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THE PSYCHOLOGY OF CONSTRAINTS:
THE TIME SCARCITY AND MONEY SCARCITY EFFECT

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Abstract

The Psychology of Constraints: “The Time Scarcity and Money Scarcity Effect”

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Consumers often experience feelings of scarcity. There is a growing interest in studying the effects of scarcity on consumers’ perceptions, behaviors, and decision-making. However, studying how the effects of scarcity differ depending on the type of resource scarcity has received less attention. This dissertation investigates how two types of scarcities, that of money and time, could have similar and differential effects on decision-making and how the interplay between the nature of these two resources leads to asymmetric effects on the ability of one resource to compensate for another. Essay 1 investigates when and why time and money scarcity can have similar or different effects. Nine experiments find that when consumers draw a self-as-lacking-a-resource inference from their scarcity, both money and time scarcity lead to greater preferences for self-improvement products (compared to those who are not feeling scarcity).

However, time (vs. money) scarce consumers could also draw a self-as-resource inference from their scarcity allowing them to make more favorable assessments of their self-value and to prefer products that appeal to their current self as valuable. Essay 2 investigates the interplay between feeling abundant and feeling scarce. Seven experiments show that both time and money scarcity lead to lower advice-taking tendencies. I find that the money scarcity effect on advice-taking tendencies can be compensated by time abundance but the time scarcity effect on advice-taking tendencies is not compensated by money abundance. These results suggest an asymmetry between time and money compensation effects and are driven by differences in the perceived value and fungibility of time (vs. money).

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RESEARCH OVERVIEW

Consumers often experience various types of resource scarcity in their lives such as financial deprivation, hunger, drought, or shortage of time. Feeling resource scarcity is a ubiquitous phenomenon and is thus receiving attention in the fields of marketing, psychology, sociology, and public policy. Researchers have found that feelings of resource scarcity can shape psychological mindsets and consumer judgments. Despite the growing interest, there is only a small stream of research studying resource scarcity and there are several important avenues that need to be examined. Specifically, extant research has investigated scarcity effects across different types of scarcities and found that different types of scarcities tend to have similar effects on decision-making (for a review, see cite Shah, Mullainathan, and Shafir 2012; Shah, Shafir, and Mullainathan 2015). Little work has explored whether scarcity effects can differ depending on the type of resource. Although prior research finds similar effects for different types of resources, could there be conditions when effects will differ based on the type of resource? Furthermore, existing research focuses on documenting scarcity effects, and less attention has been paid to understanding how to compensate for the scarcity effects. This dissertation addresses these important questions and focuses on the scarcity of two fundamental resources: time and money. Specifically, this dissertation investigates 1) whether the inherently different nature of time and money lead to differential effects of time scarcity and money scarcity, 2) when and why time and money scarcity can lead to similar or divergent effects, 3) whether the effects of time or money scarcity be compensated, and 4) the implications for marketing and consumer research. Essay 1 investigates when and why time and money scarcity have similar and divergent effects. Essay 1 demonstrates that time and money scarcity lead to

differential effects in domains where the distinct nature of each resource is pronounced. Essay 2 investigates whether feelings of time scarcity can be compensated by feeling money abundant and whether feelings of money scarcity can be compensated by time abundance. I show that time and money have asymmetric impact when compensating for the scarcity effects.

In Essay 1, I identify whether and when money versus time scarcity will have similar and divergent effects on product attitudes by altering consumers' self-inferences. Providing support for prior research on similar effects, I propose that both time and money scarcity lead to a self-as-lacking-a-resource inference (i.e., "I lack the scarce resource"), which drives the similar effects of time and money scarcity. Therefore, when a self-as-lacking inference manifests, I find that both time and money scarcity lead to greater preferences toward self-improvement products. However, based on the difference between time and money as resources, I show that time (vs. money) scarcity encourages a self-as-resource (i.e., "I am the scarce resource") inference to a greater extent, which drives the differential effects of time versus money scarcity. Therefore, when a self-as-resource inference manifests, it leads time (vs. money) scarce consumers to draw more favorable assessments of their self-value and to prefer products appealing to self-value.

Essay 2 investigates whether the effects of time and money scarcity on advice-taking tendencies can be compensated by feeling money and time abundant. I first demonstrate a novel effect of scarcity, such that both time and money scarcity lead to lower advice-taking tendency due to lower perceived similarity of the advisor. I then show that when money scarce consumers are feeling time abundant, time abundance compensates for money scarcity and increases advice-taking. However, money abundance does not compensate for time scarcity and has no impact on advice-taking. This suggests that there is an asymmetry in time and money compensation effects. We suggest that such asymmetry is due to two major distinctions between consumer beliefs

about time and money. Specifically, money is a fungible resource but time is not. Therefore, consumers who are feeling money scarcity, relative to those feeling time scarcity, may believe that money can be substituted with another resource, such as time. Additionally, time is a resource more associated with the self than is money. This would not allow money to substitute for a self-laden time. Testing for the efficacy of these consumer beliefs in different experiments, I find that an abundance of time is enough to compensate for a dearth of money while an abundance of money is not enough to compensate for a lack of time.

In conclusion, this dissertation addresses several important aspects of resource scarcity. This dissertation offers insights into the processes and effects of resource scarcity based on the differential nature of two different resources, thereby developing our understanding of how time scarcity and money scarcity impacts consumers. The findings from this research provide important insights into when and why time and money scarcity lead to similar effects (Essay 1 and Essay 2), when and why time and money scarcity lead to differential effects (Essay 1 and Essay 2), and how time and money scarcity effects can be compensated (Essay 2).

ESSAY 1

LACKING A RESOURCE OR BEING ONE: MONEY SCARCITY VERSUS TIME SCARCITY DIFFERENTIALLY SHAPE SELF-VALUE AND PRODUCT JUDGEMENTS

Consumers often encounter situations that make them feel resource-deprived. Feelings of resource scarcity create mindsets that can subsequently affect consumer decision-making and behaviors (Mani, Mullainathan, and Shafir 2013; Roux, Goldsmith, and Bonezzi 2015). Feelings of scarcity can stem from various types of resource constraints such as financial deprivation, hunger, drought, or shortage of time (Aarts, Dijksterhuis, and Vries 2001; Karau and Kelly 1992; Radel and Clément-Guillotin 2012). Prior research suggests that various constraints have similar effects (Shah, Mullainathan, and Shafir 2012; Shah, Shafir, and Mullainathan 2015). However, there has been little research examining whether feelings of resource scarcity can have different effects based on the type of scarce resources.

Time and money are primary resources that help people acquire and experience life assets, but they are finite resources and can easily become scarce (Leclerc, Schmitt, and Dube 1995). Money and time are comparable resources that have distinct characteristics (Leclerc et al. 1995; Okada and Hoch 2004; Soman 2001) and they can differ in terms of their value perceptions (Leclerc et al. 1995; Okada and Hoch 2004), accounting of resources (Soman 2001), or spending patterns (Liu and Aaker 2008; Monga and Saini 2009; Reed, Aquino, and Levy 2007; Saini and Monga 2008). These differences, in contrast to findings on resource scarcity, lead us to ask the following questions: would experiencing the scarcity of time produce different

effects than that of money? When and why would effects of time and money scarcity be similar or different?

Previous research has suggested that a scarcity mindset created by any resource scarcity produces similar effects (Shah et al. 2012; Shah et al. 2015). The current research proposes that while time scarcity and money scarcity can indeed have similar effects, they can also produce differential effects. In this research, we show that both time scarcity and money scarcity lead people to make negative self-inferences such that they lack important resources instrumental in achieving their desired outcomes (Lea and Webley 2006; Mishkin 1992). We show that in the domain where the self-as-lacking inference manifests, both time and money scarcity show similar ‘scarcity effect’, by leading to greater preferences toward products that help consumers improve their deficits. However, the current research also identifies when time scarcity and money scarcity can be different. We show that when feeling time (vs. money) scarcity, people also tend to make positive self-inferences such as being a scarce resource themselves. Because unlike money, time is a resource that has the self at its root (Flaherty and Fine 2001; Hitlin and Elder 2007; Mead 1932; Reed et al. 2007), thus scarcity of time is effectively also the scarcity of the self as an available resource. The relatively greater positive self-inference that the self-as-the resource on part of time (vs. money) scarce consumers leads to higher subjective assessment of self-value, such as higher self-esteem or self-importance. Accordingly, we show that the increased self-value manifests in consumer’s intentions or preferences toward products that reflect the value of the self. Furthermore, we test important theoretical moderators to shed light on underlying process of positive self-inference, as well as to show when and why time and money scarcity are similar or different. We identify three moderators (i.e., personal control, unique to the self vs. generic type of scarcity experiences, and self as a source of scarcity by way

of prioritizing vs. mismanaging resources) that mitigate the effect of time (vs. money) scarcity by affecting the positive self-inference (i.e., I am the scarce resource).

Our work contributes to the literatures on scarcity, time and money, and self-value. First, our research builds on previous scarcity findings and identifies a new scarcity effect. As previous scarcity research suggested (Fernbach, Kan, and Lynch 2015; Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Shah et al. 2015), we show that time scarcity and money scarcity can be similar. In this paper we suggest that both time and money scarcity lead to a negative self-inference that the self lacks important resources, which in turn can shape similar effects of time and money scarcity on preferences toward self-improvement products (i.e., products that help consumers improve the self). Our findings shed light on why previous research finds similar effects across different types of scarcity. More importantly, our key contribution to scarcity literature is that we show in domains where the distinctive nature of resources is pronounced, the effects of different types of scarcity can differ. We show that due to the difference in the nature of time and money, there is a difference in positive self-inferences that the self is the scarce resource arising from time (vs. money) scarcity. Thus when governed by this positive self-inference, we find that time (vs. money) scarcity leads to greater preferences towards self-value products (i.e., products that reflect and promote consumers' self-value). Second, we add to the scarcity literature by suggesting that feeling scarcity may not always be a negative state. Research on resource scarcity have shown that feeling scarcity can lead to negative affects (Haushofer and Fehr 2014; Maule, Hockey, and Bdzola 2000), impatient decision making (Shah et al. 2012), selfish behaviors (Roux et al. 2015) or immoral decisions (Sharma et al. 2014). While we provide support for these negative findings by showing that feeling scarcity can lead to negative self-inferences, we also show that people can make positive self-inferences such that the

self is valuable depending on the type of resource scarcity. Third, we also extend this literature by suggesting moderators of and conditions when time scarcity behaves like money scarcity and when money scarcity mimics time scarcity. Fourth, we extend the literature on time versus money as resources to the domain of scarcity of those resources. Adding to previous research on differences in the salience or spending of time versus money (e.g., Mogilner and Aaker 2009; Okada and Hoch 2004; Saini and Monga 2008; Soman 2001), we show that people experience the lack of each resource differently. Specifically, we argue that when experiencing scarcity of time, people treat both the self and the time as the resource, whereas when experiencing money scarcity, only money is seen as a resource that the self lacks. This study of the self in determining the impact of time versus money supports and adds depth to the literature on time and money effects that has previously argued that the self is closely tied to time (George and Jones 2000; Hitlin and Elder 2007; Mead 1932; Reed et al. 2007; Reed et al. 2016). Finally, our findings add to a nascent literature on the role of self-value in consumption. Various papers have used different ways of tapping into what we will call ‘self-value’, which has been broadly defined as subjective assessment of the value or psychological utility of the self (e.g., Rucker Dubois, and Galinsky 2011) and has been measured using variety of constructs such as self-importance (Rucker et al. 2011), or self-esteem/worth (James 1890; Pelham and Swann 1989; Rosenberg et al. 1995). We argue that in our context, these different measures all tap into perceptions of self-value. We show that time and money scarcity are antecedents of self-value and that self-value systematically shapes consumer’s responses (e.g., preference for higher priced products, preference for products framed as special or worthy of the self). In sum, our research opens up new avenues of research by showing that a negative state such as feeling scarcity (Shah et al.

2012; Shah et al. 2015; Haushofer and Fehr 2014) can result in a positive psychological state for the self and consequently shape consumer judgments of products and messages.

In the next section, we first review the prior work on resource scarcity and research on time and money. Based on this research, we draw our hypotheses that both time and money scarcity lead to greater preferences toward self-improvement products via self-as-lacking inference. Moreover, we hypothesize that time (vs. money) scarcity lead to greater preference toward self-value products via greater self-as-resource inference. Then we test our key effects, the underlying mechanisms and boundary conditions in nine experiments. Finally, we conclude with a discussion of theoretical and practical implications.

THEORETICAL BACKGROUND

Scarcity Mindset

Experience of scarcity is a pervasive phenomenon (Ferbach et al. 2015; Roux et al. 2015; Shah et al. 2012). Consumers feel resource scarcity when there is a gap between their needs and the resources to fulfill those needs (Mani et al. 2013). For example, people can feel a time famine when they have too much to do but not enough time to do it (Etkin, Evangelidis, and Aaker 2015; Perlow 1999; Rudd, Vohs, and Aaker 2012), or feel financially constrained when their monetary budget restricts desired purchases (Sharma and Alter 2012; Tully, Hershfield, and Meyvis 2015). Poor people may constantly feel scarcity due to their limited access to resources (Bertrand, Mullainathan, and Shafir 2004; Mani et al. 2013). However, regardless of actual shortage of resources, feelings of resource scarcity can also be felt or induced momentarily (Shah

et al. 2012; Tully et al. 2015; Zwane 2012). Thus, researchers have suggested that affluent people may feel greater resource scarcity than those who have fewer resources, as long as they feel that they do not have enough resources to meet their own needs (Nelson and Morrison 2005; Tully et al. 2015).

A growing body of research argues that feelings of resource scarcity induce a mindset that systematically affects how individuals look at problems and make decisions (Mani et al. 2013; Shah et al. 2012; Sharma and Alter 2012). The scarcity mindset can affect individuals' cognitions, perceptions, affect, and behaviors (Hall, Zao, and Shafir 2013; Haushofer and Fehr 2014; Mani et al. 2013; Shah et al. 2012; Spears 2010). Moreover, the effect of resource scarcity is not restricted to perceptions and decisions that are directly related to the scarce resources (Mani et al. 2013; Nelson and Morrison 2005; Rodeheffer, Hill, and Lord 2012; Roux et al. 2015; Sharma and Alter 2012; Spears 2010). Feelings of resource scarcity can affect decisions that should be unrelated to the scarce resources from a normative perspective, such as an individual's attitude toward different types of people, or attention to unrelated information (Nelson and Morrison 2005; Rodeheffer et al. 2012; Sharma and Alter 2012). Consumer researchers have also revealed the effect of resource scarcity on consumption-related outcomes such as food consumption, lottery purchase, product preference, and financial or time planning (Briers and Laporte 2013; Fernbach et al. 2015; Haisley, Mostafa, and Lowenstein 2008; Mehta and Zhu 2016; Roux et al. 2015; Sharma and Alter 2012; Tully et al. 2015; Zhu and Ratner 2015). Thus, a growing body of research supports that the feelings of resource scarcity can shape perceptions, decision-making, and consumer behavior.

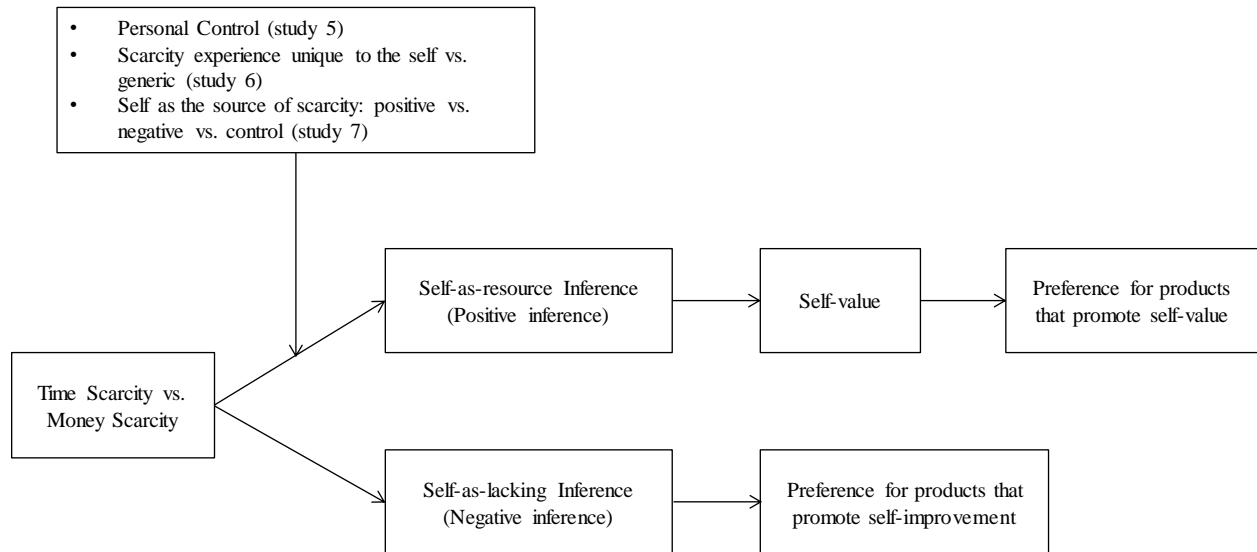
Despite the growing interest in issues surrounding resource scarcity, prior studies are limited to feelings of scarcity in general or are limited to one type of resource scarcity (Fernbach

et al. 2015; Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Tully et al. 2015). For example, studies have focused on how general reminders of resource scarcity affect consumers' selfish behaviors (Roux et al. 2015), how overall perceptions of scarcity polarize consumers' preferences (Zhu and Ratner 2015) or affect consumers' product use creativity (Mehta and Zhu 2016). Even when the studies take different types of resources into account, they examine the similar effect of different resource scarcities. For example, Shah et al. (2012) show that both a general sense of scarcity and time scarcity lead to a greater focus on the resources and make people impatient. In another investigation, the same authors show that money scarcity, caloric scarcity, and time scarcity all lead people to be less affected by contexts but focus more on their pressing needs (Shah et al. 2015). Researchers also found that both money constraints and time constraints lead to the same choice of strategy to cope with resource constraints (Fernbach et al. 2015), and both money scarcity and food scarcity increase men's preference toward heavier women (Nelson and Morrison 2005). While feelings of scarcity can emerge from various constraints such as hunger, drought, financial deprivation, or time constraints (Aarts et al. 2001; Karau and Kelly 1992; Radel and Clément-Guillotin 2012), previous research does not distinguish between different types of resource scarcity.

In the current research, we address this important gap in the literature. We examine whether feelings of resource scarcity that emerge from distinct resource constraints can have different effects on consumers' perceptions and decision-making. Moreover, we also suggest a possible explanation for the similar effects of different types of scarcity that are suggested by previous research. We focus on time scarcity and money scarcity because consumers frequently experience the scarcity of these resources, and consideration of these resources frequently affects consumer decisions. While these two resources are comparable, previous research has revealed

that they have distinct characteristics in terms of how individuals perceive their value, spend them, or make decisions related to them (Festjens and Janiszewski 2015; Leclerc et al. 1995; Lee et al. 2015; Okada and Hoch 2004; Reed et al. 2007; Soman 2001). We review the literature on time and money as resources to develop a theoretical framework that predicts when the scarcity of these two resources will produce different effects (see Figure 1 for model).

Figure 1. Theoretical Framework



Similar and Differential effects of Time and Money Scarcity: Self-as-lacking vs. Self-as-resource Inferences

Time and money are both primary resources that are used to achieve certain ends (Becker 1965). Economists view time and money similarly (Becker 1965) and to some extent, people view them as exchangeable (DeVoe and Pfeffer 2007) and accounts for them similarly (Rajagopal and Rha 2009). Both are resources that help people to acquire goods and services

(Mitchell and Mickel 1999; Williams, Masuda, and Tallis 2016). Moreover, both also help people to achieve psychological and social well-being by helping people engage in social activities or gain positions in the society (Bradshaw 2004; Byrne 2005; Duclos, Wen Wan, and Jiang 2013; Furnham 1984; Kruegler et al. 2009; Lea and Webley 2006; Williams et al. 2016; Zhou, Vohs, and Baumeister 2009). For example, money gives power to people in their economic roles (Bradshaw 2004) and can be exchanged with social acceptance or popularity (Duclos et al. 2013; Zhou et al. 2009). In a similar sense, time is also a “currency of life” (Kruegler et al. 2009), that helps people to achieve desirable outcomes such as health, personal development or leisure (Brownson, Boehmer, and Luke 2005; Williams et al. 2016). Thus when people are feeling time scarcity or money scarcity, the basic self-inference that people may have is that they lack the scarce resources that help them to achieve desired outcomes. As mentioned earlier, people feel resource scarcity when there is a gap between people’s needs and the resources to fulfill the desired needs (Mani et al. 2013). Thus when people are feeling scarcity, either time scarcity or money scarcity, people may form similar negative self-inferences such that they lack the scarce and important resource.

However, consumer researchers have shown that time can be systematically different from money (Leclerc et al. 1995; Mogilner 2010; Mogilner and Aaker 2009; Okada and Hoch 2004; Saini and Monga 2008; Soman 2001). One important difference between time and money is that spending time always requires the self as a resource, whereas the self as a resource is not a prerequisite for spending money. When spending money to fulfill needs, the role of the self as a resource is less significant than when spending time. For example, when people spend money to exchange it with desired ends, the self does not need to be present (e.g., online transfer of money) or execute the action (e.g., someone else can use your money to purchase products).

Because people perceive money as a medium of exchange, money has a fixed value no matter who uses the money or in which context the self uses money (Furnham and Argyle 1998; Leclerc et al. 1995; Liu and Aaker 2008; Mitchell and Mickel 1999; Okada and Hoch 2004; Saini and Monga 2008). Simply put, when spending money to exchange it with desired outcomes, the important resource is only the money, not the self.

However, time is a resource that requires the self as human capital. Time is, by its definition, experiences and activities that the self is connected to (Liu and Aaker 2008; Mead 1932; Reed et al. 2007; Reed et al. 2016). The experiences and activities that the self conducts consist of spending time (Flaherty and Fine 2002; George and Jones 2000; Hitlin and Elder 2007; Mead 1932). Thus what time scarcity implies is that conducting one desired activity (e.g., work) precludes the self from being engaged in another desired activity (i.e., child care; Williams et al. 2016). Simply put, when creating desired experiences by spending time, both time and the self become the resource that is being used and needed.

We suggest that due to this difference in interconnectedness of the self and the resources, self-inferences that tap into this difference can vary depending on which resource scarcity is felt. Because money is not bound to the self as an actor, the resource that people are spending or lacking when feeling money scarcity is only the money itself. Thus, the self-inference that people make when feeling money scarcity is simply that “I don’t have the resource” (i.e., self-as-lacking inference). However, because time is a resource that is rooted in the self (Flaherty and Fine 2002; Hitlin et al. 2007; Mead 1932), the scarcity of time entails meanings other than simply not possessing the resource. Individual’s activities and experiences, which translate into spending time (George and Jones 2000; Mead 1932), require the self as a human capital or resource. Thus lack of time means the shortage of the self as a resource that needs to take multiple demands at

the same time (Jabs and Devine 2006; Kaufman, Lane, and Lindquist 1991). That is, when feeling time scarcity, the resource that people are spending (or lacking) is not only time but also the self. Thus when feeling time scarcity, people may also infer that “I am the scarce resource” (i.e., self-as-resource inference).

Based on this theorizing, we propose that both feelings of money scarcity and time scarcity will lead to negative self inferences such that they lack scarce resources. However, feelings of time scarcity, relative to money scarcity, will lead people to have more positive self-inferences such that they are the scarce resource.

H1A: Both time and money scarce consumers will make negative self-inferences related to lacking the scarce resource.

H1B: Time (vs. money) scarce consumers will make more positive self-inferences about being the scarce resource.

Pilot study. Our first hypotheses suggest that time and money scarcity have similar effects in generating self-as-lacking inference, which is the negative self-inference and that time and money scarcity have differential effects on self-as-resource inference, which is the positive self-inference. Before investigating the downstream consequences of these self-inferences, we initially tested whether self-as-lacking and self-as-resource inferences reflect consumer’s negative and positive self-inferences respectively. We conducted a pilot test with a sample of participants drawn from Amazon Mechanical Turk using the six measures ($N=60$). Three measures were to measure the self-as-lacking inference; 1) I don’t have enough resources, 2) I lack the scarce resource, 3) I need to acquire more resources (adapted from Roux et al. 2015). The other three measures were developed to measure the self-as-resource inference; 1) I am the

scarce resource, 2) I am a rare resource, 3) I am a limited (in terms of availability) resource. We first gave people a description of what resource scarcity is and showed them the six statements in a randomized order. We asked people to indicate how positive or negative they perceive each statement (1 = very negative, 7 = very positive). We created an index of perceived negativity of self-as-lacking inference by averaging the three items we intended to measure the negative self-inference ($\alpha = .91$) and an index of perceived positivity of self-as-resource inference by averaging the three items we intended to measure the positive self-inference ($\alpha = .92$). As intended, people perceived the self-as-lacking inference measures as more negative ($t(59) = -2.6$, $p = .012$) and people perceived the self-as-resource inference measures as more positive ($t(59) = 3.27$, $p = .002$).

These results from the pilot test provide evidence that the inference that self is scarce is indeed perceived as positive. Moreover, we found that the inference that self lacks resources is indeed perceived as negative (for perceived positivity of each individual item, see appendix), which supports previous findings in the literature that feeling scarcity is a negative state (Haushofer and Fehr 2014; Mani et al. 2013; Shah et al. 2012; Shah et al. 2015; Sharma et al. 2015).

Similar and Differential effects of Time and Money Scarcity: Self-improvement vs. Self-value

The view that both time and money scarcity lead to a negative self-inference related to self-as-lacking can create a so called a scarcity effect. As we suggested, previous research has documented similar effects of different types of resource scarcity (Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Shah et al. 2015). One reason behind these similar effects can

be that scarcity literature generally focuses on the ‘lacking’ part of feeling scarcity. Resource scarcity is defined as not having enough to achieve desired ends (Mani et al. 2013). Thus in the domains where simply not having enough can create effects, different types of resource scarcity should lead to similar outcomes.

