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CHOICE AS AN ENGINE OF INDEPENDENCE: IMPLICATIONS FOR EMPLOYEE VOICE AND MANAGERIAL DECISION MAKING

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Statement of Originality

I hereby certify that the work embodied in this thesis is the result of original research, is free of plagiarised materials, and has not been submitted for a higher degree to any other University or Institution.

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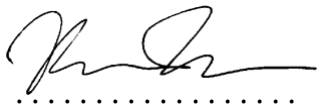

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Kevin Nanakdewa

Supervisor Declaration Statement

I have reviewed the content and presentation style of this thesis and declare it is free of plagiarism and of sufficient grammatical clarity to be examined. To the best of my knowledge, the research and writing are those of the candidate with amendments, changes and improvements as suggested by me as the Supervisor. I confirm that the investigations were conducted in accord with the ethics policies and integrity standards of Nanyang Technological University and that the research data are presented honestly and without prejudice.

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Krishna Savani

Authorship Attribution Statement

This thesis contains material from 1 paper published in a peer-reviewed journal in which I am listed as an author. An abridged version of chapter 1 is published as

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The contributions of the co-authors are as follows:

- I prepared the manuscript drafts.
- Prof Krishna Savani and Prof Hazel Markus provided the initial project direction and edited the manuscript drafts.
- Dr Madan revised the manuscript and prepared an abridged version of the manuscript for submission to *Current Directions in Psychological Science*.

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Summary

Research on choice has found that when people have the ability to make a choice, and have alternatives to choose from, they are more motivated, perform better, and are more satisfied with their decisions. More recently, a new stream of research found that even when people engaged in the same behaviors, the extent to which they construed their actions as choices varied greatly, suggesting that people differ in whether or not they construe actions as choices, referred to as a "choice mindset". This stream of research has found that manipulating a choice mindset has important consequences for attitudes, behaviors and cognition.

In chapter 1, I reviewed the outcomes associated with a choice mindset, which include support for inequality, victim blaming, and support for policies that increase individual freedoms. Integrating the findings from existing literature, I found that a choice mindset is associated with outcomes that are beneficial to individuals, but not the collective. I explained the findings by identifying novel psychological mechanisms associated with choice: (1) choice leads to a greater emphasis on personal agency and freedom, and (2) choice is associated with analytic cognition – a tendency to focus on objects independently of the broader context. Based on these newly proposed mechanisms, I hypothesized and tested two previously unexamined consequences of choice: a stronger sense of independence (chapter 2) and less bias in decision making (chapter 3).

In chapter 2, I tested the hypothesis that a choice mindset would lead to a greater awareness and experience of independence, assumed in previous research but never directly tested. This hypothesis is consistent with the first psychological mechanism of choice identified in chapter 1: choice leads to a greater emphasis on personal agency and freedom. I found that across a variety of implicit measures of independence and operationalizations of choice, a stronger belief in choice led to an awareness and experience of independence in

Singapore, India, and the US. I concluded by suggesting that choice may be an unmarked mechanism of cultural change and of growing global individualism.

The previous chapter focused on outcomes largely related to perception and motivation. The second mechanism of choice identified in chapter 1 suggests that choice leads to more analytic cognition. Thus, there may be cognitive consequences of choice not examined in chapter 2 or in existing literature. To investigate this possibility, I focused on decision making in the next chapter.

In chapter 3, I tested the hypothesis that a choice mindset would reduce decision making biases. This prediction is consistent with the second psychological mechanism identified in chapter 1: choice is associated with deliberative, analytic cognition. I found that a stronger a belief in choice attenuated decision-making biases such as the sunk-cost bias, leading to better decision making outcomes.

The research presented in this thesis is the first to document a heightened sense of independence as a key outcome of choice, and the first research to demonstrate that choice can influence decision making biases (e.g., the sunk-cost bias).

CHAPTER 1: THE PARADOXICAL CONSEQUENCES OF CHOICE: OFTEN GOOD FOR THE INDIVIDUAL, PERHAPS LESS SO FOR SOCIETY?

ABSTRACT

The proliferation of products and services, together with the rise of social media, affords people the opportunity to make more choices than ever before. I suggest here that the requirement to think in terms of choice, or to use a choice mindset, has an array of powerful but unexamined consequences for judgment and decision making in general and about others. A choice mindset leads people to engage in cognitive processes of discrimination and separation, to emphasize personal freedom and independent agency, and, in general, to focus on themselves rather than on others. Reviewing research from social psychology, legal studies, health and nutrition, and consumer behavior, I suggest that while a choice mindset may have positive consequences for the individual, the accumulated outcome of thinking in terms of individual choice may have detrimental outcomes for the society. Given the prevalence and valorization of choice in all domains of life, there is an urgent need for more research examining the full-range of the consequences of choice. Many pressing social problems require attention to others and to collective concerns. One pathway to effective solutions may be to creatively leverage the positive individual consequences of choice for the greater good.

Keywords: choice; mindset; individual; society; agency

The importance of choice in various contexts

Choice is a defining feature of contemporary societies. The opportunity for choice is a prominent marker of economic development across the world. Social media prods us to make choices every minute—to like a post, to retweet, to accept a friend request, and so on. Choice give people the opportunity to express themselves, and as such plays an important role in shaping people's identify and self-perception. Choice also gives people the opportunity to influence the environment around them, making choice important in social and organizational settings. For example, managers' choices influence a company's chances for success, the impact of the company's business practices on the surrounding environment, and the well-being and satisfaction of the employees. Given the ubiquity of choice (Schwartz, 2004; Schwartz & Cheek, 2017), it is imperative to understand the consequences of making choices and of construing behavior in terms of choice. In this review, I discuss the consequences of choice under two different waves of research: the first wave, which conceptualized choice in terms of the number of options available, and the second wave, in which I focus on choice as a psychological construct that differs between people and across cultures.

The shift from studying the number of options toward a choice mindset

The first wave of research on choice in psychology primarily defined *choice* in terms of *number of options*—the more options available, the more choice people have. This stream of research on choice is consistent with self-determination theory in that choice is a motivational force (Deci, 1980; p. 26): "Self-determination is the process of utilizing one's will. This involves accepting one's boundaries and limitations, recognizing the forces operating on one, utilizing the capacity to choose, and enlisting the support of various forces to satisfy one's needs." This stream of research found that the more options people have, the greater their intrinsic motivation, performance, persistence, and satisfaction (see Patall, Cooper, & Robinson, 2008). For example, Iyengar and Lepper (1999) found that American

students asked to choose a category of anagrams to solve performed better than their counterparts who had an assigned category. They also spent more time solving anagrams after the task was completed and the experimenter had left the room. Similarly, Cordova and Lepper (1996) found that elementary school students reported that they enjoyed educational games more when they chose the game and were more likely to stay after school to play the game. Students in the choice condition also performed better on a math test following the task. Researchers also reported similar findings with undergraduate participants. In a puzzle-solving task, participants who could choose which puzzle to solve and how much time to allot to each puzzle persisted for longer in the task, displaying greater intrinsic motivation than participants not given a choice (Zuckerman et al., 1978).

The first wave of research on choice focused on manipulating actual choices: some participants are asked to choose from a number of options, whereas others are not. In such studies, participants in the no-choice condition are often yoked to those in the choice condition, such that no-choice participants receive the item selected by the previous participant in the choice condition. For example, in Zuckerman and colleagues' (1978) study, participants were randomly paired and one participant was asked to choose a puzzle to solve, and to indicate how much time they wanted to allocate to each puzzle. The other participant in the pair was then given the same type of puzzle and the same time allocation for each puzzle. Similarly, Snibbe and Markus (2005) asked participants in the choice condition to choose a pen. The next participant (in the usurped choice condition) was told that the pen they wanted was not available and were then given the same pen that the previous participant had chosen. They found that participants that had a college education reported liking the pen they received significantly more in the choice condition than in the usurped choice condition, but this difference was not significant among participants that had a high school education. This finding supported the authors hypothesis that the effects of choice differ by educational

attainment, and that models of agency are qualitatively different for high school and college educated Americans. The method used in the pen study ensures that participants receive the same item or task across conditions, but does not control for whether participants received a more or less preferred item or task. Thus, choice is confounded with whether participants received a more preferred or a less preferred item.

Alternatively, researchers have manipulated whether participants are asked to choose from a small or a large number of options. Iyengar and Lepper (2000) asked students to write an essay and were given either 30 (extensive choice condition) or 6 (limited choice condition) topics to choose from. They found that students in the limited choice condition were more likely to complete the assignment, and scored higher than students in the extensive choice condition. This method is limited by two potential confounds. Choosing among many alternatives reduces self-control, and is cognitively taxing as it requires participants to evaluate more options (Vohs et al., 2008). Thus, manipulations of choice that ask participants to choose from an extensive number of choices versus a limited number of choices confound the use of cognitive resources and self-control effects associated with choosing from many alternatives. Also, the option sets presented to participants are not identical across all conditions if alternatives are removed as they are chosen.

I now move to the second wave of research on choice that focuses on the salience of the concept of choice. This stream of research views choice as a psychological construct that exists in peoples' minds, as opposed to an objective reality that exists in the world. In other words, this wave of research considers choice as a psychological construct, and the psychological salience of choice can be chronically stronger or weaker for different people. The repeated opportunity and requirement for choice can give people a *choice mindset*—a tendency to think about or interpret behavior as a matter of choice. Some cultures provide more opportunities for choice than others, and in these cultures a choice mindset may be

stronger. People within cultures may also perceive choice differently. Thus, any two people engaging in the same series of actions can perceive choice in fundamentally different ways. Consider this scenario. You arrive at the airport. You check your watch and notice you have some time to get lunch. The security line at the gate is long, but you purchased the priority boarding option. Just as you take out your phone to listen to a podcast, an announcement requests that all electronics be switched off. You instead browse the in-flight entertainment console. Shortly after, a flight attendant walks through the aisle offering drinks. In the scenario above, how many choices are involved in completing this trip? 103? 72? 5? If many people engaged in this identical sequence of actions, there is likely variation in how many choices they perceived themselves making.

Savani and colleagues (2010) tested the idea that some people in cultures perceive more choices than in others. In the first study, they asked U.S. American and Indian participants to either list all the choices they made in the previous day (choice condition), or all the things they had done (control condition). For U.S. Americans, participants in the choice condition listed significantly more actions than participants in the control group, however there was no significant difference across conditions for Indian participants. The second study asked U.S. American and Indian participants to indicate how many choices they made after engaging in an identical sequence of events, and found that U.S. Americans indicated that they had made significantly more choices than Indians. The third study replicated this finding, asking participants to indicate how many choices an actor made in a video. The results of the study suggest that the *mindset* component is a key psychological element in the act of making a choice. A choice mindset, I theorize, is the result of this sustained practice of making choices. The extent to which choice is a central part of life in different cultures shapes the accessibility of a choice mindset. Once people have an

accessible choice mindset, even without multiple options available, they tend to construe actions or interpret their own and others' actions through a lens of choice.

Current ways of studying choice

Manipulations associated with a choice mindset do not ask participants to make a choice as part of the manipulation. Instead, choice mindset manipulations ask participants across conditions to construe the same behavior as either a choice or an action (e.g., I ate breakfast, or I *chose* to eat breakfast). I argue that construing behaviors as either a choice or an action does not require significantly different levels of cognitive resources, especially compared to making a choice versus not making a choice. This is an assumption that future research can examine. The second wave of research on the choice mindset used four different manipulations.

In a daily activities manipulation, researchers asked participants in the choice condition to list three *choices they made* (choice condition) or three *things they did* (control condition) the previous morning, afternoon, evening and night (Savani & Rattan, 2012). For example, someone in the control condition might write "I woke up, went for a run, and prepared breakfast." On the other hand, if the same participant were assigned to the choice condition, they may write "I chose to wake up, decided to go for a run, and chose to eat oatmeal for breakfast." In both conditions, participants are asked to reflect on the same actions, but in the choice condition they are asked to *construe* those actions as choices. In a video manipulation, participants watched a video showing an actor spending an evening at home. The actor prepared food, put on some music, and did other mundane tasks around his apartment. In the choice condition, participants were asked to press a button whenever they thought the actor made a choice, whereas in the control condition, participants were asked to press a button any time the actor touched an object (Savani, Stephens, & Markus, 2011). Again, this manipulation does not differ in stimuli presented across conditions, but rather

asks participants to respond to the stimuli in such a way that makes them focus on choices, as opposed to actions. I argue that construing the same behavior as an action or a choice is not likely to differ in the cognitive resources demanded. Future research can test this assumption.

A third manipulation required participants to read an article framed as a reading comprehension test (Briley, Danziger, & Li, 2018; Kricheli-Katz, 2012). In the choice condition, participants were asked to read an article that argued that no matter what, people always have a choice. For example, one passage reads: "Choice is important to each of us in our daily lives. The choices we make help to define the type of lives we lead. This includes everyday simple choices such as what to wear or eat as well as life-defining choices, such as where to live and work, who to marry and how many children to have" (Kricheli-Katz, 2012). In the no-choice condition, participants are asked to read an article that argued instead that choice is an illusion because people are always constrained by their circumstances. A passage in the no-choice condition reads: "Choice is a catchword in our liberal, individualistic society, but it is rarely a practical reality. Regardless of how much decision-making power people think they have, in many situations, the choices people have are very limited. People are not "free" agents unconstrained by their contexts, biological predispositions, resources and culture" (Kricheli-Katz, 2012).

Behavioral economists also developed a nominal choice manipulation. Participants in both conditions were presented with two balls, a green ball and a blue ball. Participants in the choice condition were asked to make an inconsequential choice (e.g., whether a green ball or a blue ball indicates more money; Cappelen, Fest, Sørensen, & Tungodden, 2013), whereas for participants in the control condition, the computer made an inconsequential choice. The computer then randomly selected one of the two balls, making the assignment of green or blue to an outcome inconsequential. In this manipulation, participants did make a choice, but it was not cognitively demanding (i.e., blue or green) and was not consequential given that

one of the two balls will be randomly chosen later.

All four manipulations encourage people to construe actions as choices, or outcomes as consequences of choices, without having them make a consequential choice. The manipulations focus on different aspects of choice. The daily activities and video manipulation asked participants to construe actions as choices, the reading comprehension task manipulates beliefs in the efficacy of choices, and the nominal ball manipulation manipulates the idea that participants have made a choice, albeit inconsequential. Given this, the literature would benefit from comparing the effects of the various choice mindset manipulations on the same set of outcomes, and comparing whether the effects are consistent.

Extant research: consequences of the choice mindset for individuals

A recent wave of studies has identified some consequences of choice mindset. First, a choice mindset increases people's perception of options. One study found that participants asked to recall choices were more likely to perceive more room for negotiation in a negotiation task than participants asked to recall actions (Ma, Yang, & Savani, 2019). Specifically, negotiators who recalled their past choices were more likely to believe that their counterpart had a choice even if their counterpart said that they had reached their limit. When presented with ultimatums, people in a choice mindset chose to ignore the ultimatum and persisted longer in the negotiation, thereby obtaining better outcomes

Second, a choice mindset has been associated with analytic cognition. To make a choice, the decision maker must determine the dimensions on which the options differ from each other—if all options are the same, one might as well pick at random. For example, when choosing applicants to admit, a college admissions officer might recognize that all candidates have high GPA and excellent letters of recommendations. However, to choose one or more candidates, the admissions officer needs to focus on the dimensions on which the candidates differ, such as the diversity of their interests, or the creativity of their essay responses. Thus,

being in a choice mindset likely activates cognitive processes associated with separation and discrimination more than those associated with connection and integration (Oyserman, Sorensen, Reber, & Chen, 2009).

Consistent with this idea, researchers found that a choice mindset increased analytic thinking (Savani, Stephens, & Markus, 2017), which is defined as greater attention to focal objects rather than background objects (e.g., when presented with an image of fish swimming in an aquarium, analytic thinkers focus primarily on the fish, whereas holistic thinkers focus also on the plants, rocks, and other background items; Miyamoto et al., 2006). In their paper, Savani and colleagues (2017, Experiment 1) asked participants to recall choices (or actions) from the previous day. Then, participants were asked to rate the emotional expression of a focal character in a photo with other characters in the background (Masuda et al., 2008). In the photos, the emotional expression of the characters in the background are not always consistent with the focal character. People with high analytic cognition focus on the focal face more than the background faces, whereas people with high holistic cognition are more influenced by the background faces. In this study, participants in the choice condition perceived the emotions more analytically than participants in the control condition, being less influenced by the emotional expression of the characters in the background.

Third, a choice mindset leads people to be more likely to focus on their own values and preferences. Construing actions as choices puts the spotlight on the decision maker. Whereas people may engage in actions automatically, a choice is typically a more deliberative behavior that reflects an independent or disjoint model of agency, according to which "actions are understood as 'freely' chosen, contingent on one's own preferences, intentions, [and] motives" (Markus & Kitayama, 2003b, p. 7). Consistent with this idea, authors found that people reporting a stronger belief in free will were more likely to enjoy making choices and to perceive the ability to choose (Feldman, Baumeister, & Wong, 2014).

Also consistent with this idea, construing actions as choices increases people's support for social policies that increase individuals' freedom (Savani et al., 2011). In the first study, the authors asked participants in the choice condition to press the spacebar every time an actor in a video made a choice, and participants in the control group to press the spacebar every time an actor touched an object. Participants then responded to four items measuring support for policies aimed at reducing racial inequality (i.e., affirmative action policies). Participants in the choice condition were less supporting of the policies aimed at reducing inequality. The second study used the same video manipulation and asked participants to rate their support for policies that limited individual freedoms (e.g., banning violent video games) but benefitted the broader society. Again, participants in the choice condition were less supportive of the policies. In the third study, the authors found that participants in the choice condition were less likely to support policies that limited individual freedoms (e.g., banning farming of animals) but were more supportive of policies that expanded individual rights (e.g., legalizing marijuana). In study four, participants in the choice condition were more likely to blame a victim for their negative outcomes (e.g., failing a high school exam), likely because the concept of choice increased the idea that life's outcomes are a result of one's choices. The final study replicated this finding with an orphan as the target, suggesting that in cultures that emphasize choice (e.g., the U.S.), people are less empathetic to victims even when the victim – an orphan – cannot reasonably be held accountable for their negative outcomes.

In another paper, Briley and colleagues (2018) found that participants from cultural backgrounds that emphasize choice (e.g., European Americans) were more likely to reject a game-based promotion (i.e., "answer this question correctly to unlock a discount") than participants from cultural background with less emphasis on choice (e.g., Asian Americans) because they construed such promotions as a threat to their personal freedom.

