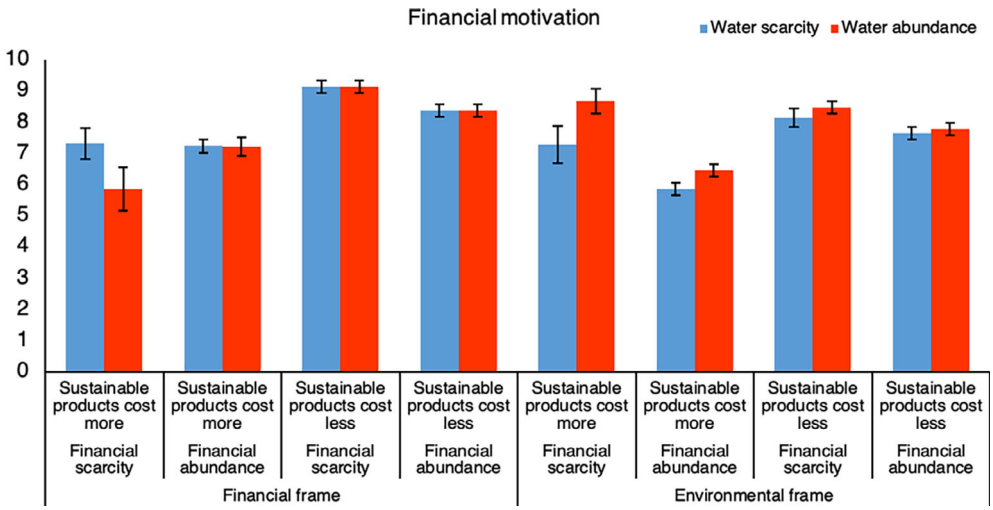

FIGURE 8 Financial motivation in Experiment 3. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

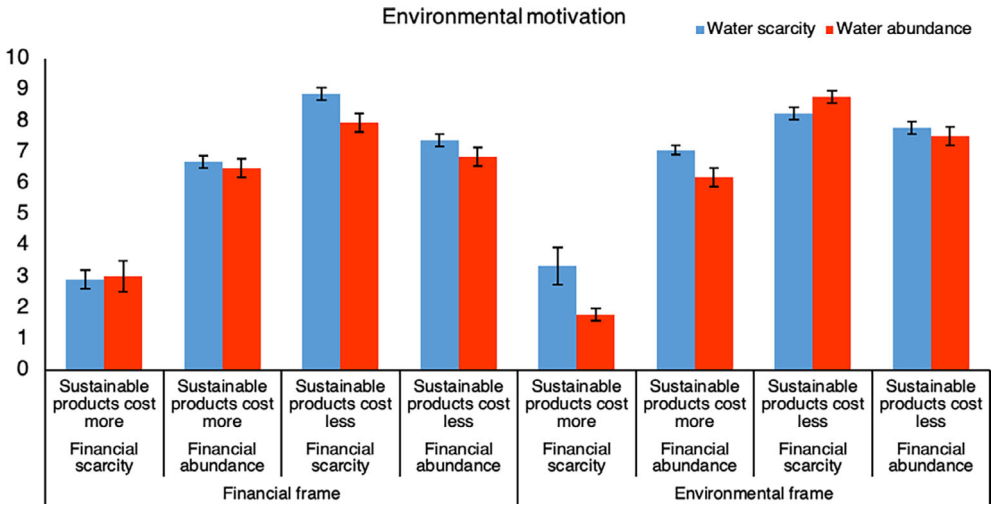

FIGURE 9 Environmental motivation in Experiment 3. Blue bars represent the water scarcity condition. Red bars represent the water abundance condition [Color figure can be viewed at wileyonlinelibrary.com]

Environmental motivations were also higher under water scarcity than under water abundance, under the environmental frame than under the financial frame, or when the sustainable products were cheaper than conventional ones. In addition, there was a significant two-way interaction between financial scarcity and pricing, suggesting that participants with financial scarcity reported higher environmental motivation than those in the financial abundance condition when sustainable products were cheaper, but they reported lower environmental motivation when sustainable products were more expensive. These findings again replicate those in Experiments 1 and 2.