As a result, in domains where the self-as-lacking inference manifests, individuals either feeling time or money scarcity will behave similarly that is different from those who are not feeling any scarcity. Because we are examining this argument from the self-inference point of view, one possible domain can be self-improvement. If individuals who are feeling resource scarcity infer that the self lacks something important, they are more likely to be motivated to improve the self in general. Thus, individuals who are feeling resource scarcity (either time scarcity or money scarcity) should become more favorable towards products that can help them improve the self.

H2a: Time and money scarce consumers will have greater preference toward products that resonate with higher self-improvement compared to those who are not feeling any scarcity.

H2b: These effects will be driven by self-as-lacking inference.

While the effect driven by negative self-as-lacking inference should be similar across those who are feeling time or money scarcity, the effect driven by positive self-as-resource inference should lead to differential effect of time (vs. money) scarcity. How does the relative difference in positive self-as-resource inference arising from time (vs. money) scarcity affect the psychology and decisions of consumers? We suggest that because time (vs. money) scarce people perceive themselves as a scarce resource, they will be more likely to assess the self as

more valuable and subsequently make judgments that reflect the self-value. The self-value we address here incorporates various psychological assessments that people make about the self, such as how worthy the self is (i.e., self-esteem/self-worth; James 1890; Pelham and Swann 1989; Rosenberg et al. 1995) or how important the self is (i.e., self-importance; Kim, Wadhwa, and Chattopadhyay forthcoming; Rucker et al. 2011). We argue that the relative difference in the positive self-as-resource inference (e.g., I am the scarce resource), can lead to a positive view that the self is valuable.

People have positive heuristics regarding scarcity, such that scarce objects are good and desirable (Cialdini 1993; Bellezza, Keinan, and Pahlaria 2016; Lynn 1991). In the domain of products, scarcity related to objects is a signal of popularity, such that products with limited availability are considered in demand and desirable (Gierl and Huettel 2010; Inman, Peter, and Raghuram 1997; Parker and Lehmann 2011). This interpretation of scarcity can be applied to making an inference about individuals such that busy people are in demand and that they are in a subjectively important position in society (Bellezza et al. 2016; Gershuny 2005). Thus time scarce individuals, who perceive themselves as the scarce resource, may view the self as more valuable. However, money scarce people, who make only the negative self-inference such that “I lack the scarce resource”, may be less likely to view the self as valuable compared to time scarce people. In this paper, we operationalize self-value, the subjective assessments of the self as valuable, using various constructs used in previous studies to tap into how capable and positive the self is perceived to be (e.g., self-importance, Rucker et al. 2011; self-esteem/worth, Pelham and Swann 1989; Rosenberg et al. 1995). Because, our hypotheses rely on assessments of the self as valuable and not on signaling status or others’ perceptions of the self, we did not expect

measures of status to be affected via favorable inferences of the self as a scarce resource under time versus money scarcity.

We further suggest that the self-value will affect consumer's response in terms of products and messages that reflect the higher self-value. For example, we suggest that time (vs. money) scarcity will lead consumers to prefer products that make them feel like they are being treated better than usual (e.g., higher-priced products) or products that use appeals that promote or reflect consumer's higher self-value (e.g., "because you are worth it"). Consumers tend to approach desirable and rewarding outcomes that are indulgent and special, especially when they feel they are worthy or deserve to be treated nicely (Carver and White 1994; Higgins 1998; Lockwood, Jordon, and Kunda 2002; Mick and DeMoss 1990; Nenkov and Scott 2014). Many marketing tactics use this tendency to value the self to promote their products. Advertisers often use appeals that make consumers feel special (Mick and DeMoss 1990), for example "you deserve a break today" (McDonald's). This is different from indulgence in the context of self-control such as choosing a tempting option over a virtuous one. Our theorizing about self-as-a-resource inferences and increased self-value under time (vs. money) scarcity do not make predictions about self-control. Regardless of the tempting or virtuous nature of the product, if it reflects or reinforces greater self-value, it will be preferable under time (vs. money) scarcity.

Thus, we suggest that time (vs. money) scarcity will lead to greater assessments of self-value and consequently consumer's preference toward products that promote self-value.

H3a: Time (vs. money) scarce consumers will have higher self-value and greater preference toward products that resonate with this higher self-value.

H3b: These effects will be driven by self-as-resource inference.

We have argued that time and money scarcity effects can be similar or different depending on which self-inference (negative self-as-lacking inference vs. positive self-as-resource inference) drives the effect. While the similar effect of time and money scarcity on the self-improvement products driven by self-as-lacking inference can be a meaningful finding itself, the more important finding is the differential effect of time versus money scarcity, which has received less attention in the literature. Thus in this paper, while we show the similar effects driven by the negative self-as-lacking inference throughout the studies, we delve more deeply into the differential effects of time versus money scarcity that is driven by the positive self-as-resource inference.

Thus, in the next section, we propose several moderators that delineates the role of self-as-resource inference driving the differential effects. We suggested that the differential effect of time (vs. money) scarcity on consumer's response towards self-value promoting products is driven by the self-as-resource inference. If this is the case, then those who are feeling time scarcity but do not make such positive self-as-resource inference will behave like those who are feeling money scarcity even in the domains related to self-value. Likewise, those who are feeling money scarcity but make positive self-as-resource inference will act like those who are feeling time scarcity. To investigate the role of positive self-as-resource inference, we propose personal control, scarcity experience (whether it is unique to the self) and source of scarcity (whether the self is a positive source of scarcity) as moderators.

Low Personal Control: When Time Scarcity Behaves Like Money Scarcity under Self-as-Resource inference

One moderator that brings out the case when time scarcity acts similar to money scarcity when responding to self-value promoting products is the case for those with low personal control. Personal control is defined as the perception of events as being a consequence of one's own actions and ability to alter the events and achieve desired outcomes (Greenaway et al. 2015; Lefcourt 1966). The theoretical argument behind why time (vs. money) scarcity leads to greater self-value is that time (vs. money) scarce consumers perceive themselves as a resource that is essential to generate the desired outcomes. Those who have low personal control would perceive themselves as unable to change the outcome or task by their actions. Such consumers, even when feeling time scarcity, may be less likely to infer that the self is the scarce resource and to consequently perceive the self as valuable.

However, as we have argued, the role of self as an actor is less important for money. When feeling money scarcity, it is the money that is scarce not the self as human capital. Thus for those who are experiencing money scarcity, the role of the self is not even salient or implicated in determining the outcomes of their actions. Hence, having high versus low perceived control may not alter any inferences about the self as a scarce resource. The effects of personal control on self-inferences will be driven by time and not money scarcity.

H4: The time (vs. money) scarcity effect on the self-as-resource inference and self-value will be moderated by personal control; when personal control is high, the time (vs. money) effect will be replicated but when personal control is low, the time (vs. money) effect will be attenuated.

Type of experience and Source of Scarcity: When Money Scarcity Acts Like Time Scarcity under Self-as-resource Inference

We have argued that money scarce people do not draw self-as-resource inferences because the idea that the self as an actor that creates desired outcomes is not salient to them or important to them. However, not all scarcity experiences may not be the same and there can be cases when the role of the self as an actor becomes salient in people's minds even when feeling money scarcity. For example, if people have decided to spend their money on their education for self-development and thus feel money constrained when planning to go to a vacation, people's thoughts about the self will not be the same compared to when feeling money scarcity because they spent money without planning. In such cases, it is possible that those who are feeling money scarcity can make self-as-resource inference, especially when the self takes an important role in creating the scarcity experience. We test this proposition by examining the type of scarcity experiences that people have and the role of the self in creating such scarcity experiences. First, we test the irreplaceability of the self in the experience of feeling scarcity. When the self takes an important role in the events that lead to money scarcity where the self cannot be replaced with others, money scarce consumers will be more likely to endow more meaning and resourcefulness to the self. For example, feeling money scarcity due to building a very first home, which is an experience that leads people to think that the self is unique and special, can lead to different thoughts about the self than feeling money scarcity due to paying bills, which is an experience that most people have. We test this by manipulating the type of experience that led to scarcity. If the scarcity experience was something that is unique to the self, instead of being generic (i.e., can happen to anyone), then the role of the self when feeling scarcity should be irreplaceable and thus salient. In such unique (vs. generic) type of scarcity experiences, money scarce consumers would draw more favorable self-inferences and self-value.

Since the self is always a part of time scarcity, we did not expect time scarce consumers to be differentially affected by the unique or generic nature of the scarcity experience.

H5: The time (vs. money) scarcity effect on the self-as-resource inference and self-value will be moderated by type of experience (unique vs. generic); when the experience is unique-to-self (vs. generic), money scarce consumers will make more self-as-resource inferences.

Second, we test whether attributions of the self as the source of scarcity would also alter whether money scarcity implicates the self. Not every salient self will lead to self-as-resource inference, because the self-as-resource inference is endowed with positive perceptions. That is, when the negative role of the self is made salient, people will not make such positive self-inference. However, when the positive role of the self is made salient, even those who are feeling money scarcity will make self-as-resource inferences. For example, people could see their scarcity arising from an unfavorable self-attribution of sub-optimal management of the resource or from a favorable self-attribution of having prioritized their resources. For money scarce consumers, when the source of scarcity is a negative self, money scarce consumers will not make self-as-resource inference, which is a positive self-inference. However, when the source of the scarcity is a positive self, we expect money scarce consumers to make favorable self-inferences. In case of feeling time scarcity, we expect whether the source of scarcity is a positive or negative self will not affect people's self-as resource inference. Because time scarcity requires the self as an actor by nature, time scarce consumers will infer that the self is the scarce resource without adequate attention to the role of self in shaping that scarcity. The observation that the self is a scarce resource overrides the valence of the self in shaping scarcity. Thus, we expect that self as source of scarcity will have no effect on self-as-resource inferences for time scarcity.

H6: The time (vs. money) scarcity effect on the self-as-resource inference and self-value will be moderated by the source of scarcity (mismanagement vs. prioritization); when the scarcity arises from the self prioritizing (vs. mismanaging) resources, money scarce consumers will draw more self-as-resource inferences.

We tested our hypotheses with nine studies. Study 1 uses measured scarcity to test the effect on self-inferences and show that both time and money scarcity are associated with negative self-as-lacking inference while only time scarcity is associated with positive self-as-resource inference. Study 2 replicates the effects we find in study 1 using manipulated scarcity and also show that the differential effect on self-as-resource inference further leads to greater assessment of self-value. Study 3A and 3B investigate the downstream consequences of self-as-lacking and self-as-resource inferences. Study 3A first examine whether feeling scarcity (both time and money scarcity) leads to greater preference towards self-improvement products while feeling time (vs. money) scarcity leads to greater preference towards self-value products. Study 3B replicates the findings of study 3A and also show that that self-as-lacking inference leads to greater preference towards self-improvement products while self-as-resource inference leads to greater preference towards self-value products. Study 4A, and 4B further examine the differential effects of time (vs. money) scarcity on the self-as-resource inference and consumer's response to self-value promoting products. In study 5, we test the role of positive self-as-resource inference by showing that when time scarce people have low personal control, the differential effect of time (vs. money) scarcity on self-value was diminished. Study 6 shows that when money scarce people perceive that the experiencing scarcity is unique to the self and thus the self is not replaceable, their self-as-resource inference and self-value were boosted. Finally, in study 7, we

show that when the self as the source of scarcity is positive, the money scarce people showed increased self-as-resource inference and self-value.

STUDY 1

We posit that both money scarcity and time scarcity lead people to make the self-inference that they lack the scarce resource, but only time scarcity will lead people to make a positive self-inference that they *are* the scarce resource (H1a and H1b). Study 1 measured participants' current feelings of scarcity and their self-inferences.

Method

A total of 194 undergraduate students participated in the study in exchange for course credit. All participants first read a short description of meaning of resource scarcity (adapted from Mani et al. 2013; Zauberman and Lynch 2005):

Human life is the existence of multiple goals that compete for the use of a single limited resource pool. There are various types of resources that help you achieve your goals and tasks, such as money, time, food, water, energy, etc. People feel resource scarcity when the resource you have is not enough to achieve multiple goals and tasks.

After reading the description, participants answered questions about how they view the self in relation to resources: 1) I lack the scarce resource, and 2) I am the scarce resource (1 =

strongly disagree, 9 = strongly agree). Next, participants answered short filler questions related to information about the self in general (e.g., how often do you work out? what is your favorite brand?), and demographic questions (e.g., age, gender, race). We then measured time constraint and money constraint by asking participants to indicate the extent to which they feel time constrained at the moment and money constrained at the moment (adapted from Tully et al. 2015, 1 = Not at all, 7 = Very much). Finally, participants indicated their English fluency and family income (1 = less than \$10,000 to 11 = \$200,000 or more).

Results and Discussion

We ran two regressions to assess the effect of time scarcity and money scarcity on positive and negative self-inferences while controlling for family income in each regression. First, we examined the effect of time scarcity and money scarcity on the “I lack the scarce resource” self-inference (i.e., self-as-lacking inference). Family income ($M = 7.72$, $SD = 2.98$) was marginally significant, such that those whose family income was higher were less likely to infer that they lack the scarce resource ($b = -.13$, $t = -1.84$, $p = .067$). Both money constraint ($M = 3.82$, $SD = 1.75$; $b = .18$, $t = 2.4$, $p = .017$) and time constraint ($M = 5.66$, $SD = 1.37$; $b = .17$, $t = 2.33$, $p = .021$) were positive and significant, suggesting that both money scarcity and time scarcity explain more additional variance in the negative self-inference.

Next, we examined the effect of time scarcity and money scarcity on the “I am the scarce resource” self-inference (i.e., self-as-resource inference). Family income was entered as a control variable and was not significant ($b = -.07$, $t = -.98$, NS). Money constraint was also not significant ($b = .02$, $t = .28$, NS), suggesting that feelings of money scarcity does not affect

positive self-inference. However, time constraint was positive and significant ($b = .17, t = 2.28, p = .023$), suggesting that participants who were feeling greater time scarcity were more likely infer that they are the scarce resource than those who were feeling lower time scarcity.

Study 1 provides evidence that greater feelings of scarcity, of both time and money, led to a negative self-as-lacking inference (i.e., I lack the scarce resource). However, those feeling greater time scarcity also made a positive self-as-resource inference that the self is the scarce resource.

STUDY 2

The objective of study 2 is to test whether the effects we found in study 1 can be replicated when manipulating the feelings of time scarcity and money scarcity. In this study, we included a control condition in order to see whether the similar effect of time and money scarcity on the self-as-lacking inference is indeed different from those who are not feeling any scarcity. Furthermore, we included measures of self-esteem and self-importance in order to see whether time (vs. money) scarcity differentially affects participants' self-value. We predict that the differential effect on self-value is mediated by self-as-resource inference, while the self-as-lacking inference does not affect self-value.

Method

A total of 175 students were recruited for partial course credit and took part in a one-factor (control vs. money scarcity vs. time scarcity) design. Participants in the time scarcity and

money scarcity condition first completed an episodic recall task (adapted from Roux et al. 2015) to manipulate different types of scarcity. Specifically, participants in the time scarcity condition were asked to describe a recent episode when they felt they “didn’t have enough time and thus felt time constrained.” Participants in the money scarcity condition were asked to describe a recent episode in which they felt they “didn’t have enough money and thus felt money constrained.” Participants in both conditions described the episode in detail. Participants in the control condition listed 10 facts they know (Tully et al. 2015).

To see if feeling time and money scarcity affect participants’ self-inferences, we asked two independent coders (blind to our hypotheses) to code the experiences that participants wrote about feeling time scarcity and money scarcity. Coders were specifically instructed to indicate on a 7-point scale whether the participants’ experiences indicated thoughts about the self is lacking scarce resources (1 = not at all, 7 = very much; $\alpha = .97$) and about the self being a scarce resource (1 = not at all, 7 = very much; $\alpha = .96$). Coders’ ratings were averaged to create an index of self-as-lacking inference and an index of self-as-resource inference.

Following the manipulation, we presented participants with an ostensibly unrelated task, which were questions related to how they view the self. Specifically, we measured participants’ self-esteem and self-importance by asking them to indicate the extent to which they agree to the statements (1= not at all, 10 = extremely). We used three items from Rosenberg (1989) self-esteem scale to measure self-esteem: “I have a positive attitude towards myself”, “I am satisfied with myself”, “At times, I think I am no good at all”. The third item was reverse coded. We also measured participants’ self-importance using adapted version of two items (“I am very important as an individual” and “I am a person of worth,”) from Rucker et al. (2011). These five items were averaged to form an index of self-value ($\alpha = .89$).

Finally, participants indicated the extent to which they felt time constrained and money constrained while answering the survey on 7-point scales (1 = not at all, 7 = very much; adapted from Tully et al. 2015) and answered demographic questions such as gender, age and family income. These demographic variables were not significant covariates in this study or any of the following studies, and thus are not discussed further. Three participants reported that they never experienced feeling money scarcity and were dropped from the analyses.

Results

Manipulation check. As intended, there was a significant scarcity condition effect on the time-scarcity feelings ($F(2, 169) = 19.89, p < .001$). Participants in the time scarcity condition rated their time-scarcity feelings significantly higher than those in the money scarcity condition ($M_{\text{time}} = 5$ vs. $M_{\text{money}} = 3.39, t(169) = 1.61, p < .001$) or those in the control condition ($M_{\text{time}} = 5$ vs. $M_{\text{control}} = 2.91, t(169) = 2.09, p < .001$). We also found a significant scarcity condition effect on the money-scarcity feelings ($F(2, 169) = 30.24, p < .001$). As expected, the money scarcity condition rated their money-scarcity feelings greater than the time scarcity condition ($M_{\text{time}} = 2.57$ vs. $M_{\text{money}} = 4.48, t(169) = 1.92, p < .001$) or the control condition ($M_{\text{money}} = 4.48$ vs. $M_{\text{control}} = 1.95$ vs., $t(169) = 2.53, p < .001$). These results provide evidence that our manipulation was effective.

Self-as-lacking inferences. An ANOVA showed a significant scarcity condition effect on the self-as-lacking inference ($F(2, 169) = 263.74, p < .001$). As expected, the self-as-lacking scores for the time scarcity condition and the money scarcity condition were both higher than the control condition ($M_{\text{time}} = 5.96$ vs. $M_{\text{control}} = 1.12, t(169) = 4.84, p < .001$; $M_{\text{money}} = 5.71$ vs.

$M_{\text{control}} = 1.12$, $t(169) = 4.59$, $p < .001$). However, the self-as-lacking score was not significantly different across the time scarcity and the money scarcity conditions ($M_{\text{time}} = 5.96$ vs. $M_{\text{money}} = 5.71$, $t(169) = .25$, $p = \text{NS}$), indicating that both conditions make a negative self-as-lacking inference.

Self-as-resource inference. A separate ANOVA on the self-as-resource inference also revealed a significant scarcity condition effect ($F(2, 169) = 306.18$, $p < .001$). The self-as-resource inference score was higher for the time scarcity condition compared to the money scarcity condition ($M_{\text{time}} = 5.98$ vs. $M_{\text{money}} = 2.49$, $t(169) = 3.49$, $p < .001$) and the control condition ($M_{\text{time}} = 5.98$ vs. $M_{\text{control}} = 1.15$, $t(169) = 4.84$, $p < .001$). We also found that the self-as-resource inference score for the money scarcity condition was higher than the control condition ($M_{\text{money}} = 2.49$ vs $M_{\text{control}} = 1.15$ vs., $t(169) = 1.29$, $p < .001$). We expect that this result is due to the nature of control condition manipulation. We asked the control condition to write down the facts they know, which has nothing to do with participant's thoughts about themselves. Thus, we found very low scores on the self-inference measures.

Self-value. An ANOVA on self-value revealed a significant scarcity condition effect ($F(2, 172) = 3.63$, $p = .028$). As we hypothesized, we found that the time scarcity condition showed greater self-value than the money scarcity condition ($M_{\text{time}} = 7.2$ vs. $M_{\text{money}} = 6.46$, $t(172) = .76$, $p = .023$) or the control condition ($M_{\text{time}} = 7.2$ vs. $M_{\text{control}} = 6.44$, $t(172) = .78$, $p = .02$). However, the money scarcity condition showed similar level of self-value compared to the control condition ($M_{\text{money}} = 6.46$ vs $M_{\text{control}} = 6.44$ vs., $t(172) = .017$, $p = \text{NS}$). These results support our hypothesis that time (vs. money) scarcity leads to greater self-value.

Mediation. To test whether the positive self-as-resource inference mediated the effect of time (vs. money) scarcity on the self-value, we ran a mediation analysis using the bootstrapping technique with 5,000 bootstrapped samples (Hayes and Preacher, 2014; Model 4). The money scarcity condition was group 1, the control condition was group 2 and the time scarcity condition was group 3. The PROCESS macro generated dummy variables for multicategorical independent variables (money scarcity versus control as D1 and time scarcity versus money scarcity as D2). The result indicated that time scarcity had a significant positive effect on self-as-resource inference compared to money scarcity ($b = 3.49, SE = .21, t(169) = 16.98, p < .001$), and that higher levels of self-as-resource inference had a significant positive effect on the self-value ($b = .25, SE = .12, t(168) = 2.02, p = .04$). The bootstrapping test confirmed that greater self-as-resource inference mediated the effect of time (vs. money) scarcity on the self-value ($b = .87, SE = .49, 95\% \text{ CI from } .03 \text{ to } 2$). Additional analyses with reverse model (scarcity \rightarrow self-value \rightarrow self-as-resource inference) was not significant ($b = .002, 95\% \text{ CI from } -.0007 \text{ to } .01$). Including self-as-lacking inference as covariate did not change our results.

In summary, we found similar effects of time scarcity and money scarcity, such that both lead to negative self-inference that the self lacks scarce resource, compared to those who are not feeling any scarcity. However, more importantly, we also found that compared to money scarcity, time scarcity leads to greater positive self-inference that the self is the scarce resource. We found that this positive self-as-resource inference further leads to greater assessment of self-value. The important next question is whether such effects on self-inferences have downstream consequences on consumers' response towards certain products. We argued that the similar effect of time and money scarcity on the negative self-as-lacking inference can lead to greater

preference towards self-improvement products. However, the differential effect of time and money scarcity on the positive self-as-resource inference will lead to greater preference towards self-value products. Our next study provides evidence for these hypotheses.

STUDIES 3A and 3B

The objective of studies 3A and 3B is to test the downstream consequences of time and money scarcity by examining consumers' response towards self-improvement and self-value products. Study 3A initially tests whether time and money scarcity have similar effects on consumer's response towards self-improvement products and whether time and money scarcity have differential effects on consumer's response towards self-value products. In study 3B, we replicate these findings and show that the effect on self-improvement product is driven by self-as-lacking inference and the effect on self-value product is driven by self-as-resource inference.

STUDY 3A

Method

A total of 350 people participated via Amazon Mechanical Turk (age: 18-83, Mean age: 35.55, 53.4% male). We used a 3 (scarcity type: control vs. time vs. money) \times 2 (product type: self-improvement vs. self-value) between subjects design. Participants were randomly assigned to one of the conditions. To manipulate scarcity, we used the adapted version of busyness manipulation from Wilcox et al. (2016). Participants in the time scarcity condition were asked to

list all the tasks they had to do recently and indicate how time scarce they were on a two-item scale. Similarly, participants in the money scarcity condition were first asked to list all the things they had to buy or pay recently and indicate how money scarce they were on a two-item scale. To manipulate scarcity, the scale measuring time (vs. money) scarcity was altered so that the responses will be indicating moderately feeling time (vs. money) scarcity (for time scarcity condition: 1 = somewhat feeling time scarcity, 7 = extremely feeling time scarcity; for money scarcity condition: 1 = somewhat feeling money scarcity, 7 = extremely feeling money scarcity). Similarly, another scale measuring the number of tasks (vs. things to buy or pay) was adjusted so that participants' responses will indicate moderate amount of things to do or buy (for time scarcity condition: 1 = some tasks, 7 = very many tasks; for money scarcity condition: 1 = some things, 7 = very many things). The control condition was asked to list 10 facts they know (Tully et al. 2015).

Following the manipulation, as an ostensibly unrelated task, participants were asked to answer a product related study. Participants in the self-improvement product condition were asked to view two books that is related to improving their life and their performance (e.g., “Improve the quality of your life”, “High performance habits”; See appendix). Participants in the self-value product condition were also asked to view two books but these books were related to promoting self-value (e.g., “Bring the luxury to your table”, “You are special and you deserve a break”). After viewing the books, participants indicated their preference towards the book and their likelihood of purchasing the book on 9-point scales (1 = not at all, 9 = very much). Due to high reliability ($\alpha = .92$), we averaged preference measures and purchase likelihood measures of the two books to form one index of attitude towards products.

Next, to ensure that our manipulation worked, we asked participants to indicate the extent to which they felt time constrained and money constrained while answering the survey on 7-point scales (1 = not at all, 7 = very much; adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked for their participation.

Results and Discussion

Manipulation check. We found a significant scarcity condition effect on the time-scarcity feelings ($F(2, 347) = 3.27, p = .039$). Participants in the time scarcity condition rated their time-scarcity feelings significantly higher than those in the money scarcity condition ($M_{\text{time}} = 3.49$ vs. $M_{\text{money}} = 2.96, t(347) = .53, p = .018$) or those in the control condition ($M_{\text{time}} = 3.49$ vs. $M_{\text{control}} = 3.04, t(347) = .45, p = .048$). We also found a significant scarcity condition effect on the money-scarcity feelings ($F(2, 347) = 7.2, p = .001$). As expected, the money scarcity condition rated their money-scarcity feelings greater than the time scarcity condition ($M_{\text{time}} = 4.03$ vs. $M_{\text{money}} = 4.58, t(347) = .54, p = .03$) or the control condition ($M_{\text{money}} = 4.58$ vs. $M_{\text{control}} = 3.62, t(347) = .95, p < .001$). These results provide evidence that our manipulation was effective.