Extant research: consequences of the choice mindset in social and organizational settings

If the salience of choice highlights individual agency, a choice mindset is likely to lead people to attribute greater personal responsibility for outcomes. Consistent with this idea, stay-at-home mothers who perceived their workplace departure as a choice were also less likely to recognize workplace barriers and discrimination as a source of gender inequality compared to mothers that did not view their workplace departure as a personal choice (Stephens & Levine, 2011). In study two, the authors found that framing actions in terms of choice (e.g., "choosing to leave" as opposed to "women at home") led participants to believe that society provides equal opportunities and that gender discrimination no longer exists, presumably because thinking about choice led participants to attribute greater personal responsibility for outcomes. In a qualitative interview-based study, Porter (2013) found that people were more likely to refer to accountability for choosing unhealthy options over healthy ones when they themselves were primed with choice. One participant in the making choices condition commented "when you see a 6-year old and they're like damn near 100 pounds the first thing that runs through your mind is ''what the hell are their parents doing?'" (Porter, 2013, p. 4).

Furthermore, a heightened belief in choice increased people's support for discrimination against working mothers (Kricheli-Katz, 2012). Participants were asked to read an article, either about choices or constraints, then presented with two equally-qualified candidates in a hiring task, a mother and a non-mother. Participants asked to read a "theory of choice" article were less likely to hire the candidate who was a mother. On the other hand, participants asked to read a "theory of constraints" article were more likely to hire the candidate who was a mother. Participants in the choice condition also discriminated against mothers in terms of salary, recommending a salary for mothers that was significantly lower

than their equally qualified non-mother counterparts. A heightened belief of choice has been associated with discrimination not only against mothers in the workforce, but also against minority groups such as gay men and the obese (Kricheli-Katz, 2013). Participants were asked to read a choice or constraint article (from Kricheli-Katz, 2012) and then complete a hiring task. Overall, participants asked to read the "theory of choice" article were less likely to hire gay men, fat men, and mothers than participants asked to read the "theory of constraint" article. The findings from these studies suggest that when thinking about choice, people hold others more personally accountable for their outcomes, are less empathetic towards minorities, and are more likely to discriminate against minorities in the context of hiring.

A choice mindset also has problematic consequences for the collective. Savani and Rattan (2012, Experiment 1) asked participants to recall either choices (choice condition) or actions (control condition) then asked participants to indicate how disturbed they were by ten factual statements about wealth inequality (e.g., the richest 20% of Americans own 85% of the wealth in the country). Controlling for political orientation and perceived social class, participants in the choice condition were less disturbed by the factual statements about wealth inequality. In the third experiment, the authors tested the idea that choice leads people to overemphasize individual agency and underemphasize the role of societal factors in attributing wealthy people's success. After manipulating choice, the authors asked participants to respond to nine statements to indicate how much they believed that societal factors shape wealth acquisition, maintenance, and transfer (e.g., ""Many rich people have become rich because there exists a society in which their property rights are protected"). Participants in the choice condition were less likely than participants in the control condition to agree that societal factors contribute to people's success, likely because of a stronger attribution of personal responsibility for outcomes. In experiment four, the authors found that

choice not only made people less disturbed about wealth inequality, but it also makes participants less likely to support policies aimed at reducing equality through more equal distribution of resources between wealthier and poorer communities (e.g., increasing compensation for teachers at schools where half of the students show indicators of poverty). Experiment five ruled an alternative explanation that choice leads people to be less likely to support any government policy, and experiment six found that participants in the choice condition were less likely to support policies aimed at redistribution of resources from the rich to the poor.

People in a choice mindset were also more likely to blame victims for their plight (Savani et al., 2011), presumably because they thought that the victims were personally responsible for their outcomes. Similarly, participants who made trivial choices felt less empathy for a poor orphan child in need (Savani et al., 2011). Since the orphan has little to no control over their situation in this scenario, the findings indicate that choice leads to a reduced focus on others even when the target cannot be reasonably held responsible for their circumstances. This study also showed that the idea of choice played a smaller role in India, a more interdependent cultural context. Although choice is increasingly available in many Indian contexts, it is not yet widely culturally supported and inscribed. This effect of choice has important societal and policy implications. If people perceive that their own and others' outcomes are a consequence of personal choices, they may ignore collective factors that also contribute to people's outcomes and oppose policies aimed at addressing societal inequality. This could potentially impact the effectiveness of government agencies, private foundations, and universities that formulate practices and policies aimed at solving various societal problems (Hook & Markus, 2019).

Choice also allows people to express their own preferences, beliefs, values, and goals, which can diminish people's focus on others. Consistent with this idea, choice has been

linked to independence (Nanakdewa, Madan, Savani, & Markus, 2019), a construal of the self that emphasized the expression of one's unique attributes and needs (Markus & Kitayama, 1991). The authors found that when participants were asked to recall choices, they reported feeling stronger and more powerful, a perception of the self associated with independence (Hamedani, Markus, & Fu, 2013). In the second study, participants primed to think about choice drew a sociogram of their social network symbolically drawing their own circles larger than circles of their friends, an implicit measure of independence. In the third study, the authors found that students who recalled choices were quicker to identify independence related concepts in a lexical decision task. Finally, in study four participants from Singapore, the U.S., and India all reported that they would be more likely to express their voice (beliefs, opinions, ideas) working for a company that emphasized a strong belief in the value of choice.

Given that the meaning of choice varies across cultures (Markus & Schwartz, 2010), it would not be surprising that the effects of choice may also vary across cultures. For example, whereas people in individualistic contexts tend to view choice as a means for exercising independent agency, people in other contexts can view choice as a means to foster relationships, meet expectations, and as a means to interdependent agency (Stephens, Markus, & Townsend, 2007, Markus, 2016), indicating that some of the mechanisms of a choice mindset may operate somewhat differently in more collectivistic cultures. However, little research has directly compared the effects of choice mindset across cultures.

Target questions, contexts, and approaches

The research reviewed above suggests that choice is not an unalloyed good; it is a double-edged sword. The objective of this review is to summarize the wide range of research questions that arise when choice is considered in the context of both individual and collective consequences, and to raise new questions that will guide upcoming investigations about

choice.

Given the predominantly negative consequences of a choice mindset on societal well-being, how may we counteract these effects? Choosing for others may make others' needs, wants, and desires more salient than one's own, potentially increasing people's focus on others' welfare.

Further, with reference to the cognitive consequences of choice (i.e., increased analytic thinking), could asking people to think about how the options are similar to each other when they are making a choice help reduce the processes of discrimination and separation associated with a choice mindset? One possibility is that the increased salience of similarities would offset the decision maker's focus on differences that is typically associated with making a choice. Alternatively, focusing on similarities might not have such an effect because when options are similar on one attribute, people perceive the differences on other attributes as larger in magnitude (Mellers & Biagini, 1994), and seek more information about how the options differ from each other (Bockenholt, Albert, Aschenbrenner, & Schmalhofer, 1991).

Highlighting personal agency clearly has the potential to improve individual well-being. For example, full-time working women's earnings are still 79% that of men in the US (Payscale, 2019). Women are also often subject to harassment and unacceptable working conditions (Chatterjee, 2018). A sense of agency and empowerment activated by choice could aid women and other minoritized populations to counteract harassment and to negotiate better salaries and work conditions. Given that this issue is prominent worldwide, cross-cultural research examining whether choice can serve to empower people to speak out and express their voice in the workplace is a fruitful direction for future research. Also, with increasing demands on time, people can find their behavior (e.g., spending hours responding to emails) patterned in ways that can sometimes reduce their life satisfaction (Kong, Wang, &

Zhao, 2014). Activating a choice mindset, with its emphasis on personal agency, may lead people to actively choose how to spend their time to maximize their subjective well-being (e.g., choosing to respond by phone rather than email). Furthermore, given that choice has been associated with analytic cognition, which is characterized as a more flexible, controlled processing system, it is possible that choice can improve decision making (Savani et al., 2017). This could potentially hold important implications for managerial decision making, in which decision making biases, such as the sunk cost bias, are prevalent and persistent (Roth et al., 2015). Future research can examine whether the flexibility afforded by a choice mindset can improve business problem solving.

However, the emphasis on personal freedom associated with choice can also lead people to oppose interventions aimed at improving their physical and financial well-being, as such interventions can be construed as reducing one's right to choose. Public health campaigns to reduce the consumption of sugary drinks or sodas often meet fierce resistance (Hook & Markus, 2019). Similarly, the increased focus on one's own preferences that accompanies choice may reduce people's concern for victims of climate change and pollution, thereby reducing their support for environmental policies. Potentially, reactance to such policies could be reduced by framing such policies as choices, e.g., "*choose* to create a more sustainable Earth". This language of choice might persuade individuals to commit to more sustainable behaviors, although its effectiveness would require systemic assistance to create compatible choice architectures (Sunstein, 2019). One important future direction is to improve our understanding of the implications of activating a choice mindset, and under what circumstances the effects of activating a choice mindset is moderated by the content of the outcome measure. For example, a policymaker may try to use a choice framing to persuade voters to support a campaign for a healthier food in schools (e.g., "It's Your Choice!"), only to find that the voters react negatively because they perceive their freedom is being limited by

the policy itself. For policymakers, it would be valuable to know if framing a freedom-limiting policy in terms of choice would increase or decrease support for that policy.

From the literature on choice, I find several psychological mechanisms of choice, leading to outcomes that can be beneficial or detrimental to individuals and society. For example, choice leads to psychological processes of separation and discrimination, puts the spotlight on the decision maker, and allows individuals to express their own preferences and values. These mechanisms of choice are ripe for empirical investigation. For example, given that choice leads to psychological processes of separation and discrimination, what would happen if people were asked to think about similarities among options when making a choice? One possibility is that the increased salience of similarities would offset the decision maker's focus on differences that is typically associated with making a choice. On the other hand, focusing on similarities among the options might enhance the focus on differences by provoking the decision maker to perceive greater differences between options on other dimensions (Mellers & Biagini, 1994), or to seek more information to find differences between options (Bockenholt et al., 1991).

It is also possible that the emphasis on personal agency associated with a choice mindset and its range of consequences could make individuals less susceptible to both manipulation and persuasion. This could have some good outcomes if individuals resist manipulation by advertisers coaxing them to buy junk food (Bryan, Yeager, & Hinojosa, 2019), or by paid influencers urging them to buy anything and everything. Yet it could also have detrimental consequences if individuals react negatively to policies aimed at increasing individual or societal welfare. In this sense, mindfulness about the sources of one's choices and how they are shaped can have both positive and negative outcomes for individuals and society. Specifying these consequences for a diverse array of sociocultural contexts is a promising future research agenda.

CHAPTER 2: THE SALIENCE OF CHOICE FUELS INDEPENDENCE: IMPLICATIONS FOR SELF-PERCEPTION, COGNITION, AND BEHAVIOR

ABSTRACT

People across the world are exposed to ideas of choice and have the opportunity to make choices more than ever before. The current research investigated an unexamined and potentially powerful consequence of this salience of choice—an awareness and experience of independence. Four studies (*N*=1,288) across three cultural contexts known to differ in both the salience of choice and the cultural emphasis on independence (the US, Singapore, and India) provided converging evidence of a link between the salience of choice and awareness and experience of independence. US Americans who recalled choices rather than actions rated themselves as physically stronger (Study 1). Conceptually replicating this finding, Study 2 found that recalling choices led Singaporean students to represent themselves as larger than their peers when drawing their social network. In a word-nonword lexical decision task (Study 3), Singaporean students who recalled choices rather than actions were quicker at identifying independence-related words, but not neutral words or interdependence-related words. US Americans, Singaporeans, and Indians all indicated that when working in an organization that emphasized choice, they would be more likely to express their opinions. However, only US Americans and Singaporeans reported that they would prefer to work in such an organization (Studies 4a and 4b). Across a variety of tasks and operationalizations of choice, the findings suggest that salience of choice may drive an awareness and experience of independence even in contexts where, unlike the US, independence has not been a dominant ethos. Choice thus may be an unmarked mechanism of cultural change and of growing global individualism.

Keywords: choice; independence; culture; employee voice

INTRODUCTION

People in middle-class contexts around the world make countless choices throughout the day—eggs, oatmeal, or rice for breakfast; blue or white shirt; coffee, tea or flavored water at breaktime; which emails require a quick reply; what social media to check; when to return home in the evening; what to buy from the supermarket, etc. Most of these everyday choices seem mundane, trivial, and of little consequence. Yet I propose that a choice, even a simple one without much deliberation or intention is a complex act with a wide range of behavioral consequences. Psychologists have examined multiple motivational consequences of choice (Patall, Cooper & Robinson, 2008). This literature has nearly exclusively defined choice in terms of the number of options available. People are healthier, happier, and more motivated when they have more options (Langer & Rodin, 1976; Schultz & Pomerantz, 1976; Zuckerman, Porac, Lathin & Deci, 1978), but having too many options can sometimes be demotivating and stressful (Iyengar & Lepper, 2000; Schwartz, 2000; Schwartz, 2004).

Making choices allows people to express their preferences, influence their environments, and individuate themselves (Bruner, 1990; Stephens, Markus, & Townsend, 2007). For example, by choosing what to buy at a supermarket, choosers express and reinforce their personal preference for various consumer products, shape the consumer goods that are present in their homes and that are stocked in the supermarket, and reinforce their sense of self as people with preferences. By choosing which emails to reply to and which to ignore, choosers express their priorities and goals. I submit that these effects of choice might not be contingent on making actual choices—the mere exposure to the idea of choice, or in other words, the salience of choice, can potentially activate these psychological processes.

Given that expressing one's personal preferences, values, beliefs, and goals, and influencing the environment are both central features of independence (Markus & Kitayama, 1991; Markus & Kitayama, 2003a), the current research tests whether the psychological

salience of choice fuels a general awareness and experience of the self as independent, and leads to behaviors informed by this sense of independence. More generally, I ask whether choice—a phenomenon that increasingly underpins everyday life in all domains—is an increasingly salient but unmarked feature of the environment, one that fuels independent self-perception, cognition, and behavior, even in settings where independence has not historically been the dominant ethos.

The link between the salience of choice and awareness and experience of independence has been assumed as the underlying mechanism in recent research. For example, when the idea of choice was made salient, people were more likely to oppose policies aimed at increasing societal welfare by restricting individuals' freedom (e.g., banning violent video games; Savani, Stephens, & Markus, 2011), and were less concerned about wealth inequality (Savani & Rattan, 2012). Further, when the idea of choice was made salient, people were more likely to engage in victim blaming, and had less empathy for a poor child living in under-resourced circumstances (Savani, Stephens, & Markus, 2011). Researchers cited a heightened focus on independence as the underlying mechanism. The salience of choice also leads people to think in a more analytic manner (Savani, Stephens, & Markus, 2017), a cognitive style that has been associated with more independent cultural contexts (Talhelm et al., 2014; Varnum, Grossmann, Kitayama, & Nisbett, 2010). As such, in many of these studies, the underlying mechanism explaining the effect of choice is assumed to be a sense of independence (see Madan et al., 2020 for an overview). Yet none of the studies directly assessed this mechanism. The goal of the current research is to investigate the often-assumed link between the salience of choice and an awareness and experience of independence.

Specifically, I hypothesized that if choice is a means for expressing an independent self, then the salience of choice would amplify the importance of the self in people's minds,

thereby leading them to have more elaborated mental representations of the self than of others. Further, if choice is a means for expressing an independent self, then when choice is made salient, concepts associated with independence (e.g., myself, individual) would be more accessible in people's minds. Finally, these cognitive effects of the salience of choice might also translate into greater feelings of independent agency, such that people feel that their self is stronger and more influential. Such an increased sense of strength and agency can allow people to exercise their voice, and even motivate them to take action. Figure 1 illustrates this conceptual model.

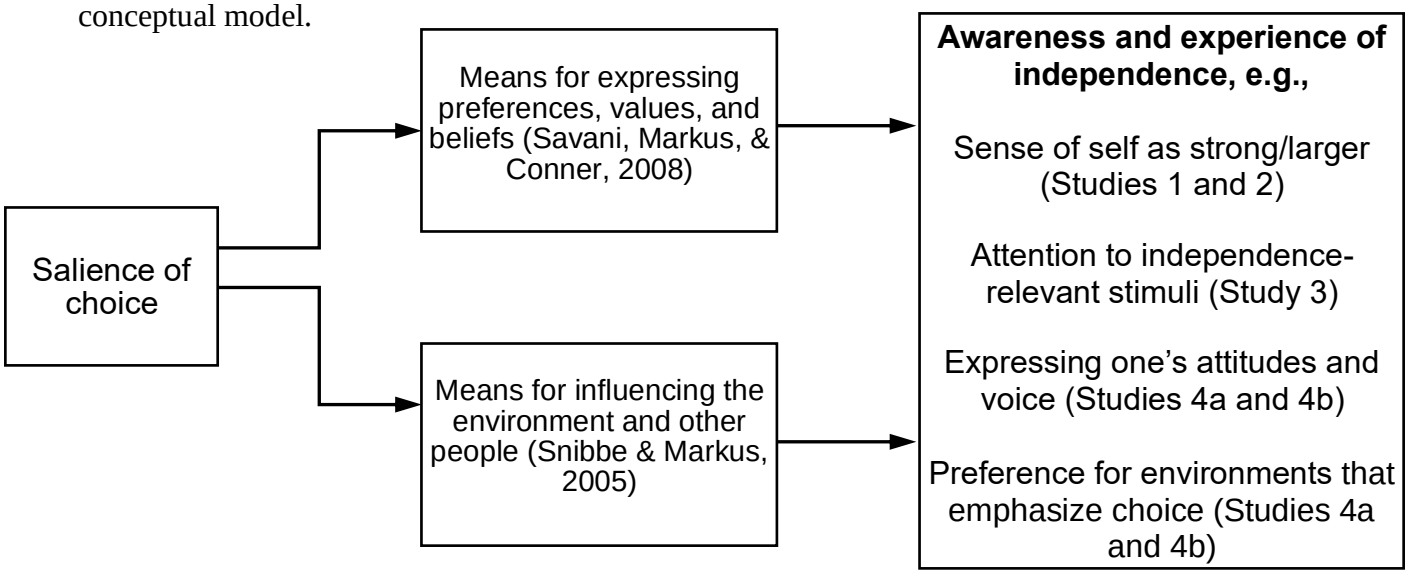

Figure 1. Conceptual model of salience of choice and awareness and experience of independence.