In sum, Experiment 3 largely replicated the results in Experiments 1 and 2, highlighting the distinct impacts of financial scarcity and natural resource scarcity on sustainable choices and motivations. Specifically, financial scarcity reduced sustainable product choices and decreased the motivation to behave in an environmentally friendly way. In contrast, water scarcity increased sustainable product choices and also increased environmental motivation. In other words, financial abundance or water scarcity increases green consumer choices and motivations.

6 | GENERAL DISCUSSION

The current study examined how financial scarcity and natural resource scarcity independently and interactively influence sustainable choices and motivations. Experiment 1 showed that financial scarcity reduced sustainable product choices, lowered the motivation to behave in an environmentally friendly way, but increased the motivation to save financial costs. The effect on choice seemed to be constrained by the price of sustainable products. That is, when sustainable products were less expensive than conventional ones, people under financial scarcity chose more sustainable products. This suggests that alleviating the condition of financial scarcity either by having a larger budget or a lower price can increase green consumer choices. Furthermore, describing the financial cost-saving benefits of the green products boosted the selection of these products by participants in the scarcity condition, provided they were cheaper.

Experiment 2 showed that water scarcity increased sustainable product choices, in contrast to the effect of financial scarcity in Experiment 1. Water scarcity also increased environmental motivation. By examining both financial and water scarcity, Experiment 3 largely replicated the results in Experiments 1 and 2, again highlighting the distinct impacts of financial scarcity and water scarcity on sustainable choices and motivations. However, neither Experiment 1 nor 2 suggested an effect of product framing. Even in Experiment 3, the effect size of framing was small despite being statistical significance. This could be due to price and scarcity overwhelming a more subtle effect of framing which we hope to explore in future studies. These results collectively demonstrate the negative impact of financial scarcity but the positive impact of natural resource scarcity on green consumer choices. In other words, the presence of financial abundance or natural resource scarcity in the case of a drought can increase green consumer choices and motivations.

The current findings also highlight the differential power of financial scarcity and natural resource scarcity on green consumerism. The effect size of financial scarcity seemed to be 5 to 10 times stronger than the effect size of natural resource scarcity (Table 1 shows η_p^2 = .07 of financial scarcity, Table 2 shows η_p^2 = .007 of water scarcity, and Table 3 shows η_p^2 = .01 and .002 of financial and water scarcity, respectively). This difference suggests that financial scarcity may potentially overwhelm resource scarcity. Indeed, Figure 7 in Experiment 3 showed that water scarcity and water abundance had minimal impact on sustainable choices under financial scarcity, and the benefit of water scarcity only appeared under financial abundance. Also, financial scarcity reduced sustainable choices from 4 to 0.5, but water scarcity increased sustainable choices by less than 1. The same pattern can be seen in Figures 1 and 2. These results suggest that financial scarcity is more prohibitive than natural resource scarcity. The inability to afford sustainable products outweighs the desire to save environmental resources. There are a number of reasons this could be the case. First, the qualitatively different manipulations of financial scarcity and water scarcity may have led to this result. Relatedly, it is possible that the reason natural resource scarcity appears to be less impactful on green consumer behavior than financial scarcity is that natural resources are perceived (and described in the current study) as a common pool resource. This is distinct from other domains of scarcity that have been studied in the past (e.g., time, money, or calories) which all happen to impact only the individual. Can the scarcity of shared natural resources carry the same urgency as our inherently personal resources? That has been a fundamental question of environmental psychology (i.e., Tragedy of the Commons) but it at least presents an interesting direction for future work.

Although both scarcity manipulations had statistically significant effects, the effect sizes were small. This may be due to the fact that our manipulations were relatively light involving hypothetical budgets, scenarios, and choices. To boost the effect sizes, future studies can use more realistic manipulations of water scarcity beyond hypothetical scenarios portraying a water shortage, such as a natural experiment before versus after a drought. Since the choice task used in the current experiments involved hypothetical choices, there were no real consequences of the choices or going over the budget. This could lead participants to ignore our instructions and choose randomly instead. However, despite these possibilities the results from three experiments consistently demonstrated the impact of financial scarcity and environmental resource scarcity on sustainable choices. In addition, participants did express that the task was more difficult under the financial scarcity condition based on the manipulation checks. One way to further strengthen these effects is to use incentive compatible approaches to examine the impact of financial scarcity on conservation behaviors.