Attitude towards products. We next conducted 3(scarcity type: time vs. money vs. control) \times 2(product type: self-improvement vs. self-value) ANOVA using attitude as dependent variable. The analysis revealed that only scarcity type \times product type interaction was significant ($F(2, 344) = 7.03, p = .001$). As we hypothesized, we found that the time scarcity condition showed more favorable response towards self-improvement products than the control condition ($M_{\text{time}} = 4.66$ vs. $M_{\text{control}} = 3.9, t(344) = .76, p = .045$). Moreover, we also found that the money

scarcity condition showed more favorable response towards self-improvement products than the control condition ($M_{\text{money}} = 5.23$ vs. $M_{\text{control}} = 3.9$, $t(344) = 1.32$, $p = .001$). The time scarcity condition and the money scarcity condition showed similar level of favorable attitude ($p = \text{NS}$). However, with respect to attitude towards self-value products, we found a significant difference between the time scarcity condition and the money scarcity condition. As we hypothesized we found that the time scarcity condition showed more favorable attitude towards self-value product than the money scarcity condition ($M_{\text{time}} = 4.75$ vs. $M_{\text{money}} = 3.79$, $t(344) = .96$, $p = .011$).

STUDY 3B

Method

A total of 251 people participated via Amazon Mechanical Turk (age: 18-68, Mean age: 34.87, 57.8% male). Again, we used 3(scarcity type: time vs. money vs. control) \times 2(product type: self-improvement vs. self-value) between subjects design. All procedures were identical to the study 3A except that we measured participants' self-inferences before asking their attitudes about the books. Participants were asked to answer several questions related to the self, and among the questions, we included items that measure participants' self-as-lacking inference and self-as-resource inference. To measure the self-as-lacking inference, we asked; 1) I don't have enough resources, 2) I lack the scarce resource, 3) I need to acquire more resources ($\alpha = .84$; adapted from Roux et al. 2015). To measure the self-as-resource inference, we asked; 1) I am the scarce resource, 2) I am a rare resource, 3) I am a limited (in terms of availability) resource ($\alpha = .87$). All self-inference items were on 9-point scales (1 = not at all, 9 = very much).

Results and Discussion

Manipulation check. An ANOVA was used to examine whether the manipulation was successful. We found that the time scarcity condition experienced greater time scarce feelings than the money scarcity condition ($M_{\text{time}} = 3.77$ vs. $M_{\text{money}} = 3.17$, $t(248) = .61$, $p = .019$) and the control condition ($M_{\text{time}} = 3.77$ vs. $M_{\text{control}} = 2.79$, $t(248) = .99$, $p < .001$). Also, the money scarcity condition experienced greater money scarce feelings than the time scarcity condition ($M_{\text{time}} = 4.06$ vs. $M_{\text{money}} = 4.64$, $t(248) = .58$, $p = .04$) and the control condition ($M_{\text{money}} = 4.64$ vs. $M_{\text{control}} = 2.93$, $t(248) = 1.71$, $p < .001$). These results support that our manipulation was successful.

Self-as-lacking inferences. We first conducted a one-way ANOVA on the self-as-lacking inference and found a significant scarcity type effect ($F(2, 248) = 5.05$, $p = .007$). As expected, we found no significant difference between the time scarcity condition and the money scarcity condition ($M_{\text{time}} = 5.74$ vs. $M_{\text{money}} = 6.02$, $p = \text{NS}$). Also we found that both time scarcity ($t(248) = .66$, $p = .032$) and money scarcity ($t(248) = .958$, $p = .002$) showed greater self-as-lacking inference compared to control ($M_{\text{control}} = 5.08$) suggesting that feeling scarcity leads to inference that the self lacks resources.

Self-as-resource inference. We conducted a separate ANOVA on the self-as-resource inference and found a significant scarcity condition effect $F(2, 248) = 5.05$, $p = .007$). As expected, we found no significant difference between the time scarcity condition and the money scarcity condition ($M_{\text{time}} = 5.74$ vs. $M_{\text{money}} = 6.02$, $p = \text{NS}$). More importantly, we found that both time scarcity ($t(248) = .66$, $p = .032$) and money scarcity ($t(248) = .958$, $p = .002$) showed greater

self-as-lacking inference compared to control ($M_{\text{control}} = 5.08$) suggesting that feeling scarcity leads to inference that the self lacks resources.

Attitude towards products. To measure attitude towards products, we used the same measures from study 3A ($\alpha = .90$). We conducted 3(scarcity type: time vs. money vs. control) \times 2(product type: self-improvement vs. self-value) ANOVA on the attitude towards products measure. We found a significant main effect of scarcity type ($F(2, 245) = 5.12, p = .007$). Replicating our previous result, we also found a significant interaction effect ($F(2, 245) = 4.78, p = .009$). As predicted, both the time scarcity condition and the money scarcity condition showed more favorable attitude towards self-improvement products than the control condition ($M_{\text{time}} = 5.17$ vs. $M_{\text{control}} = 3.98, t(245) = 1.19, p = .007$; $M_{\text{money}} = 5.01$ vs. $M_{\text{control}} = 3.98, t(245) = 1.02, p = .026$). The time scarcity condition and the money scarcity condition did not significantly differ on their attitude towards self-improvement products ($M_{\text{time}} = 5.17$ vs. $M_{\text{money}} = 5.01, p = \text{NS}$). However, we found a significant difference between the time scarcity and the money scarcity conditions on the attitude towards self-value products. As expected, the time scarcity condition showed significantly more favorable attitude towards self-value products than the money scarcity condition ($M_{\text{time}} = 5.18$ vs. $M_{\text{money}} = 3.65, t(245) = 1.53, p = .001$).

Moderated mediation. To assess which self-inference is driving the effects on attitude towards self-improvement products and self-value products, we conducted a moderated mediation analysis (Model 15; Hayes 2013). We used scarcity type as independent variable, self-as-lacking and self-as-resource inferences as mediators and attitude towards products as dependent variable, while the effect of self-inferences on attitude is dependent on the product

type (self-improvement product coded as 0 and self-value product coded as 1). Because our independent variable has three levels, we created dummy variables (money scarcity versus control as D1 and time scarcity versus control as D2). Model 15 was run twice, once with money scarcity and control comparison with time scarcity and control comparison as a covariate and second with time scarcity and control comparison with money scarcity and control as a covariate (Hayes and Preacher 2014). We found that time scarcity and money scarcity were both showed greater self-as-lacking inference than the control ($b = .95$, $SE = .31$, $95\% CI = .34$ to 1.55 for D1 and $b = .65$, $SE = .13$, $95\% CI = .06$ to 1.25 for D2) and greater self-as-lacking inference significantly predicted attitude towards products ($b = .25$, $SE = .1$, $95\% CI = .05$ to $.45$ for D1, $b = .29$, $SE = .1$, $95\% CI = .09$ to $.49$ for D2). However, the effect on attitude towards products was moderated by the product type ($b = -.27$, $SE = .13$, $95\% CI = -.53$ to $-.01$ for D1, $b = -.33$, $SE = .13$, $95\% CI = -.58$ to $-.07$ for D2). Indirect effects showed that self-as-lacking inference predicts attitude towards product when the product is self-improvement product ($b = .24$, $SE = .14$, $95\% CI = .04$ to $.61$ for D1, $b = .19$, $SE = .13$, $95\% CI = .02$ to $.54$ for D2) but not when is self-value product ($95\% CI = -.2$ to $.12$ for D1, $95\% CI = -.2$ to $.08$ for D2). We also found that compared to control, time scarcity showed greater self-as-resource inference ($b = .71$, $SE = .3$, $95\% CI = .13$ to 1.29). Moreover, the effect of self-as-resource inference on the product attitude was significantly moderated by product type ($b = .27$, $SE = .13$, $95\% CI = .01$ to $.54$). We found that when the product is self-value product, self-as-resource inference significantly predicted the favorable attitude ($b = .28$, $SE = .14$, $95\% CI = .06$ to $.62$), but not when it is self-improvement product ($95\% CI = -.04$ to $.37$). Because our main interest is to see whether there is a significant difference between time scarcity and money scarcity with respect to effects on self-as-resource inference and self-value products, we conducted additional analysis using new dummy variables

(money scarcity versus control as D1 and time scarcity versus money scarcity as D2). As expected, we found that compared to money scarcity, time scarcity showed greater self-as-resource inference ($b = .61$, $SE = .3$, 95% CI = .02 to 1.19) and that self-as-resource inference effect on attitude was significantly moderated by product type ($b = .27$, $SE = .14$, 95% CI = .01 to .54). We found that when the product is self-value product, self-as-resource inference significantly predicted product attitude ($b = .24$, $SE = .14$, 95% CI = .03 to .58), but not when the product is self-improvement (95% CI = -.23 to 1.35). These results suggest two important findings. First, we showed that the effects of time scarcity and money scarcity can be similar in the domain of self-improvement products. We showed that because both time and money scarcity consumers make negative inference, that the self lacks important resources, they prefer products that can improve the self in general. This result gives support to previous findings in the literature that showed different types of resource scarcity lead to similar outcomes (Nelson and Morrison 2005; Shah et al. 2012; Shah et al. 2015). Second, we find important evidence that contributes to the scarcity literature that time scarcity and money scarcity effects can be different in the domain of self-value products. Because time (vs. money) scarce consumers make more positive inferences that the self is the scarce resource, they are more likely to prefer products that promote their self-value. In the next studies, we investigate this differential effect of time (vs. money) scarcity more carefully by replicating the effect and examining when this differential effect can be moderated.

STUDIES 4A AND 4B

The objective of studies 4A and 4B is to delve more deeply into our findings of differential effects of time (vs. money) scarcity. In the previous studies, we found that time (vs. money) scarcity affects consumers to prefer self-value products, which is driven by the increased positive self-as-resource inference. We attempt to replicate these findings in studies 4A and 4B using different types of self-value products. In study 4A, we show that positive self-as-resource inference mediates time (vs. money) scarcity effect on consumer's preference towards product appeals that promote self-value. In this study, we control the product and manipulate whether the same product is presented in a self-value promoting way or a quality promoting way. In study 4B, we replicate the mediating effect of positive self-as-resource inference on the self-value products. In study 4B, we use luxury options to examine response towards self-value products. Luxury or higher priced options are special and considered as treats that consumer would not normally buy (Cavanaugh 2014; Kivetz and Simonson 2002; Mukhopahyay and Johar 2009). Thus, consuming luxury products can be a reward or gift to the self when consumers believe the self is worthy or deserving of it (Cavanaugh 2014; Kivetz and Simonson 2002; Mukhopahyay and Johar 2009).

STUDY 4A

A total of 146 students participated in the study for partial course credit. Participants were randomly assigned to either a time scarcity condition or a money scarcity condition. To manipulate scarcity type, we used the same episodic recall task from study 2 (adapted from Roux et al. 2015) and asked participants to describe a recent episode of experiencing time scarcity or money scarcity. After the recall task, we asked participants to move on to the next study - an

advertisement evaluation study. All participants viewed two advertisements for the same shoe. Both advertisements had a picture of a shoe, but one had a tagline that promotes self-value (i.e., “You deserve the best, because you are worth it”; see appendix) and the other had a tagline that promotes the quality of the shoe (i.e., “Designed for quality, designed to accelerate.”; see appendix). We conducted a pretest that established that people view self-value advertisement to promote consumer’s self-value and quality advertisement to promote quality of the shoe. Then participants were asked to indicate their preference toward the one advertisement over the other, on a bipolar scale (10-point scale; 1 = prefer ‘designed for quality, designed to accelerate’ advertisement to 10 = prefer ‘you deserve the best, because you are worth it’ advertisement). Thus, higher score would indicate participants’ preference toward the self-value promoting advertisement over the quality advertisement.

Next, participants completed short filler questions related to information about the self in general (e.g., how often do you work out?) and demographic questions. After the filler questions, participants were given a definition of scarcity and were asked to indicate their self-inference in relation to resources: 1) I lack the scarce resource, and 2) I am the scarce resource (1 = strongly disagree to 7 = strongly agree). Finally, to ensure that our manipulation worked, we asked participants to indicate the extent to which they felt time and money constrained while answering the survey on 9-point scales (1 = not at all, 9 = very much; adapted from Tully et al. 2015).

Results

Manipulation check. As intended, participants in the time scarcity condition rated their time-scarcity feelings significantly higher than those in the money scarcity condition ($M_{\text{time=}}$

6.43 vs. $M_{\text{money}} = 5.38$, $F(1, 144) = 9$, $p = .003$). Moreover, participants in the money scarcity condition rated their money-scarcity feelings significantly higher than those in the time scarcity condition ($M_{\text{time}} = 6.71$ vs. $M_{\text{money}} = 5.96$, $F(1, 144) = 6$, $p = .016$). These results provide evidence that our manipulation was effective.

Self-as-lacking inference An one-way ANOVA showed that the time scarcity condition and the money scarcity condition did not significantly differ on the negative self-as-lacking inference ($M_{\text{time}} = 5.23$ vs. $M_{\text{money}} = 4.97$, NS).

Self-as-resource -inference. An one-way ANOVA showed that the time scarcity condition reported significantly greater positive self-as-resource inference (i.e., I am the scarce resource) than the money scarcity condition ($M_{\text{time}} = 4.32$ vs. $M_{\text{money}} = 3.19$, $F(1, 144) = 13.27$, $p < .001$).

Advertisement evaluation. Again, an one-way ANOVA was conducted on the preference toward the self-value promoting advertisement over the quality promoting advertisement. As predicted, the time scarcity condition showed greater preference toward the self-value promoting advertisement than the money scarcity condition ($M_{\text{time}} = 4.47$ vs. $M_{\text{money}} = 3.31$, $F(1, 144) = 10.35$, $p = .002$).

Mediation. To test whether the self-as-resource inference mediated the effect of time (vs. money) scarcity on preference toward the self-value promoting advertisement, we ran a mediation analysis using the bootstrapping technique with 5,000 bootstrapped samples (Hayes

2013; Model 4). The time scarcity condition was coded as 1 and the money scarcity condition was coded as 0. The result indicated that time scarcity had a significant positive effect on self-as-resource inference compared to money scarcity ($b = 1.13$, $SE = .31$, $t(144) = 3.64$, $p < .001$), and that higher levels of self-as-resource inference had a significant positive effect on preference toward the self-value promoting advertisement ($b = .2$, $SE = .1$, $t(144) = 2.1$, $p = .03$). The bootstrapping test confirmed that greater self-as-resource inference mediated the effect of time (vs. money) scarcity on preference toward the self-value promoting advertisement ($b = .23$, $SE = .14$, 95% CI from .03 to .58).

STUDY 4B

The objective of study 4B was to replicate the findings from study 4A using different products to capture a consumer consequence of self-value, which is consumer's preference towards luxury options (Kivetz and Simonson 2002).

A total of 140 people participated in the study via Amazon Mechanical Turk and were assigned to either the time scarcity condition or the money scarcity condition. Again, feelings of scarcity were manipulated using a recall task (see study 4A). After the manipulation task, participants were asked to participate in a separate study, which we told them as a consumer preference study. We told participants to imagine that they bought a lottery ticket (\$1) and to choose between two options as the prize they will receive if they win (adapted from Kivetz and Simonson 2002). The options are either \$200 in cash (option A) or \$200 worth of a gift certificate for a 4-course meal at a leading gourmet restaurant (option B). We expected that the baseline preference will be towards option A for both conditions, because time scarce people will

less likely to prefer time consuming option (option B: 4-course meal) and money scarce people will more likely to prefer money receiving option (option A: \$200 cash). However if time scarcity makes people more likely to prefer luxury option compared to money scarcity, then there will be a systematic difference between time scarcity and money scarcity in their choice, such that time scarce participants choose option B more than money scarce participants. Moreover, because option A directly fulfills money scarce participants' needs, the effect we expect to see can be driven by money scarcity leading to increased preference towards the cash option, rather than time scarcity leading to greater preference towards luxury option compared to money scarcity. Thus we asked participants' tendency to treat the self better, which does not involve any monetary component in it. If time scarcity leads to greater self-value through increased self-as-resource inference, then time scarce participants will be more likely to treat the self better. Thus we used self-deservingness measures from Cavanaugh (2014) to capture this tendency: "To what extent do you feel you deserve to reward yourself," "To what extent do you feel you deserve to treat yourself," and "To what extent do you feel you deserve to indulge yourself a little", "To what extent to you feel you deserve to buy something special for yourself" ($\alpha = .95$; 7-point scale: 1 = strongly disagree, 7 = strongly agree). Finally, before finishing the study, we measured participants' self-inferences as an ostensibly unrelated study, using the same measures from study 3B (self-as-lacking inferences, $\alpha = .87$; self-as-resource inferences, $\alpha = .9$).

Results

Manipulation check. As intended, participants in the time scarcity condition rated their time-scarcity feelings significantly higher than those in the money scarcity condition ($M_{\text{time=}}$

4.22 vs. $M_{\text{money}} = 2.63$, $F(1, 138) = 26.78$, $p < .001$). Moreover, participants in the money scarcity condition rated their money-scarcity feelings significantly higher than those in the time scarcity condition ($M_{\text{time}} = 3.52$ vs. $M_{\text{money}} = 5.1$, $F(1, 138) = 24.04$, $p < .001$). These results provide evidence that our manipulation was effective.

Self-as-lacking inference An one-way ANOVA showed that the time scarcity condition and the money scarcity condition did not significantly differ on the negative self-as-lacking inference ($M_{\text{time}} = 5.64$ vs. $M_{\text{money}} = 5.65$, NS).

Self-as-resource -inference. An one-way ANOVA showed that the time scarcity condition reported significantly greater positive self-as-resource than the money scarcity condition ($M_{\text{time}} = 6.41$ vs. $M_{\text{money}} = 5.64$, $F(1, 138) = 4.72$, $p = .032$).

Choice between luxury option versus cash option. As predicted, a chi-square analysis revealed that participants who felt time scarcity (24.6%) were more likely to choose the luxury option over the cash option than were participants who felt money scarcity (9.9%), $\chi^2(df = 1, N = 140) = 5.38$, $p = .002$).

Tendency to treat the self better. An one-way ANOVA was conducted on the tendency to treat the self better measures. As predicted, the time scarcity condition showed greater tendency to treat the self better than the money scarcity condition ($M_{\text{time}} = 5.07$ vs. $M_{\text{money}} = 4.47$, $F(1, 138) = 5.61$, $p = .019$).

Mediation. Next, we attempted to see whether the self-as-resource inference significantly mediated the time (vs. money) scarcity effect on participants' choice between two options and tendency to treat the self better. The mediation analysis did not show significant mediation on the choice between the two options. However mediation analysis using tendency to treat the self better as a dependent variable showed a significant mediation with 5,000 bootstrapped samples (Hayes 2013; Model 4). The time scarcity condition was coded as 1 and the money scarcity condition was coded as 0. The result indicated that time scarcity had a significant positive effect on self-as-resource inference compared to money scarcity ($b = .77, SE = .35, t(140) = 2.17, p = .03$), and that higher levels of self-as-resource inference had a positive effect on tendency to treat the self better ($b = .27, SE = .06, t(140) = 4.77, p < .001$). The bootstrapping test confirmed that greater self-as-resource inference mediated the effect of time (vs. money) scarcity on the tendency to treat the self better ($b = .21, SE = .11, 95\% \text{ CI from } .04 \text{ to } .48$).

Study 4A and 4B replicated the differential effects of time versus money scarcity on consumers' response in the domain of self-value. Consistent with hypothesis, we found that time (vs. money) scarcity leads to greater self-as-resource inference and such self-as-resource inference further leads to consumers' responses toward an advertisement that promote consumer's self-value or luxury option. Furthermore, both study 4A and 4B tested self-inferences after participants responded to self-value options. This suggests that the effects on preference towards self-value options are not the consequences of demand effect that is caused by asking self-relevant questions.

Next, we develop the case for when the time (vs. money) scarcity effect we found in studies 1-4 can be moderated. In study 5, we test the role of personal control and show that for

those who have low personal control, time (vs. money) scarcity effect is diminished. In study 6, we test the irreplaceability of the self and show when the role of the self is made salient by making the self irreplaceable (i.e., experience of scarcity is unique to the self vs. generic), money scarce consumers show increased self-as-resource inference and subsequent response towards self-value products. In study 7, we test the positive (vs. negative) role of self in feeling scarcity and show that when the self as a source of scarcity is positive, money scarce consumers show greater self-as-resource inferences and subsequent responses towards self-value products.

STUDY 5

The goal of study 5 is to test the moderating role of personal control (H4) and to provide further evidence for our proposed mechanism that the positive self-as resource inference (“I am the scarce resource”) drives the differential effect of time (vs. money) scarcity on consumers’ responses towards self-value promoting options. We argue that time scarcity leads to the self-as-resource inference because spending time requires the self as an actor who conducts the tasks that one needs to finish in the given time. However, if this is the case, then people who are less likely to think that the events and experiences they are engaged in are the consequences of their own actions (i.e. people with low personal control) should be less likely to think that they can alter the events (Lefcourt 1966; Greenaway et al. 2015). Thus, for those with low perceived control, the role of the self as an actor should be perceived as insignificant, making them less likely to infer that the self is the scarce resource. Thus, we expect to replicate our previous findings only for those who have high personal control. We predict that time and money scarce

consumers will show similar level of positive self-inference when they have low personal control. However, in case of negative self-inferences (i.e., I lack the scarce resource), perceived control should affect both for time and money scarce people. Because people with high (vs. low) perceived control may believe that they have a control over the resources, they will be less likely to infer that they lack the scarce resource.

Method

A total of 210 people participated via Amazon Mechanical Turk (age: 18-70, Mean age: 36.4, 51.4% male). Participants were randomly assigned to either the time scarcity condition or the money scarcity condition. To manipulate feelings of scarcity, participants were asked to recall a recent experience of feeling time scarcity or money scarcity (adapted from Roux et al. 2015). After manipulating time (vs. money) scarcity, we measured participants' self-inferences as an ostensibly unrelated study, using the same measures from study 2B (negative self-inferences, $\alpha = .85$; positive self-inferences, $\alpha = .76$).

Next, participants viewed two advertisements about the same shoe (see study 4A for details). One advertisement promoted consumer's self-value and the other promoted quality of the shoe. Then participants indicated which ad they preferred on a bipolar scale (10-point scale; 1 = prefer 'designed for quality, designed to accelerate' advertisement to 10 = prefer 'you deserve the best, because you are worth it' advertisement).

Then, participants indicated the extent to which they felt time and money constrained while answering the survey on 7-point scales (1 = not at all, 7 = very much; adapted from Tully et al. 2015) and answered demographic questions. Before finishing the survey, we measured

participants' perceived personal control using the following three items: "I feel in control of my life", "I am free to live my life how I wish", "My experiences in life are due to my own actions" (Greenaway, Louis, and Hornsey, 2013; Greenaway et al. 2015). We created a composite score of perceived control by averaging the three items ($\alpha = .84$).

Results and Discussion

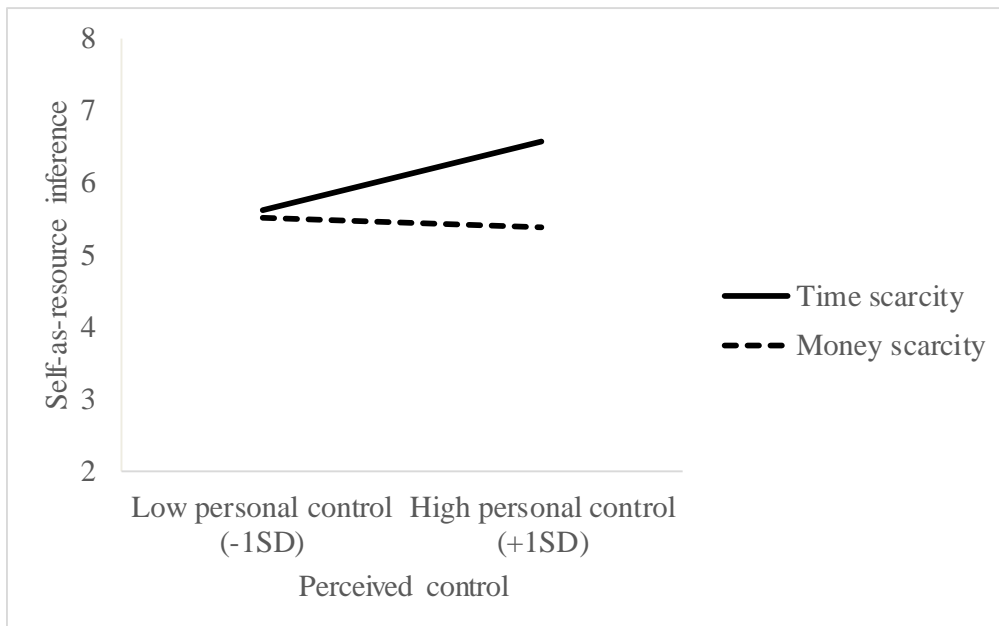
Manipulation check. The manipulations of scarcity was successful in that participants in the time (vs. money) scarcity condition felt greater time-scarcity ($M_{\text{time}} = 4.71$ vs. $M_{\text{money}} = 3.27$, $F(1, 208) = 29.96$, $p < .001$) and participants in the money (vs. time) scarcity condition reported feeling greater money scarcity ($M_{\text{time}} = 3.78$ vs. $M_{\text{money}} = 5.25$, $F(1, 208) = 32.76$, $p < .001$).

Self-as-lacking inference. As predicted, a linear regression with self-as-lacking inference as dependent variable and scarcity type (1 = time scarcity, 0 = money scarcity), perceived control (standardized), and their interaction as independent variables revealed only a significant effect of perceived control ($b = -.49$, $SE = .17$, $t = -2.93$, $p = .004$). Neither the effect of scarcity type nor the interaction was significant. These results replicated our findings, which the time scarcity condition and the money scarcity condition did not significantly differ on the self-as-lacking inference. Moreover, consistent with our prediction, participants with higher (vs. lower) perceived control are less likely to infer that they lack the scarce resource.