Earlier research on choice assumed that the effects of choice are culture-general (Zuckerman, Porac & Lathin, 1978), but more recent research has documented that some of the motivational effects of choice do not generalize across cultures (Iyengar & Lepper, 1999; Tripathi, Cervone, & Savani, 2018), and that the practice, meaning and function of choice varies by sociocultural context (Savani, Markus, & Conner, 2008; Savani et al., 2010). I thus examine the link between the salience of choice and various manifestations of independence across diverse cultural contexts—the US, Singapore, and India. In particular, US contexts

emphasize both the value of choice and the practice of choice (Savani, Stephens, & Markus, 2011; Savani & Rattan, 2012; Savani, Stephens, & Markus, 2017). Grocery aisles in the US overflow with hundreds of varieties of cookies and chips, cafes offering several hundred permutations of drinks, and retirement plan options run into the thousands (Schwartz, 2000, 2004). Choice makes people happier, more motivated, and more productive (Patall et al., 2008). Expressing one's thoughts and feelings through choices is a core part of the American identity, and thus integral to life satisfaction and well-being (Diener & Diener, 2009). Choice is an undeniably sacred concept in the US, and the US is often called the republic of choice (Markus & Schwartz, 2010).

Singapore offers a pointed comparison to the US. Multiple cross-cultural comparisons categorize the US as a more individualistic country but Singapore as a more collectivistic country (Hofstede, Triandis, Schwartz). However, Singapore affords similar opportunities for the practice of choice as the US, as shopping and consumerism are staple activities of everyday life in Singapore (Chua, 2003). This is not surprising, given that Singapore has higher GDP per capita than the US (World Bank, 2019). The idea of choice is possibly less important in Singapore than in the US as Singapore's official "national values" emphasize duty and harmony more than freedom and choice (National Integration Council, 2019). However, some indirect evidence suggests that personal choice might be similarly important in the US and Singapore—in both these countries, people's satisfaction with the self predicted their life satisfaction (Diener & Diener, 2009). Thus, whether Singaporean contexts differ from US American contexts in the meaning and significance of choice remains an unanswered question.

India offers a pointed comparison to both the US and Singapore. Cross-cultural comparisons categorize India as a more collectivistic country, similar to Singapore (Hofstede, Triandis, Schwartz). However, although consumer choice has increased dramatically in India

in the last few decades, it is likely that there are significantly fewer opportunities to exercise choice in India than in the US or Singapore (Kotwal, Ramaswami, & Wadhwa, 2011). Further, the meaning of choice differs across the US and India. For example, Indians are less likely to choose according to their personal preferences, less motivated to express their preferences in their choices, less likely to construe their actions as choices, less threatened by a lack of choice than US Americans, and less motivated by the provision of choice (Savani, Markus, & Conner, 2008; Savani et al., 2010; Tripathi, Cervone, & Savani, 2019). Further, unlike in the US and Singapore, in India, people's satisfaction with the self did not predict their life satisfaction (Diener & Diener, 2009). Instead, choice in India is often conceptualized as a means to help people meet the requirements of duty and interpersonal responsibility (Miller, Bersoff, & Harwood, 1990; Savani et al., 2011, 2012). Thus, both the meaning of choice and the practice of choice are likely different in India compared to the US and Singapore.

Thus, I tested whether the relationship between salience of choice and awareness and experience of independence holds across three cultural contexts varying in their dominant cultural values (US: independence; Singapore and India: interdependence), their practice of choice (US and Singapore: higher; India: lower), and the meaning ascribed to choice (US: means of self-expression; India: means to fulfill duty; Singapore: undetermined). I sought to test whether the salience of choice can fuel an awareness and experience of independence even in contexts in which neither choice nor independence are elaborated and revered in cultural ideas and practices. Further, I also tested whether the importance and value ascribed to choice varies across these three contexts.

I conducted four studies to examine the hypothesis that the salience of choice is associated with awareness and experience of independence. Study 1 tested whether increasing the salience of choice leads Americans to engage in symbolic self-inflation, i.e., to

perceive themselves to be physically stronger. Study 2 (pre-registered) tested whether this finding conceptually replicates in Singapore, that is, whether increasing the salience of choice would lead Singaporeans to represent themselves as larger than their friends when drawing a diagram of their social network. Study 3 assessed whether increasing the salience of choice shifts Singaporeans' attention to stimuli related to independence. Specifically, I tested whether participants who recalled choices rather than actions would be faster at detecting independence-related words (but not interdependence-related words or neutral words) in a word-nonword lexical decision task. Studies 4a and 4b (pre-registered) tested a downstream consequence of the salience of choice on experience of independence across the three cultures. Specifically, I assessed whether people in the US, Singapore, and India would be more likely to engage in employee voice (i.e., express opinions, attempt to create change) in an organization that emphasized choice. I also assessed whether people in the three cultures would prefer an organization emphasizing choice over one emphasizing the lack of choice.

I obtained informed consent from all participants. The Institutional Review Board of Nanyang Technological University (protocol IRB-2016-05-019) approved this research.

ARCHIVAL ANALYSIS

In a preliminary analysis, I conceptually assessed whether the salience of choice and the salience of independence in society are correlated over time (Figure 2). I did this by analyzing the correlation between the frequency of choice-related words and that of independence-related words in the 2012 Google Ngram database, a corpus of fiction and non-fiction literature over the past 100 years. I found a significant positive bivariate correlation between the usage of choice-related words (e.g., choice, option) and independence-related words (e.g., achieve, personal) in English fiction and non-fiction literature between the years 1900-2000 ($r = .70$, $p < 0.001$). I also observed a significant negative bivariate correlation between the usage of choice-related words and interdependent-related words (e.g., harmony,

together) in the same time period (r = -.88, p < .001). These findings suggest the growing salience of independence relative to interdependence, and the increasing salience of the concept of choice that accompanies these two trends in English-language literature. See Appendix A for methodology and additional analyses.

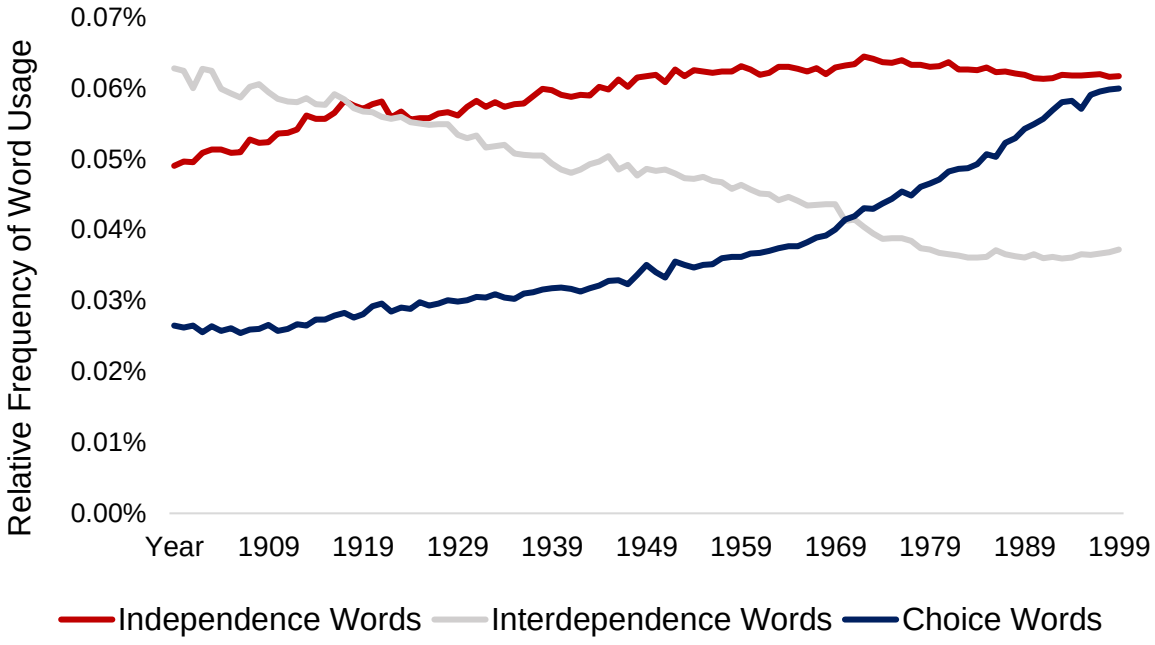

Figure 2. Choice, independence, and interdependence word usage in American fiction and non-fiction books for year 1900-2000.

STUDY 1: STRENGTH

Study 1 sought to experimentally test whether increasing the salience of choice would make people feel more independent. Recent research has found that the idea of independence makes Americans feel strong (Hamedani, Markus, & Fu, 2013), so I tested whether increasing the salience of choice would make Americans feel stronger. Self-perceived strength can be viewed as an indicator of self-inflation, the idea that the self is good, big, and strong, which are hallmarks of independence (Kitayama, Sevincer, Karasawa, & Uskul, 2009).

Method

As this study was conducted after Study 2, the sample size was determined by a power analysis using the effect size from Study 2: $d = .35$. I conducted a power analysis using the G*Power software (Faul, Erdfelder, Lang & Buchner, 2007) for a *t*-test for differences between two independent groups, $\alpha = .05$ (two-tailed), power = 80%. This analysis indicated that I would need to recruit a minimum of 260 participants. I decided on a larger sample size of 400 participants and posted the study on Amazon's Mechanical Turk seeking 400 participants. In response, a total of 463 participants completed the study (258 women, 151 men, 3 other gender, 51 unreported; mean age 35.8 years; 297 European Americans, 36 African Americans, 15 Latin Americans, 6 Native American, 20 Asian Americans, 11 other races, 25 multiracial, 53 unreported races).

Participants were randomly assigned to either the *choice condition* or the *control condition.* Specifically, participants in the choice condition were asked to describe *three choices they made* the previous morning, afternoon, evening and night, whereas participants in the control condition were asked to describe *three things they did* in the same periods (adapted from Savani & Rattan, 2012). I used this experimental manipulation because it produces similar results to a manipulation in which people are asked to make a choice vs. not make a choice (cf. Savani & Rattan, 2012; Savani, Stephens, & Markus, 2017), but does not involve associated confounds (e.g., people have to exert more cognitive effort to choose one of many options than to simply engage in an action as per the experimenter's choice). As such, this manipulation likely activates the cognitive processes associated with making a choice, the idea that the respondent is an individual who makes choices, and the concept of choice in general.

Next, I asked participants three questions about their physical strength ("How muscular are you?", "How physically strong are you?", and "How well-built are you?") on a 5-point

scale (ranging from *I'm not very muscular* to *I'm especially muscular*). The three items had high reliability ($\alpha = .86$) and were thus averaged to create a measure of perceived strength.

Results

In the choice condition, participants wrote about the choices they made the previous day (e.g., "I chose to wake up early yesterday", "I chose to eat instant noodles instead of going out to eat" and "I chose to wake up on the second alarm and move on with my day"). On the other hand, participants in the control condition wrote what they did the previous day (e.g., "I ate breakfast", "I went shopping", and "I went to the gym"). As the dependent variable was not normally distributed (skewness = 1.01, kurtosis = 4.37, Kolmogorov-Smirnov $D(463) = 0.169$, $p < 0.001$), I analyzed the data using the Wilcoxon Mann-Whitney test, which does not make any assumptions about the distribution of the dependent variable. As predicted, I found that participants in the choice condition, $M = 2.07$, 95% CI [1.97, 2.18], SD = .78, were likely to view themselves as physically stronger than those in the control condition, $M = 1.93$, 95% CI [1.83, 2.03], SD = .78, $z = -2.34$, $p = .020$, Cohen's $d = .18$. The effect size was similar for men and women (Cohen's $d = .15$ and .16, respectively).

Discussion

I found that increasing the salience of choice heightened peoples' experience of independence, and specifically, of self-inflation. People who recalled their past choices subsequently reported being more muscular, physically strong, and well-built compared to those who recalled their past actions.

STUDY 2: SELF INFLATION

This study aimed to conceptually replicate and extend the findings of Study 1. Specifically, instead of using a self-reported measure of self-inflation, I used a more indirect method to assess symbolic self-inflation. Specifically, past research has found that when people draw a diagram of their social network, North Americans represent themselves as

larger than their friends but Japanese represent themselves as about the same size as their friends (Kitayama et al., 2009). I hypothesized that if salience of choice leads people to perceive themselves as more independent, it would increase the gap between the size of the self and the size of others. Further, I tested whether the relationship between salience of choice and experience of independence would hold in Singapore.

Method

The hypotheses, power analysis, sample size, participant inclusion criteria, and methods for this study were pre-registered (https://osf.io/ena93/register/5730e99a9ad5a102c5745a8a). I conducted a pilot study with 22 undergraduate students using identical procedures as in the main study, which found an effect in the predicted direction with Cohen's d = .42. I conducted a power analysis using the G*Power software (Faul et al., 2007) for a *t*-test for differences between two independent groups, and entered the following values: d = .42, α = .05 (one-tailed, given pre-registered directional hypothesis), power = 80%. This analysis indicated that I would need to recruit a minimum of 142 participants. To ensure sufficient power, I decided on a sample size of 160. A study seeking 160 participants was conducted with the university participant pool in return for course credit. In response, 161 participants completed the study (81 women, 56 men, 24 unreported; mean age 20.33 years; 87 East Asian, 46 Southeast Asian, 1 South Asian, 9 other ethnicity, 18 unreported).

I used the same experimental manipulation as in Study 1 to activate the salience of choice. Participants in the choice condition were asked to describe *three choices they made* yesterday morning, afternoon, evening and night, whereas participants in the control condition were asked to describe *three things they did* in the same time periods.

Following the experimental manipulation, participants were given a sociogram task (Duffy, Uchida, & Kitayama, 2008). Participants were instructed: "Start by putting yourself in an oval on the sheet of paper provided. Next, put your friends in ovals around you. If your

friends are friends with each other, draw a line to connect their ovals. You have 5 minutes to create your sociogram on the sheet of paper lying on the table. You can make as complex a sociogram as you want." Participants were then given five minutes to complete the task, and a countdown timer on the screen displayed the remaining time.

After five minutes, participants were instructed: "In the room, there is a ruler located under the keyboard. Please use this ruler to measure the ovals that you have drawn. For each oval, measure the LONGEST diameter then record the length in centimeters (cm) on the following page. Please be accurate to one decimal place. In the example below, you would record '5.5'." To avoid ambiguity in the interpretation of the instructions, the page included an example image of a ruler and an oval, explicitly demonstrating how to measure each oval. Participants were asked to measure and report the diameter of the self-oval first. Next, participants were asked to label the ovals representing their friends (starting from 1, 2, 3, ...), measure the longest diameter of each oval, and enter it on the screen in the order in which they had labeled the ovals.

Results

There was no difference in the number of friends that participants drew in their social network across the control condition, M = 14.95, 95% CI [13.55,16.34], SD = 6.30, and the choice condition, M = 16.26, 95% CI [14.81,17.71], SD = 6.58, $t(160) = -1.29$, $p = .198$, Cohen's $d = .203$. Additionally, there was no difference in the network density (calculated as the number of connections existing in the network divided by the total possible number of connections) that participants drew across the control condition, M = .36, 95% CI [.29, .43], SD = .32, and the choice condition, M = .33, 95% CI [.28, .38], SD = .23, $t(149) = .704$, $p = .48$, Cohen's $d = .115$.

Following Kitayama et al. (2009), our dependent measure was the diameter of self-oval compared to the average diameter of the other-ovals. The diameter of the self-oval was

directly inputted by the participant (one value per participant), whereas the average diameter of the other-ovals was computed by taking the mean value of all other-ovals (ranging from three to thirty per participant), see Figure 3. Participants in the choice condition drew a larger self-oval, *M* = 2.81 cm, 95%CI [2.52, 3.10], SD = 1.33, than other-ovals, *M* = 2.36 cm, 95%CI [2.16, 2.56], SD = 0.91, *t*(80) = 3.55, *p* < .001, Cohen's *d* = .395. In the control condition, there was no significant difference between the self-oval (*M* = 2.55 cm, 95%CI [2.30, 2.80], *SD* = 1.13) and other-oval diameter, *M* = 2.45 cm, 95%CI [2.32, 2.60], SD = 0.64, *t*(79) = 0.94, *p* = .35, Cohen's *d* = .102.

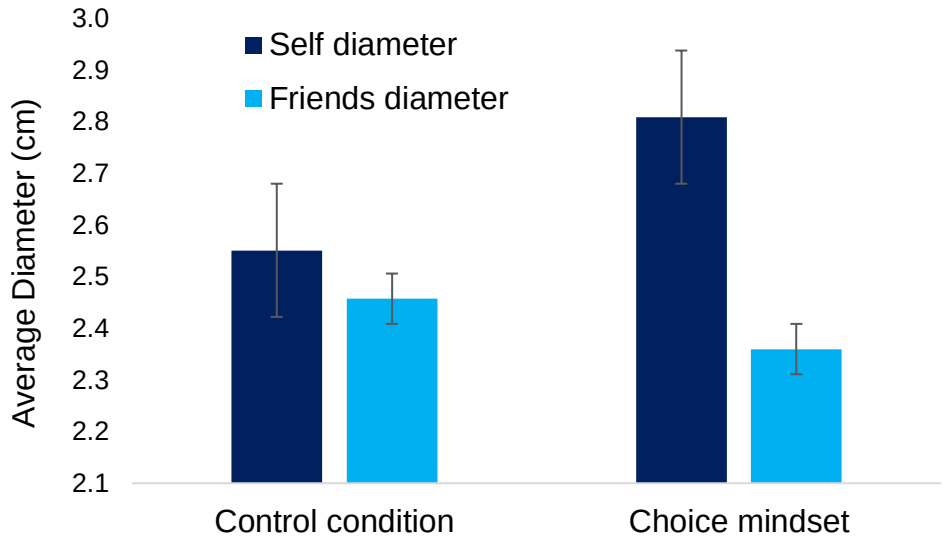

Figure 3. Sociogram task diameters for self- and other-ovals by condition (study 2**).**

Following pre-registered analyses, for each participant, I computed the difference between the size of the self-oval and the average size of the other-ovals. I found that this difference was significantly larger in the choice condition, *M* = .45 cm, 95%CI [0.19,0.70], SD = 1.14, than in the control condition, *M* = .09 cm, 95%CI [-0.10,0.29], SD = 0.88, *t*(159) = -2.22, *p* = .014 (one-tailed, given pre-registered directional hypothesis), Cohen's *d* = .35.

Discussion

The pre-registered Study 2 conceptually replicated the findings of Study 1 using a different dependent measure. Specifically, I found that people who recalled past choices were

more likely to engage in subjective self-inflation—representing the self as larger than others—a key indicator of independence (Kitayama et al., 2009). The findings suggest that the salience of choice leads people to experience themselves as more independent, and consequently, bigger than their peers. I obtained this finding in Singapore, a more interdependent cultural context than the US (Soh & Leong, 2002), although one where the practice of choice is an integral part of everyday life (Chua, 2003).