As financial scarcity had a larger impact on sustainable choices than water scarcity did, what would be an effective intervention to alleviate the mindset of financial scarcity? Our study suggests two options: by increasing the budget or lowering the price. We should note that these two options had distinct impacts (as shown by the significant interaction between scarcity and price in Table 1). When sustainable products were more expensive (max costs = $274.52), the small budget ($220) under the financial scarcity condition would allow only one sustainable product purchase. Indeed, Figure 1 showed that about half of the participants chose one sustainable product, and the other half chose zero. But with the large budget ($2,200) under the financial abundance condition, participants chose around four sustainable products. Thus, increasing the budget boosted sustainable choices from 0.5 to 4 when sustainable products were more expensive, with the average sustainable choices being 2.3. Interestingly, when sustainable products were less expensive (max costs = $215.79), virtually everyone in the financial scarcity condition ($220) chose all six sustainable products, but participants in the financial abundance condition ($2,200) chose five products, with the average number of sustainable choices being 5.5. Thus, lowering the price of sustainable products boosted sustainable choices by over 3 (from 2.3 to 5.5), but increasing the budget from $220 to $2,200 boosted sustainable choices by just over 1 (from 3.3 to 4.5). This suggests that lowering the prices is a more effective intervention to increase green consumerism than increasing the financial budget.

It is also worth noting that because the restricted budget in the financial scarcity condition in our experiments was prohibitive to making sustainable choices when those products were more expensive, we did run a follow-up experiment (N = 1,462) replicating Experiment 3 on Mturk, where we slightly increased the budget in the financial scarcity condition that did not restrict any choice. In this case, we again found the same results where financial scarcity reduced sustainable choices ($F = 22.28$, $p < .001$, $\eta_p^2 = .01$) and environmental motivation ($F = 31.10$, $p < .001$, $\eta_p^2 = .02$). Thus, our results in Experiments 1 and 3 were not solely driven by the hard constraint of the budget, but it is clear that financial scarcity, whether it was extreme or less pronounced, did prompt participants to put costs above all else. This is a completely reasonable response to perceived scarcity however, as previous work has suggested, the scarcity mindset creates cognitive burdens, potentially making these everyday consumer purchases more effortful and computationally demanding (Mani, Mullainathan, Shafir, & Zhao, 2013). Scarcity highlights the need to choose cheaper options, and also forces the need to meticulously calculate the costs with respect to the available budget (Shah, Zhao, Mullainathan, & Shafir, 2018; Tomm & Zhao, 2016; Zhao & Tomm, 2018). Future studies can assess whether the salience of price under conditions of financial scarcity may have a positive impact on sustainable consumer choices, which might have a higher up-front cost, but also last longer. It could be the case of highlighting price per load of laundry, for example, may be one way of making green consumer products (which, again, do tend to be more expensive upfront) more palatable to people living in conditions of scarcity.

We also sympathize deeply with the perspective that green consumerism may not be the most impactful means of engaging in conservation behavior. Perhaps people may associate low-cost or cost-free behaviors such as recycling, engaging in clean-up efforts or even upcycling or repairing products as needed rather than replacing them, as other green behaviors. That being said, however, the utility of studying alternative forms of green behaviors does not diminish the value of selecting the purchase of green versus convention products, as described in the current work. Most people in the North American context in which the current study took place do make consumer decisions of the type we employ here. If there is a way to shift consumer preferences toward buying paper products made from sustainably grown forests or from recycled materials that would be an important step toward environmental sustainability.

To conclude, the current study showed distinct impacts of financial scarcity and natural resource scarcity on green consumerism. The current findings provide both theoretical implications on how scarcity shapes sustainable choices and practical implications on how to engage people from different socio-economic backgrounds on green consumerism. First, the context of scarcity itself can shift sustainable choices. Financial assistance programs have the potential to boost green choices in low-income consumers. Likewise, lowering the prices of sustainable products can significantly boost green choices in low-income communities. Second, natural resource scarcity can increase green consumerism. This suggests that periods of environmental devastation (e.g., drought) may be a good time to engage communities on sustainable actions—perhaps by aligning environmental campaigns when natural disasters are salient. Finally, this work shows that the motivations to engage in environmental behavior are multifold and systematically vary by not only socioeconomic status but also perceived wealth. Environmental interventions that acknowledge diverse motivations, and tailor them to specific communities, have the potential to be more effective than those that utilize only a dominant ecological model.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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