Self-as-resource inference. Again, we used a linear regression with self-as-resource inference as dependent variable and scarcity type (1 = time scarcity, 0 = money scarcity),

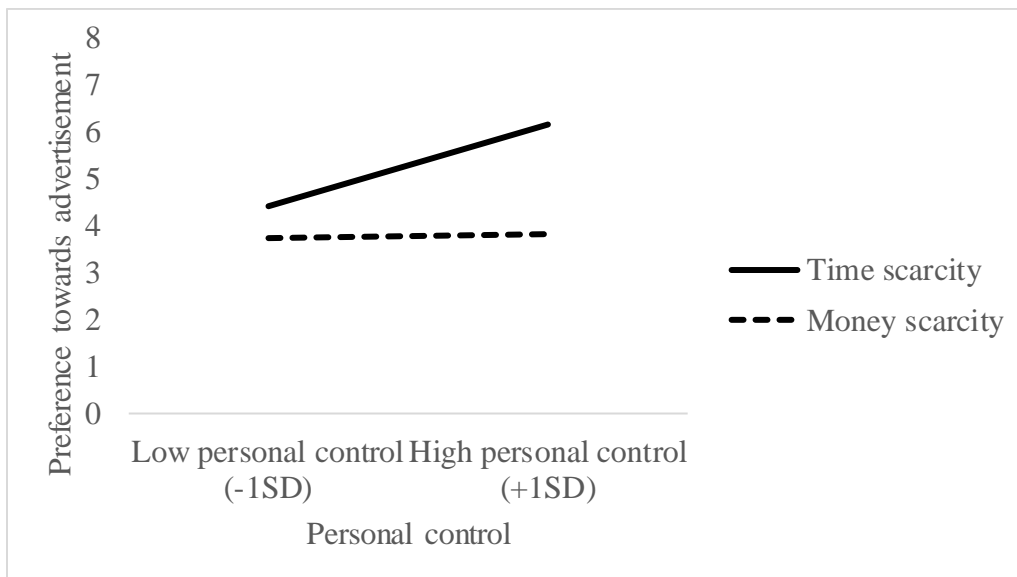
perceived control (standardized), and their interaction as independent variables. There was no significant effect of perceived control on the self-as-resource ($b = -.07$, $SE = .19$, $t = -.37$, NS). As predicted, the regression analysis revealed a significant main effect of scarcity type ($b = .65$, $SE = .26$, $t = 2.54$, $p = .01$). More importantly, we found a significant interaction between the scarcity type and perceived control ($b = .54$, $SE = .26$, $t = 2.07$, $p = .04$; see figure 2). The slope of perceived control was significant for the time scarcity condition ($b = .47$, $SE = .18$, $t = 2.59$, $p = .01$), suggesting that those who have low (vs. high) perceived control make lower positive self-inferences. The slope of perceived control was not significant for the money scarcity condition ($b = -.07$, $SE = .18$, $t = -.37$, NS). This suggests that perceived control did not affect how money scarce consumers make positive self-inferences.

Figure 2. The moderating role of personal control on the positive self-inference



Advertisement evaluation. We used a linear regression with preference toward the self-value promoting advertisement over the quality promoting advertisement as dependent variable and scarcity type (1 = time scarcity, 0 = money scarcity), perceived control (standardized), and their interaction as independent variables. There was no significant effect of perceived control on the positive self-inference ($b = .05$, $SE = .27$, $t = .17$, NS). As predicted, the regression analysis revealed a significant main effect of scarcity type ($b = 1.51$, $SE = .37$, $t = 4.14$, $p < .001$). We also found a significant interaction between the scarcity type and perceived control ($b = .82$, $SE = .37$, $t = 2.2$, $p = .03$; see figure 3). The slope of perceived control was significant for the time scarcity condition ($b = .86$, $SE = .26$, $t = 3.33$, $p = .001$), suggesting that for those who have low (vs. high) perceived control had lower preference toward the self-value promoting advertisement when feeling time scarcity. The slope of perceived control was not significant for the money scarcity condition ($b = .05$, $SE = .27$, $t = .17$, NS). This suggests that perceived control did not affect money scarce consumers' preference toward the self-value promoting advertisement.

Figure 3. The moderating role of personal control on the advertisement evaluation



Moderated mediation. We tested whether the interactive effect of scarcity type and perceived control on the positive self-inferences mediated the preference toward the self-value (vs. quality) promoting advertisement. We conducted moderated mediation analysis using Hayes's (2013) PROCESS macro (model 8; 5,000 bootstrapped samples). The interaction between scarcity type and perceived control had a significant effect on self-as-resource inference ($b = .65$, $SE = .26$, $p = .01$). In turn, the self-as-resource inference had a significant and positive effect on the preference towards self-value promoting advertisement ($b = .23$, $SE = .1$, $p = .018$). A significant positive indirect effect of scarcity type on preference toward the self-value promoting advertisement through positive self-inference emerged for those who have high perceived control (1 SD above the mean; $b = .26$, $SE = .14$, 95% CI = .05 to .63), but a non-significant indirect effect for those who have low perceived control (1 SD below the mean; $b = .01$, $SE = .1$, 95% CI = -.16 to .25). Finally, the indirect effect of the highest order interaction was significant, suggesting a moderated mediation (95% CI = .003 to .38; $b = .13$, $SE = .09$).

Study 5 results replicated our previous findings, that time (vs. money) scarcity leads consumers to make greater self-as-resource inferences and this positive self-inference further affects consumer's response towards self-value options. Since the positive self-inference that time scarce people are making is specific to the inference that the self is the scarce resource, we found that those who have low perceived control did not make greater self-as-resource inference compared to the money scarce people or time scarce people with higher perceived control. We also found that perceived control did not affect how money scarce people make self-as-resource inferences about the self. Since spending money does not require the self as an actor, the role of the self may not be salient to those who are feeling money scarcity, which explains why personal control did not affect inference that they are the scarce resource. In the next two studies, we

manipulate the salience of the self when feeling scarcity and show that money scarce consumers can have positive self-as-resource inference when the role of the self is salient and positive.

STUDY 6

In this study, we examine type of scarcity experience as a moderator to suggest a context when even the money scarce people show preference towards self-value products. Money scarce people are less likely to think they are the scarce resource compared to time scarce people, because spending money does not require the self to be present or to take important roles. That is, for money scarce people, the self's role as an agent is not even salient to them, which makes it difficult for them to infer that the self is a scarce resource. If the self were irreplaceable and unique in a scarcity experience, that would make the role of the self salient and thus making the self a resource and increasing its value. Thus in study 6, we test hypothesis 5 by studying the case when the experience of scarcity is unique to the self or can happen to anyone. This would increase the self-value effects for money but not time scarcity.

Furthermore in study 6, we also measured participants' perceived status. Bellezza et al. (2016) showed that people perceive busy individuals to be a scarce resource that leads people to perceive busy individuals to have high status. Although their findings are about how people perceive others who are busy and compare busy others with non-busy others, it is possible that time scarce people view the self to have a higher status compared to the money scarce people. Since status is a more of signaling mechanism, we do not expect it to mediate our effect that is more driven by a subjective self-assessment of self-value.

Method

A total of 183 people participated via Amazon Mechanical Turk (age: 20-70, Mean age: 35.8, 49.2% male). We used a 2 (scarcity type: time vs. money) \times 2 (type of scarcity experience: generic vs. unique to the self) between-subjects design. Participants were randomly assigned to one of four conditions. Again, we used recall task to manipulate feelings of scarcity with a few differences. To manipulate the type of scarcity experience, we asked participants to recall specific cases of experiencing time scarcity or money scarcity. Those who were assigned to the generic condition were asked to recall either a time or money constrained experience that can happen to anyone (examples of participants' responses: time scarcity due to cleaning and cooking dishes; money scarcity due to paying income taxes). Those who were assigned to the unique-to-the-self condition recalled either time or money constrained experience that they thought was unique to them (examples: time scarcity because of working late on things that needed my presence; money scarcity because car got stolen and needed to pay a lot to rent a car).

After the recall task, they answered the self-inference measures from the previous studies. We created an index for the self-as-lacking inference ($\alpha = .75$) and an index for the self-as-resource inference ($\alpha = .85$) by averaging the items. We also measured participants' perceived social status on a 9-point scale (1 = low social status to 9 = high social status), along with other filler questions.

Next, participants were asked to evaluate the self-value promoting advertisement ("You deserve the best, because you are worth it") and the quality promoting advertisement ("Designed for quality, designed to accelerate") we used in studies 4A and 5. Participants were asked to indicate their preference toward the one advertisement over the other, on a bipolar scale (10-

point scale; 1 = prefer ‘designed for quality, designed to accelerate’ advertisement to 10 = prefer ‘you deserve the best, because you are worth it’ advertisement). Then, we asked participants to indicate the extent to which they felt time constrained and money constrained while answering the survey on 7-point scales (1 = not at all, 7 = very much; adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked.

Results and Discussion

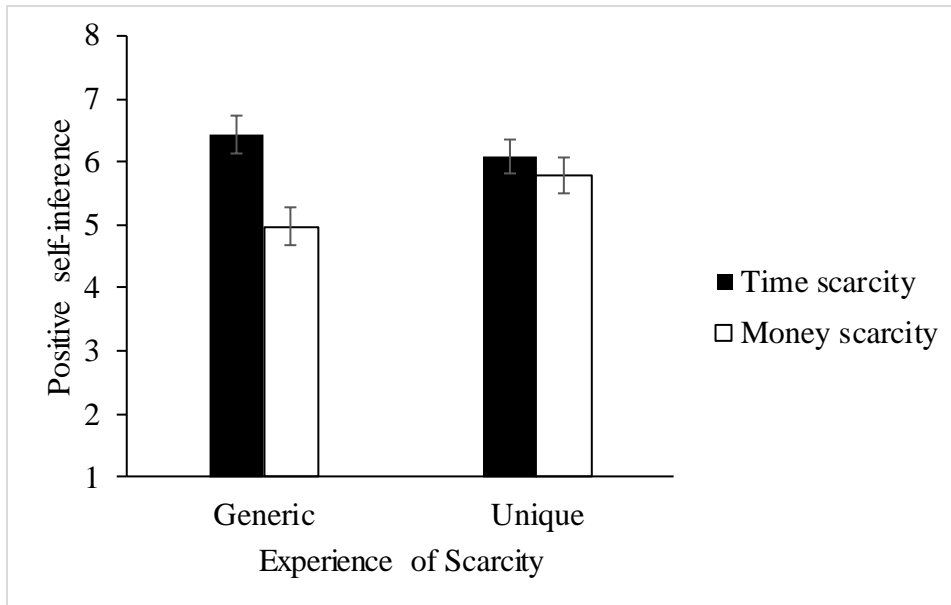
Manipulation check. A 2 (scarcity type: time vs. money) \times 2 (source of scarcity: generic vs. unique to the self) ANOVA was used to examine whether the manipulation was successful. As intended, participants in the time scarcity condition felt greater time-scarcity than those in the money scarcity condition ($M_{\text{time}} = 4.48$ vs. $M_{\text{money}} = 2.93$, $F(1, 179) = 32.23$, $p < .001$) and participants in the money scarcity condition felt greater money scarcity than those in the time scarcity condition ($M_{\text{time}} = 3.19$ vs. $M_{\text{money}} = 5.16$, $F(1, 179) = 49.27$, $p < .001$). The type of experience did not affect time scarce feelings ($M_{\text{generic}} = 3.70$ vs. $M_{\text{unique}} = 3.74$, $F(1, 179) < 1$, NS) or money scarce feelings ($M_{\text{generic}} = 3.27$ vs. $M_{\text{money}} = 3.12$, $F(1, 179) < 1$, NS) and there was no interaction effect on both time scarce feelings and money scarce feelings (all F s < 1). These results provide evidence that our scarcity manipulation was successful.

Self-as-lacking inference. A 2 (scarcity type: time vs. money) \times 2 (type of experience: generic vs. unique to the self) ANOVA was conducted on the index of self-as-lacking inference. As predicted, we did not find any main effect or an interaction effect. Replicating our previous

finding, the time scarcity condition and the money scarcity condition did not significantly differ on the negative self-inference ($M_{\text{time}}= 6.23$ vs. $M_{\text{money}}= 5.96$, $F(1, 179) = 1.18$, NS).

Self-as-resource inference. Again, a 2 (scarcity type: time vs. money) \times 2 (type of experience: generic vs. unique to the self) ANOVA was conducted on the index of self-as-resource inference. We found a significant interaction between the scarcity type and the type of experience ($F(1, 179) = 4.11$, $p = .04$; see figure 4). In particular, when participants were feeling scarcity due to generic reasons, we replicated our previous findings that the time scarcity condition had greater positive self-inference than the money scarcity condition ($M_{\text{time, generic}}= 6.43$ vs. $M_{\text{money, generic}}= 4.97$, $F(1, 179) = 12.17$, $p = .001$). However, when participants were feeling scarcity that is unique to the self, the difference in the positive self-inference between the time scarcity condition and the money scarcity condition was no longer significant ($M_{\text{time, unique}}= 6.1$ vs. $M_{\text{money, unique}}= 5.79$, $F(1, 179) < 1$, NS). Moreover, among the money scarcity condition, those who recalled money scarcity unique to the self showed greater positive self-inference than those who recalled money scarcity that is generic ($M_{\text{money, generic}}= 4.97$ vs. $M_{\text{money, unique}}= 5.79$, $F(1, 179) = 4.04$, $p = .046$). There was no significant difference in the positive self-inference between those who recalled time scarcity unique to the self and those who recalled time scarcity that is generic ($M_{\text{time, generic}}= 6.43$ vs. $M_{\text{time, unique}}= 6.1$, $F(1, 179) < 1$, NS). This suggests that the interaction is driven by the money scarcity condition who recalled scarcity that is unique to the self.

Figure 4. Time (vs. money) scarcity effect on positive self-inference when the type of experience is unique to the self or generic

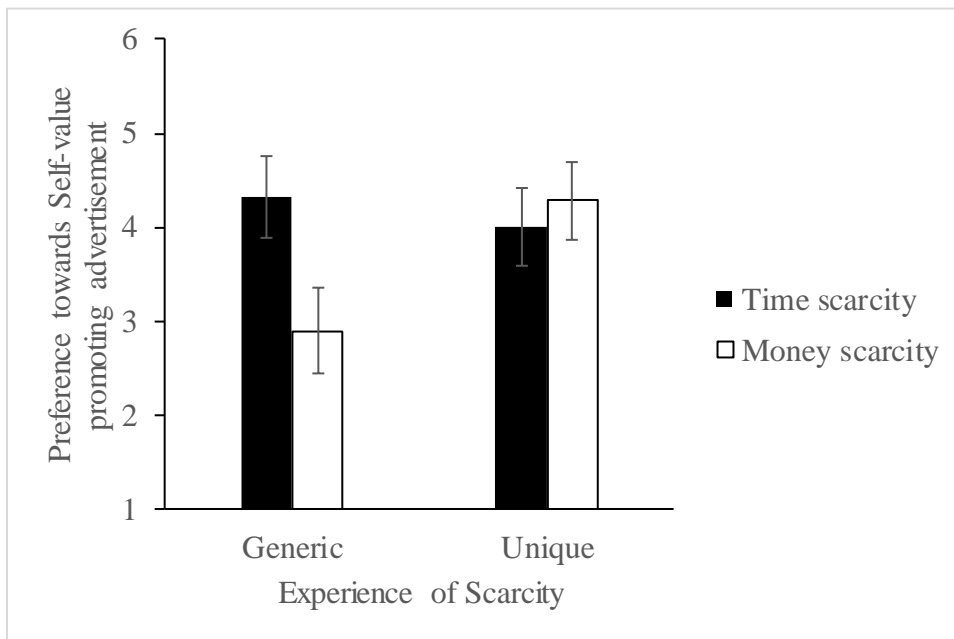


- Error bars represent standard error of the means.

Advertisement evaluation. A 2 (scarcity type: time vs. money) \times 2 (type of experience: generic vs. unique to the self) ANOVA on preference toward the self-value promoting advertisement over the quality promoting advertisement revealed a significant interaction effect ($F(1, 179) = 3.9, p = .05$; see figure 5). As predicted, when participants were feeling scarcity due to generic reasons, we replicated our previous findings that the time scarcity condition indicated greater preference toward the self-value promoting advertisement than the money scarcity condition ($M_{\text{time, generic}} = 4.32$ vs. $M_{\text{money, generic}} = 2.9, F(1, 179) = 5.2, p = .026$). However, when participants were feeling scarcity that is unique to the self, the difference between the time scarcity condition and the money scarcity condition was no longer significant ($M_{\text{time, unique}} = 4$ vs. $M_{\text{money, unique}} = 4.28, F(1, 179) < 1, \text{NS}$). Moreover, among the money scarcity condition, those who recalled money scarcity unique to the self had greater preference toward the self-value promoting advertisement than those who recalled money scarcity that is generic ($M_{\text{money, generic}} = 2.9$ vs. $M_{\text{money, unique}} = 4.28, F(1, 179) = 5.04, p = .026$). There was no significant difference

between those who recalled time scarcity unique to the self and those who recalled time scarcity that is generic ($M_{\text{time, generic}} = 4.32$ vs. $M_{\text{time, unique}} = 4$, $F(1, 179) < 1$, NS).

Figure 5. Time (vs. money) scarcity effect on advertisement evaluation when the type of experience is unique to the self or generic



- Error bars represent standard errors of the means.

Moderated mediation. Next, we tested whether the interactive effect of scarcity type and type of experience on the positive self-inference mediated the preference toward the self-value promoting advertisement over the quality promoting advertisement (time scarcity = 1, money scarcity = 0; generic = 0, unique = 1). We conducted moderated mediation analysis using Hayes's (2013) PROCESS macro (model 8; 5,000 bootstrapped samples). Interaction between scarcity type and type of experience had a significant effect on the self-as-resource inference ($b =$

1.47, $SE = .42$, $p < .001$) and self-as-resource inference had a significant effect on the advertisement evaluation ($b = .32$, $SE = .11$, $p = .004$). We found a significant positive indirect effect of scarcity type on preference toward the self-value promoting advertisement through positive self-inference for those who recall generic scarcity ($b = .47$, $SE = .2$, 95% CI = .15 to .97), but a non-significant indirect effect for those who have recalled unique-to-the-self scarcity ($b = .1$, $SE = .13$, 95% CI = -.13 to .46). Finally, the indirect effect of the highest order interaction was significant, suggesting a moderated mediation (95% CI = -.94 to -.04; $b = -.37$, $SE = .22$).

Ruling out perceived status. We found a marginal effect on perceived social status ($M_{time} = 5.26$ vs. $M_{money} = 4.74$, $F(1, 179) = 3.14$, $p = .078$). Time scarce participants perceived themselves to have higher social status than money scarce participants. However, neither the self-as-resource inference nor the preference toward self-value promoting advertisement measures, which are our main focuses of this paper, were associated with the perceived social status. One possible explanation is that the positive self-inference, ‘I am the scarce resource’, affects self-perceptions only and not how the self is viewed by others. As Bellezza et al. (2016) had shown, higher status of busy people was perceptions of others, suggesting that perceived status is closely associated with signaling effect to others. Because we study the positive self-inference that time (vs. money) scarce people make regardless of how they are viewed by others, perceived social status should be independent from the positive self-inference or self-value. However, the marginal effect we found on the perceived status implies that in the contexts where there is a presence of others, time (vs. money) scarcity can differentially affect perceived social

status. This finding calls for future research and suggests that there are more to explore the psychological of time (vs. money) scarcity.

Taken together, study 6 suggests making the self unique can help money scarce people act similarly to time scarce people. When money scarcity was felt due to unique to the self (vs. generic/common) constraints, money scarce people are more likely to perceive their self as a scarce resource (i.e., my investing/spending money on that experience was something that only I could do). Furthermore, we show that the process underlying these effects is driven by positive self-inference and shapes consumers' self-value.

STUDY 7

The goal of study 7 is to provide additional evidence of our proposed effect using another theoretical moderator. As we had shown in study 6, when the role of the self as an agent is made salient, even money scarcity led to the inference that the self is the scarce resource. However, making the role of the self salient will not universally lead to the inference that the self is the scarce resource, because such inference is perceived as the positive self-inference. Thus in study 7, we manipulated more detailed salience of the self, whether the self is viewed as a source of scarcity in a favorable or unfavorable way. We manipulate the favorable self as the source of scarcity by having participants to feel scarcity due to prioritizing the use of resource and manipulate unfavorable self as the source of scarcity by having participants to feel scarcity due to failed resource management. For money scarce people, when the self is a negative source in leading to scarcity, we expect previous effects will be replicated. However, when we manipulate money scarce people to see the self as a positive source behind scarcity by having them think the

scarcity is due to their careful resource prioritization, they are more likely to perceive that they are the important and beneficial resources, which will lead to positive self-inferences. For time scarce people, we expect that whether the self is a positive or negative source of scarcity will not affect their view. Regardless of whether the scarcity is due to failed resource management or prioritizing the use of resources, time scarcity means the shortage of the self as a resource. Thus, time scarcity will lead to positive self-inferences regardless whether the source of time scarcity prioritization or mismanagement of time.

Method

A total of 221 students participated for partial course credit. We used a 2 (scarcity type: time vs. money) \times 3 (source of scarcity: control vs. mismanagement vs. prioritization) between subjects design. Manipulating scarcity type was similar to the procedures from previous studies. We asked participants to recall the most recent event of experiencing time (vs. money) scarcity. To manipulate the source of scarcity, we asked them to recall specific cases of experiencing time scarcity or money scarcity. Those who were assigned to the mismanagement condition were asked to recall experiencing time or money scarcity because they failed to manage their resources. Those who were assigned to the prioritization condition were asked to recall experiencing time or money scarcity because they were prioritizing the use of their resources. Those who were assigned to the control condition were not given with specific instructions and simply asked to recall time (vs. money) constrained event. Two participants in the control condition who were asked to recall money constrained event indicated never experiencing money constraints: 1) I can't remember the last time that I felt that I was money strapped. I am able to

enjoy the basic necessities of life, and 2) To be honest, I have never felt money constrained because I was saving money. These two participants were excluded from further analyses.

After the recall task, participants answered the self-inference measures we used in study the previous studies (e.g., study 3B; 9-point scale, 1 = Strongly disagree to 9 = Strongly agree). Participants answered both the negative self-as-lacking inference measures (e.g., I lack the scarce resource) and the positive self-as-resource inference measures (e.g., I am the scarce resource). As we did in our previous studies, we created an index for the self-as-lacking inference by averaging the items ($\alpha = .72$) and an index for the self-as-resource inference by averaging the items ($\alpha = .86$).

To examine participants' response towards self-value products, we looked at participants' tendency to prefer higher-priced options. As we have shown with consumer's response towards luxury products, higher-priced options are special and considered as treats that consumer would not normally buy, thus consumers prefer such higher priced products when they believe the self is worthy (Cavanaugh 2014; Kivetz and Simonson 2002; Mick and Demoss 1999; Mukhopahyay and Johar 2009). In an ostensibly unrelated task, participants were asked to imagine a situation that they are choosing a shampoo. We asked participants to think that they are considering the items to include in their wish list but not actually paying for it, in order to avoid unnecessary money constrained feelings. All participants viewed three kinds of shampoos that varied in the level of price so that they can clearly tell that our focal product of interest (i.e., highest priced option) is the higher-end product by comparing it with other lower priced products: economy (Pantene [\$6.49]), mid-range (Bed Head [\$10.99]), and a higher-end product (Aveda [\$26.00]). The products were presented with color photographs and price (see appendix). After viewing the products, participants indicated their feelings of deservingness of each product and preference

toward each product. Next, to see if our manipulation had worked, we asked participants to indicate the extent to which they felt time constrained and money constrained while answering the survey on 7-point scales (1 = not at all, 7 = very much; adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked for their participation.

Results and Discussion

Manipulation check. A 2 (scarcity type: time vs. money) \times 3 (source scarcity: control vs. mismanagement vs. prioritization) between subjects ANOVA was used to examine whether the manipulation was successful. As intended, participants in the time scarcity condition felt greater time scarcity than those in the money scarcity condition ($M_{\text{time}} = 5.30$ vs. $M_{\text{money}} = 3.74$, $F(1, 213) = 42.47$, $p < .001$) and participants in the money scarcity condition felt greater money scarcity than those in the time scarcity condition ($M_{\text{time}} = 2.75$ vs. $M_{\text{money}} = 4.22$, $F(1, 213) = 35.42$, $p < .001$). The source of scarcity did not affect time scarce feelings ($M_{\text{control}} = 4.61$ vs. $M_{\text{mismanagement}} = 4.59$ vs. $M_{\text{prioritization}} = 4.43$, $F(2, 213) < 1$, NS) and money scarce feelings ($M_{\text{control}} = 3.46$ vs. $M_{\text{mismanagement}} = 3.64$ vs. $M_{\text{prioritization}} = 3.31$, $F(2, 213) < 1$, NS). There was no interaction effect on both time scarce feelings and money scarce feelings ($ps = \text{NS}$). These results provide evidence that our scarcity manipulation was successful.

Self-as-lacking inference. A 2 (scarcity type: time vs. money) \times 3 (source scarcity: control vs. mismanagement vs. prioritization) between subjects ANOVA was conducted on the index of negative self-as-lacking inference. As predicted, we did not find a main or an interaction effect on the negative self-inferences. Replicating our previous finding, the time scarcity

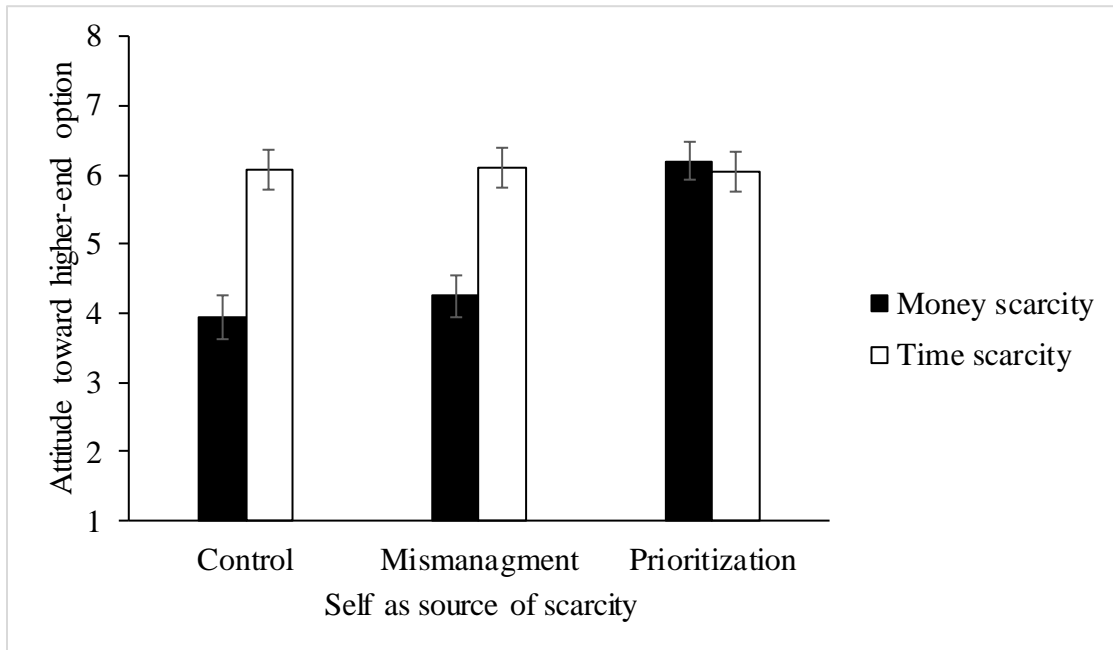
condition and the money scarcity condition did not significantly differ on the negative self-inference ($M_{\text{time}} = 5.3$ vs. $M_{\text{money}} = 5.3$, $F(1, 213) < 1$, NS).