STUDY 3: ATTENTION TO INDEPENDENCE-RELATED STIMULI

Study 3 sought to extend the findings of Studies 1 and 2 by testing whether the salience of choice not only makes people experience and represent themselves as more independent but also directs their attention to independence-related concepts. Specifically, I tested whether when the idea of choice is salient, words related to independence are automatically primed in people's minds. I used a lexical decision task (Meyer & Schvaneveldt, 1971) in this study, in which people have to detect whether a given string is a word or a non-word. If a given concept is salient in people's minds, then people are typically faster in judging that a word related to the salient concept is in fact a word (Baldwin et al., 1993). To test whether the salience of choice particularly activates the concept of independence, I also presented participants with words related to interdependence, along with neutral words. I hypothesized that when choice is salient, people will be faster at accurately detecting independence-related words but not interdependence-related words or neutral words. I once again sampled participants in Singapore, which is a predominantly English speaking nation.

Method

Following past research on the effects of activating the salience of choice (Savani, Stephens, & Markus, 2011; Savani & Rattan, 2012), I assumed an effect size of Cohen's d = .40. A power analysis indicated that I would need a sample size of 100 to detect an effect of this size with α = .05 (two-tailed) and 80% power. Thus, I posted a study for 100 participants

at a large university in Singapore. Three participants who registered did not show up for the study, resulting in a final sample of 97 undergraduates (40 men; 57 women; mean age 22.08 years; 92 Chinese, 1 Malay, 1 Eurasian, 3 others)

All participants completed the task individually, in a quiet room, without any distractions. The practice trials were not included in the analysis. I used the same experimental manipulation as in Studies 1 and 2 to vary the salience of choice. Participants in the choice condition were asked to describe *three choices they made* yesterday morning, afternoon, evening and night, whereas participants in the control condition were asked to describe *three things they did* in the same time periods.

To measure the accessibility of independence-related concepts, participants were presented with a word-nonword lexical decision task. Participants were presented with 80 strings of letters, including 10 independence-related words (e.g., myself, individual), 10 interdependence-related words (e.g., family, connected), 20 neutral words (e.g., record, television), and 40 non-words (e.g., fsleym, yfimla). The non-words were generated by scrambling the letters included in each of the 40 words. The words used in our pilot Google Ngram analysis (Figure 2) were formal words associated with independence and interdependence that are often used to define these terms. In the present study I used more colloquial words for independence and interdependence that come up in everyday interactions. I reviewed key literature on interdependence and independence (Cross, Hardin, & Gercek-Swing, 2011; Hamedani, Markus, & Fu, 2013; Kühnen & Oyserman, 2002; Markus & Kitayama, 1991) and generated lists of commonly used words that are associated with these concepts (e.g., together, share, single, autonomy; see Appendix B).

The task was programmed using Inquisit© software. To familiarize participants with the task, I included 10 practice trials (consisting of 5 neutral words and 5 non-words). Next, the 80 test trials were presented one at a time in random order. The strings were displayed in

black color font on a white background in the middle of the screen. Each string was displayed for 250 milliseconds, followed by a mask—a string of X's of the same length as the string used in that trial. As is typical with lexical decision tasks, this was done to ensure that an afterimage of the string did not remain active in the periphery of the visual system (Granqvist, Mikulincer, Gewirtz, & Shaver, 2012). Participants were instructed to press the 'I' key if they saw a word and the 'E' key if they saw a nonword. The dependent variable was participants' reaction time to accurately detect whether the string was a word or a non-word, with faster reaction times indicating greater accessibility of the associated concept.

Results

In the 80 test trials, participants' average accuracy was 84%. For all trials on which participants identified the word or non-word correctly, I used their cleaned reaction time as the dependent measure. Following standard data cleaning procedures for response times (Whelan, 2008; Willemsen & Johnson, 2011), I dropped reaction times that were 100 milliseconds or less, or three standard deviations or more above the mean. I then log transformed the response times, which reduced skewness from 3.98 to -1.49 and kurtosis from 43.73 to 9.95, thus bringing the distribution of the data closer to the normal distribution.

I analyzed the data using a hierarchical linear model (HLM), treating the 80 trials as nested within participants. Log transformed reaction time was our trial-level dependent variable. I further included two trial-level dummy variables, one indicating whether the trial contained an independence-related word, and another indicating whether the trial contained an interdependence-related word. Neutral words were treated as the dropped baseline condition. I had one participant-level predictor: experimental condition (control = 0, choice = 1). I also included a cross-level interaction between the experimental condition and the *independence dummy*, and another cross-level interaction between the experimental condition and the *interdependence dummy*. The slope of the key predictor—the *independence dummy*

was allowed to vary across participants, and covariance between participants' slope and intercept was estimated. A model with robust standard errors was used.

The simple effect of type of word was not significant for either independence-related words, *B* = .012, *95% CI* [-.0101, .035], *SE* = .011, *z* = 1.080, *p* = .28, or interdependence-related words, *B* = -.012, *95% CI* [-.031,.0074], *SE* = .0099, *z* = -1.21, *p* = .23, indicating that on average, participants took a similar amount of time to detect independence-related, interdependence-related, and neutral words. The simple effect of experimental condition was nonsignificant, *B* =.0601, *95% CI* [-.049, .17], *SE* = .055, *z* = 1.080, *p* = .28, indicating that participants in the choice and control conditions were equally fast in detecting the neutral words. The interaction between condition and interdependence-related words was also nonsignificant, *B* = -.021, *95% CI* [-.061, .019], *SE* = .0203, *z* = -1.05, *p* = .29. However, as predicted, the interaction between condition and independence related words was significant, *B* = -.040, *95% CI* [-.077, -.0029], *SE* = .019, *z* = -2.11, *p* = .035. The negative sign on the Beta coefficient indicates that participants in the choice condition were faster in correctly identifying independence-related words than participants in the control condition (see Figure 4).

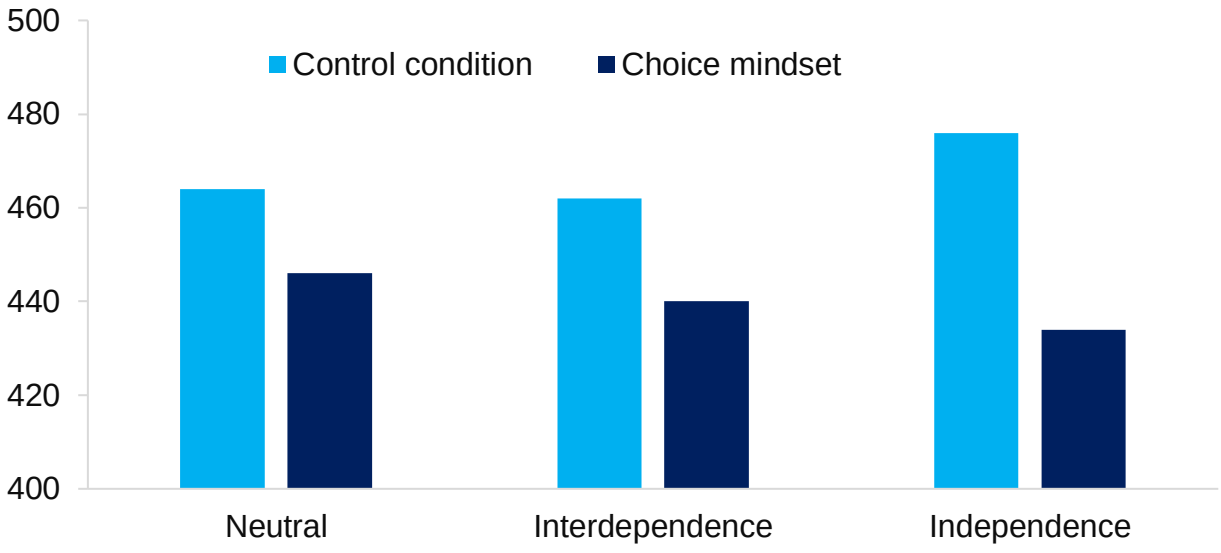

Figure 4. Lexical decision task reaction time by condition (study 3).

To further examine the interaction between condition and independence related words, I conducted separate HLMs within each condition. In the control condition, participants' reaction times were no different across the independence-related words and neutral words, *B* = .014, *95% CI* [-.0081, .037], *SE* = .011, *z* = 1.26, *p* = .21. However, in the choice condition, participants' reaction times were significantly faster for independence-related words compared to neutral words, *B* = -.034, *95% CI* [-.066, -.0011], *SE* = .17, *z* = -2.03, *p* = .043.

In additional analyses, to test whether the experimental condition influenced participants' accuracy for the different types of words, I ran a hierarchical logistic model paralleling the above hierarchical linear model, but while including all 40 trials involving words, and using participants' accuracy as the dependent variable (0 = incorrect, 1 = incorrect). I found that participants were significantly more accurate at detecting interdependence-related words compared to neutral words, *B* = .43, *95% CI* [.0401, .83], *SE* = .20, odds ratio = 1.54, *z* = 2.16, *p* = .031. None of the other effects were significant, *p*'s > .36.

Discussion

This study extended the findings of the previous studies by documenting that the salience of choice activates an awareness of independence in general. Participants in the choice condition detected independence-related words vs. neutral words more rapidly than participants in the control group, indicating that recalling past choices facilitated participants' detection of independence-related words. These findings provide additional support for the idea that the link between salience of choice and awareness of independence generalizes to Singapore.

STUDY 4A AND 4B: EMPLOYEE VOICE

Studies 1-3 found that the salience of choice activates an awareness and experience of independence across two contexts in which the practice of choice is widely prevalent—the

US and Singapore. Studies 4a and 4b were designed to accomplish multiple objectives. First, I sought to test whether salience of choice leads to more independent behavior. To that end, I investigated independent behavior in an organizational setting, manifested through greater employee voice. Second, I tested whether the choice-independence link generalizes to another interdependent cultural context but one in which choice is not as widely practiced as in the US and Singapore and in which choice has a different meaning than in US American contexts, i.e., India. Third, I tested whether these three cultural contexts (US, Singapore, and India) are similar or different both in the choice-independence link and in the extent to which people value choice.

The downstream consequence I focused on in this study was employee voice. Specifically, I tested whether participants are more willing to engage in employee voice in organizations that emphasize choice. *Employee voice* refers to employees' proactive communication of ideas, suggestions, or concerns, with the intent to bring about improvement or change (Van Dyne, Ang, & Botero, 2003). Employee voice is inherently an act of expression as it involves making suggestions or sharing ideas based on preferences, values and beliefs. Furthermore, employee voice is an act intended to influence others and the environment given that the intended outcome of employee voice is some sort of improvement or change. Despite the benefits of exercising voice, both for employees and for organizations, employees often refrain from voicing their ideas because they feel that they are weak (Detert & Treviño, 2010). Given that choice makes individuals feel stronger, I hypothesize that people will be more likely to engage in employee voice in organizations that emphasize choice.

I conducted two studies using identical methods but with different samples. Study 4a was conducted with working adults in the US and India with online samples, and Study 4b was conducted in Singapore with undergraduate students.

Method

The hypotheses, power analysis, sample size, participant inclusion criteria, and methods for this study were pre-registered on the Open Science Foundation, for US (https://osf.io/mk9h4/?view_only=b5d5796205c34340a730dd70fd5d4e69, Study 4a), India (https://osf.io/nfkzu/?view_only=f9a1f5a11c104a54b92cc8760b77be52, Study 4a), and Singapore (https://osf.io/g2ujw?view_only=1c5e1db9734c440294b1b5d8e8191025, Study 4b). As I was using a within-participant design for the first time, I decided on a sample size of 200 participants in each country, which would give us 80% power to detect a small effect size, Cohen's d = .20.

For Study 4a, I sought 200 US residents and 200 India residents on Amazon's Mechanical Turk. In the US, a total of 231 participants completed the study (127 women, 103 men, 1 other gender; mean age 39.3 years; 162 European Americans, 18 African Americans, 9 Latin Americans, 8 Native American, 14 Asian Americans, 10 other races, 10 multiracials). In India, a total of 209 participants completed the study (74 women, 134 men, 1 unreported; mean age 29.2 years; 151 South Asians, 38 other Asians, 1 African, 7 other races, 11 multiracials, and 1 unreported). For Study 4b, I posted a survey seeking 200 undergraduates at Nanyang Business School's subject pool. In response, 127 students completed the study within seven days (74 women, 53 men; mean age 23 years). Although I posted the study for final year students (which is typically year 3 or 4 of college, depending on the program), I had a few students from other years in the dataset (1 student in year 1; 1 student in year 2; 34 students in year 3; 85 students in year 4, 5 students in year 5; and 1 student in year 6). As I had not specified any exclusions related to school year in the pre-registration, I used responses from all participants.

Whereas Studies 1-3 used an experimental manipulation of choice that asked participants to recall either their past choices or their past actions, this study manipulated

choice by asking participants to read descriptions of companies that either emphasized choice or not. Specifically, I asked participants to assume the role of a job applicant and to read brochures for two companies that were recruiting new employees. One of the companies ("The Smith Group") emphasized the idea of choice, and the other company ("The Wilson Group") emphasized constraints (adapted from Kricheli-Katz, 2012; see Appendix C). For example, in the choice condition, the brochure said "Choice is important to each of us in our daily lives. Here at the Smith Group, we believe that choices we make help to define the type of lives we lead." In the constraints condition, the brochure said "Choice is a catchword in our liberal, individualistic society, but it is rarely a reality. Regardless of how much decision-making power people think they have, in many situations, the choices people have are very limited."

This was a within-participant design, so each participant was exposed to both the choice condition and the constraint condition. The order of the conditions was counterbalanced across participants.

After reading each company's brochure, participants responded to a 6-item employee voice measure (Van Dyne & LePine, 1998) (α's =.93-.96 across cultures and conditions). A sample item was "If you accepted a job with the [Smith] Group, how likely would you be to speak up in the department with ideas for new projects or changes in procedures?" After responding to both the choice condition and the constraint condition, participants were asked to indicate how likely they would be to accept a job at each company (e.g., "How likely would you be to accept a job at the [Smith] Group?"). The employee voice measure, and the likelihood to accept a job questions were both rated on a 7-point scale ranging from *not at all likely* to *extremely likely*.

Study 4a Results

I first submitted participants' employee voice ratings to a repeated measures ANOVA with whether the company emphasized choice vs. constraints as a within-participant variable, and culture as a between-participant variable. I found a main effect of condition, $F(1,437) = 72.71$, $p < .001$, $\eta_p^2 = .14$, indicating that participants were more likely to exercise voice in the choice condition, $M = 5.52$, 95% CI [5.41, 5.63], SD = 1.17, than in the constraints condition, $M = 5.01$, 95% CI [4.87, 5.14], SD = 1.47. I also found a main effect of culture, $F(1,437) = 55.87$, $p < .001$, $\eta_p^2 = .11$, indicating that Indians were more likely to exercise voice, $M = 5.68$, 95% CI [5.53, 5.83], SD = 1.09, than Americans, $M = 4.88$, 95% CI [4.74, 5.03], SD = 1.12. I also found a significant interaction, $F(1,437) = 34.73$, $p < .001$, $\eta_p^2 = .07$ (see Figure 5).

To de-compose the interaction, I conducted independent samples *t*-tests within each culture. These separate analyses by culture represent our pre-registered analyses. In the US, participants in the choice condition, $M = 5.30$, 95% CI [5.15, 5.45], SD = 1.18, were more likely to engage in employee voice than those in the constraint condition, $M = 4.47$, 95% CI [4.28, 4.67], SD = 1.50, $t(230) = 8.25$, $p < .001$, Cohen's $d = .54$. Similarly, in India, participants in the choice condition, $M = 5.75$, 95% CI [5.60, 5.90], SD = 1.10, were more likely to engage in employee voice than those in the constraint condition, $M = 5.60$, 95% CI [5.44, 5.76], SD = 1.18, $t(207) = 3.21$, $p = .0016$, Cohen's $d = .22$. Thus, the interaction is driven by the fact that the effect size is about 2.5 times stronger in the US than in India.

Next, I submitted participants' rating of how likely they would be to accept a job at the company to a parallel repeated measures ANOVA. I found a main effect of choice, $F(1,436) = 68.35$, $p < .001$, $\eta_p^2 = .14$, indicating that participants were more likely to accept a job in the company that emphasized choice, $M = 5.53$, 95% CI [5.40, 5.67], SD = 1.44, rather than constraints, $M = 4.69$, 95% CI [4.51, 4.87], SD = 1.93. I also found a main effect of

culture, $F(1,436) = 114.46$, $p < .001$, $\eta_p^2 = .21$, indicating that Indians were more likely to accept a job, $M = 5.74$, 95% CI [5.59, 5.90], SD = 1.12, than Americans, $M = 4.54$, 95% CI [4.39, 4.70], SD = 1.22. I also found a significant interaction, $F(1,436) = 55.88$, $p < .001$, $\eta_p^2 = .11$ (see Figure 6).

To de-compose the interaction, I conducted independent samples *t*-tests within each culture. US American participants were more likely to accept a job in the company that emphasized choice, $M = 5.31$, 95% CI [5.11, 5.52], SD = 1.58, rather than constraints, $M = 3.77$, 95% CI [3.53, 4.02], SD = 1.90, $t(230) = 9.33$, $p < .001$, Cohen's d = .61. Importantly, in India, there was no significant difference in how likely participants were to accept a job in the organization that emphasized choice, $M = 5.78$, 95% CI [5.62, 5.95], SD = 1.22, versus constraints, $M = 5.71$, 95% CI [5.52, 5.90], $SD = 1.39$, $t(206) = .827$, $p = .41$, Cohen's $d = .06$.

Study 4b Results

I conducted a repeated measures ANOVA with participants' employee voice ratings as the dependent variable and whether the company emphasized choice vs. constraints as a within-participant predictor variable. I found a significant difference by condition, such that participants were more likely to exercise voice in the choice condition, $M = 5.20$, 95% CI [5.031, 5.37], SD = .98, than in the constraints condition, $M = 4.02$, 95% CI [3.80, 4.23], SD = 1.24, $t(127) = 9.13$, $p < .001$, Cohen's d = .81 (see Figure 5).

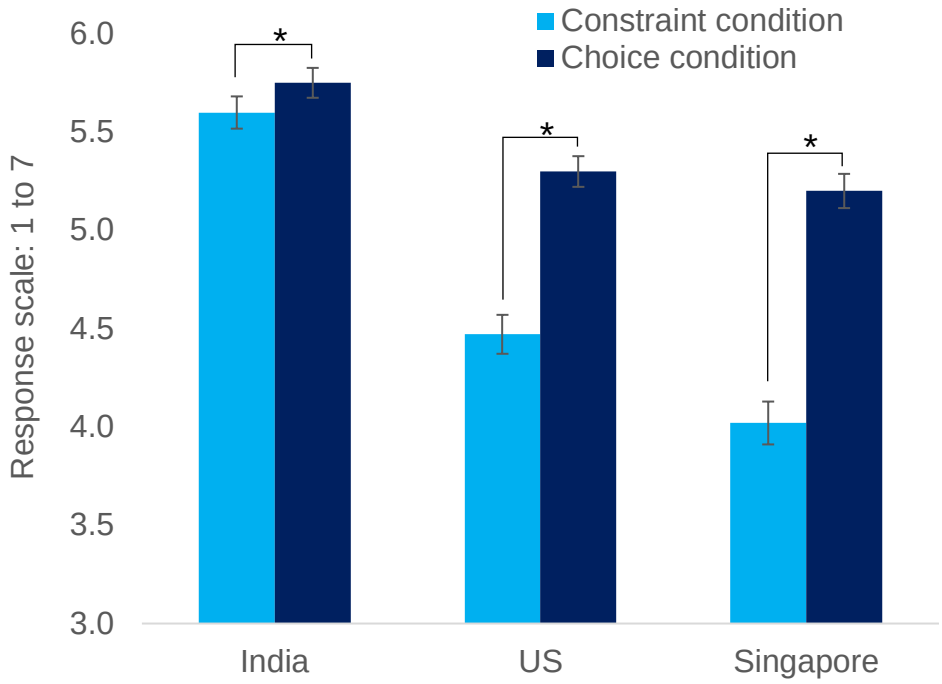

Figure 5. Participants' likelihood of engaging in employee voice at a company that emphasizes choice versus constraints across the three countries (study 4a and 4b). Error bars depict standard error of the means. ***p<.001

Further, I conducted a parallel repeated measures ANOVA with participants' responses to how likely they would be to accept a job at the company. I again found a significant difference by condition, such that participants were more willing to accept a job at the organization that emphasized choice, M = 5.31, 95% CI [5.10, 5.53], SD = 1.22, than the one that emphasized constraints, M = 3.69, 95% CI [3.43, 3.95], SD = 1.48, $t(127) = 8.59$, $p <$ .001, Cohen's d = .76 (see Figure 6).

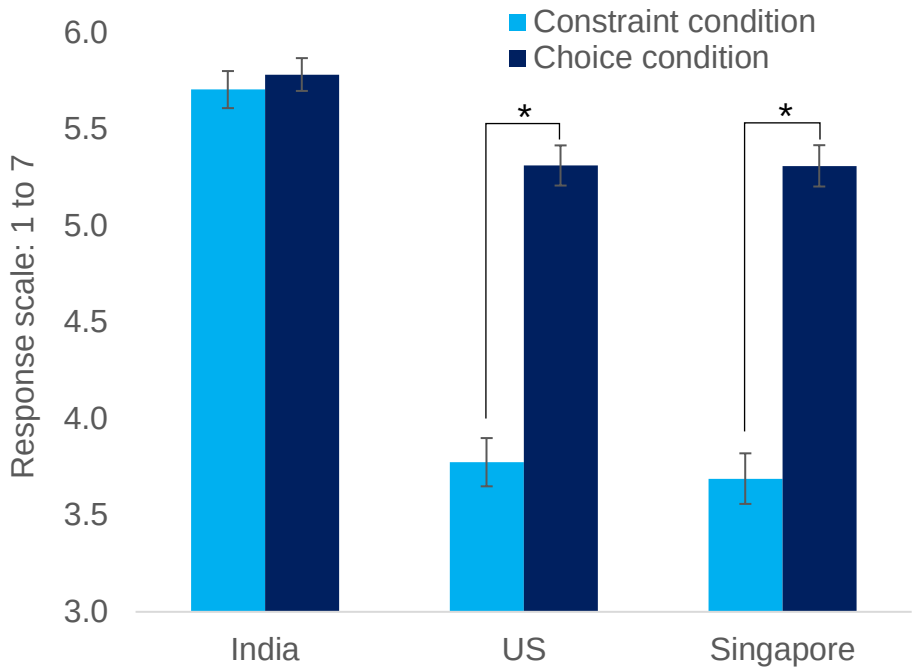

Figure 6. Participants' likelihood of accepting a job at a company that emphasizes choice versus constraints across the three countries (study 4a and 4b). Error bars depict standard error of the means. ***p<.001

Discussion

Studies 4a and 4b uncovered employee voice as a novel consequence of choice. Specifically, across the US, India, and Singapore, individuals were more willing to express employee voice in an organization that emphasized choice. However, the effect of choice was much larger in the societies in which the practice of choice is all pervasive (i.e., the US and Singapore) than in which it is less pervasive (i.e., India). More importantly, these studies found that although the consequences of choice (i.e., employee voice) are similar across cultures, there exist cultural differences in how attractive the idea of choice is: although American and Singaporean participants were more willing to accept a job in a company that emphasized choice than in one that did not, Indian participants did not prefer one company over the other. The findings suggest that the salience of choice leads to an awareness and experience of independence even in cultures in which the practice of choice is not as

prevalent and in which choice might have different meanings, but the effect is likely to be weaker in size in such cultures.

GENERAL DISCUSSION

Choice is the unmistakable signal of economic progress all over the world. Growing consumerism, coupled with the rise of social media, has afforded people the opportunity to make more choices than envisaged ever before, and research has begun to uncover the ways in which choice shapes our experience of the self. The manner in which people experience the self is an important predictor of cognition, emotion, motivation, and behavior (Markus & Kitayma, 1991; Markus, 1977). Thus, it is critical to understand how the salience of choice influences the experience of the self, and serves as an engine that drives patterns of both thoughts and behaviors. Taken together, the current findings suggest that choice shifts people's awareness and behavior in a more independent direction, i.e., leads them to perceive themselves as larger and stronger, focuses their attention on independence-related stimuli, and leads them to engage in actions informed by a focus on personal independence and autonomy. The present research found support for this relationship using diverse methods, including archival and experimental studies.

I used a variety of tasks that tap into independent agency without asking participants to consciously reflect on or assess their own sense of independence. The choice manipulations asked people to consciously think about choice (e.g., listing choices they made the previous day). The outcomes used a mix of implicit (e.g., size of ovals in a social network) and explicit (e.g., likelihood to voice opinions) methods. As such, a mix of conscious and nonconscious processes may be involved in the effect of choice on independence. Overall, my findings suggest that mere salience of choice leads to consequential differences in people's self-perception, cognition, and behavior. In other words, these effects were not contingent on people making actual choices. Just activating the idea of choice in peoples' minds, for

example asking people to recall choices (as opposed to actions) from the previous day, or envisioning a context that supports the idea of choice, was sufficient to result in greater awareness and expression of independent agency.

In my conceptual model, I highlight two processes associated with the effects of choice. First, choice allows people to express preferences, values, and beliefs. Second, choice offers a means for influencing the environment and other people. Some choices may be more strongly associated with one process over the other. For example, choices in a consumer setting, such as whether to buy a simple or elaborate t-shirt, are more likely associated with the process of expression. On the other hand, choices in an organization, such how much money to offer in a negotiation, are more likely associated with the process of influencing. Future research can examine the function of these mechanisms in different contexts and the extent to which these processes occur simultaneously or separately.

The relationship between choice and independence held across a number of different cultural contexts: the US, Singapore, and India. In particular, although Singapore is a more collectivistic country compared to the US that emphasizes duty and harmony (National Integration Council, 2019), I found that salience of choice reliably activates the concept of independence in Singapore, and further, that Singaporeans were as attracted to the idea of choice as Americans. Importantly, consumer choice is widely practiced in Singapore (Chua, 2003). This finding suggests that the practice of choice can engender the awareness and experience of independence even in collectivistic countries as long as people have frequent opportunities for practicing choice in their everyday life. Even if the cultural context emphasizes duty and harmony, personal choice stimulates individuals to express their preferences and influence the environment, and thereby affords a heightened sense of independence. Further, the findings from Singapore indicate that frequently practicing choice in everyday life might make people more attracted to the concept of choice.

Salience of choice increased the experience of independence even in India, although this effect was weaker than in the US and Singapore. This finding indicates that even in cultures where the practice of choice is not as prevalent, choice can activate a sense of independence, just not as strongly as in cultures where choice is highly prevalent. Importantly, unlike Americans and Singaporeans, Indians were not attracted to the idea of choice. This finding is consistent with the idea that the meaning of choice is different in India than in the US (Miller et al., 1990). As the Indian economy develops, the practice of choice in India is bound to become more and more prevalent.

Even within US American contexts, the effects of choice are not uniform. The US American pattern of choice-related behavior characterizes choosers who are college-educated and in well-resourced contexts, but is not common among choosers in poorly-resourced or high school educated contexts (Stephens, Markus, & Townsend, 2007; Snibbe & Markus, 2005). One potential explanation for these findings is that salience of choice is most likely to foster a sense of independence or independent agency only when choosers have the opportunity to choose among good alternatives, and when expressing one's preferences does not signal a lack of interdependence or disregard for the preferences of others. Although I did not intentionally sample individuals across different socioeconomic strata, I did collect measures of self-reported social class in a number of studies but not find that the relationship between salience of choice and independence varied by social class. Nevertheless, future research needs to examine this question more closely. Furthermore, I used an established manipulation, which referred to choices in the choice condition and constraints in the control condition (Kricheli-Katz, 2012, 2013). Future research can examine include a neutral control condition to examine how ideas of choice and constraints shift people's behaviors relative to the neutral control condition.

Although I found that the salience of choice fosters independence across different cultural contexts, how this independence is manifested likely varies by cultural context. For example, past research has found that in contexts in which choice is hyper-salient, encouraged, and culturally supported, such as middle-class US American contexts, we get one set of outcomes (e.g., strong reactance when choice is restricted; strong association between preferences and choices), but in contexts in which choice is only minimally supported, we obtain other outcomes (e.g., lack of reactance; weaker association between choices and preferences; Savani, Markus, & Conner, 2008; Snibbe & Markus, 2005). More generally, the current research underscores the importance of understanding the unintentional consequences of choice. Future research can investigate how these unintentional consequences moderate the well-documented positive and negative motivational effects of choice across cultural contexts.

The current research raises some important questions. For decades, researchers have highlighted a growing trend in individualism globally, with economic development (Inglehart & Oyserman, 2004) and socioeconomic factors (Grossmann & Varnum, 2015) cited as explanations for the growth. In the same time frame, choices in many domains of life have exploded exponentially (Schwartz, 2004). Is the global growth in both choice and individualism coincidental? One possible explanation is that global economic growth has allowed for the expansion of choice in cultures that could not previously afford choice, and that this growth in choice has provided people with a greater sense of independence as demonstrated in the present research. Choice therefore may be an unmarked engine of cultural change. Whereas the United States is a nation that was historically built upon the ideals of independence, it is possible that salience of choice may serve to perpetuate independence over time through the growth of consumer and other choices in countries like Singapore and India. If this is the case, we might consider other broad consequences of the

role of choice availability in driving cultural change. For example, when an economy is strong, an increase in resources may expand the availability of choice for people in middle and lower classes, potentially leading to a stronger sense of independence. Likewise, when an economy is not performing well, or in the face of threats, such as during a recession or a crisis, the availability of choices may contract, leaving people with less choices (e.g., employment) and leading to a weaker sense of independence, or perhaps even foster greater interdependence. Future research can investigate the role of choice (or lack of choice) resulting from economic conditions and the associated individual and societal consequences mediated through a stronger or weaker sense of independence.

Also, what are the individual and societal consequences of people who see themselves as strong and independent actors who can influence the world around them? On one hand, an enhanced sense of agency and independence may fuel people's determination to work toward their own goals, and therefore, improve individual achievements and well-being. Shifting people's self-representation in a more independent direction may lead to better outcomes, such as helping them negotiate better working conditions, retaliating against sexual harassment, and taking action against oppressive governments. On the other hand, an increased focus on personal independence may backfire when collective action is critical for the greater good, such as arresting climate change, restoring economic mobility, and integrating millions of migrants displaced by war and natural disasters. By focusing people on their personal independence, the salience of choice might reduce people's support for environmental policies (e.g., a gas tax) because such policies restrict individual freedom. Hence, while beneficial for the individual, the increased salience of choice may have adverse consequences for society. Research to date suggests that consequences associated with choice appear to manifest in the form of a greater awareness and experience of the self as independent, for better or worse. Given the proliferation of choice in our lives and its

potentially divergent consequences for the individual and the society, there is a pressing need for more research on the broad ramifications of choice.

The present research advances our understanding of how salience of choice shapes our experience of the self as independent actors, and proposes the idea that choice serves as an unmarked engine of a global individualism. This enhanced focus on the self, in turn leads to consequences such as engaging in employee voice at the workplace. Future research needs to examine downstream consequences of choice for personal decision making, societal outcomes, and policymaking.

This chapter highlights consequences of the choice mindset largely associated with perception and motivation. Earlier research found that choice is associated with analytic cognition (Savani et al., 2017), suggesting that choice may have cognitive consequences beyond attention. In the next chapter, I examine whether a choice mindset can lead to greater cognitive flexibility, and thus better decision making.

CHAPTER 3: CHOOSING TO CHANGE COURSE: A STRONGER BELIEF IN CHOICE LEADS TO FLEXIBILITY IN SWITCHING FROM A PREVIOUSLY COMMITTED TO (BUT SUBOPTIMAL) COURSE OF ACTION

ABSTRACT

Managers often need to abandon old strategies in the face of change and switch to new, more efficient strategies. Doing so requires cognitive flexibility to overcome the tendency to follow familiar or previously committed to strategies. Across four studies, I identify a novel antecedent of cognitive flexibility – a stronger belief in choice. Study 1 (*N*=217) found that participants reporting a stronger belief in choice were quicker to adapt to a changing sorting rule in a sorting task. Study 2 (*N*=258) found that participants reporting a stronger belief in choice were more likely to switch from a complex solution in earlier trials to a simple solution that was available in later trials in an algebra task. In a stock investment task, participants who were given feedback that highlighted their choices were quicker to switch to a better performing stock compared to participants given the same feedback but without emphasizing choice (Study 3; *N*=81). Study 4 (*N*=86) found that participants were less likely to continue to invest money in a profitless project when assuming the role of CEO of a company that believed strongly in choice as opposed to a company that believed strongly in constraints. The findings suggest that the idea of choice may provide people with the cognitive flexibility necessary to switch strategies depending on environmental conditions and demands.

Keywords: choice; cognitive flexibility; inflexible perseverance; decision making; problem solving; sunk-cost

INTRODUCTION

In stable environments, managers can commit to a strategy without having to constantly re-evaluate alternatives. For example, imagine that a CEO of an energy company decided ten years ago to invest all of the company's annual research and development funds to develop low-cost solar panels, and the company has been successful in a relatively stable market with low competition. But as the market grows and competition increases, what happens when the CEO learns one day that a competitor has developed a low-cost solar panel with technology beyond the capabilities of her own firm? If the manager is making decisions rationally, she would stop investing in developing low-cost solar panels and switch to another strategy, as further investment is unlikely to be profitable. As straightforward as this may seem, managers often persist with strategies that become profitless in the face of environmental changes. Thus, in environments that are constantly changing, managers must be able to adapt to the environment and switch between strategies quickly. This ability to quickly switch strategies is referred to as cognitive flexibility. In this research, I consider the role of choice as an individual-level predictor of cognitive flexibility.

Cognitive flexibility

Cognitive flexibility refers to the ability to change one's behavior when environmental conditions and demands change (Gelfo, 2019). It is one of the basic executive functions of the brain and is a precursor for higher-level executive functions, such as reasoning, problem-solving, and planning (Diamond, 2013). Executive functions refer to a set of "general purpose control processes that regulate one's thoughts and behaviors" (Miyake & Friedman, 2012, p. 8). There are three prominent executive functions: updating (e.g., remember the most recent three letters as new letters are presented), inhibition (when focusing on one side of the screen, report the object that appears briefly on the other side of the screen), and shifting (sort the card according to a changing sorting rule; see Miyake &

Friedman, 2012). I focus on the shifting executive function, given that this is most related to cognitive flexibility.

Most measures of cognitive flexibility involve a problem-solving task with multiple trials (Grant & Berg, 1948; Luchins & Luchins, 1950). In a forced-switch paradigm, there is only one correct answer and participants are prompted to switch solutions, whereas in an optional-switch paradigm, multiple solutions are correct but differ in their efficiency or their relative outcome (Watzek, Pope, & Brosnan, 2019). The correct solution in a forced-switch paradigm or the most efficient solution in an optional-switch paradigm changes at different intervals, and researchers measure how quickly participants switch to the correct or more efficient solution. For example, in the Wisconsin Card Sorting Task (Grant & Berg, 1948), participants are presented with a sequence of cards and are asked to sort each card according to a sorting rule (by color, by shape, or by number). Participants receive feedback on whether they sorted each new card accurately or not and need to deduce the rule from the feedback. After ten consecutive correct trials, the sorting rule changes and participants must infer the new sorting rule based on feedback provided. People with higher cognitive flexibility switch the new sorting rule more quickly.

Cognitive flexibility has been investigated in clinical psychology and neuropsychology as an index of prefrontal executive function (i.e., reasoning, problem solving, planning; see Leber, Turk-Browne, & Chun, 2008). Lower scores have been associated with prefrontal cortex dysfunction, schizophrenia, impaired working memory, and impaired attention shifting ability (for a review, see Nyhus, & Barceló 2009). One study found that people with eating disorders exhibited lower cognitive flexibility than those without eating disorders on the Wisconsin Card Sorting Task (Tchanturia et al., 2012). Beyond clinical psychology, organizational researchers have studied cognitive flexibility at the individual level (in organizational behavior) and at the firm level (in strategic

management) to understand why some managers and organizations persist with suboptimal strategies in the face of environmental change.

Cognitive flexibility in organizations

Decision making biases often prevent managers from making good decisions (see Bazerman & Moore, 2013). The sunk-cost bias – the tendency to persist with a course of action because of prior commitment – affects managers (Arkes & Blumer, 1985), and is closely related to cognitive flexibility (Emich & Pyone, 2018). Antecedents of the sunk-cost bias include individual factors such as age (Bruine de Bruin, Strough, & Parker, 2014), rumination about past negative events (Van Putten, Zeelenberg, & Van Dijk, 2010), and the need to rationalize previous behaviors or to psychologically defend oneself (Staw, 1976). Researchers have identified interventions that attenuate the sunk-cost bias. For example, participants who watched a happy video clip of a dancing hippo reported that they were less likely to pay an additional $195 for a membership at an inferior gym where they had paid a $100 non-refundable deposit instead of a gym with newer equipment and a $195 membership fee (Emich & Pyone, 2018, Study 4), suggesting that positive affect attenuates the sunk-cost bias. Further, participants who were asked to limit their temporal horizon by imagining that they had a critical illness were less likely to continue investing time or money in something that was not valuable to them, such as continuing to watch a boring movie (Strough, Schlosnagle, Karns, Lemaster, & Pichayayothin, 2014). The authors concluded that restricting participants to a short-term focus decreases the sunk-cost bias.