Self-as-resource inference. Again, a 2 (scarcity type: time vs. money) \times 3 (source scarcity: control vs. mismanagement vs. prioritization) between subjects ANOVA was conducted on the index of positive self-as-resource inference. We found a significant interaction between the scarcity type and the source of scarcity ($F(2, 213) = 4.5$, $p = .01$). In particular, when participants were asked to recall feeling scarcity without any special instructions (i.e., the control condition), we replicated our previous findings that the time scarcity condition showed greater self-as-resource inference than the money scarcity condition ($M_{\text{time, control}} = 5.96$ vs. $M_{\text{money, control}} = 5.18$, $F(1, 213) = 3.9$, $p = .049$). Moreover, when participants were asked to recall feeling scarcity because they failed to manage the resources (i.e., the mismanagement condition), those who are feeling time scarcity had greater positive self-inference than those who are feeling money scarcity ($M_{\text{time, mismanagement}} = 6.17$ vs. $M_{\text{money, mismanagement}} = 5.41$, $F(1, 213) = 3.9$, $p = .049$). However, when participants were feeling scarcity because they were prioritizing the use of their resources (i.e., the prioritization condition), the difference in the positive self-inference between the time scarcity condition and the money scarcity condition was no longer significant ($M_{\text{time, prioritization}} = 5.84$ vs. $M_{\text{money, prioritization}} = 6.45$, $F(1, 213) = 2.7$, NS). Moreover, among the money scarcity condition, those who recalled money scarcity due to prioritizing the resource showed greater positive self-inference than those who recalled money scarcity due to mismanaging the resource and those who recalled money scarcity without any specific source of scarcity ($M_{\text{money, prioritization}} = 6.45$ vs. $M_{\text{money, mismanagement}} = 5.41$ vs. $M_{\text{money, control}} = 5.18$, $F(2, 213) = 6.49$, $p = .002$). There was no significant difference in the positive self-inference within the time scarcity

condition ($M_{\text{time, prioritization}} = 5.84$ vs. $M_{\text{time, mismanagement}} = 6.17$ vs. $M_{\text{time, control}} = 5.97$, $F(2, 213) < 1$, NS). This suggests that the interaction is driven by the money scarcity condition who felt scarcity because they were prioritizing the resources.

Attitude toward higher-priced option. We created a composite score of attitude toward higher-priced option by averaging the preference and deservingness measures ($\alpha = .72$). A 2 (scarcity type: time vs. money) \times 3 (source scarcity: control vs. mismanagement vs. prioritization) between-subjects ANOVA revealed a significant main effect for scarcity type ($F(1, 213) = 27.47$, $p < .001$), a significant main effect for source of scarcity ($F(2, 213) = 8.28$, $p < .001$), and a significant interaction ($F(2, 213) = 8.94$, $p < .001$; see figure 6). As we predicted, time-scarce participants showed more positive attitude towards higher-priced option compared to money-scarce participants when there was no specific source of scarcity salient (i.e., control; $M_{\text{time, control}} = 6.07$ vs. $M_{\text{money, control}} = 3.95$, $F(1, 213) = 23.93$, $p < .001$) and when feeling scarcity due to their failed management of resources ($M_{\text{time, mismanagement}} = 6.11$ vs. $M_{\text{money, mismanagement}} = 4.26$, $F(1, 213) = 19.52$, $p < .001$). However, when participants felt scarcity because they were prioritizing the resources, there was no significant difference between the time scarcity and the money scarcity conditions ($M_{\text{time, prioritization}} = 6.04$ vs. $M_{\text{money, prioritization}} = 6.2$, $F(1, 213) < 1$, NS). Moreover, those who felt money scarcity because they were prioritizing their use of money showed greater attitude toward the higher-priced option than those who felt money scarcity without any specific source of scarcity ($M_{\text{money, prioritization}} = 6.2$ vs. $M_{\text{money, mismanagement}} = 4.26$ vs. $M_{\text{money, control}} = 3.95$, $F(2, 213) = 17.42$, $p < .001$). There were no significant differences among the time scarcity conditions ($F(2, 213) < 1$, NS).

Figure 6. The moderating role of source of scarcity on attitude toward higher-priced option



Moderated mediation. We explored whether positive self-as-resource inference significantly mediated the interaction of scarcity type and source of scarcity attitude toward higher-priced product. To do so, we conducted multi-level moderated mediation analyses (Hayes 2013) with scarcity type as the independent variable (time scarcity = 1, money scarcity = 0), source of scarcity as the moderator, and self-as-resource inference as mediator. Because we had three levels for the source of scarcity factor, we created two dummy variables, representing the mismanagement condition (D1) and the prioritization condition (D2). We ran the model twice, once with mismanagement and control comparison with prioritization and control comparison as a covariate and second with prioritization and control comparison with mismanagement and control comparison as a covariate. When the prioritization condition was compared to the control condition, we found a significant moderated mediation on attitude ($b = -.35$, $SE = .15$, 95% CI

from -.74 to -.12). When the mismanagement condition was compared to the control condition, the moderated mediations on attitude (95% CI from -.04 to .61) was not significant.

The results from study 7 replicate our previous findings and also suggest an additional important moderator. When the role of the self as an agent is not salient or the negative self-role is made salient, money scarce people showed lower positive self-as-resource inference and thus showed lower preference towards products that reflect self-value compared to time scarce people. Across the conditions, we found that for those who are feeling time scarcity, source of scarcity did not affect their self-as-resource inference. This could be due to the fact that spending time always requires the self is as the resource, thus even in the condition where people view the self as a detrimental cause to feeling scarcity, the self is still the human capital that acts and conducts tasks when feeling time scarcity. Most importantly, we found that positive self-view can boost the positive self-as-resource inference of the money scarce people. When the scarcity is caused by the self being the positive source (i.e., prioritizing the use of resource), even the money scarce people infer that the self is a scarce resource which in turn increases their response towards self-value products.

GENERAL DISCUSSION

Previous scarcity research has considered feeling scarcity as consumers being in the state of lacking a resource and showed similar effect of scarcity across time scarcity and money scarcity. In this research, we provide additional evidence for previous findings by showing that feeling time scarcity and money scarcity both lead to a negative inference that the self lacks important resources. Because time scarcity and money scarcity share the common ground that

both lead to self-as-lacking inferences, we show that time and money scarcity lead to greater preference toward products that can improve the self.

However, what previous research has paid less attention to is whether the effects of time scarcity and money scarcity can be different. In this research, we compare time scarcity versus money scarcity and show that time (vs. money) scarcity leads people to make a positive self-inference because when feeling time scarcity, the self also becomes the scarce resource. We further show that this inference that the self is the scarce resource leads to greater assessment of self-value, which affects consumers' attitude towards self-value products.

Moreover, we identify important boundary conditions. When time scarce consumers have low perceived control, they showed lower positive self-inference, which further affected their response towards self-value products. Also, when the money scarce consumers were led to believe their scarcity is unique to the self, their positive self-inference increased which further increased their preference towards self-value products. Finally, when the source of scarcity is the prioritization (vs. mis-management) of resources, money scarce consumers showed increased positive self-inference and preference towards self-value products. These findings add to research on scarcity, time versus money, and self-value.

Theoretical Contributions

This research extends our understanding of resource scarcity, illuminates the nature of time versus money as resources, particularly in the context of scarcity, offers insight into the drivers of self-value and how feeling scarcity can affect consumers' preference toward certain type of products.

Different types of resource scarcity produce different effects. The present study fills a gap in the literature on resource scarcity. Previous research mostly focused on general feelings of resource scarcity (Roux et al. 2014; Zhu and Ratner 2015) or on one type of resource scarcity (e.g., financial constraints only, Tully et al. 2014; Sharma and Alter 2012; time constraints only, Dhar and Nowlis 1999; Jabs and Devine 2006). A few studies that examined different types of resource scarcity have shown comparable effect of types of resource scarcity, such that different types of resource scarcity lead to similar perceptions and decision-making (Shat et al. 2012; Fernbach et al. 2015; Nelson and Morrison 2005). The current research makes a unique contribution by examining the possibility that in domains where the distinctive nature of resources is pronounced (e.g., the underlying process is driven by whether the self is the important actor when spending the resource), the effect of resource scarcity can differ depending on the type of resource. We focused on time scarcity and money scarcity, which are comparable but also have distinctive characteristics (Leclerc et al. 1995). Specifically, we show that two types of resource scarcity have different effect on self-value, and we identified the mechanism (i.e., self-inference) that drives the effect. We show that consumers who feel time scarcity view themselves more positively by inferring that they are the scarce resource compared to those who feel money scarcity. This differential effect on positive self-as-resource inferences shape consumer's self-value and subsequent intentions to value the self via consumption.

Why do we see similar effects of time scarcity and money scarcity? Furthermore, our research gives insight on why previous research has found similar effects of different types of resource scarcity by showing that both time scarcity and money scarcity leads to negative self-inferences. Studies have shown similar effects across different types of resource scarcity (e.g.,

time scarcity, money scarcity, food scarcity) or general sense of scarcity (Mehta and Zhu 2015; Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Shah et al. 2015; Sharma and Alter 2012; Sharma et al. 2014; Tully et al. 2014; Zhu and Ratner 2015). We contribute the literature on resource scarcity by examining why such similar effects occur. We show that both time scarcity and money scarcity lead to negative self-inference that the self lacks important resources, because at a higher level, time and money are both resources that people use to achieve certain ends. Due to this commonality between time and money, time scarce or money scarcity consumers make self-as-lacking inference which further affects consumers' preference towards products that help them improve the self.

Time versus money. Moreover, our findings also contribute to the literature on time versus money by building upon and expanding the previous findings. Researchers have documented the difference between time and money such that perceived value of the resources (Okada and Hoch 2004; Leclerc et al. 1995), accounting of the resources (Soman 2001), decision-making regarding the resources (Saini and Monga 2008) or activated constructs (Gino and Mogilner 2014; Macdonnell and White 2015; Mogilner 2010; Mogilner and Aaker 2009) can differ. We add to this body of research by suggesting a novel prediction that when spending money, people view money as the only resource that is needed but when spending time, people view the self as a resource in addition to time. Due to this difference, we show that activating the construct of time and money through scarcity of the resource can lead to different perceptions of the self. Previous studies mostly focused on how the salience of the resources or how spending of the resources differ (Leclerc et al. 1995; Mogilner 2010; Mogilner and Aaker 2009; Reed et al.

2007). Adding to this stream of research, we show that the difference between time and money as resources shape how people perceive scarcity and the self.

Self-perceptions. Moreover, our research contributes to the literature on self-perceptions by identifying a new antecedent of when consumers want to improve the self, when consumers psychologically assess the self more valuable and when consumers want to treat the selves better. Understanding how consumers make inferences about the self based on their feelings of resource scarcity is important in consumer research. We showed that perceiving themselves as lacking something important can motivate consumers to improve the self and further affects preference toward self-improvement products. More importantly, perceiving the self to be valuable can lead consumers to act in a way that reflects their self-value. While it is possible to argue that the relatively lower perceived self-value of money scarce consumers can lead to greater preference towards products that can enhance self-value due to a self-enhancement motive (Higgins, 1996; Swann, Pelham, and Krull 1989). However, as we showed in study 2, money scarce consumers did not necessarily show lower perceived self-value than the control condition. Even if money scarce consumers have low self-value, the self-consistency motive will predict our results because they are motivated to confirm their self-beliefs (Higgins 1996).

Understanding consumers' self-value is important in consumer research, because it helps to predict when consumers are more likely to indulge, prefer products that are special or makes people feel valued and rewarded (Cavanaugh 2014; Kivetz and Simonson 2002; Mick and Demoss 1990; Mukhopadhyay and Johar 2009). Previous research has identified when consumers tend to self-gift or reward the self by consuming products that are considered as treats or indulgent (Feather 2003; Jiang, Hoegg, and Dahl 2013; Mick and Demoss 1990; Reczek,

Haws, and Suumers 2014). However, these research have identified the tendency to treat the self nicely only when consumers feel deserving to do so by investing effort or conducting actions that can justify their rewards (Kivetz and Simonson 2002; Muckhopadhyay and Johar 2009). For example, consumers felt deserving of rewards and treatments when they had earned it but felt uncomfortable when receiving unearned rewards in front of others (Jiang et al. 2013). Our research shows how consumers psychologically assess the self, such as self-esteem or self-importance, affects consumer's tendency to treat the self better even without conducting actions to invest efforts and earn the reward.

Future Directions

Our research highlights several avenues for future research. As noted earlier, time and money have distinctive characteristics in terms of value appreciation, information processing, or highlighted constructs (Okada and Hoch 2004; Saini and Monga 2008; Mogliner and Aaker 2009). Future research can investigate other consequences of time versus money scarcity based on these distinctive characteristics. Future research should study other types of scarcities.

Money scarcity can impact consumption in a variety of ways. We show self-value as a driver of how money scarcity shapes consumption. Another process by which money shapes consumption is perception of affordability. For example, even in our results, one could argue that people in the money scarcity condition do not choose the higher-priced products (e.g., Study 2B) because they think they cannot afford higher-end products. We ruled out this explanation in various ways by having them to think they are merely putting the item on their wish list. To further control the price difference, we measured consumer's attitude toward advertisements of

the same products but framing the appeals differently in study 2A, 3, 4 and 5. Although our findings cannot be explained by an affordability-driven process under money scarcity, there might be contexts where consumption is governed by perceptions of affordability. Future research could examine when the effects of scarcity, particularly that of money, are driven by processes such as affordability, deservingness, or cognitive load (Mani et al. 2013).

Managerial Implications

Our research has important implications for practitioners. Marketers commonly emphasize consumer's self-value by promoting that they are worth it (e.g., "you deserve a break today"), encouraging people to indulge or self-gift (Mick and Demoss 1990). Our research shows that this marketing practice can have a different influence on consumers who feel time or money scarcity. Because feeling time scarcity or money scarcity is a prevalent phenomenon that every consumer can easily experience, and because such feelings of scarcity can be induced with subtle situational cues (Roux et al. 2014), marketers can benefit from carefully designing their consumption contexts and marketing messages. For example, marketers can promote indulgent products when consumers are shopping close to a store's closing hours, or in busy times of the year (e.g., holidays). Moreover, our research suggests that promoting the benefits of products may have negative consequences for those who are feeling money scarcity, and thus have lower self-deserving tendency. Marketers can design product messages to emphasize consumers' high effort when promoting products to low-income people.

ESSAY 2

THE ASYMMETRY BETWEEN TIME AND MONEY COMPENSATION EFFECT WHEN FEELING SCARCITY: TIME HELPS THE MONEY POOR, BUT MONEY DOESN'T HELP THE TIME POOR

Resource availability is an inevitable aspect of consumers' lives. Consumers experience scarcity and abundance of resources every day. For example, people might feel resource abundance immediately after receiving a paycheck, but might feel resource-deprived immediately after paying off their credit card debt (Mishra, Mishra, and Nayakankuppam 2010; Soster, Gershoff, and Bearden, 2014). This question of resource scarcity or abundance has sparked growing interest in understanding how feelings of resource availability affect consumers' mindsets, perceptions and behaviors (Roux, Goldsmith, and Bonnezzi 2015; Shah, Mullainathan, and Shafir 2012; Shah, Shafir, and Mullainathan 2015). A majority of recent findings document resource scarcity effects and examine the ways in which feeling scarcity is different from feeling resource abundance (Mehta and Zhu 2016; Shah et al. 2012; Sharma and Alter 2010; Zhu and Ratner 2015). For example, resource scarcity leads consumers to seek more scarce goods (Sharma and Alter 2010), be more creative (Mehta and Zhu 2016), and have polarized preferences (Zhu and Ratner 2015).

Resource scarcity and abundance are not at opposite ends of the spectrum; in fact, consumers often experience both scarcity and abundance of resources. For example, people who are time-scarce may feel money-rich, and people who are money-scarce may feel time-rich (Sullivan and Gershuny 2004). The current research attempts to fill this gap by providing a better understanding of consumers who feel a scarcity of one resource and an abundance of another. Specifically, can resource abundance compensate for resource scarcity? Will this compensation

occur regardless of the abundant or scarce resource? We address these questions by focusing on the two resources that people often feel a scarcity or abundance of: time and money. These are not just primary resources that are ubiquitous in our daily lives; they also help people acquire and experience life assets (Leclerc, Schmitt, and Dube 1995). Moreover, consumers sometimes make tradeoffs between these two resources (Monga, May, and Bagch 2017). For example, hourly wages make plain the ways that time can be traded for money. Because we are interested in how the abundance of one resource compensates for the scarcity of another, we focus our investigation on the two commonly traded resources.

The main goal of this article is to identify whether the abundance of one resource compensates for the scarcity of another, but more importantly, we investigate whether the compensation effects are asymmetric depending on the resource type. We hypothesize that time abundance compensates for money scarcity, but money abundance does not compensate for time scarcity, because of fundamental differences in the nature of time and money. First, people believe money is a substitutable resource whereas time is not (Leclerc et al. 1995; Okada and Hoch 2004). Due to the greater fungibility of money, money-scarce people may have a mindset that money can even be substituted for a resource such as time. However, time is a less fungible resource than money; thus, time-scarce people may have a mindset that time cannot be substituted for other resources. Second, people may perceive time to have greater value than money. Time is more laden with personal meaning than money (Aaker, Rudd, and Mogilner 2011; Mogilner and Aaker 2009; Reed et al. 2007; Reed et al. 2016) and thus people may assign greater value to time than money. If this is the case, having a more valuable resource—time—may compensate for lack of less valuable resource, which is money. Having abundant money,

however, may not compensate for a lack of time because consumers may not view the value of money to be enough to compensate for time.

Another goal of this paper is to identify a new scarcity effect. In order to show the proposed asymmetric compensation effect, we need first to identify an effect that can serve as a baseline. In this paper, we suggest that time and money scarcity will have a similar effect on consumers' advice-taking tendencies compared to those who are not feeling scarcity. We show that both money scarcity and time scarcity make people less likely to change their preexisting opinions, and thus less likely to take advice from others. This is a new scarcity effect that has not been examined in the previous literature. Moving beyond this baseline effect, we show that when people feel money scarcity and time abundance, time abundance compensates for money scarcity, thus increasing their advice-taking tendency. However, when people feel time scarcity and money abundance, money abundance does not compensate for time scarcity and thus does not increase their advice-taking tendency.

Our work contributes to several streams of literature including resource scarcity, time versus money, and advice-taking. Previous research on resource scarcity placed resource scarcity and resource abundance at opposing ends of a spectrum (Shah et al. 2012; Shah et al. 2015; Mehta and Zhu 2016; Nelson and Morrison 2005; Sharma and Alter 2010; Zhu and Ratner 2015). Our work expands the literature by investigating the effects when consumers feel resource scarcity and resource abundance simultaneously. Moreover, little existing research on resource scarcity distinguishes scarcity and abundance stemming from different types of resources (Fernbach et al. 2015; Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Tully et al. 2015). Existing research focuses on only one type of resource (Tully et al. 2015, Sharma and Alter 2012) or examines the general sense of scarcity or abundance (Shah et al. 2012; Shah et al.

2015). Our research shows that based on the type of resource that is scarce or abundant (i.e., money scarcity, time scarcity, money abundance, time abundance), the interplay of resource scarcity and abundance can differ. Our work also adds to the literature on time versus money by showing that time compensates for money, but money does not compensate for time. Finally, our work contributes to the research on advice-taking. Our findings suggest that feelings of scarcity and abundance can be important factors in understanding when consumers are likely to accept advice that differs from preexisting personal opinions.

The remainder of this article is organized as follows. We will first review the relevant literature on resource scarcity and draw from this literature to suggest that both time and money scarcity leads to lower advice-taking tendency. We then propose our hypothesis on asymmetric compensation effect based on the literature on time versus money. Next, we test our predictions in seven experiments. Finally, we suggest our theoretical and practical implications.

RESOURCE SCARCITY AND ADVICE-TAKING

Consumers often feel resource scarcity when they feel they do not have enough necessary resources to meet their needs (Mani et al. 2013). Such feelings of resource scarcity can stem from a scarcity of various types of resources, such as money scarcity, time scarcity, food scarcity, water scarcity, etc. (Aarts, Dijksterhuis, and Vries 2001; Karau and Kelly 1992; Radel and Clément-Guillot 2012; Sharma and Alter 2012). Feelings of resource scarcity systematically affect how consumers think, perceive, feel, and behave by creating scarcity mindsets (Hall, Zao, and Shafir 2013; Haushofer and Fehr 2014; Mani et al. 2013; Shah et al.

2012; Shah et al. 2015; Roux et al. 2015). Scarcity effects influence product preferences, moral decisions, food consumption, and donations (Briers and Laporte 2013; McDonnel and White 2015; Roux et al. 2015; Sharma et al. 2014; Sharma and Alter 2012; Tully et al. 2015). These findings offer important insights into how feelings of scarcity affect consumers.

Adding to this line of research, we suggest that when people feel resource scarcity, a scarcity mindset leads them to infer that others are different from themselves, which then affects their advice-taking tendencies. That is, we argue that when people are feeling scarcity, they are less likely to change their pre-existing opinions based on someone else's advice that differs from their own beliefs. We suggest that when feeling resource scarcity, people will hold polarized view of the self and others.

Research suggests that resource scarcity can lead to more selfish behaviors leading people to focus more on the self (Roux et al 2015). Because resource scarcity signals that the environment is harsh (Laran and Salerno 2013; Hill et al. 2012; Griskevicius et al. 2013), suggesting that people need to compete with others for the scarce resource (Kristofferson et al. 2017; Roux et al. 2015). Insufficient resources make people protect what they have and become aggressive to others for the sake of their own benefit (Kristofferson et al. 2017; Roux et al. 2015). Thus, when feeling scarcity, people are more focused on the self than thinking from other's perspective. Furthermore, other empirical research on resource scarcity suggests that resource scarcity leads to more polarized view. For example, when people are primed with a scarce environment, they are more likely to narrow the definition of their in-groups and thus categorize others who have ambiguous group identity as outgroups (Rodeheffer, Hill, and Lord 2012). Moreover, a general sense of scarcity makes people show a greater preference towards an option that was already their favorite, and express greater dislike for an option that was already

disliked (Zhu and Ratner 2015). Thus, we argue that consumers who are feeling resource scarcity may have a polarized view of the self and others.

We suggest that such polarization will manifest in people's advice-taking tendency, especially when they have preexisting opinions. People who are feeling scarcity may polarize the self and others, thinking that the self is different from others. When resource-scarce people think that others are different from the self, they may find opinions from others to be less attractive. Ample research has shown that whether people view advisors to be similar to the self or not affects advice-taking tendency (Berscheid 1966; Brock 1965; Churchill 1975; Faraji-rad, Samuelson, and Warlop 2015; Gino, Shang, and Croson 2009; Jiang et al. 2010). When people view advisors as similar to themselves, they are more likely to accept advice. Thus, we expect that when people are feeling resource scarcity, they will see others as dissimilar and therefore will be less willing to accept their advice.

We expect that this proposed scarcity effect will hold for any type of resource scarcity, including time scarcity and money scarcity. Research on resource scarcity has shown that regardless of the type of scarce resource, they all create similar outcomes by creating a scarcity mindset (Roux et al. 2015; Shah et al. 2012; Shah et al. 2015; Zhu and Ratner 2015). Different types of resource scarcity (e.g. food scarcity and money scarcity, time scarcity and money scarcity), or simply feeling a general sense of scarcity, leads to scarcity effects (Ferbach et al. 2015; Nelson and Morrison 2005; Roux et al. 2015; Shah et al. 2012; Shah et al. 2015). Because our theorizing on advice-taking tendency is based on this broad scarcity mindset, we suggest that this effect can be generalized to any resource-scarce situation, including time and money scarcities.

H1: Compared to control, both money- and time-scarce consumers will be less likely to adopt others' advice when the advice is different from their personal opinion, and this effect will be driven by lower perceived similarities of advisors.

COMPENSATION OF RESOURCE ABUNDANCE:

ASYMMETRY BETWEEN TIME AND MONEY COMPENSATION EFFECT

If time and money scarcity makes consumers less likely to adopt advice from others, the next important question is when such scarcity effect might be compensated. Feeling scarcity is an aversive state that people would like to eliminate or reduce (Haushofer and Fehr 2014; Shafir et al. 2012; Sharma et al. 2014; Mani et al. 2013). Ample research has shown negative consequences of feeling scarcity such as impatient decision-making (Shah et al. 2012), neglecting contextual cues (Shah et al. 2015), exhibiting selfish behaviors (Roux et al. 2015), and experiencing anxiety and stress (Haushofer and Fehr 2014) or impaired cognitive function (Mani et al. 2013). Such negative consequences of feeling scarcity raise the importance of when and how such scarce feelings can be compensated. Indeed, research shows that people who are feeling scarcity are motivated to compensate in some way. Financially dissatisfied people, or those who perceive a resource is scarce due to a harsh environment show a greater desire for high-calorie food in order to replenish their scarce feelings (Briers and Laporte 2013; Laran and Salerno 2013). Hall et al. (2013) showed that financial scarcity could be compensated by self-affirmation, and showed that poor people who are self-affirmed are better at cognitive tasks than those who are not self-affirmed.