Researchers have also found that mindfulness through meditation can attenuate the sunk-cost bias and increase cognitive flexibility. Participants led through a focused-breathing exercise intended to induce mindfulness reported that they were more likely to buy a discounted $10,000 generic printer for their company that is 50% faster than a customized printer they decided to buy recently for $200,000 and cannot be sold (Hafenbrack, Kinias, &

Barsade, 2014, Study 2). Consistent with this finding, Moore and Malinowski (2009) found that participants in a meditation group reported more mindfulness and performed better on a Stroop test of cognitive flexibility. Finally, participants asked to spend five minutes writing about hopes and aspirations (i.e., promotion-focused condition) as opposed to their duties and obligations (i.e., prevention-focused condition) were more likely to report that they would switch investments from an underperforming division of the company, which they had previously invested in, to a better performing (Molden & Hui, 2011).

Cognitive flexibility is also closely related to the escalation of commitment bias, or the tendency to continue a course of action instead of switching, despite facing negative feedback about a previous decision (Staw, 1976). Researchers have identified interventions to reduce this bias. For example, Feldman and Wong (2018) found that participants asked to make a decision with de-escalation framed as an action (i.e., "the project will continue unless you take action") were less likely to escalate commitment to a profitless strategy than participants asked to make a decision with escalation framed as an action (i.e., "without your authorization the project will close down"). Also, groups of participants asked to form a collective intention of judging the project as neutral observers who are not responsible for earlier investment decisions were less likely to invest more money in the second and third phase of a three phase project after receiving negative feedback about the project (Wieber, Thürmer, & Gollwitzer, 2015, Study 1). Although escalation of commitment bias is well-established and occurs commonly (Hammond, Keeney, & Raiffa, 1998; Vermeulen & Sivanathan, 2017), the number of interventions to minimize escalation of commitment bias in managerial decision making is limited.

In strategic management, concepts such as path dependence, structural inertia, core rigidities, competency traps, organizational agility, and so on have been studied at the firm-level to understand how firms inflexibly persevere with a particular strategy in the face of

change (Jarzabkowski, 2004). For example, path dependence refers to "a rigidified, potentially inefficient action pattern built up by the unintended consequences of former decisions and positive feedback processes" (Sydow et al., 2009, p 696). Another example is organizational agility, referring to "the capacity to continuously adjust and adapt strategic direction in a core business to create value for a company" (Teece et al., 2016). Although traditionally conceptualized as a firm-level competence (Jarzabkowski, 2004), scholars have argued that the flexibility required for organizations to change when old strategies become inefficient comes from individuals (Marcel et al., 2011), leading to some empirical findings that shed light on the function of cognitive flexibility in organizations.

For example, Furr and colleagues (2012) studied firms in an industry in which multiple parallel technologies had been developed concurrently, with one sometimes leading the other, but no clear convergence towards a winning technology. They found that management teams comprised of CEOs and top managers who had prior experience outside the industry were more likely to make major technology changes (i.e., switch quickly between different technologies) compared to teams comprised of members who did not have experience in other industries. Further, managers with more cognitive flexibility displayed better aggregate performance on two different types of problem solving tasks, shedding light on cognitive flexibility as the "individual-level mechanism behind organizational adaptation" (Laureiro-Martínez and Busoni (2018, p.1031). These empirical findings support the idea that concepts in strategic management such as path dependence and competency traps may depend on cognitive processes at the individual and group level, and highlight the value of understanding individual-level cognitive processes to explain firm behavior and outcomes.

Despite the history of theorizing on cognitive flexibility in organizations, and interventions that attenuate the sunk-cost bias and escalation of commitment bias, our

understanding of how to increase cognitive flexibility at the individual-level is limited. In the present research, I identify one potential antecedent of cognitive flexibility – choice.

The role of a choice mindset

A choice mindset refers to a tendency to think about or construe behavior as a choice and is associated with stronger beliefs in one's ability to make choices. This construct is distinct from constructs such as a growth mindset and mindfulness. A growth mindset refers to people's belief that their basic qualities can be cultivated through effort (Dweck, 2008). Mindfulness refers broadly to "present-centered attention and awareness" (Good et al., 2016, p. 115). Both constructs differ conceptually from the choice mindset. A growth mindset emphasizes the connection between effort and basic qualities, and mindfulness emphasizes attention to internal or external stimuli, whereas a choice mindset refers to a tendency to construe actions as choices. Savani and colleagues (2010) found that even when people were induced to engage in an identical stream of behaviors (e.g., picking a pen, choosing where to sit, filling out a consent form), there was large variation in how many choices participants perceived themselves as making. This tendency to construe behaviors as choices can be experimentally manipulated and has been associated with a number of behaviorally significant outcomes. For example, participants asked to list three choices they made (as opposed to three things they did) the previous morning, afternoon, evening, and night reported being less disturbed by factual wealth inequality statistics in the US (Savani & Rattan, 2012; Experiment 1 and 2). Further, participants asked to watch a video of a man engaging in mundane actions in his apartment and press a button every time the man made a choice (as opposed to every time he touched an object) were less supportive of policies that benefited the collective (Savani, Stephens, & Markus, 2011), and were more likely to blame victims (e.g., who had been abused). In addition to experimental manipulations, Tan and

colleagues (2020, in preparation) recently developed a scale to measure choice mindset (e.g., "Even in the worst of situations, I have a choice").

Although no consensus exists on the immediate antecedents of cognitive flexibility, two requirements consistently appear in the literature on cognitive flexibility, both of which may be associated with peoples' belief in choice. Specifically, cognitive flexibility requires the ability to use controlled instead of automatic cognitive processing, and the ability to identify alternatives.

First, cognitive processing can be classified into two types (see Kahneman, 2003), sometimes referred to as Type 1 (i.e., automatic processing) and Type 2 (i.e., controlled processing). Automatic processing is fast, inflexible, and governed by habit, whereas controlled processing is slow, flexible, and governed by rules (Kahneman, 2003), suggesting that cognitive flexibility requires the use of controlled processing over automatic processing. Consistent with this idea, authors have argued that cognitive flexibility requires cognitive control, and the inhibition of immediate responses (Laureiro-Martínez, Brusoni, & Zollo, 2009). Importantly for decision-making, the two types of processes are associated with different task construal: automatic processing is "highly contextualized, personalized, and socialized", whereas deliberative processing serves to "decontextualize and depersonalize problems" (Stanovich & West, 2000, p. 658-659).

The two types of cognitive processing styles have also been referred to in cultural psychology as holistic and analytic cognition (Nisbett, Peng, Choi, & Norenzayan, 2001; Stanovich & West, 2000). Recently, researchers found that across three experiments, people with a stronger belief in choice were more likely to use analytic (i.e., controlled) cognition and attention (Savani, Stephens, & Markus, 2017). For example, participants asked to watch a video of a man engaging in mundane actions in his apartment and press a button every time the man made a choice (as opposed to touched an object) were more likely to group three

objects based on shared categories (e.g., cow and hen are both animals) as opposed to shared relationships (e.g., a cow eats grass), an indicator of analytic cognition (Experiment 2). In another task, participants were presented with thirty pairs images that had a change in the foreground (e.g., a change in the color of a prominent plane) or a change in the background (e.g., a change in the airport control tower). Participants asked to write about three choices they made (as opposed to things they did) yesterday morning, afternoon, evening, and night were quicker to identify changes to focal objects, but there was no difference in reaction time to identify changes to background objects, suggesting that construing actions as choices led to more analytic attention (Experiment 3).

In the context of problem solving, prior decisions can be viewed as a broader context or the background for present decisions. Automatic or holistic cognitive processing may lead to greater emphasis on prior decisions (i.e., highly contextualized), whereas controlled or analytic processing may lead to less emphasis on prior decisions (i.e., independent of context). Given the link between a choice mindset and analytic cognition, I expected that a choice mindset would lead people to focus on the present decision without undue influence from prior decisions, thus increasing cognitive flexibility.

Consistent with this prediction is the finding that people with a weaker belief in free-will (referring to the belief in one's ability to make choices; Feldman et al., 2014) exhibit less self-control and are more likely to engage in short-sighted, automatic and impulsive courses of action (Baumeister, Masicampo, & DeWall, 2009). Researchers also found that participants were slower to adjust their behavior following an error after reading a passage undermining the existence in free-will (Rigoni, Wilquin, Brass, & Burle, 2013).

Second, cognitive flexibility requires individuals to generate alternative courses of action to adapt to new situational demands (Bernardo & Presbitero, 2018; Dennis & Vander Wal, 2010; Dshemuchadse, Grage, & Scherbaum, 2015; Gabrys, Tabri, Anisman, &

Matheson, 2018). The Cognitive Flexibility Inventory (CFI; Dennis & Vander Wal, 2010) includes two subscales: the control subscale, which measures an individual's ability to maintain control when making decisions, and the alternatives subscale, which measures an individual's ability to identify multiple solutions before making decisions. Further, cognitive flexibility can be measured using the alternate uses task (AUT; Guilford, 1967; Ibrahim, Shoshani, Prior, & Share, 2013; Roberts et al., 2017; Tomer, Fisher, Giladi, Aharon-Peretz, 2002), which requires participants to identify as many possible alternate uses for common household items such as a paperclip.

A choice mindset may lead people to identify more choices in the environment. Savani and colleagues (2010) found that people from a culture with stronger beliefs in choice (e.g., US Americans) were more likely to identify choices in the environment than people from cultures with a weaker belief in choice (e.g., Indians). Also, researchers found that participants asked to re-write sentences suggesting that people have choices and control in life (as opposed to sentences suggesting that free-will and the ability to make choices is an illusion) generated more novel alternative ideas for product names (Alquist, Ainsworth, & Baumeister, 2013, Study 3). Based on these arguments, I hypothesized that a stronger belief in choice (i.e., a choice mindset) will be positively associated with cognitive flexibility.

OVERVIEW OF STUDIES

Study 1 tested the main hypothesis that the more people believe in choice, the faster they would be at switching to new sorting rules in the commonly used Wisconsin card sorting task. Study 2 sought to conceptually replicate this finding with a more cognitively involved task that required participants to solve algebra problems using computerized water jugs. Study 3 sought to experimentally test the causal influence of choice on cognitive flexibility. Specifically, I tested whether participants who were given feedback that highlighted their choices were quicker to switch to a better performing stock compared to participants given

the same feedback but without emphasizing choice. Study 4 sought to conceptually replicate the findings from Study 3 by asking participants to assume the role of the CEO of two different companies – one that believes in choice and one that believes in constraint – and decide if they wanted to continue to invest money to complete projects that had become obsolete, or switch to other investments.

No participants were dropped from the analyses in any study unless reported. All conditions and choice measures are reported. In each study, data were analyzed only after the target sample size was met.

STUDY 1: CARD-SORTING TASK

The goal of Study 1 was to test whether the more people believe in choice, the quicker they are to switch to new sorting rules. I used a task that required participants to sort cards according to a rule that changed after every few trials (Grant & Berg, 1948). I expected that participants who reported a stronger belief in choice would more flexibly switch to each new sorting rule, thus making fewer errors in the task.

Method

I posted a survey seeking 200 participants on Amazon's Mechanical Turk (MTurk), in response 217 participants completed the survey (M_{age} = 39.6 years; 118 women, 99 men). All participants had unique MTurk IDs.

To assess participants' sense of choice, I used a 15-item choice scale (Tan et al., in preparation; sample items: "I always have a choice"; "I feel anxious when I have no choice"; "I like making lots of choices"; $\alpha = .85$). Participants responded on a 7-point scale ranging from "strongly disagree" to "strongly agree."

To test flexible switching, I asked participants to complete the 128-trial Wisconsin card sorting task (Grant & Berg, 1948), an ecologically valid indicator of executive functioning (Burgess et al., 1998). Importantly, the Wisconsin card sorting task is particularly

suitable for assessing the "mental set shifting" executive function (Miyake et al., 2000), which I focus on in the present study. In each trial, I presented participants with four cards across the lower half of the screen (fixed for all trials), and one card on the top half of the screen (different for each trial). The four cards on the bottom represented sorting categories based on the 1) shape, 2) color of shapes, and 3) number of the shapes. The one card on top needed to be sorted. The top cards varied by shape (e.g., circle, fat plus-sign, star, triangle), color (e.g., green, red, yellow, blue) and number of shapes (e.g., one, two, three, four) for a total of 64 cards in the deck.

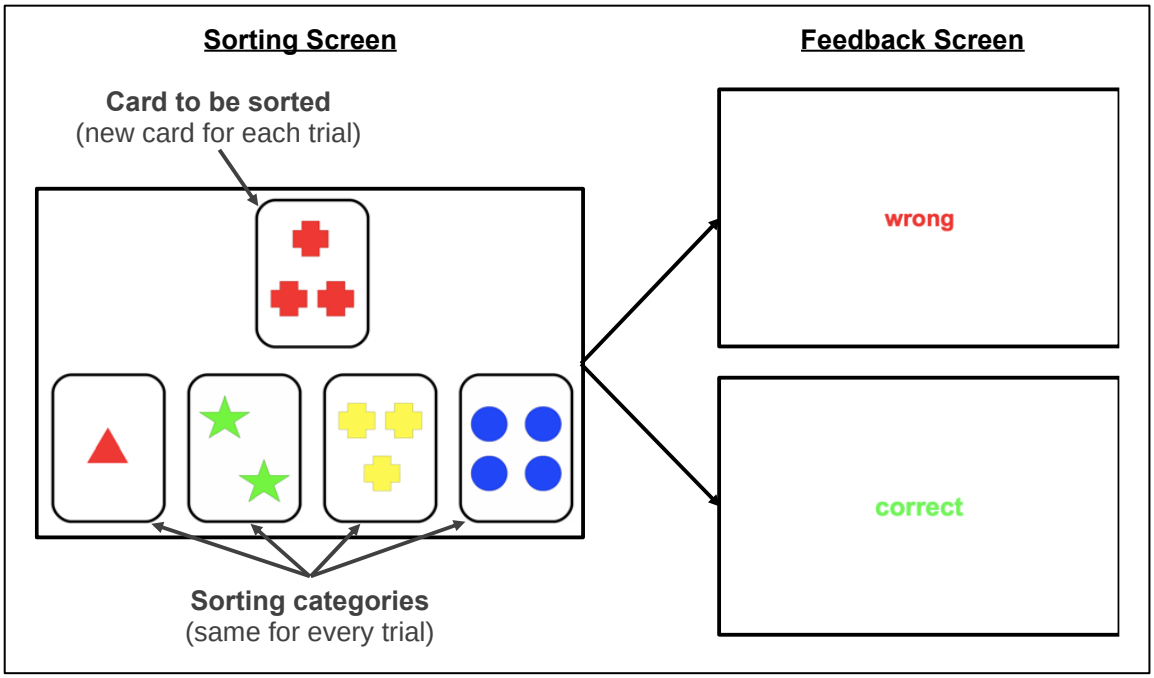

Figure 7. Sample trial from the card sorting task.

The sorting rule rotated every few trials between *by color*, *by shape*, and *by number*. Participants needed to infer the current sorting rule using the feedback after each trial. For example, in Figure 1, if participants clicked on the red triangle, and the current sorting rule was *by color*, they would have seen the "correct" screen. Given the low difficulty of this task, most participants inferred that the current sorting rule is *by color* and continued to sort the next card by color. After participants correctly sorted 10 consecutive trials, the sorting rule changed, and participants saw the "wrong" screen. At this point, participants either inflexibly

persisted with the old rule, or immediately switched to another sorting rule. The task ended when participants completed two rounds of the sorting rule sequence (i.e., color->shape->number), or when all 128 cards had been used.

The dependent measure for this task is perseverative errors (Grant & Berg, 1948), which are responses still in compliance with the old rule after a rule switch (and no response has been made yet that violates the old rule). For example, if the sorting rule was *by color* for 10 consecutive trials, then the participant received "wrong" feedback, yet persisted in sorting the next card by color, then this trial would be coded as a perseverative error. If the participant continued to sort cards by the old sorting rule, each subsequent trial would be counted as a perseverative error until the participant switched to a different sorting rule. The dependent measure is a count variable representing the total number of perseverative errors made by each participant throughout the task, with a higher count representing less flexibility in switching (Carr & Steele, 2009).

After the card sorting task, participants completed a short demographic survey, including gender (0 = women, 1 = men, 3 = other), age, educational level (1 = "Less than high school", 2 = "High school", 3 = "Incomplete college", 4 = "Associate's degree", 5 = "Bachelor's degree", 6 = "Master's degree", 7 = "Doctor's degree"), and other demographic information. I conducted the study using the Millisecond Inquisit software (Millisecond, 2015).

Results

On average, participants made 8.07 (SD = 4.39) perseverative errors throughout the task. I ran a Poisson regression to predict the number of perseverative errors based on the participants' scores in the choice scale. As expected, I found that scores in the choice scale were negatively associated with the number of perseverative errors made in the task (z = -2.54, p = .011), suggesting that people reporting a stronger belief in choice were more

flexible in switching to a new sorting rule after the sorting rule had changed. Research using the Wisconsin Card Sorting Task found demographic differences in performance on the task. Specifically, women scored better than men, younger adults scored better than older adults, and more educated participants scored better than less educated participants (Boone et al., 1993). I controlled for age, gender, and education, and found that participants' scores on the choice scale was still a significant negative predictor of perseverative errors on the task (z = -3.23, p = .001).

Discussion

Study 1 found that peoples' belief in choice is associated with higher levels of switching flexibility in a card sorting task. Specifically, higher scores on the choice scale were associated with fewer errors related to persevering with an old sorting rule once the sorting rule changed. One limitation of this study is that the card sorting task is a forced-switch measure that requires participants to switch between solutions (Grant & Berg, 1948). However, in real-world scenarios (see Watzek, Pope, & Brosnan, 2019), people typically need to select from multiple strategies or solutions that are all technically correct, but differ in efficiency or relative benefit (e.g., time spent, investment return, resources required). In Study 2, I used an optional-switch task that has multiple correct solutions, but the solutions differ in their efficiency in solving the problem.

STUDY 2: WATER JUG TASK

The goal of Study 2 was to conceptually replicate the findings of Study 1 using an optional-switch paradigm in which there are multiple correct responses to each problem that vary in their efficiency. I used the Water Jug Task (Luchins & Luchins, 1950) in this study, in which participants were required to use three jugs of different volumes to measure out a specific amount of water across ten trials. In the first five trials a common complex solution was available, whereas in later trials, the complex solution worked but a simpler solution was

also available. The purpose of the task was to assess the extent to which participants could switch from the complex solution to the simple, more efficient solution. I hypothesized that participants reporting a stronger belief in choice would be more likely to use the simple solution as opposed to inflexibly persisting with the more complex solution.