The most straightforward way to reduce such negative states will be to increase feelings of abundance. In reality, however, people who are feeling a scarcity of one resource will not suddenly feel abundant unless there are windfall gains. Most research has treated resource scarcity as an opposing state of resource abundance, as if the two states may not coexist (Shah et al. 2012; Shah et al. 2015; Mehta and Zhu 2016; Nelson and Morrison 2005; Sharma and Alter 2010; Zhu and Ratner 2015). However, consumers sometimes experience both resource abundance and resource scarcity. This is often observed when the abundant and scarce resources are of different types (Gershuny 2000; Sullivan and Gershuny 2004). For example, busy people may feel time scarcity but they may also feel money abundance. Poor people may feel money scarcity but they may also feel time abundance.

Thus, in this research we investigate whether the abundance of one resource can compensate for the scarcity of another. We suggest that the compensation of resource abundance is asymmetric, depending on whether the abundance resource is time or money. Although people often use the phrase ‘time is money’ and express time in monetary terms (e.g., hourly wage; Becker 1965; Lakoff and Johnson 1980), consumers perceive time and money differently (Leclerc et al. 1995; Okada and Hoch 2004; Mogilner and Aaker 2009). We suggest that time abundance compensates for money scarcity, but money abundance does not compensate for time scarcity. First, consumers have different perceptions of the fungibility of time and money (Leclerc et al. 1995). Fungibility of a resource refers to whether the resource can be exchanged or substituted (Leclerc et al. 1995; Zauberan and Lynch 2005). Money is perceived as a fungible and substitutable resource (Leclerc et al. 1995). Units of money are substitutable across contexts, such that people can borrow money or store the money for later use. Thus, when people are feeling money scarcity, they may understand that the money can be substituted with another

resource. However, time is a resource that cannot be stored, reused or borrowed (Leclerc et al. 1995; Soman 2001). When time is scarce, people perceive that time as forever lost. The low fungibility of time should make it difficult for people to think that time could be substituted by the abundance of another resource.

Second, consumers perceive time to be more laden with personal meaning than money (Aaker et al. 2011; Mogilner and Aaker 2009; Reed et al. 2007; Reed et al. 2016). Time is more often associated with personal connections with others, whereas money is more associated with utility and personal disconnections (Mogilner 2010; Mogilner and Aaker 2009; Vohs, Mead, and Goode 2006). Spending time can be more self-expressive than spending money (Reed et al. 2007), so people are more selective when spending time compared to spending money (Foa and Foa 1980; Reed et al. 2016). Additionally, time is more closely linked with activities that are generally perceived as happy experiences (Mogilner 2010; Aaker et al. 2011). Because people perceive time as a more personally meaningful resource than money, they may also perceive time as a more valuable resource than money. Thus, an abundance of time should outweigh a lack of money. However, a lack of time may be perceived as more detrimental, thus an abundance of money may not be enough to compensate for it.

Thus, we propose that there is an asymmetry in time (vs. money) abundance compensating for money (vs. time) scarcity, such that time abundance compensates for money scarcity but money abundance does not compensate for time scarcity. This asymmetry in compensation should manifest in consumer's advice-taking tendencies, which we suggested as being affected by feelings of scarcity.

H2: Consumers who feel money scarcity but time abundance will show a greater advice-taking tendency than consumers who feel time scarcity but money abundance, or those who feel only time scarcity or money scarcity.

We test our hypotheses with seven experiments. Studies 1 and 2 first establish the basic effect that both time scarcity and money scarcity lead to lower advice-taking tendencies than control, using measured scarcities (study 1) and manipulated scarcities (study 2). Studies 3, 4, and 5 replicate the scarcity effect and also test the asymmetry between time and money substitutability when compensating for the scarcity. Study 3 uses scenarios to test our proposed effect. Study 4 tests the effect with a design that is closer to real life settings by using participants' preexisting opinions. Study 5 tests the effect using a subtler way to manipulate time abundance. Studies 6 and 7 examine the underlying mechanism of asymmetry between time and money substitutability when compensating for scarcity by measuring people's perceptions of the value of time versus money (study 6) and manipulating perceived substitutability of time and money (study 7). In studies 1,2,3,5, and 7, we test our model in the context of online reviews. Consumers often use online reviews these days and online reviews has become an important source of advice for consumers (Faraji-rad et al. 2015 ;"Nielsen: "Global Consumers' Trust in 'Earned' Advertising" 2012). Studies 4 and 6 examine consumers response towards a health advisor.

STUDY 1

In study 1, we examined whether feeling scarcity (either time scarcity or money scarcity) leads to a lower advice-taking tendency. Specifically, we showed participants a review that was inconsistent with participants' own opinions. We then measured participants' time scarcity and money scarcity, and assessed whether the extent to which they felt scarcity predicted lower levels of persuasion.

Method

A total of 112 Amazon Mechanical Turk participants completed the study for a small compensation. Participants were told to imagine that while they were looking for a fun activity for the weekend, they came across a boat-ride service that seemed less interesting than other options (Faraji-rad et al. 2015). Next, participants viewed a very positive online review about the boat-ride service, with a favorable rating (6 out of 7) and a positive statement about the service ("The boat-ride was an extraordinary experience. I had a lot of fun. I highly recommend it!"); from Faraji-rad et al. 2015). Next, as the persuasion measure, participants rated the boat-ride service using three items ("Very [bad/good] choice"; "I [dislike/like] the boat-ride service very much"; and "I have a very [unfavorable/favorable] attitude"; from Faraji-rad et al. 2015) on a 9-point scale. We then measured participants' feelings of time scarcity and money scarcity by asking them to indicate to what extent they were feeling time-constrained while answering the survey, and the degree to which they were feeling money-constrained while answering the survey, on a 7-point scale (adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked for their participation.

Results and Discussion

We created an index of persuasion by averaging the three items ($\alpha = .92$). We ran a stepwise regression with persuasion as the outcome variable and scarcity measures (time scarcity and money scarcity) as predictors. Consistent with our prediction, money scarcity significantly negatively predicted persuasion ($\beta = -.29, t = -3.18, p = .002$). Also, time scarcity significantly improved the fit of the model ($R^2_{\text{change}} = .035, p = .038$). As we predicted, time scarcity also significantly and negatively predicted persuasion ($\beta = -.2, t = -2.1, p = .038$). These results suggest that the more people feel scarcity, both time scarcity and money scarcity, the less likely they are to be persuaded by others' opinions.

STUDY 2

In this study, we provided further evidence that feeling scarcity (both time scarcity and money scarcity) leads to lower advice-taking tendencies by explicitly manipulating time scarcity and money scarcity. Furthermore, we tested the proposed mediating role of perceived similarities of others. We hypothesized that people who were feeling scarcity would be less likely to accept advice from others because they perceived others as different from themselves.

Method

A total of 200 people participated in the study via Amazon MTurk. We randomly assigned participants to one of three conditions: control, time scarcity, and money scarcity. All

participants were first asked to recall specific life experiences. Participants in the control condition were asked to recall “five things you did today;” participants in the time scarcity condition were asked to recall a recent experience of feeling time scarcity (adapted from Roux et al. 2015) and those in the money scarcity condition were asked to recall a recent experience of feeling money scarcity (adapted from Roux et al. 2015).

After the recall task, participants were asked to complete a separate study about average Americans’ opinions of restaurants and bars. Participants were told to imagine that they were looking for a nice wine bar to go to with their friends and came across a wine bar that they had been to once, a long time ago, but they had not liked the experience very much. Next, we showed a very positive review from a reviewer named Jordan. Participants saw a favorable rating (5 out of 5) as well as a positive statement about the service (“I love, love, love this place! This is more than just a charming wine bar - it's a wonderful and romantic dining experience.”). Next, as the persuasion measure, participants rated the wine bar using three items (“Very [bad/good] choice”; “I [dislike/like] the wine bar very much”; and “I have a very [unfavorable/favorable] attitude”; from Faraji-rad et al. 2015) on a 9-point scale. We created an index of persuasion by averaging the three items ($\alpha = .92$). In order to examine the advice-taking tendency, we also asked participants whether 1) they were willing to accept the advice from this reviewer, and 2) whether they were likely to change their opinions of the wine bar based on the review (9-point scale). These two items were averaged into an index of advice-taking tendency ($\alpha = .89$). Next, participants reported their perceived reviewer similarity on three items: 1) the reviewer is like me, 2) the reviewer behaves like me, and 3) the reviewer is similar to me. We created an index of perceived similarity by averaging the three items ($\alpha = .97$).

As a manipulation check, we then measured participants' feelings of time scarcity and money scarcity by asking them to indicate to what extent they were feeling time-constrained while answering the survey, and feeling money-constrained while answering the survey on a 7-point scale (adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked for their participation.

Results and Discussion

Manipulation Check. The manipulation check confirmed that those who were in the time scarcity condition felt greater time scarcity than the control condition or the money scarcity condition ($M_{\text{control}} = 3.38$ vs. $M_{\text{money}} = 4.13$ vs. $M_{\text{time}} = 5.89$; $F(2, 197) = 30.85, p < .001$). Also, those who were in the money scarcity condition felt greater money scarcity than those in the control condition or the time scarcity condition ($M_{\text{control}} = 3.33$ vs. $M_{\text{money}} = 5.97$ vs. $M_{\text{time}} = 3.48$; $F(2, 197) = 42.43, p < .001$).

Perceived Similarity. An ANOVA on the index of perceived similarity of the reviewer revealed a significant effect of condition ($F(2, 197) = 3.82, p = .024$). Compared to those in the control condition ($M_{\text{control}} = 4.36$), participants in both the time scarcity condition ($M_{\text{time}} = 3.73, p = .02$) and the money scarcity condition ($M_{\text{money}} = 3.73, p = .017$) reported lower perceived similarity. Those in the time scarcity condition and the money scarcity condition did not significantly differ on perceived similarity. This suggests that feelings of scarcity lead people to perceive that others are different from themselves.

Persuasion, Advice-Taking, and Mediation. Next, we examined the effect of scarcity on our dependent variables, which were persuasion and advice-taking tendency. Both dependent variables yielded similar patterns. An ANOVA on persuasion revealed a significant scarcity effect ($F(2, 197) = 6.13, p = .003$). Compared to the control condition ($M_{\text{control}} = 6.5$), participants in both the time scarcity condition ($M_{\text{time}} = 5.53, p = .002$) and the money scarcity condition ($M_{\text{money}} = 5.62, p = .004$) were less likely to be persuaded by the review. An ANOVA on advice-taking tendency revealed a similar effect ($F(2, 197) = 6.02, p = .003$). Compared to the control condition ($M_{\text{control}} = 6.39$), participants in both the time scarcity condition ($M_{\text{time}} = 5.23, p = .001$) and the money scarcity condition ($M_{\text{money}} = 5.49, p = .009$) were less likely to accept the advice.

Furthermore, perceived similarity of the reviewer significantly mediated the effect of scarcity on both persuasion and advice-taking tendency. We ran multicategorical mediation analyses using Process (Hayes and Preacher 2014). Our independent variable was treated as two dummy variables: D1 (control: 0, money scarcity: 1, time scarcity: 0) and D2 (control: 0, money scarcity: 0, time scarcity: 1). D1 contrasted money scarcity to control and D2 contrasted time scarcity to control. We found that on the persuasion index, the indirect effect of scarcity through perceived similarity was negative and significant (Money scarcity: $\beta = -.44$, 95% CI from $-.83$ to $-.09$; Time scarcity: $\beta = -.44$, 95% CI from $-.83$ to $-.09$). Similarly, the indirect effect of scarcity through perceived similarity on advice-taking tendency was negative and significant (Money scarcity: $\beta = -.55$, 95% CI from -1.07 to $-.11$; Time scarcity: $\beta = -.55$, 95% CI from -1.05 to $-.11$). These results suggest that when people are feeling scarcity (either time scarcity or money scarcity), they perceive others as dissimilar to themselves, which further leads to lower levels of persuasion and advice-taking tendencies.

Taken together, we found initial evidence that both time scarcity and money scarcity leads to lower levels of advice-taking tendency and persuasion because feelings of scarcity make people perceive that others are different from themselves. Our study 1 results showed that the more people feel either time scarcity or money scarcity, the less likely they were to be persuaded by others' opinions. Study 2 showed that feeling time scarcity or money scarcity led to lower levels of perceived similarity between the self and the other, which further led to lower advice-taking tendencies. Based on these findings, we examined whether feeling an abundance of one resource compensates for feeling a scarcity of a different resource, and furthermore we tested whether there is an asymmetry between substitutability of time and money.

STUDY 3

The objective of study 3 was to replicate the effect of scarcity that we found in our previous studies, and also to show that time abundance compensates for money scarcity, but money abundance does not compensate for time scarcity. We used a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects design, with an additional hanging control condition. We expected that those who were feeling scarcity only (either time scarcity or money scarcity) would be less likely to be persuaded by others' opinions, and would report lower advice-taking tendencies than those who were not feeling any scarcities. This would replicate our previous results. However, we also expected that those who were feeling money scarcity and time abundance at the same time would show increased persuasion and advice-taking tendencies. Moreover, we expected that those who were feeling time scarcity

and money abundance simultaneously would show lower levels of persuasion and advice-taking tendencies, suggesting an asymmetry between time and money substitutability. We also expected to find evidence of time abundance compensating for money scarcity by showing reduced feelings of money scarcity.

Method

A total of 227 people participated via Amazon MTurk. We used a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) + control condition between subjects design. Participants were randomly assigned to one of the five conditions. We told participants that there were several unrelated parts of the study, and that the first part was to understand average Americans' thoughts on various issues. First, we manipulated participants' feelings of time (vs. money) scarcity by asking them to list thoughts about having only a small amount of time (vs. money) (McDonnell and White 2015). Participants first thought about having a little time (vs. money) and listed their thoughts about what it would be like, what they might think or do, etc. Those assigned to the control condition were asked to list 10 facts they knew (Tully et al. 2015). Next, we asked participants assigned to the abundance of alternate resource condition to list their thoughts about having a lot of money (vs. time) (McDonnell and White 2015). More specifically, those who completed the time scarcity task and were assigned to the abundance condition were asked to list their thoughts about having a lot of money. Likewise, those who completed money scarcity task and were assigned to the abundance condition were

asked to list their thoughts about having a lot of time. Those who were assigned to the scarcity condition or the hanging control condition did not complete any task at this stage¹.

Next, we told participants that the objective of second part of the study was to understand their opinions about a wine bar. Using the same study settings from study 2, participants were told to imagine that they are looking for a nice wine bar to go to with their friends, and that they came across a wine bar they had been to once long time ago, but they had not liked the experience very much. Next, we showed the same very positive review from study 2. We used the same persuasion measures ($\alpha = .92$) and advice-taking tendency measures ($\alpha = .86$) from study 2 (9-point scale). The items were averaged into an index of persuasion and an index of advice-taking tendency. Next, participants reported their perceived reviewer similarity using the same three items from study 2 ($\alpha = .97$).

We then measured participants' feelings of time scarcity and money scarcity by asking them to indicate to what extent they were feeling time constrained while answering the survey and feeling money constrained while answering the survey on a 7-point scale (adapted from Tully et al. 2015). Finally, participants answered demographic questions and were thanked for their participation.

Results and Discussion

¹ For ease of interpretation, the condition that felt money scarcity and abundance of alternate resource is referred as the money scarcity/time abundance condition. The condition that felt time scarcity and abundance of alternate resource is referred as the time scarcity/money abundance condition. The condition that felt only the money scarcity is referred as the money scarcity condition. The condition that felt only the time scarcity is referred as the time scarcity condition. Those who neither felt scarcities nor abundance are referred as the control condition.

Measures of Time Scarcity and Money Scarcity. We ran 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVAs on participants' reported feelings of time scarcity and money scarcity. First, the feeling of time scarcity was assessed; participants in the time scarcity condition felt greater time scarcity during the survey than the money scarcity condition ($M_{\text{money}} = 3.45$ vs. $M_{\text{time}} = 4.81$, $F(1, 212) = 29.71$, $p < .001$). There was neither a main effect of abundance of alternate resource nor an interaction effect. Next, we assessed the feeling of money scarcity, and as expected, there was a main effect of scarcity; participants in the money scarcity condition felt greater money scarcity than the time scarcity condition ($M_{\text{money}} = 4.20$ vs. $M_{\text{time}} = 3.70$, $F(1, 212) = 4.66$, $p = .032$). There was no significant effect of abundance of alternate resource. Most importantly, we found a significant interaction between the scarcity and the abundance of alternate resource ($F(1, 212) = 7.53$, $p = .007$). Under scarcity conditions, participants in the money scarcity condition felt greater money scarcity than the time scarcity condition ($M_{\text{money scarcity}} = 4.61$ vs. $M_{\text{time scarcity}} = 3.57$ vs., $F(1, 212) = 12.45$, $p = .001$). Participants in the money scarcity/time abundance condition felt significantly less money scarcity than those who were feeling money scarcity only (i.e., money scarcity condition; $M_{\text{money scarcity/time abundance}} = 3.69$ vs. $M_{\text{money scarcity}} = 4.61$, $F(1, 212) = 9.42$, $p = .002$). Under abundance of alternate resource conditions, the money scarcity condition and the time scarcity condition did not significantly differ on the level of money scarcity ($M_{\text{money scarcity/time abundance}} = 3.69$ vs. $M_{\text{time scarcity/money abundance}} = 3.82$).

These results provide evidence that time abundance compensated for money scarcity, thereby reducing the extent of feeling money scarcity. However, money abundance did not compensate for time scarcity; the time scarcity ratings were still high, even after feeling money abundance. We also compared our effects to the hanging control condition. The one-way

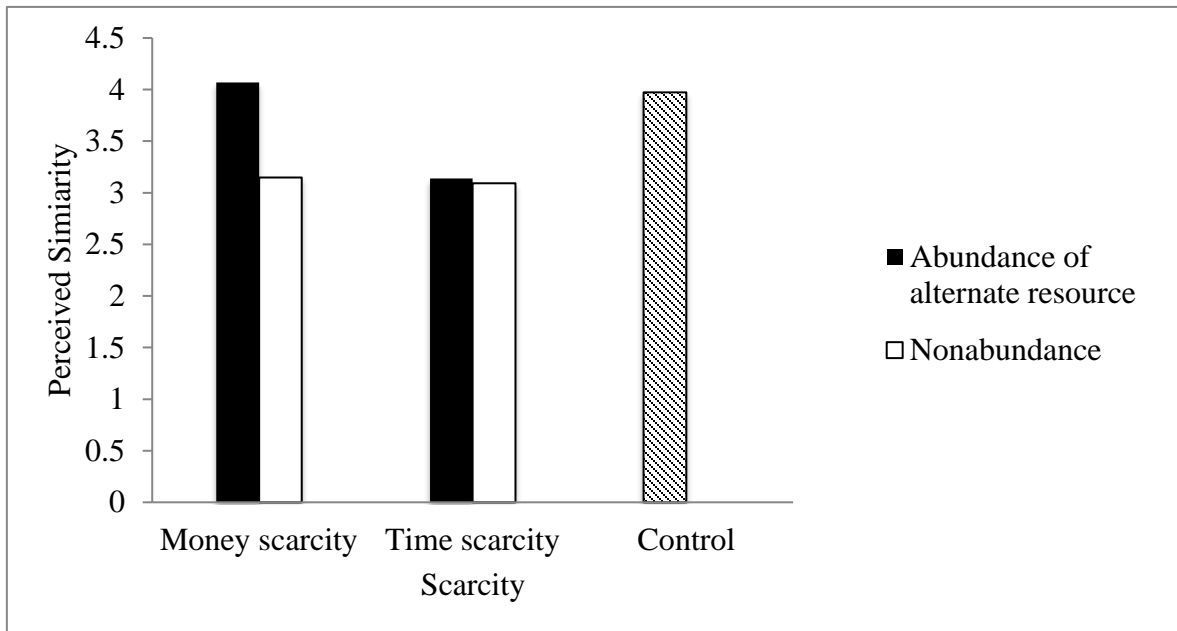
ANOVA, including all five conditions (money scarcity/time abundance, time scarcity/money abundance, money scarcity, time scarcity, and control) on the time scarcity rating showed a significant difference. As expected, participants in the time scarcity/money abundance condition and time scarcity condition felt significantly greater levels of time scarcity than those in the control condition ($M_{\text{control}} = 3.93$ vs. $M_{\text{time scarcity/money abundance}} = 3.82$ vs. $M_{\text{time scarcity}} = 4.84$; $t(272) = 1.44$, $p < .001$; $t(272) = 1.74$, $p < .001$ respectively), suggesting that our time scarcity manipulation was successful and money abundance did not compensate for time scarcity. Participants in the money scarcity/time abundance condition and money scarcity condition did not significantly differ on the time scarcity ratings compared to the control ($M_{\text{control}} = 3.39$ vs. $M_{\text{money/abundance}} = 3.55$ vs. $M_{\text{money/scarcity}} = 3.38$; $t(272) = .16$, $t(272) = -.02$ respectively, NS). The same analysis on money scarcity showed that participants in the money scarcity condition felt significantly greater levels of money scarcity than those in the control condition ($M_{\text{control}} = 3.39$ vs. $M_{\text{money/scarcity}} = 4.6$; $t(272) = 1.08$, $p < .001$), suggesting that our money scarcity manipulation was successful. However, those in the money scarcity/time abundance condition did not significantly differ on the money scarcity rating compared to the control condition ($M_{\text{control}} = 3.39$ vs. $M_{\text{money/abundance}} = 3.69$; $t(272) = .17$, NS), suggesting that time abundance compensated for money scarcity. Participants in the time scarcity/money abundance condition and the time scarcity condition did not significantly differ on the money scarcity ratings compared to the control ($M_{\text{control}} = 3.53$ vs. $M_{\text{time scarcity/money abundance}} = 3.82$ vs. $M_{\text{time scarcity}} = 3.57$; $t(272) = .29$, $t(272) = -.04$ respectively, NS).

Perceived Similarity. A 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA was conducted on the index of perceived

similarity of the reviewer. The results showed a significant main effect of scarcity ($F(1, 212) = 5.29, p = .022$), a significant main effect of abundance of alternate resource ($F(1, 212) = 5.12, p = .025$) and a significant interaction ($F(1, 212) = 4.16, p = .04$, see figure 7). As expected, participants who felt money scarcity and abundance of alternate resource (i.e., the money scarcity/time abundance condition) reported significantly greater perceived similarity than those in the money scarcity ($M_{\text{money scarcity/time abundance}} = 4.07$ vs. $M_{\text{money scarcity}} = 3.16, F(1, 212) = .37, p = .002$) and the time scarcity/money abundance ($M_{\text{money scarcity/time abundance}} = 4.07$ vs. $M_{\text{time scarcity/money abundance}} = 3.14, F(1, 212) = 9.1, p = .003$) conditions. Participants in the time scarcity condition and the time scarcity/money abundance condition reported equivalent levels of perceived similarity ($M_{\text{time scarcity/money abundance}} = 3.14$ vs. $M_{\text{time scarcity}} = 3.09, F(1, 212) < 1, \text{NS}$). These results suggest that the interaction is driven by the money scarcity/time abundance condition. Furthermore, we compared our effects to the hanging control condition to have a better understanding of the effects. A one-way ANOVA with all five conditions showed that participants in the control condition reported significantly higher perceived similarity than those in the money scarcity ($M_{\text{control}} = 3.97$ vs. $M_{\text{money scarcity}} = 3.15, t(272) = .83, p = .004$) and the time scarcity ($M_{\text{control}} = 3.97$ vs. $M_{\text{time scarcity}} = 3.09, t(272) = .88, p = .003$) conditions. These results replicated our previous findings: feeling scarcity leads people to perceive others as different from themselves. Moreover, participants in the control condition reported significantly higher perceived similarity than those in the time scarcity/money abundance condition ($M_{\text{control}} = 3.97$ vs. $M_{\text{time scarcity/money abundance}} = 3.14, t(272) = .83, p = .004$), suggesting that money abundance did not compensate for time scarcity. However, the control condition and the money scarcity/time abundance condition did not significantly differ on the perceived similarity ($M_{\text{control}} = 3.97$ vs.

$M_{\text{money scarcity/time abundance}} = 4.07$, $t(272) = -.1$, NS), suggesting that time abundance compensated for money scarcity.

Figure 7. Perceived similarity of the reviewer



Persuasion. Next, we ran $2(\text{scarcity: time vs. money}) \times 2(\text{abundance of alternate resource: abundance vs. scarcity})$ between subjects ANOVAs on persuasion. An ANOVA on persuasion revealed a significant scarcity effect ($F(1, 212) = 4.67$, $p = .03$), a significant abundance of alternate resource effect ($F(1, 212) = 9.1$, $p = .003$) and a significant interaction effect ($F(1, 212) = 4.94$, $p = .027$). Again, the interaction was driven by those who felt money scarcity and abundance of alternate resource. Those in the money scarcity/time abundance condition were more likely to be persuaded by the reviewer than those in the money scarcity

($M_{\text{money scarcity/time abundance}} = 5.88$ vs. $M_{\text{money scarcity}} = 4.55$, $F(1, 212) = 13.91$, $p < .001$) and time scarcity/money abundance ($M_{\text{money scarcity/time abundance}} = 5.88$ vs. $M_{\text{time scarcity/money abundance}} = 4.76$, $F(1, 212) = 9.29$, $p = .003$) conditions. Participants in the time scarcity condition and the time scarcity/money abundance condition reported equivalent level of persuasion ($M_{\text{time scarcity/money abundance}} = 4.76$ vs. $M_{\text{time scarcity}} = 4.56$, $F(1, 212) < 1$, NS). Moreover, when compared to the hanging control condition, those in the control condition were more likely to be persuaded than those in the money scarcity ($M_{\text{control}} = 5.45$ vs. $M_{\text{money scarcity}} = 4.55$; $t(272) = .91$, $p = .007$), the time scarcity ($M_{\text{control}} = 5.45$ vs. $M_{\text{time scarcity}} = 4.57$; $t(272) = .89$, $p = .01$), and the time scarcity/money abundance ($M_{\text{control}} = 5.45$ vs. $M_{\text{time scarcity/money abundance}} = 4.76$; $t(272) = .69$, $p = .045$) conditions. However, the hanging control condition and the money scarcity/time abundance condition did not significantly differ on their reported persuasion ($M_{\text{control}} = 5.45$ vs. $M_{\text{money scarcity/time abundance}} = 5.88$; $t(272) = -.42$, NS).

Advice-Taking Tendency. An ANOVA on advice-taking tendency revealed a marginally significant scarcity effect ($F(1, 212) = 3.71$, $p = .055$), a significant abundance of alternate resource effect ($F(1, 212) = 8.19$, $p = .005$), and a significant interaction effect ($F(1, 212) = 4.04$, $p = .046$). Those in the money scarcity/time abundance condition were more likely to take the advice than participants in the money scarcity condition ($M_{\text{money scarcity}} = 4.12$ vs. $M_{\text{money scarcity/time abundance}} = 5.52$, $F(1, 212) = 12.03$, $p = .001$) and the time scarcity/abundance condition ($M_{\text{money scarcity/time abundance}} = 5.52$ vs. $M_{\text{time scarcity/money abundance}} = 4.39$, $F(1, 212) = 7.49$, $p = .007$). The advice-taking tendency of participants in the time scarcity/money abundance condition was equivalent to that of the time scarcity condition participants ($M_{\text{time scarcity/money abundance}} = 4.39$ vs. $M_{\text{time scarcity}} = 4.15$, $F(1, 212) < 1$, NS). Moreover, when compared to participants in the control

condition, we found that those the control condition were more likely to accept advice than the money scarcity participants ($M_{\text{control}} = 5.1$ vs. $M_{\text{money scarcity}} = 4.12$; $t(272) = .98, p = .01$), the time scarcity ($M_{\text{control}} = 5.1$ vs. $M_{\text{time scarcity}} = 4.15$; $t(272) = .95, p = .017$), and the time scarcity/abundance ($M_{\text{control}} = 5.1$ vs. $M_{\text{time scarcity/money abundance}} = 4.39$; $t(272) = .71, p = .068$) conditions. However, the hanging control condition and the money scarcity/abundance condition did not significantly differ on their reported persuasion ($M_{\text{control}} = 5.1$ vs. $M_{\text{money scarcity/time abundance}} = 5.52$; $t(272) = -.42, \text{NS}$).

Moderated Mediation. Furthermore, we found that perceived similarity of the reviewer significantly mediated the interaction effect of scarcity and abundance of alternate resource on both persuasion and advice-taking tendency. A bootstrap analysis (Hayes 2012, Model 8) was conducted (money scarcity = 1, time scarcity = 0; abundance = 1, scarcity = 0). We found that perceived similarity had a significant effect on reported persuasion ($\beta = .9, t = 17.08, p < .001$). More importantly, the conditional indirect effect of scarcity through perceived similarity was positive and significant in the abundance of alternate resource condition ($\beta = .84, 95\% \text{ CI from } .29 \text{ to } 1.45$). However, in the scarcity condition, the conditional indirect effect was not significant (95% CI from $-.48$ to $.55$). Similarly, the same bootstrap analysis was conducted on the advice-taking tendency ($\beta = 1.01, t = 16.84, p < .001$). The conditional indirect effect of scarcity through perceived similarity was positive and significant in the abundance of alternate resource condition ($\beta = 1, 95\% \text{ CI from } .29 \text{ to } 1.6$), but it was not significant in the scarcity condition (95% CI from $-.53$ to $.64$).

These results support our hypothesis that there is an asymmetry between time and money substitutability. We found that time abundance compensates for money scarcity, but money abundance does not compensate for time scarcity. While time abundance reduced the feelings of money scarcity, increased participants' perceived similarity of the reviewer, increased persuasion, and increased advice-taking tendencies, money abundance did not affect the experience of time scarcity.

Table 1: Means from study 3.

	Abundance of alternate resource			Nonabundance	
	Control	Money scarcity/ Time abundance	Time scarcity/ Money abundance	Money scarcity	Time scarcity
Time scarcity rating	3.39	3.55	4.84	3.38	5.14
Money scarcity rating	3.52	3.69	3.82	4.61	3.57
Perceived similarity	3.97	4.07	3.14	3.15	3.09
Persuasion	5.45	5.88	4.76	4.55	4.56
Advice taking tendency	5.10	5.52	4.39	4.12	4.15

STUDY 4

In study 4, our goal was to replicate our findings in study 3 with a more real life setting. Instead of the hypothetical scenarios we used in study 3, we asked participants' own opinions on whether exercising or diet is more important for health. Then we showed an article by a health advisor presenting the opposing perspective of the participant's personal opinion. We examined whether feelings of time or money scarcity affected participants' acceptance of the opposing opinion, and we also examined the asymmetry between time and money substitutability. Finally, we examined whether persuasion and an advice-taking tendency can manifest in participants' reported behavioral intentions, such as an expressed intention to hire the health advisor or attend a seminar held by the health advisor.

Method

A total of 230 people participated in the study via Amazon MTurk. The procedure was similar to that of study 3; again we used a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects design with a hanging control condition. Participants first completed a scarcity manipulation by writing what it would be like to have very little time (vs. money) (from McDonnell and White 2015). Next, those who were randomly assigned to the abundance of alternate resource condition were asked to write what it would be like to have a lot of money (vs. time) (from McDonnell and White 2015). More specifically, as in study 3, those who were assigned to the time scarcity/money abundance condition wrote about having a lot of money and those who were assigned to the money scarcity/time abundance condition wrote about having a lot of time. Participants who were assigned to a scarcity only condition did not complete any writing tasks at this stage. Participants who were assigned to the hanging control condition were asked to write three to five things they had done that day (adapted from Roux et al. 2015).

After manipulating scarcity and abundance of alternate resource, we asked participants to move on to the second part of the study, the stated purpose of which was to understand average Americans' opinions on various issues. We first asked participants to choose the more important option for a healthy life, from exercising and diet. Next, we presented an article written by a person named Daniel Christiansen that supported the different option from the opinion of the participant. In other words, participants who indicated that exercising is more important than diet read an article about why diet is more important than exercising, and those who indicated that

diet is more important than exercising read an article about why exercising is more important than diet. Then we measured participants' advice-taking tendency by asking 1) how much they agreed with the opinion of the article, 2) how likely they were to accept the advice from the article writer, and 3) how likely they were to change their opinion about diet and exercising (9-point scale). By averaging these three items, we created an index of advice-taking tendency ($\alpha = .86$). Next, we measured participants' perceived similarity of the reviewer using the three items from previous studies (Faraji-rad et al. 2015; 7-point scale, $\alpha = .95$). We then measured behavioral intentions by asking 1) how likely they were to hire the article writer as their health advisor, and 2) how likely they were to attend a seminar held by the article writer (9-point scale). We created an index of behavioral intention by averaging the two items ($\alpha = .81$). Finally, we asked how money-constrained they felt during the survey and how time-constrained they felt during the survey, on a 7-point scale (adapted from Tully et al. 2015).

Results and Discussion

Measures of Time Scarcity and Money Scarcity. An analysis of 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA on feelings of time scarcity revealed only a main effect of scarcity type. Participants in the time scarcity condition reported greater time scarcity during the survey than those in the money scarcity condition ($M_{\text{money}} = 2.58$ vs. $M_{\text{time}} = 4.08$, $F(1, 175) = 31.16$, $p < .001$). There was neither a main effect of abundance of alternate resource, nor an interaction effect. However, the same ANOVA on the feelings of money scarcity revealed a significant main effect of scarcity, a main effect of abundance of alternate resource, and a significant interaction. As expected, participants

in the money scarcity condition felt greater money scarcity than those in the time scarcity condition ($M_{\text{money}} = 4.25$ vs. $M_{\text{time}} = 2.89$, $F(1, 175) = 26.3$, $p < .001$). Also, participants in the abundance of alternate resource condition reported significantly less feelings of money scarcity than those in the scarcity condition ($M_{\text{abundance}} = 3.07$ vs. $M_{\text{scarcity}} = 4.07$, $F(1, 175) = 14.15$, $p < .001$). Most importantly, we found a significant interaction between the scarcity and the abundance of alternate resource ($F(1, 212) = 8.45$, $p = .004$). Among scarcity conditions, the money scarcity condition felt greater money scarcity than the time scarcity condition ($M_{\text{money scarcity}} = 5.14$ vs. $M_{\text{time scarcity}} = 3$, $F(1, 175) = 32.59$, $p < .001$). However, among the participants who were in the money scarcity condition, those who felt time abundance reported significantly less money scarcity than those who felt money scarcity only ($M_{\text{money scarcity/time abundance}} = 3.36$ vs. $M_{\text{money scarcity}} = 5.14$, $F(1, 175) = 23.65$, $p < .001$). Among the abundance of alternate resource conditions, time-scarce people and money-scarce people reported equivalent levels of money scarcity ($M_{\text{money scarcity/time abundance}} = 3.36$ vs. $M_{\text{time scarcity/money abundance}} = 2.77$, $F(1, 175) = 2.44$, $p = \text{NS}$).

Again, these findings about feelings of time scarcity and money scarcity provide evidence that there is an asymmetry between time and money substitutability: time abundance compensates for money scarcity, but money abundance does not compensate for time scarcity. For a deeper understanding of the results, we compared our effects to the hanging control condition. The one-way ANOVA, including all five conditions (money scarcity/time abundance, time scarcity/money abundance, money scarcity, time scarcity, and control) on the time scarcity rating showed that the participants in the time scarcity/money abundance condition and time scarcity condition felt significantly greater time scarcity than those the control condition ($M_{\text{control}} = 2.73$ vs. $M_{\text{time scarcity/money abundance}} = 3.86$ vs. $M_{\text{time scarcity}} = 4.33$; $t(225) = 1.14$, $p = .002$; $t(225) =$

1.6, $p < .001$ respectively). Participants in the control condition did not significantly differ on the time scarcity rating compared to the money scarcity/time abundance and the money scarcity conditions. These results suggest that our time scarcity manipulation was successful, and that money abundance did not compensate for time scarcity. The one-way ANOVA with five conditions on the money scarcity rating revealed that participants in the control condition reported significantly less money scarcity than the money scarcity condition ($M_{\text{control}} = 2.97$ vs. $M_{\text{money scarcity}} = 5.14$; $t(225) = -2.18$, $p < .001$). However, the control condition did not significantly differ when compared to the other three conditions (money scarcity/abundance, time scarcity, and time scarcity/abundance), suggesting that time abundance compensated for money scarcity.

Perceived Similarity. We ran a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA on the index of perceived similarity of the reviewer. The results showed only a significant interaction effect ($F(1, 175) = 4.58$, $p = .03$). As expected, participants in the money scarcity/time abundance condition reported significantly greater perceived similarity than those who only felt money scarcity ($M_{\text{money scarcity/time abundance}} = 3.8$ vs. $M_{\text{money scarcity}} = 3.2$, $F(1, 175) = 5.17$, $p = .024$). Moreover, people in the money scarcity/time abundance condition reported significantly greater perceived similarity than the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 3.8$ vs. $M_{\text{time scarcity/money abundance}} = 3.07$, $F(1, 175) = 7.09$, $p = .008$). This shows that the interaction is driven by the money scarcity/time abundance condition. Among time scarcity conditions, the abundance of alternate resource condition and the scarcity condition showed similar level or perceived similarity ($M_{\text{time scarcity/money abundance}} = 3.07$ vs. $M_{\text{time scarcity}} = 3.29$, $F(1, 175) < 1$, NS). Furthermore,

we compared our effects to the hanging control condition to have a better understanding of the effects. A one-way ANOVA with all five conditions showed that people in the control condition reported significantly higher perceived similarity than those in the money scarcity condition ($M_{\text{control}} = 3.86$ vs. $M_{\text{money scarcity}} = 3.2$, $t(175) = .66$, $p = .011$), the time scarcity/money abundance condition ($M_{\text{control}} = 3.86$ vs. $M_{\text{time scarcity/money abundance}} = 3.29$, $t(175) = .57$, $p = .041$), and the time scarcity ($M_{\text{control}} = 3.86$ vs. $M_{\text{time scarcity}} = 3.07$, $t(175) = .79$, $p = .004$) condition. However, the control condition did not show significantly different perceived similarity than the money scarcity/time abundance condition ($M_{\text{control}} = 3.86$ vs. $M_{\text{money scarcity/time abundance}} = 3.8$, $t(175) = .06$, NS), suggesting that time abundance compensated for money scarcity.

Advice-Taking. Next, we ran $2(\text{scarcity: time vs. money}) \times 2(\text{abundance of alternate resource: abundance vs. nonabundance})$ between subjects ANOVAs on the index of advice-taking tendency. An ANOVA on advice-taking revealed a significant scarcity effect ($F(1, 175) = 6.1$, $p = .015$), a significant abundance of alternate resource effect ($F(1, 175) = 4.29$, $p = .04$) and a significant interaction effect ($F(1, 175) = 4.15$, $p = .043$). People in the money scarcity condition were more likely to accept advice than those in the time scarcity condition ($M_{\text{money}} = 4.7$ vs. $M_{\text{time}} = 4.08$, $F(1, 175) = 6.1$, $p = .015$) and those in the abundance of alternate resource condition were more likely to accept advice than those in the scarcity condition ($M_{\text{abundance}} = 4.65$ vs. $M_{\text{scarcity}} = 4.13$, $F(1, 175) = 4.29$, $p = .04$). As expected, the interaction was driven by participants in the money scarcity/time abundance condition. Participants in this condition were more likely to be accept advice than those who were in the money scarcity condition ($M_{\text{money scarcity/time abundance}} = 5.21$ vs. $M_{\text{money scarcity}} = 4.18$, $F(1, 175) = 8.98$, $p = .003$) and the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 5.21$ vs. $M_{\text{time scarcity/money abundance}} =$

4.08, $F(1, 175) = 10.06, p = .002$) conditions. However, those in the time scarcity/money abundance condition and the time scarcity condition did not significantly differ on the level of advice-taking tendency ($M_{\text{time scarcity/money abundance}} = 4.08$ vs. $M_{\text{time scarcity}} = 4.08, F(1, 175) < 1, \text{NS}$). Moreover, when compared to the hanging control condition, participants in the control condition were more likely to accept advice than people in the money scarcity ($M_{\text{control}} = 5.16$ vs. $M_{\text{money scarcity}} = 4.18; t(175) = .98, p = .002$), the time scarcity ($M_{\text{control}} = 5.16$ vs. $M_{\text{time scarcity}} = 4.08; t(175) = 1.09, p = .002$), and the time scarcity/money abundance ($M_{\text{control}} = 5.16$ vs. $M_{\text{time scarcity/money abundance}} = 4.08; t(175) = 1.08, p = .001$) conditions. However, those in the hanging control condition and the money scarcity/time abundance condition did not significantly differ on their advice-taking tendency ($M_{\text{control}} = 5.16$ vs. $M_{\text{money scarcity/time abundance}} = 5.21; t(175) = -.05, \text{NS}$).

Behavioral Intentions. An ANOVA on the index of behavioral intentions revealed a significant scarcity effect ($F(1, 175) = 6.61, p = .011$), a significant abundance of alternate resource effect ($F(1, 175) = 5.26, p = .023$), and a marginally significant interaction effect ($F(1, 175) = 3.22, p = .074$). People in the money scarcity/time abundance condition were more likely to report an interest in taking behavioral actions (i.e., hiring the advisor as their personal health advisor, attending a seminar held by the advisor) than those in the money scarcity ($M_{\text{money scarcity/time abundance}} = 5.08$ vs. $M_{\text{money scarcity}} = 3.94, F(1, 175) = 8.89, p = .003$) and the time scarcity/money abundance ($M_{\text{money scarcity/time abundance}} = 5.08$ vs. $M_{\text{time scarcity/money abundance}} = 3.86, F(1, 175) = 9.44, p = .002$) conditions. When we compared the effects to the hanging control condition, the results showed that those in the control condition were more likely to report a willingness to take behavioral action than those in the money scarcity ($M_{\text{control}} = 4.92$ vs. $M_{\text{money scarcity}} = 3.94; t(175) = .98, p = .007$), the time scarcity ($M_{\text{control}} = 4.92$ vs. $M_{\text{time scarcity}} = 3.73; t(175)$

= 1.2, $p = .002$), and the time scarcity/money abundance ($M_{\text{control}} = 4.92$ vs. $M_{\text{time scarcity/money abundance}} = 4.86$; $t(175) = 1.06$, $p = .005$) conditions. However, people in the hanging control condition and the money scarcity/time abundance condition did not significantly differ on their behavioral intentions ($M_{\text{control}} = 4.92$ vs. $M_{\text{money scarcity/timeabundance}} = 5.08$; $t(175) = -.16$, NS).

Moderated Mediation. We found that perceived similarity of the reviewer significantly mediated the interaction effect of scarcity and abundance of alternate resource on both advice-taking tendency and behavioral intentions. Bootstrap analysis (Hayes 2012, Model 8) was conducted (money scarcity = 1, time scarcity = 0; abundance = 1, scarcity = 0) on the advice-taking tendency. We found that the interaction had a significant effect on the perceived similarity ($\beta = .82$, $t = 2.14$, $p = .03$), and the perceived similarity had a significant effect on the advice-taking tendency ($\beta = .86$, $t = 11.7$, $p < .001$). More importantly, the conditional indirect effect of scarcity through perceived similarity was positive and significant in the abundance of alternate resource condition ($\beta = .63$, 95% CI from .18 to 1.15). However, in the scarcity condition, the conditional indirect effect was not significant (95% CI from -.55 to .38). Similarly, the same bootstrap analysis was conducted on the behavioral intentions and revealed that perceived similarity significantly predicted behavioral intentions ($\beta = .92$, $t = 10.87$, $p < .001$). The conditional indirect effect of scarcity through perceived similarity was positive and significant in the abundance of alternate resource condition ($\beta = .67$, 95% CI from .17 to 1.21), but was not significant in the scarcity condition (95% CI from -.62 to .40).

The results from study 4 replicated our findings in study 3. We found evidence to support our hypothesis that there is an asymmetry between time and money substitutability. Time

abundance compensated for money scarcity, leading to a reduction in feelings of money scarcity, and an increase in perceived similarity of the reviewer, advice-taking tendency and behavioral intentions. However, money abundance did not compensate for time scarcity, such that time scarcity/money abundance condition still showed the scarcity effects.

STUDY 5

Our objective in study 5 was to replicate our findings using a more subtle way of eliciting feelings of time abundance. Our previous manipulation was explicit, such that we asked participants to write about what it would be like to have a lot of time. It is possible that the any scarcity feelings that participants felt before conducting the time abundance task could have been washed out. Thus, in study 5, we used a more subtle way of manipulating time abundance. Spending time on other people increases one's sense of time affluence, even compared to gaining a windfall of free time (Mogilner, Chance, and Norton 2012), so instead of asking participants to explicitly write about having a lot of time, we asked them to recall an experience of spending time on other people.

Method

A total of 200 people participated via Amazon MTurk. Again we used a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects design with a hanging control condition. Participants first completed a scarcity manipulation by writing what it would be like to have very little time (vs. money) (from McDonnell and White 2015).

Next, to manipulate abundance of alternate resource, those who were assigned to the time scarcity/money abundance condition were asked to write what it would be like to have a lot of money (from McDonnell and White 2015), and those who were assigned to the money scarcity/time abundance condition were asked to write their experience of spending time on others (from Mogilner et al. 2012). Those assigned to the scarcity condition did not conduct any tasks at this stage. Participants in the hanging control condition were asked to write 10 facts they know (from Tully et al. 2015).

After we manipulated scarcity and abundance of alternate resource, participants were asked to move on to the next part of the study, which was similar to that of study 1. We asked participants to imagine that they were looking for a fun activity for the weekend and came across a boat-ride service that seemed less interesting than other options (Faraji-rad et al. 2015). We showed the same positive review and measured persuasion (9-point scale; $\alpha = .87$) and perceived similarity of the reviewer (7-point scale; $\alpha = .96$). The review and measures were identical to those used in study 1 (also see Faraji-rad et al. 2015). We also asked participants' advice-taking tendencies by asking 1) how likely they were to accept the advice from the reviewer, and 2) how likely they were to change their opinion, on 9-point scales ($\alpha = .93$).

Finally, participants indicated the extent to which they felt money-constrained and time-constrained during the survey (adapted from Tully et al. 2015) and answered demographic questions.

Results and Discussion

Feelings of Money Scarcity and Time Scarcity. A 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA on the feelings of time scarcity revealed only a main effect of scarcity type. People in the time scarcity condition felt greater time scarcity than those in the money scarcity condition ($M_{\text{money}} = 3.67$ vs. $M_{\text{time}} = 5.29$, $F(1, 151) = 44.06$, $p < .001$). An ANOVA on the feelings of money scarcity revealed a significant main effect of scarcity, and a significant interaction. As expected, those in the money scarcity condition felt greater money scarcity than those in the time scarcity condition ($M_{\text{money}} = 4.85$ vs. $M_{\text{time}} = 4.09$, $F(1, 151) = 5.45$, $p < .001$). Most importantly, we found a significant interaction between the scarcity and the abundance of alternate resource ($F(1, 151) = 8.87$, $p = .003$). Participants in the money scarcity condition felt significantly greater money scarcity than those in the money scarcity/time abundance ($M_{\text{money scarcity/time abundance}} = 4.11$ vs. $M_{\text{money scarcity}} = 5.45$, $F(1, 151) = 11.52$, $p = .001$) and the time scarcity ($M_{\text{time scarcity}} = 5.45$ vs. $M_{\text{time scarcity/money abundance}} = 4.29$, $F(1, 151) = 15.07$, $p < .001$) conditions. Those in the money scarcity/time abundance condition did not feel greater money scarcity than those in the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 4.11$ vs. $M_{\text{time scarcity/money abundance}} = 4.29$, $F(1, 151) < 1$, $p = \text{NS}$). Moreover, people in the time scarcity/money abundance condition and the time scarcity condition did not significantly differ on the level of money scarcity ($M_{\text{time scarcity/money abundance}} = 4.29$ vs. $M_{\text{time scarcity}} = 3.89$, $F(1, 151) < 1$, NS). We also compared these effects to the hanging control condition. The analysis of time scarcity revealed that those in the control condition felt significantly less time scarcity than people in the time scarcity/money abundance ($M_{\text{control}} = 3.44$ vs. $M_{\text{time scarcity/money abundance}} = 5.29$, $t(151) = -1.85$, $p < .001$) and the time scarcity ($M_{\text{control}} = 3.44$ vs. $M_{\text{time scarcity}} = 5.28$, $t(151) = -1.83$, $p < .001$) conditions. The same analysis of money scarcity showed that people in the control condition felt significantly less

money scarcity than those in the money scarcity condition ($M_{\text{control}} = 3.98$ vs. $M_{\text{money scarcity}} = 5.45$, $t(151) = -1.47$, $p < .001$). However, feelings of money scarcity among those in the control condition were equivalent of those of participants in the money scarcity/time abundance condition ($M_{\text{control}} = 3.98$ vs. $M_{\text{money scarcity/time abundance}} = 5.45$, $t(151) = -.13$, NS), suggesting that time abundance compensated for money scarcity.

Taken together, these findings show that our scarcity manipulation was successful. Also these results provide evidence that time abundance compensated for money scarcity, and thus led to reduced feelings of money scarcity, but money abundance did not compensate for time scarcity.

Perceived Similarity. We ran a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA on the index of perceived similarity of the reviewer. The results showed a significant main effect of scarcity type ($F(1, 151) = 6.87$, $p = .01$), a significant main effect of abundance of alternate resource ($F(1, 151) = 4.85$, $p = .029$), and a significant interaction effect ($F(1, 151) = 5.35$, $p = .022$). Replicating our previous effects, participants in the money scarcity/time abundance condition reported significantly greater perceived similarity than those who only felt money scarcity ($M_{\text{money scarcity/time abundance}} = 4.72$ vs. $M_{\text{money scarcity}} = 3.87$, $F(1, 151) = 11.23$, $p = .001$). Moreover, people in the money scarcity/time abundance condition reported significantly greater perceived similarity than those in the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 4.72$ vs. $M_{\text{time scarcity/money abundance}} = 3.79$, $F(1, 151) = 11.44$, $p = .001$). Again, among those in the time scarcity conditions, participants in the abundance of alternate resource condition and the scarcity condition did not show any significant difference ($M_{\text{time scarcity/money abundance}} = 3.79$ vs. $M_{\text{time scarcity}} = 3.82$ ($F(1, 151) <$

1, NS). This shows that the interaction is driven by the money scarcity/time abundance condition. Furthermore, we compared our effects to the hanging control condition to have a better understanding of the effects. A one-way ANOVA with all five conditions showed that participants in the control condition reported significantly higher perceived similarity than those in the money scarcity condition ($M_{\text{control}} = 4.54$ vs. $M_{\text{money scarcity}} = 3.87$, $t(151) = .67$, $p = .006$), the time scarcity/money abundance condition ($M_{\text{control}} = 4.54$ vs. $M_{\text{time scarcity/money abundance}} = 3.79$, $t(151) = .75$, $p = .005$) and the time scarcity condition ($M_{\text{control}} = 4.54$ vs. $M_{\text{time scarcity}} = 3.82$, $t(151) = .73$, $p = .005$). However, people in the control condition did not report a significantly different perceived similarity than those in the money scarcity/time abundance condition ($M_{\text{time scarcity/money abundance}} = 6.24$ vs. $M_{\text{money scarcity/time abundance}} = 4.72$, $t(151) = -.18$, NS), suggesting that time abundance compensated for money scarcity.