Method

I posted a survey seeking 200 participants on MTurk, in response 282 participants completed the survey. In the analyses, I excluded 24 participants who attempted the survey more than once using the same MTurk ID because their responses may be affected by prior knowledge. The final sample consisted of 258 participants (M_{age} = 35.0 years; 115 women, 89 men, 54 unreported due to a technical error).

I used the same choice scale as in Study 1 (α = .86). To test flexible switching, I used the computerized Water Jug Task (Luchins & Luchins, 1950). Participants were presented with three jugs of different sizes and were required to use these jugs to obtain a target amount of water by adding or subtracting jugs.

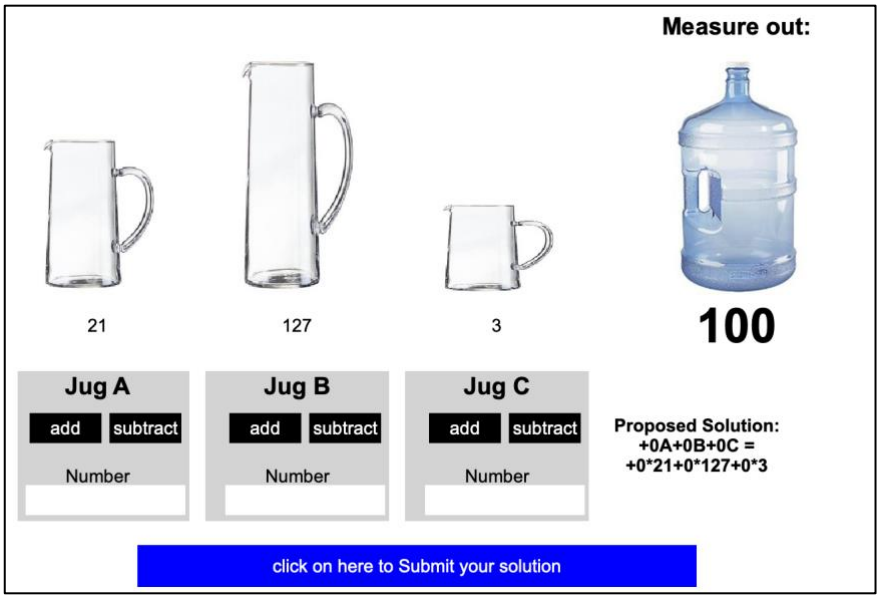

Figure 8. Sample trial from the water jug task.

For example, in the first trial (Figure 2), I asked participants to obtain 100 units given Jug A (21 units), Jug B (127 units), and Jug C (3 units). The solution involving the fewest

actions was B − A − 2C (e.g., 127 − 21 − 6 =100). The first five trials could be solved by this solution, B – A – 2C, referred to as the *complex* solution. After the first five trials, all of which used the complex solution, participants were presented with four similar problems that could be solved by either the complex solution or a simpler solution (e.g., A – C, or A + C). For example, in the sixth trial, I asked participants to obtain 20 units given Jug A (23 units), Jug B (49 units), and Jug C (3 units). Participants could have used the complex solution of B – A – 2C (e.g., 49 − 23 − 6 = 20) or a simpler solution of A − C (e.g., 23 − 3 = 20). Trials six, seven, nine and ten are the four critical trials in the study, as they could all be solved by either the complex solution or a simpler solution. The measure of flexible switching was how many times the participant used the complex solution in the critical trials despite the availability of a simpler, more efficient solution that required fewer actions.

Following the water jug task, participants completed a short demographic survey including gender, age, and educational background with the same coding scheme as in Study 1. I conducted the study using the Millisecond Inquisit software (Millisecond, 2015).

	Containers given (volume)			Volume	Complex	Simple
Trial	A	B	C	required	solution	solution
1	21	127	3	100	B − A − 2C	
2	14	163	25	99	B − A − 2C	
3	18	43	10	5	B − A − 2C	
4	9	42	6	21	B − A − 2C	
5	20	59	4	31	B − A − 2C	
6	23	49	3	20	B − A − 2C	A − C
7	15	39	3	18	B − A − 2C	A + C
8	28	76	3	25		A − C
9	18	48	4	22	B − A − 2C	A + C
10	14	36	8	6	B − A − 2C	A − C

Table 1. Water jug task trials (Luchins & Luchins, 1950).

Results

On average, participants solved critical trials using the complex solution .97 times (SD = 1.25). I ran a Poisson regression to predict the number of times participants used the complex solution based on the participants' scores in the choice scale. As expected, I found

that scores in the choice scale were negatively associated with the number of times participants used the complex solution instead of the simple solution (z = -3.06, p = .002), suggesting that people reporting a stronger belief in choice were more flexible in switching to the simpler solution instead of persisting with the old, more complex solution. Research using the Water Jug Task found that flexible switching is negatively correlated with age (Ross, 1952) and positively correlated with intelligence, and that on average men exhibit more flexible switching than women (Luchins & Luchins, 1959). I controlled for age, gender, and education, and found that participants' scores on the choice scale was still a significant negative predictor of participants' use of complex solutions when simple solutions were available (z = -2.42, p = .016).

Discussion

Study 2 conceptually replicated the findings from Study 1, finding that people reporting a stronger belief in choice were less likely to continue using a complex solution to a problem when a simpler, more efficient solution was available. Studies 1 and 2 support the association between choice and flexible switching using tasks that test participants' cognitive functioning related to flexibility. The limitations of these studies are that they offer only correlational evidence, the tasks used are of limited practical relevance (i.e., sorting cards and pouring water in jugs), and participants were not incentivized to maximize performance. Choice is also a culturally shaped construct (Savani et al., 2010), and Studies 1 and 2 were both conducted with US participants. I aim to address these limitations in Study 3.

STUDY 3: STOCK INVESTMENT TASK

The goal of Study 3 was to test whether highlighting the idea choice in feedback about how stocks are performing would lead people to switch from a weaker performing stock to a stronger performing stock more quickly. This was a lab study conducted in Singapore. I designed a task that asked participants to make a series of 104 decisions: invest

in stock A or invest in stock B. Stock A performed better than stock B for 4-6, trials, then stock B performed better for 4-6, and so on. To maximize performance in the overall task, participants needed to switch frequently between the two stocks, despite incurring a switching cost ("broker fee") each time they switched. I expected that participants provided with feedback throughout the task framed in terms of choice (e.g., "the stock that you chose") would more flexibly switch between the two stocks and would be less likely to continue investing in a stock when it begins to perform worse, compared to participants given neutral feedback (e.g., "the stock that you invested in").

Method

I posted a study seeking 100 undergraduate students at a large university in Singapore, 101 students completed the paid study. I excluded participants who indicated in the demographics that they were not born in Singapore (20 participants). The final sample consisted of 81 participants (M_{age} = 21.2 years; 45 women, 36 men). All but one participant was of Chinese ethnicity.

I designed a task that asked participants to make a series of stock investments across 104 trials (described as weekly, for two years). In each trial, I asked participants to indicate if they would prefer to invest $1000 in stock A or B. At the end of the week, participants learned how each stock performed (e.g., +0.73%, -0.02%), and how much money they earned (or lost) in that week based on their chosen investment. The participant's cumulative earnings were displayed at the bottom of the screen throughout the task. Participants incurred a switching cost of $1 (called a "broker fee") if they switched investments from the previous trial.

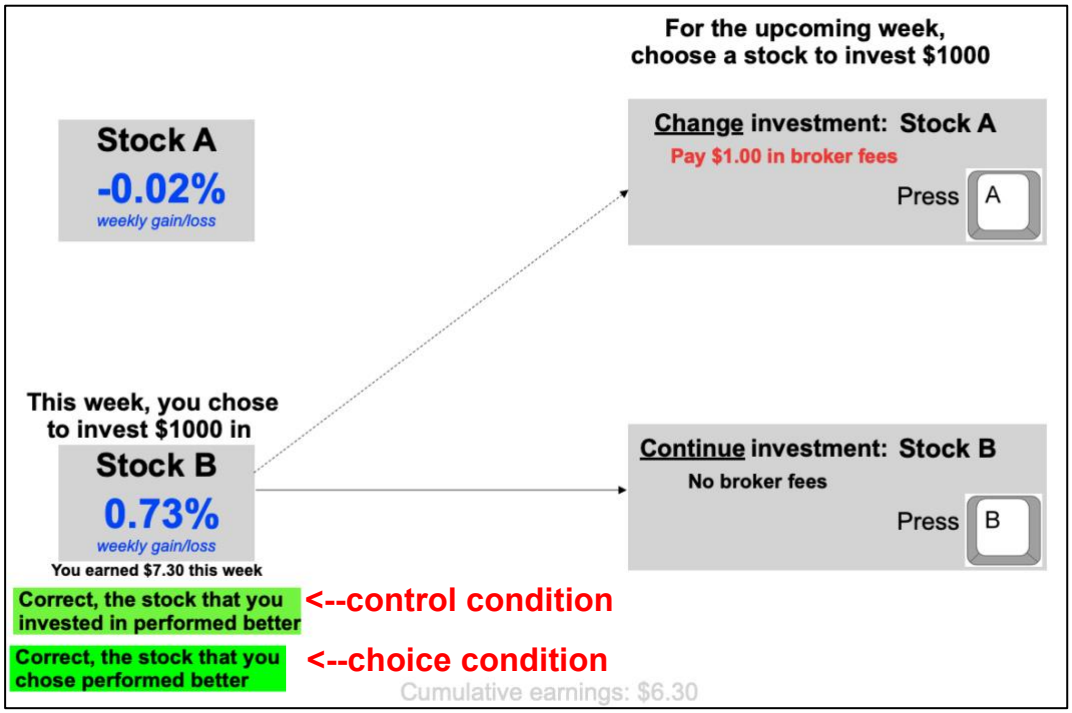

Figure 9. Sample trial from stock investment task.

Unbeknownst to participants, the 104 trials consisted of 22 blocks ranging from three to six trials per block. There were three types of blocks: blocks that A performed better for all trials (A blocks), blocks that B performed better for all trials (B blocks), and blocks that A and B alternated in relative performance (mixed blocks). In each trial, each stock increased or decreased in value by around 1% to 2%. I included the mixed blocks so that the pattern was not too obvious. The dependent measure was the number of trials that participants continued investing in a stock after it had become the worse performing stock. For example, if a participant had invested in stock A for five consecutive trials and A was performing better, then on the next trial, B performed better than A, yet the participant continued to invest in stock A, this increased the dependent measure by one. In order for a given trial to increase the dependent variable by 1, it had to meet three criteria. First, the trial had to be a *critical trial*. Certain trials were not designated as critical trials because they could not potentially measure cognitive flexibility. I did not include trials within mixed blocks as critical trials, or trials in blocks that followed mixed blocks, as these did not measure participants' switching. I also

did not include the first trial in each A and B block as critical trials, as the participant only knew that the better performing stock had changed after one trial in the new block. Second, the participant had to select the lower performing stock in the trial. Third, the participant had to select the same stock as in the trial immediately preceding it. The second and third criteria ensure that the participant is persisting with the worse performing stock.

Block #	# Trials	# Critical Trials	Better stock	Block #	# Trials	# Critical Trials	Better stock
1	3	0	Mixed	12	4	3	A
2	4	0	A	13	5	4	B
3	5	4	B	14	5	4	A
4	6	5	A	15	6	5	B
5	4	0	Mixed	16	3	0	Mixed
6	6	0	B	17	5	0	A
7	5	4	A	18	5	4	B
8	4	3	B	19	6	5	A
9	6	5	A	20	4	3	B
10	4	0	Mixed	21	4	3	A
11	4	0	B	22	6	5	B

Table 2. Stock investment task trials.

At the start of the task, I randomly assigned participants to either the choice condition or the control condition. The two conditions differed only in that participants saw slightly different feedback after each trial. For example, if participants invested in the worse performing task, in the choice condition, they received this feedback: “Wrong, you can choose to switch investments if you want”; in the control condition, they received this feedback: “Wrong, the stock that you invested in performed worse.” Before starting the task, I informed participants that the best performer would receive a gift card for a ride-hailing and food delivery company worth $50 Singapore dollars (approximately $35 US dollars). After completing the task, participants were asked to respond to a demographic questionnaire. Participants completed the task independently in isolated rooms. I conducted the study using the Millisecond Inquisit software (Millisecond, 2015).

Results

On average, participants continued to invest in a stock after it became the worse performing stock 16.4 times (SD = 9.23). I ran a Poisson regression to predict the number of times participants continued investing in a stock after it performed worse based on condition (choice condition = 1, control condition = 0). As expected, I found that participants in the choice condition continued to invest in the worse performing less than participants in the control condition (z = -2.47, p = .013), suggesting that the subtle framing of feedback in terms of choice led participants to switch to the better performing stock more flexibly. The result did not change when I controlled for age and gender (z = -2.72, p = .006).

Discussion

Study 3 found that choice exerts a causal influence on flexible switching. Participants presented with feedback highlighting the salience of their choice were less likely to continue investing in a stock that performed worse than an alternate stock. An alternative explanation for the findings in Study 1 to 3 is that people tend to ignore information suggesting to switch when they have developed strong routines (e.g., clicking the same card type, investing in the same stock) in similar recurring decisions (Betsch, Haberstroh, Glöckner, Haar, & Fiedler, 2001). In Study 4, I used a sunk-cost task that does not involve recurring decisions.

STUDY 4: SUNK-COST TASK

The goal of Study 4 was to conceptually replicate the findings from Study 3 with a different manipulation of choice and a different measure of cognitive flexibility. I asked participants to assume the role of the CEO of two different companies. For each company, I asked them to make two decisions about how to allocate research budgets. I expected that participants would be less likely to exhibit the sunk-cost bias (i.e., they would not invest in profitless projects regardless of prior investment) when serving as the CEO of the company that believed in choice compared to the company that believed in constraints.

Method

I posted a study seeking 100 participants at a large university in Singapore, 105 students completed the paid study. This study required participants to read a five-page brochure as part of the manipulation and four scenarios for the sunk-cost task. To ensure that participants read the material, I included two open-ended questions asking people to describe the belief held by each company, and excluded four participants who either did not respond or provided responses that did not answer the question. As in Study 3, I excluded participants who indicated in the demographics that they were not born in Singapore (15 participants). The final sample consisted of 86 participants (M_{age} = 23.0 years; 54 women, 32 men, 2 unreported). All but one participant was of Chinese ethnicity.

I designed a within-subject task to investigate the sunk-cost bias (adapted from Arkes & Blumer, 1985, Experiment 3). In the original between-participant design, participants are randomly assigned to either the sunk-cost or no sunk-cost condition then presented with a scenario asking whether they would invest $1 million dollars to build a plane that could not be detected by radar, but was likely to be obsolete by the time it was completed. In the sunk-cost condition, participants are told that they have already invested $10 million dollars of the company's money into the research project. Studies have consistently found that participants in the sunk-cost condition are more likely to invest in the project than participants in the no sunk-cost condition (see Arkes & Blumer, 1985; Feldman & Wong, 2018; Garland & Newport, 1991; Tan & Yates, 1995).

To increase statistical power (Lakens, 2016), I created a within-subject version with four trials for each participant 2 (choice vs no-choice) x 2 (sunk-cost present vs sunk-cost absent). The order of the choice and sunk-cost conditions was counterbalanced across participants using four randomly assigned groups (see Table 2). I first asked participants to assume the role of the CEO of the Tan Company then asked them to read a brochure with

company information that emphasized either choice or constraints (adapted from Kricheli-Katz, 2012). In the choice condition, participants read a brochure about a company that believed in the idea of choice (e.g., "at the Tan/Lim Company, we believe that there is always a choice"), whereas in the no-choice condition, participants read about a company that believed in the idea of constraints (e.g., "Here at the Tan/Lim Company, we believe that it is important to be aware of the environmental constraints that influence our behavior and choices"). I then asked participants to respond to two open-ended questions (e.g., "According to the company brochure, what are the key beliefs held by the Tan/Lim Company?") and to rate how much they agree (1-100) with the statement that "we always have a choice."

			Group 1		Group 2		Group 3		Group 4	
Trial	Company	Aircraft	Choice	Sunk-cost	Choice	Sunk-cost	Choice	Sunk-cost	Choice	Sunk-cost
1	Tan	Airplane	Yes	Yes	Yes	No	No	Yes	No	No
2	Tan	Helicopter	Yes	No	Yes	Yes	No	No	No	Yes
3	Lim	Military drone	No	Yes	No	No	Yes	Yes	Yes	No
4	Lim	Freight plane	No	No	No	Yes	Yes	No	Yes	Yes

Table 3. Sunk-cost task trials.

Next, as the CEO of the Tan Company, which they just read about in the brochure, I asked participants to make two business decisions, one with a sunk-cost present and one without a sunk-cost. The sunk-cost scenario read "As the CEO of the Tan Company, you have invested $10 billion of the company's money into a research project", whereas the sunk-cost absent scenario reads "As the CEO of the Tan Company, you are considering investing the last $1 billion of your research funds". In each trial the project was unique, and differed by aircraft type (airplane, helicopter, military drone, or freight plane) and distinguishing feature (hyper-speed, long-distance, radar-blank, or ultra-light). In both scenarios, I informed

participants that a competing firm had begun marketing a superior product (e.g., "another firm begins marketing a military drone that can travel much faster than the military drone your company is working on"). I then asked participants in both conditions if they would invest their last $1 million in research funds for this project (yes = 1), or for some other purpose (no = 0). In the choice condition, I included a line before asking participants to make a decision: "As you contemplate the situation, one of the members of the board reminds you that at The Tan Company, we always have a choice."

After participants completed a sunk-cost and no sunk-cost trial as the CEO of the Tan Company, I asked participants to "Now imagine that you have shifted jobs to another company, the Lim Company. You are now the CEO of the Lim Company." I again provided participants with a company brochure, this time about the Lim Company, suggesting that the Lim Company believed in either choice or constraints, depending on what brochure they had been presented with in the first half of the task (see Table 2 above). I asked participants to respond to the same two open-ended questions as in the first half of the task, and to rate their agreement with the statement that "we always have a choice." Next, as the CEO of the Lim Company, which they just read about in the brochure, I asked participants to make two business decisions. Participants made a business decision with a sunk-cost present and one without a sunk-cost, same as the first half of the task but with different aircraft types (e.g., helicopter) and distinguishing features (e.g., hyper-speed) to avoid repetition that may have confused participants. For each decision, participants indicated if they wanted to invest the $1 million to complete the project (yes = 1) or for some other purpose (no = 0). After completing the task, I asked participants to respond to a demographic questionnaire.