Persuasion. We next conducted a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects ANOVA on the index of persuasion. We found a marginally significant main effect of scarcity type and a marginally significant interaction. There was no main effect of abundance of alternate resource. Participants in the money scarcity condition were more likely to be persuaded than those in the time scarcity condition ($M_{\text{money}} = 5.82$ vs. $M_{\text{time}} = 5.4$, $F(1, 151) = 3.59$, $p = .06$). As we expected, participants in the money scarcity/time abundance condition were more likely to be persuaded than those in the money scarcity condition ($M_{\text{money scarcity/time abundance}} = 6.24$ vs. $M_{\text{money scarcity}} = 5.48$, $F(1, 151) = 5.48$, $p = .02$) and those in the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 6.24$ vs. $M_{\text{time scarcity/money abundance}} = 5.35$, $F(1, 151) = 6.3$, $p = .013$). Furthermore, those in the time scarcity/money abundance condition did not show significantly different levels of

persuasion than participants in the time scarcity condition ($M_{\text{time scarcity/money abundance}} = 5.35$ vs. $M_{\text{time scarcity}} = 5.45$ vs., $F(1, 151) < 1$, NS). We then compared the effects to the hanging control condition. People in the control condition were more likely to be persuaded than those in the money scarcity condition ($M_{\text{control}} = 6.1$ vs. $M_{\text{money scarcity}} = 5.48$; $t(151) = .63$, $p = .028$), the time scarcity condition ($M_{\text{control}} = 6.1$ vs. $M_{\text{time scarcity}} = 5.44$; $t(151) = .66$, $p = .042$), and the time scarcity/money abundance condition ($M_{\text{control}} = 6.1$ vs. $M_{\text{time scarcity/money abundance}} = 5.35$; $t(151) = 7$, $p = .023$). However, participants in the hanging control condition and the money scarcity/time abundance condition did not significantly differ on their advice-taking tendency ($M_{\text{control}} = 6.1$ vs. $M_{\text{money scarcity/time abundance}} = 6.24$; $t(151) = -.13$, NS).

Advice-Taking. The same analysis was conducted on the index of advice-taking tendency. An ANOVA on advice-taking revealed a significant scarcity effect ($F(1, 151) = 4.83$, $p = .029$) and a marginally significant interaction effect ($F(1, 151) = 3.4$, $p = .067$). Participants in the money scarcity condition were more likely to accept advice than those in the time scarcity condition ($M_{\text{money}} = 5.62$ vs. $M_{\text{time}} = 5.01$, $F(1, 151) = 4.83$, $p = .029$). Moreover, the analysis revealed that the interaction was driven by participants in the money scarcity/time abundance condition; these participants were more likely to accept advice than those in the money scarcity condition ($M_{\text{money scarcity/time abundance}} = 6.16$ vs. $M_{\text{money scarcity}} = 5.19$, $F(1, 151) = 5.54$, $p = .02$) and the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 6.16$ vs. $M_{\text{time scarcity/money abundance}} = 4.92$, $F(1, 175) = 7.68$, $p = .006$) conditions. Among time scarcity conditions, the abundance of alternate resource condition and the scarcity condition did not reveal significant differences ($M_{\text{time scarcity/money abundance}} = 5.19$ vs. $M_{\text{time scarcity}} = 5.08$, $F(1, 151) < 1$, NS). Moreover, when compared to the hanging control condition, participants in the control condition were more

likely to accept advice than those in the money scarcity condition ($M_{\text{control}} = 6.41$ vs. $M_{\text{money scarcity}} = 5.19$; $t(151) = 1.22, p = .001$), the time scarcity condition ($M_{\text{control}} = 6.41$ vs. $M_{\text{time scarcity}} = 5.08$; $t(151) = 1.33, p = .001$), and the time scarcity/money abundance condition ($M_{\text{control}} = 6.41$ vs. $M_{\text{time scarcity/money abundance}} = 4.92$; $t(151) = 1.49, p < .001$). However, participants in the hanging control condition and the money scarcity/time abundance condition did not significantly differ on their advice-taking tendency ($M_{\text{control}} = 6.41$ vs. $M_{\text{money scarcity/time abundance}} = 6.16$; $t(151) = .25, \text{NS}$).

Moderated Mediation. Again, bootstrap analyses (Hayes 2012, Model 8) were conducted (money scarcity = 1, time scarcity = 0; abundance = 1, scarcity = 0) on the persuasion and the advice-taking tendency to examine whether perceived similarity mediated the interaction of scarcity and the abundance of alternate resource. We found that the interaction had a significant effect on perceived similarity ($\beta = .87, t = 2.31, p = .02$), and the perceived similarity had a significant effect on persuasion ($\beta = .73, t = 8.41, p < .001$). The conditional indirect effect of scarcity via perceived similarity was positive and significant among the abundance of alternate resource conditions ($\beta = .67, 95\% \text{ CI from } .24 \text{ to } 1.22$), whereas the conditional indirect effect was not significant among the scarcity conditions (95% CI from $-.3$ to $.397$). The same analysis on the advice-taking tendency showed that the interaction had a significant effect on perceived similarity ($\beta = .87, t = 2.31, p = .02$) and perceived similarity had a significant effect on the advice-taking tendency ($\beta = 1.14, t = 12.02, p < .001$). More importantly, the conditional indirect effect of scarcity through perceived similarity was positive and significant in the abundance of alternate resource conditions ($\beta = 1.05, 95\% \text{ CI from } .4 \text{ to } 1.79$). However, in the scarcity conditions, the conditional indirect effect was not significant (95% CI from $-.48$ to $.57$).

STUDY 6

So far we have found that feelings of scarcity, whether of time or money, lead to lower levels of advice-taking (study 1) due to decreased perceived similarity (study 2). Furthermore, we found that the scarcity effect can be compensated when individuals feel money scarcity and time abundance. However, such compensation does not occur when they feel time scarcity and money abundance. Thus, we showed an asymmetry between time and money substitutability, such that time substitutes for money, but money does not substitute for time.

In study 6, we examine why such asymmetry exists. We argued that people perceive time to have a malleable value, whereas money has a fixed value. Thus, such ambiguity of time value makes it easier for people to think that an abundance of time can compensate for money scarcity. Moreover, because time is laden with more personal meaning than money, people may perceive time to be more valuable than money, leading them to think that money abundance is not enough to compensate for time scarcity, but time abundance can compensate for money scarcity. We test our theorizing in study 6 using people's beliefs about time being the more valuable resource than money. Among those who believe time is more valuable than money, we should replicate our previous effect. However, for those who believe money is more valuable than time, time abundance may not compensate for money scarcity. We expect that for those who believe that time is a more valuable resource than money, there should be no effect because time is not a substitutable resource.

Method

A total of 188 students participated in the study for course credits. We randomly assigned students to one of the 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) between subjects conditions. We followed a similar procedure from the previous studies reported here, with a few exceptions. First, to manipulate scarcity, we asked participants to recall a recent experience of feeling time (vs. money) scarcity (adapted from Roux et al. 2015). The abundance of alternate resource manipulation was the same as that in our previous studies. To measure participants' advice-taking tendencies, we used the same procedure from study 4. We asked which option, between diets and exercising, is better for health and then presented an article supporting the opposing opinion. We used the same measures from study 4 to measure perceived similarity of advisor (7-point scale; $\alpha = .91$) and advice-taking tendency (9-point scale; $\alpha = .81$). We then asked some filler questions before measuring participants' belief about the value of time compared to money. Participants indicated the extent to which they agree with 'money is more valuable than time' (7-point scale). We reverse-coded this so higher scores reflected a perception that time is more valuable than money. Finally, participants indicated how money-constrained they felt during the survey and how time-constrained they felt during the survey (adapted from Tully et al. 2015).

Results and Discussion

Belief about the Value of Time Compared to Money. We conducted a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) ANOVA on participants' beliefs about the value of time compared to money. As expected, we didn't find any effect on this measure, indicating that participants' beliefs were not affected by our manipulation.

Furthermore, we found that participants generally believed time to be more valuable than money ($M = 4.9$, $SD = 1.41$, $t(187) = 8.75$, $p < .001$).

Measures of Time Scarcity and Money Scarcity. We conducted a 2(scarcity: time vs. money) \times 2(abundance of alternate resource: abundance vs. scarcity) \times belief about the value of time compared to money continuous regression on feelings of time scarcity. The results revealed only a main effect of scarcity type. As expected, participants in the time scarcity condition indicated feeling greater time scarcity than those in the money scarcity condition ($M_{\text{money}} = 3.16$ vs. $M_{\text{time}} = 5.29$, $t(180) = -2.23$, $p = .027$). However, the 2 \times 2 \times continuous regression on the feelings of money scarcity revealed a marginally significant main effect of scarcity and a significant three-way interaction. As expected, people in the money scarcity condition felt greater money scarcity than those in the time scarcity condition ($M_{\text{money}} = 3.67$ vs. $M_{\text{time}} = 2.32$, $t(180) = 1.75$, $p = .08$). Most importantly, we found a significant three-way interaction ($\beta = -.73$, $t(180) = -2.27$, $p = .02$). A spotlight analysis at one standard deviation above and below the mean of belief (Aiken and West 1991) showed that for those who believe time is more valuable than money, time abundance compensated for money scarcity, thus reducing the feelings of money scarcity ($\beta = -2.23$, $t(180) = -3.47$, $p < .001$). However, for those who believe money is more valuable than time, this effect is not significant (NS).

Perceived Similarity. We ran the same 2 \times 2 \times continuous regression on the index of perceived similarity of the advisor. The results showed a significant three-way interaction effect ($\beta = .53$, $t(180) = 2.29$, $p = .02$). A spotlight analysis showed that among those who believe time is more valuable than money, participants who felt only money scarcity reported lower perceived

similarity than those who felt only time scarcity ($\beta = -.63$, $t(180) = -2.02$, $p = .04$), but those who felt money scarcity and time abundance reported a higher perceived similarity than those who felt time scarcity and money abundance ($\beta = .98$, $t(180) = 2.92$, $p = .004$). However, as expected, this effect was not significant for those who believe money is more valuable than time (NS).

Advice-Taking. The same $2 \times 2 \times$ continuous regression on the index of advice-taking tendency was conducted. The results showed a significant three-way interaction effect ($\beta = .7$, $t(180) = 2.26$, $p = .02$). A spotlight analysis showed that for those who believe time is more valuable than money, participants who felt only money scarcity showed marginally lower advice-taking tendencies than those who felt only time scarcity ($\beta = -.73$, $t(180) = -21.74$, $p = .08$). However, more importantly, among the people who believe time is more valuable than money, those who felt money scarcity and time abundance showed greater advice-taking tendencies than those who felt time scarcity and money abundance ($\beta = 1.42$, $t(180) = 3.16$, $p = .001$). However, as expected, this effect was not significant for those who believe money is more valuable than time (NS).

Moderated Mediation. Next we conducted a moderated mediation analysis using scarcity type as an independent variable, abundance of alternate resource as moderator 1, belief about the value of time compared to money as moderator 2, perceived similarity as a mediator, and advice-taking as a dependent variable. We found a significant three-way interaction on perceived similarity ($\beta = 1.53$, $t(180) = 2.29$, $p = .02$), and perceived similarity significantly predicted advice-taking tendency ($\beta = .82$, $t(180) = 10.89$, $p < .001$). Among the people who believe time is more valuable than money, when compared to those who only felt time scarcity, those who

only felt money scarcity reported lower perceived similarity, and this perceived similarity significantly affected advice-taking tendencies ($\beta = -.52$, 95% CI from -1.02 to -.04). Among the people who believe time is more valuable than money, when compared to those who felt time scarcity and money abundance, those who felt money scarcity and time abundance reported greater perceived similarity, which further affected their advice-taking tendencies ($\beta = .8$, 95% CI from .34 to 1.3). However, for those who believe money is more valuable than time, these effects are no longer significant (NS).

Our results show that the asymmetry between time and money substitutability occurs when people believe that time is more valuable than money. We found that people generally believe time is more valuable than money, which explains why we found the asymmetry in the time and money substitutability in the previous studies. However, such asymmetry disappears when people do not hold the belief that time is more valuable than money. When people believe money is more valuable than time, time abundance did not compensate for money scarcity. Furthermore, we did not find a reversal of our effects with those who believe money is more valuable than time. If people believe money is more valuable than time, then it is natural to assume that money abundance compensates for time scarcity but time abundance does not compensate for money scarcity. However, we did not find the reversal. We suggest that this is due to the nature of the difference between time and money, such that money is a substitutable resource, whereas time is not. That is, because people generally think time is not substitutable, money does not compensate for time scarcity even for those who consider money to be more valuable. In the next study, we manipulated participants' mindsets when thinking about time and money substitutability to test this premise in depth.

STUDY 7

Study 7 examined the underlying process of asymmetry in time and money substitutability by manipulating participants' thoughts on whether time and money are substitutable. When a concept is primed, associated thoughts are activated, affecting people's subsequent judgments and behaviors accordingly (Liu and Aaker 2009; Srull and Wyer 1979). Thus, in this study, we primed participants with the concept of time and money substitutability, or imperfect substitutability. We expect that our previous results will be replicated for only the substitutability primed condition.

Method

A total of 243 students participated in the study for course credit. Participants were randomly assigned to one of the four conditions in a 2(scarcity and abundance: money scarcity/time abundance vs. time scarcity/money abundance) \times 2(substitutability of time and money: substitutability vs. imperfect substitutability) design. To manipulate scarcity and abundance, we first asked participants who were assigned to the money scarcity/time abundance condition to list up to 10 things they needed to buy or pay that made them feel money-constrained (adapted from Tully et al. 2015). Next, we asked them to write about a time when they spent time for others to manipulate feelings of time abundance (from Mogilner et al. 2012). Participants who were assigned to the time scarcity/money abundance condition were asked to write 10 tasks they needed to finish that made them feel time-constrained (adapted from Tully et

al. 2015). Next, to manipulate money abundance, participants were asked to write about an experience that made them feel financially better off than their peers (Sharma and Alter 2012). After manipulating scarcity and abundance, participants in the substitutability condition rated the extent to which they agreed with the statement “Time is money.” In the imperfect substitutability condition, participants rated their agreement with the statement “Money doesn’t buy you time.”

Next, we showed the same very positive wine bar review from study 2. Participants were told to imagine that they had tried the wine bar once but hadn’t liked the experience. The same persuasion measures (9-point scale, $\alpha = .93$) and perceived similarity of reviewer measures (7-point scale, $\alpha = .96$) from study 2 were used. Finally, participants indicated the extent to which they felt money constrained and time constrained during the survey (adapted from Tully et al. 2015).

Results and Discussion

Feelings of Money Scarcity and Time Scarcity. First, a 2(scarcity and abundance: money scarcity/time abundance vs. time scarcity/money abundance) \times 2(substitutability prime: substitutability vs. imperfect substitutability) between subjects ANOVA was conducted on the feelings of time scarcity. As expected, we found a main effect of scarcity and abundance, such that those who were assigned to the time scarcity/money abundance condition felt greater time scarcity than those who were in the money scarcity/time abundance condition ($M_{\text{money scarcity/time abundance}} = 4.7$ vs. $M_{\text{time scarcity/money abundance}} = 5.69$, $F(1, 239) = 32.78$, $p < .001$). There was no main effect of substitutability prime, nor an interaction. However, on the feelings of money scarcity, we found a significant main effect of the substitutability prime and a significant interaction.

Participants in the imperfect substitutability condition reported feeling greater money scarcity than those in the substitutability condition ($M_{\text{imperfect sub}} = 3.61$ vs. $M_{\text{sub}} = 3.05$, $F(1, 239) = 7.95$, $p = .005$). Moreover, the interaction was significant ($F(1, 239) = 8.54$, $p = .004$). Among those in the imperfect substitutability condition, participants in the money scarcity/time abundance condition reported feeling greater money scarcity than those who were in the time scarcity/money abundance condition ($M_{\text{money scarcity/time abundance}} = 4.05$ vs. $M_{\text{time scarcity/money abundance}} = 3.17$, $F(1, 239) = 9.64$, $p = .002$). Moreover, among participants in the money scarcity/time abundance condition, those in the substitutability condition reported significantly less money scarcity than those in the imperfect substitutability condition ($M_{\text{imperfect sub}} = 4.05$ vs. $M_{\text{sub}} = 2.9$, $F(1, 239) = 16.16$, $p < .001$). This suggests that time abundance compensated for money scarcity only for those who had been primed that time and money are substitutable. Including the extent to which participants agreed with each statement as a covariate did not significantly change the results.

Perceived Similarity. We conducted the same two-way ANOVA on the index of perceived similarity. People in the substitutability condition reported greater perceived similarity to the reviewer than did those in the imperfect substitutability condition ($M_{\text{imperfect sub}} = 2.74$ vs. $M_{\text{sub}} = 3.02$, $F(1, 239) = 2.97$, $p = .086$). More importantly, the interaction was significant ($F(1, 239) = 4.18$, $p = .04$). Among the substitutability conditions, people in the money scarcity/time abundant condition reported greater perceived similarity than the time scarcity/money abundant condition ($M_{\text{money scarcity/time abundance}} = 3.33$ vs. $M_{\text{time scarcity/money abundance}} = 2.75$, $F(1, 239) = 5.82$, $p = .017$). Among the money scarcity/time abundance conditions, the substitutability condition reported greater perceived similarity than the imperfect substitutability condition ($M_{\text{imperfect sub}} =$

2.68 vs. $M_{\text{sub}} = 3.33$, $F(1, 239) = 6.95$, $p = .009$), suggesting that the interaction is driven by participants in the money scarcity/time abundance who had been primed that time and money are substitutable.

Persuasion. The same ANOVA revealed a marginally significant effect of substitutability prime, such that people in the substitutability condition were more likely to be persuaded than those in the imperfect substitutability condition ($M_{\text{imperfect sub}} = 4.46$ vs. $M_{\text{sub}} = 4.82$, $F(1, 239) = 2.97$, $p = .086$). Moreover, there was a significant interaction effect ($F(1, 239) = 4.18$, $p = .042$). Again, among the substitutability conditions, participants who felt money scarcity and time abundance were persuaded more than those who felt time scarcity and money abundance ($M_{\text{money scarcity/time abundance}} = 5.16$ vs. $M_{\text{time scarcity/money abundance}} = 4.5$, $F(1, 239) = 5.36$, $p = .02$). Among the money scarcity/time abundance conditions, those in the substitutability condition were more persuaded than people in the imperfect substitutability condition ($M_{\text{imperfect sub}} = 4.38$ vs. $M_{\text{sub}} = 5.16$, $F(1, 239) = 7.39$, $p = .007$).

Moderated Mediation. We conducted moderated mediation analysis (Hayes 2012, Model 8; money scarcity/time abundance = 1, time scarcity/money abundance = 0; substitutability = 1, imperfect substitutability = 0). Scarcity and abundance was our independent variable, the substitutability of time and money was a moderator, perceived similarity was the mediator, and the persuasion index was the dependent variable. We found that perceived similarity had a significant effect on level of persuasion ($\beta = .46$, $t(239) = 6.59$, $p < .001$). More importantly, the conditional indirect effect of scarcity and abundance through perceived similarity was positive and significant in the substitutability condition ($\beta = .27$, 95% CI from .08 to .54). However, in

the imperfect substitutability condition, the conditional indirect effect was not significant (95% CI from -.31 to .15).

These results provide evidence that the asymmetry between time and money substitutability exists only when people think that money is substitutable with time; these results replicate our previous findings that time abundance compensated for money scarcity. However, when the imperfect substitutability was primed, time abundance no longer compensated for money scarcity. Even priming substitutability of time and money did not affect those who felt time scarcity and money abundance. This may be due to a general belief that time is more valuable than money. That is, even when people think time can be substituted with money, if time is perceived as more valuable than money, money abundance should not be enough to compensate for time scarcity. Our findings in study 7 suggest that whether people believe money is substitutable or not is another important boundary condition, along with the perception that time is more valuable than money.

GENERAL DISCUSSION

Across seven studies, we demonstrated that time scarcity and money scarcity can lead to lower levels of advice-taking, because scarcity leads people to perceive others as dissimilar to themselves. More importantly, we showed that the money scarcity effect can be compensated when people feel time abundance. However, such compensation does not hold for those who feel time scarcity and money abundance. These results suggest an asymmetry between the time and

money compensation effect, such that time compensates for money scarcity but money does not compensate for time scarcity.

In studies 1 and 2, we documented the baseline scarcity effect that both time scarcity and money scarcity lead to lower levels of persuasion and advice-taking due to lower perceived similarity of the reviewer. Studies 3-5 showed the asymmetry between the time and money compensation effect as well as replicated the effect from studies 1 and 2, using participants' real opinions, and hypothetical scenarios. We found that feeling scarcity (of either time or money) leads to lower perceived similarity of the reviewer, advice-taking tendencies, persuasiveness of the advice, and behavioral intentions. Moreover, we found that time abundance compensated for money scarcity, but money abundance did not compensate for time scarcity. Finally, studies 6 and 7 suggested important boundary conditions as well as provided evidence for why such asymmetry exists. We suggested that when time is perceived as more valuable resource than money, it is easier to think that time compensates for money but not vice versa. We tested this in study 6 by measuring people's perceptions of the value of time and money. We found that the proposed asymmetry does not exist for those who believe money is more valuable than time. Furthermore, we suggested that due to a difference in the fungibility of time and money, people generally think money is a substitutable resource, whereas time is not. We tested this notion in study 7 by manipulating people's perceptions of the substitutability of time and money and found that the asymmetry only holds when people are primed with time and money substitutability.

Together, our results provide important contributions to the literature of scarcity, time and money, and advice-taking. Previous research on scarcity considered feeling scarcity as an opposing state to feeling abundance (Briers and Laporte 2013; Mehta and Zhu 2015; Sharma and Alter 2012). However, consumers often experience both feelings of scarcity and feelings of

abundance at the same time, suggesting that these feelings may coexist. For example, people may experience time scarcity but money abundance, or money scarcity but time abundance. Our research addresses this gap, showing that when people experience both scarcity and abundance of different resources, time abundance compensates for money scarcity but money abundance does not compensate for time scarcity. Furthermore, research on scarcity has studied scarcity at a higher level—feelings of scarcity in general—regardless of which resource is scarce, leading to similar mindsets (Shah et al. 2012; Shah et al. 2015). Scant research examines the different types of resource scarcities (see So and Agrawal working paper for an exception).

Our research provides support for previous findings that there is a scarcity effect on advice-taking tendency, and that both time scarcity and money scarcity lead to similar outcomes. However, as recent research suggests (So and Agrawal working paper), time scarcity and money scarcity can be different when there is an interplay with resource abundance. Due to a difference in the nature of time and money, people who are money scarce feel that the scarcity can be compensated with resource abundance. However, we show that time scarcity cannot be compensated with resource abundance.

Furthermore, our research adds to the literature in time versus money by showing that time substitutes for money, but money does not substitute for time. Prior research on time versus money continuously suggested fungibility as one of the important differences between time and money (Leclerc et al. 1995; Zauberaman and Lynch 2005). Time has lower fungibility than money, such that it cannot be stored for later use or borrowed from others. We add to the research by showing that the fungibility difference can apply across the resources. Because money is a fungible resource, people who feel money scarcity have a mindset that it can be substituted, even with a different resource. Furthermore, we add to the literature by showing that

people generally consider time as more valuable resource than money. Due to this perception, along with the malleable value of time (Okada and Hoch 2004), money-scarce people can easily think that time substitutes for money, so that time abundance compensates for money scarcity. However, in the case of feeling time scarcity, money abundance may not be enough to compensate for time scarcity. Thus, money abundance does not compensate for time scarcity.

Finally, our research enriches the literature on advice taking. Previous research on advice taking has focused on the characteristics of advice (e.g., valence, extremity) (Gershoff, Mukherjee, and Mukhopadhyay 2003; 2006; 2007), the characteristics of the advisor (e.g., similarity, confidence, relationship length, past agreement with agent, expertise; Faraji-rad et al. 2015; Gershoff et al. 2006; Goldsmith and Fitch 1997; Jiang et al. 2010; Jungermann and Fischer 2005; Price and Stone 2004; Schwartz, Luce, and Ariely 2011). We provide another important antecedent in predicting when people are less likely to take advice from others, and when such effect can be moderated. We show that feeling resource scarcity makes people view others as different from themselves, leading people to be less likely to take advice. However, in the case of feeling money scarcity, such advice-taking tendency can be moderated by making them feel time abundant.

This research presents many implications for managers. Low income individuals often fail to open bank accounts, get regular medical check-ups, or sign up for 401(k)s (Bertrand, Mullainathan, and Shafir 2004; Oyserman, Fryberg, and Yoder 2007). Furthermore, this may not be the problem only for people who are money scarce. Those who are time scarce postpone important decisions because they are too busy with other matters (Shah et al. 2012). Proper policy guidance for those who have scarce resource is important (Chakravarti 2006), yet it can be difficult for people to follow recommended policy and accept beneficial advice. Our research

provides a new explanation for why people with scarce resource are less likely to listen to others' advice or change their status quo. Furthermore, we suggest an important way to increase the advice-taking tendency of money scarce people. Many money scarce individuals may have a lot of time (Sullivan and Gershuny 2004). If policy makers can prime their abundance of time resource, it can help low-income individuals accept advice or change their status quo.

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APPENDIX

A1. Essay 1 Pilot Study Results

One sample t-test against 4 for each item of self-inferences.

Self-inferences	Item	Mean	t-value	p-value
Positive self-inferences	I am the scarce resource	4.52 (1.43)	2.8	.007
	I am a rare resource	4.68 (1.37)	3.86	< .001
	I am a limited (in terms of availability) resource	4.47 (1.46)	2.48	.016
Negative Self-inferences	I don't have enough resources	3.17 (1.83)	-3.52	.001
	I lack the scarce resource	3.2 (1.8)	-3.42	.001
	I need to acquire more resources	3.88 (2)	-.45	> .05

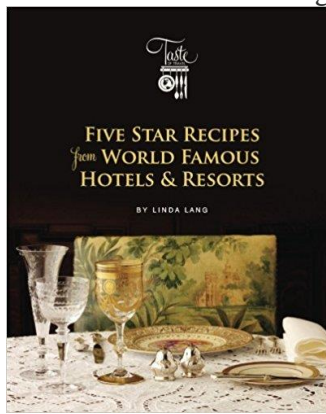
Standard deviations are given in parentheses.

A2. Essay 1 Study 3A and 3B Stimuli

Self-value product 1

Because you are worth it.
Bring the luxury to your table.

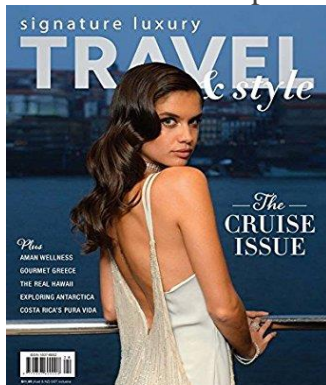
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Self-value product 2

You are Special,
and You deserve a break.

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A3. Essay 1 Study 4A, 5, and 6 Stimuli

Shoe advertisement promoting self-value



Shoe advertisement promoting quality



A4. Essay 1 Study 7 Stimuli



Pantene

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