Results

I conducted the analyses using hierarchical linear modeling (HLM), treating the four decisions as nested within participants. I coded each trial by choice condition (choice = 1, no-

choice = 0) and sunk-cost condition (sunk-cost present = 1, sunk-cost absent = 0), and created an interaction term by multiplying the two dummy variables. The dependent measure for each trial was whether the participant chose to invest in the project (yes = 1, no = 0). I entered the choice condition variable, the sunk-cost condition variable, and their interaction as predictors in a multilevel logistic regression predicting whether the participant chose to invest in the project in that trial. I expected to find an odds ratio (OR) significantly greater than 1 for the sunk-cost condition variable (i.e., replicating the sunk-cost bias) and an odds ratio significantly less than 1 on the interaction term, suggesting that the sunk-cost bias was lower in the choice condition compared to the no-choice condition. Consistent with previous research, I replicated the sunk-cost bias, findings an odds ratio significantly greater than 1 on the sunk-cost condition variable in predicting participants' investment in the project (b = 3.75, SE = .545, z = 6.89, $p < .001$, OR = 42.7 95%CI [14.67, 124.34]). Supporting the main hypothesis, I found an odds ratio significantly less than 1 on the interaction of choice and sunk-cost condition in predicting participants' investment in the project (b = -1.26, SE = .606, z = -2.08, p = .038, OR = .28 95%CI [.087, .932]). Controlling for age and gender did not change the results (p = .038).

Discussion

Study 4 found replicated the finding from Study 3 that choice exerts a causal influence on flexible switching. Asking participants to assume the role of a CEO of a company that emphasizes choice made people less likely to invest money in a low potential project that was 90% complete compared to a low potential project that had not been started.

GENERAL DISCUSSION

Four studies provide evidence that people with a stronger belief in choice exhibit greater cognitive flexibility in problem solving. In Study 1, participants had to sort cards by either shape, color, or number of shapes and were required to flexibly switch to a new sorting

rule six times throughout the task. People with a stronger sense of choice were able to recognize and switch to the new sorting rule in fewer trials. In Study 2, I conceptually replicated the findings from Study 1 using a water jug task that required participants to use three jugs of different volumes to obtain a specified volume of water across ten trials. In the first five trials a complex solution was available, in later trials the complex solution was again available, but a simple solution was also available. People with a stronger sense of choice were less likely to persevere with the complex solution, instead switching to the simple, more efficient solution in the later trials. Study 3 found causal support for the link between choice and cognitive flexibility. Participants presented with feedback that highlighted the salience of their choice were less likely to continue investing in a lower performing stock, instead switching to a higher performing stock quickly. In Study 4, I found that people were less likely to continue to invest in a profitless project when assuming the role of a CEO in a company that strongly believed in choice, as opposed to a company that strongly believed in constraints.

Theoretical implications

My research contributes to the literature on choice as the first investigation linking choice to improved decision making. Earlier research found that choice is associated with motivation (Iyengar & Lepper, 1999), support for policies that benefit individuals rather than the collective (Savani & Rattan, 2012; Savani et al., 2011), and analytic cognition (Savani et al., 2017). To date no research has been conducted on choice in the judgment and decision-making literature. The current research suggests that a stronger belief in choice (Study 1 and 2), the mere salience of choice (Study 3), and being in contexts where choice is valued (Study 4) leads to better decision making. Given that cognitive flexibility is conceptually linked to other biases such as the confirmation bias and the loss aversion bias (Wilson, Nusbaum,

Whitney, & Hinson, 2018), future research can investigate if the role of choice in attenuating the sunk-cost bias generalizes to other biases.

The present research also contributes to the literature on tasks used to measure cognitive flexibility and decision-making biases. In Study 3, adding the word "choice" in feedback to participants was enough to increase cognitive flexibility. In this sense, the present research also contributes to literature on existing measures of cognitive biases that include choice framing as part of the task. For example, Wilson and colleagues (2018) recently asked participants to complete a gambling task to investigate the loss-aversion bias, which asks participants to "click the mouse to see your choices" and informs participants that "You chose: $50." The framing of choice may not be problematic for making comparisons across manipulation conditions where instructions and feedback are identical across conditions. Yet it is possible that existing tasks inadvertently highlighting the salience of choice may underestimate of the absolute level of cognitive biases given the findings presented in the present research.

My research also contributes to the literature on cognitive flexibility, identifying choice as a novel individual and contextual antecedent of cognitive flexibility. Cognitive flexibility theory emphasizes that effective learning is context-dependent (Spiro, Coulson, Feltovich, & Anderson, 1988), focusing on the contexts in which concepts are relevant. I extend the role of context in cognitive flexibility, finding that contexts that endorse the idea of choice may support greater levels of cognitive flexibility, as in Study 4. This finding contributes to the literature on strategic management. Researchers have argued that in managerial decision making, organizational ideology serves as a guide for action to adopt or resist certain practices based on implicit rules and norms that dictate what is and is not appropriate (Gupta, Briscoe, & Hambrick (2017)). It is possible that a strong organizational ideology about people's ability to make choices leads managers to exercise their ability to

make choices in the form of switching between strategies freely (consistent with my findings in Study 4). The findings here suggest that flexibility in organizations is neither a firm-level factor, nor an isolated individual-level factor that shapes firm outcomes, but rather an individual-level factor that is influenced by organizational ideology and influences firm-level outcomes. Future research can investigate the interplay between organizational ideology, managerial decision-making, and firm-level outcomes.

Finally, my research contributes on the literature on sunk-cost bias (Arkes & Blumer, 1985) and escalation of commitment to a failing course of action (Feldman & Wong, 2018). To my knowledge, no studies have found support for situational factors that can be manipulated to reduce the sunk cost bias. The present research (Study 3) found that people are less likely to engage in the sunk cost bias in an organization that values choice. This suggests that determinants of the sunk-cost bias may include not only individual factors (e.g., age) and decision-specific factors (e.g., availability of alternatives), but also broader context factors such as organizational values that are not directly associated with the decision-making process.

Practical implications

The sunk-cost bias is a big problem in organizations, sometimes referred to as the "Concorde fallacy," named after the British and French governments' decision to continue investing in a supersonic aircraft with dim financial prospects on the grounds that they had already invested a lot of money (Arkes & Atyon, 1999). Based on the findings of the present research, organizations can operationalize the idea of choice in multiple way to increase flexibility and decrease sunk-cost bias. For example, as in Study 3, managers can include choice-related words in presentation slides during meetings, or in reports to promote more flexibility in decision making during times of change. Also, as in Study 4, managers can incorporate the idea of choice in company values through mission statements, company

brochures, the company website and more broadly as strategy for organizational culture. Leaders can also use the idea of choice in public relations to signal to employees that choice is valued within the organization. For example, Jeff Bezos, CEO of Amazon said in a convocation speech "Will inertia be your guide, or will you follow your passions?" and ended the speech with "In the end, we are our choices. Build yourself a great story."

Directions for future research

To test the relationship between choice and cognitive flexibility, I used controlled manipulations of choice and cognitive flexibility tasks that asked participants to come up with solutions in a lab or online. The findings of this study may be limited in situations where manipulating choice is not feasible, or when decision making is more complex.

The ecological validity of the choice manipulation needs to be evaluated. In Study 3, I manipulated choice by highlighting the salience of participants' choices. Making choice salient to a decision-maker is manageable in a controlled experiment but is more difficult in an environment where information is unstructured. For example, if a manager is making a decision about whether or not to continue to invest in a project that is underperforming, she may weigh factors according to her experiences and what she has heard through the grapevine about how employees feel. If there is no physical or verbal prompt to make a decision, it would be hard to make the idea of choice salient. Future research can investigate other interventions to prime the idea of choice in environments where information is not as structured as in a lab experiment. Also, most decisions in organizations are political and involve input from multiple stakeholders (Pettigrew, 2014). For example, if a manager holds a meeting with a group of project leaders to decide to continue or abandon a project, the opinions from around the room may overpower any attempted priming of choice. Future research can investigate the efficacy of choice framing in the context of group decisions.

Study 3 and 4 focused on the immediate effects of choice manipulations on cognitive flexibility. It is unclear whether more involved and extended choice interventions can lead to greater chronic cognitive flexibility in the long-term. For example, a field experiment can randomly assign employees to either a choice group or a control group. Managers can ask employees in the choice group to identify and write down all of the choices that they made each day for a month. In the same time period, employees in the control group can be asked to write down all of the things they did. The company can then measure the extent to which employees exhibit cognitive flexibility in decision making one week, one month, and one year after the intervention to see if the choice intervention had any long-term effects on flexibility in decision making. In this sense, future research can discern whether the salience of choice holds only immediate effects on decisions in the moment, or if the idea of choice more broadly can foster cognitive flexibility in the long-term.

In Study 4, I found that participants made better decisions assuming the role of CEO of a company that strongly believed in choice. Creating an organization that employees view as strongly believing in choice takes time and resources. Future research can use a field experiment with a choice condition, promoting the idea of choice in one department, and a control condition in another department, then measure cognitive flexibility in decision making across the two divisions.

In the present research, I focused on the role of choice in influencing the "shifting" executive function, which involves being able to switch flexibly. Given that the shifting executive function has been shown to be distinct from the updating and inhibition executive functions (Miyake et al., 2000), it cannot be assumed that the effects of choice generalize across all executive functions. The updating function involves constant monitoring and quick adjustments to the working memory contents, and the inhibition executive function refers to deliberate overriding of dominant responses (Miyake & Friedman, 2012). One possibility is

that the idea of choice has a similar effect on the updating and inhibition functions, and that this effect may lead to other downstream consequences, such as greater creativity. On the other hand, it is possible that the idea of choice only influences the shifting executive function, but not the others. Researchers have found that the Wisconsin card sorting task is suitable for measuring the shifting function, whereas other tasks are suitable for measuring the inhibition and updating functions (Miyake et al., 2000). Future research can investigate whether the effects of choice on the shifting executive function generalize to the "updating" and "inhibition" executive functions using other executive functioning tasks.

Limited research has examined whether performance on tasks measuring cognitive flexibility, such as the Wisconsin card sorting task, predict outcomes in organizations. The present research used controlled tasks that were not complex, ranging from sorting cards (Study 1) to investing in Stock A or B (Study 3). In reality, organizational decision makers often face complexity. Thus, it is unclear whether these findings will generalize to an organizational context, yet some research suggests this possibility. One study found that performance on the Wisconsin card sorting task predicted people's occupational status (Kibby et al., 1998). Another study found that neuropsychological tests like the Wisconsin card sorting task predicted work behaviors, such as number the of promotions received at work (Ready et al., 2001). Cognitive flexibility tasks have also been shown to have clear neural and genetic representations (Krugel et al., 2009). Future research can use a controlled field experiment to investigate whether the idea of choice improves cognitive flexibility in the face of complex decisions.

Conclusion

Managerial decision-makers operate in environments that are constantly changing. Although strategies can serve as useful shortcuts in stable conditions, environmental changes require that managers must re-evaluate their strategy and switch to a more efficient strategy

(or abandon ineffective strategies) depending on environmental conditions or demands. I found that people with a stronger sense of choice are more likely to adapt to changing conditions, and switch to more efficient strategies or solutions quickly. Just like in the wilderness, the ability to adapt to one's environment is necessary for survival, and a choice mindset might help managers maintain the cognitive flexibility required to adapt and survive in a changing market. As the first empirical investigation on the role of choice in decision making, the findings from the present research help us better understand why some managers respond to environmental change with flexibility, and others respond with inertia.

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APPENDIX

Appendix A: Chapter 2, Archival Analysis: Methods and Results

The goal of this analysis was to assess whether the salience of choice and the salience of independence in society is correlated over time. We did this by analyzing the correlation between the frequency of choice-related words and that of independence-related words in the 2012 Google Ngram database, a corpus of fiction and non-fiction literature over the past 100 years. This database allows researchers to assess the frequency of words and phrases contained in American fiction and non-fiction books between the years 1500 and 2008. Following past research, we included data ending with the year 2000 rather than 2008 because Google used a different methodology for selecting books after the year 2000 (see Greenfield, 2013; Grossmann & Varnum, 2015). The raw frequency of a word for a given year is adjusted for the number of words published in the given year to control for annual fluctuations in the total number of books and words published. Hence, the frequency is reported as a percentage of the number of words published in a given year.

Method. For independence-related words, we used words commonly appearing in psychological scales used to measure independence (i.e., *able, achieve, differ, own, personal, prefer,* and *special;* taken from Grossmann & Varnum, 2015). For choice-related words, we used *choice* and its synonyms (i.e., *choice, select, pick, option,* and *alternative*), along with all variations of these root words. For comparison, we also included words commonly appearing in psychological scales used to measure interdependence (i.e., *belong, duty, give, harmony, obey, share, together*; taken from Grossmann & Varnum, 2015). For all words used in the study, we used the part-of-speech tagging capability of the 2012 Ngram data set (Lin et al., 2012). In line with previous work using the Ngram database (Greenfield, 2013; Grossmann & Varnum, 2015), we compiled a dataset consisting of the selected words from the year 1900-2000. See below for a full list of words and part-of-speech.

Choice-related	
select (verb)	choices (noun)
selected (verb)	option (noun)
selection (noun)	options (noun)
selections (noun)	alternative (noun)
Choose (verb)	alternatives (noun)
Chose (verb)	pick (verb)
chosen (verb)	picked (verb)
choice (noun)	picks (verb)

Independence-related	Interdependence-related
able (adjective)	belong (verb)
achieve (verb)	duty (noun)
differ (verb)	give (verb)
own (verb)	harmony (noun)
personal (verb)	obey (verb)
prefer (verb)	share (verb)
special (adjective)	together (adjective)

Table 4. Words and part-of-speech used for Google Ngram Archival Analysis.

Results. Figure 2 plots the frequencies of all the choice-, independence-, and interdependence-related words used in the current study. The percentage of both choice- and independence-related words in English-language literature has been increasing over the past 100 years, consistent with the finding that endorsement of values associated with self-expression has been increasing over the past few decades (Inglehart & Baker, 2000).

We calculated the relative frequency of word usage for each category by taking the sum of absolute word usage for all words within a category and dividing by the number of unigrams (i.e., words) for each year.

Over the one-hundred-year period, we found a significant bivariate correlation between the frequency of independence-related words and choice-related words, $r = .70$, $p < 0.001$. We also observed a significant negative bivariate correlation between the frequency of interdependence-related words and choice-related words, $r = -.88$, $p < .001$. We conducted a secondary analysis using Kendall's τ, a coefficient typically used for time-series frequency

data analysis (Grossmann & Varnum, 2015). Once again, we found that the frequency of choice- and independence-related words is highly and positively correlated in the Google Ngram database, $r_\tau = .66$, $p < 0.001$.

Given that an "option" can ambiguously refer to an alternative available in a decision or an option in the financial sense, as in a stock option, I conducted the analysis without including option and options. When these two words were not included in the measure of choice, the significant bivariate correlation between the frequency of independence-related and choice-related words remained significant, $r = .50$, $\underline{p} < .001$. Additionally, the negative bivariate correlation between the frequency of interdependence-related words and choice-related words remained significant, $r = -.71$, $p < .001$.

***Discussion*.** This analysis found that the frequency of words related to *choice* and *independence* have both been increasing over the past 100 years in English-language literature, whereas the frequency of words related to *interdependence* have been decreasing. Further, the frequency of choice-related words was associated with an increased salience of independence and but reduced salience of interdependence in the corpus. These findings reflect the growing salience of independence relative to interdependence, and the increasing salience of the concept of choice that accompanies these two trends in English-language literature.

Appendix B: Chapter 2, Study 3 – Lexical Decision Task Words

Independence-related	Interdependence-related
alone	group
individual	together
apart	team
autonomy	cooperate
distinct	share
separate	connected
personal	related
myself	friends
single	family
solo	collective

Neutral words	
chair	snail
umbrella	jackhammer
card	plant
beginning	software
table	position
coatstand	chickens
writing	minister
pocket	square
record	bottle
television	tree

Table 5. Words used in the lexical decision task.

Nonwords: uporg, eeroghtt, amte, eaprtooce, ahsre, dctenonce, dltaere, ifdsern, yfimla, tvelclcoie, naleo, dnuliivaidl, tpraa, onmtyoau, cniitsdt, eaapsrte, lrnaopse, fsleym, lngsie, olos, rhaci, baerullm, dacr, giienngbn, eatbl, dtaoctsna, gtirwin, tpcoek, dcorer, vnoletiies, lnsai, rmhajkemac, ntlap, rwotsefa, ntipisoo, skeihccn, rsiiemnt, eqrasu, ltobte, eret

Appendix C: Chapter 2, Study 4a and 4b Choice Manipulation

Choice Condition

The Smith Group

You are considering applying for a job in the Smith Group, a mid-sized manufacturing company with headquarters close to your home. The Smith Group **has provided you with a brochure** containing **company information and values**.

Review the information on the following pages then answer the questions that follow.

THE SMITH GROUP EMPLOYMENT BROCHURE

"As human beings, we are endowed with freedom of choice, and we cannot shuffle off our responsibility upon the shoulders of God or nature. We must shoulder it ourselves. It is up to us." - A. J. Toynbee.

Choice is important to each of us in our daily lives. Here at the Smith Group, we believe that choices we make help to define the type of lives we lead. This includes everyday simple choices such as what to wear or eat as well as life-defining choices, such as where to live and work, who to marry and how many children to have.

Some argue that people are so limited by their biological predisposition, as well as a wide range of other environmental factors, that free choice is not an option. **However, at the Smith Group, we believe that there is always a choice.**

Think of the people who choose to adopt healthy lifestyle habits— exercise more and keep a healthy balanced diet—to overcome a biological predisposition for obesity. In fact, obesity is the leading *preventable* cause of death worldwide.

At the Smith Group, we believe that only a few cases are caused solely by genes, endocrine disorders, medications or psychiatric illness. The primary treatment for obesity is dieting and physical exercise.
Or think of our careers. At the Smith Group, we believe that although a career is important for us to provide financially for ourselves and our families, **our careers are our choice** and we can take control of our career to be satisfied with what we do.

A 2018 study found that only 51% of people in the USA are satisfied with their work. We believe that our choices ultimately lead to satisfaction or dissatisfaction throughout a career. For example, we can choose what major we want to study in school, which jobs to apply for, when to change jobs, and when to retire.

Nobody is destined to a career of dissatisfaction. Genetics, personality and disposition may have some influence on job satisfaction, but we firmly believe that people have the freedom to make their career what they want it to be, through a series of choices.

At the Smith Group we believe that, whatever limits we have to free will, in the long run it is our choices that determine our satisfaction in life.

The critical choices are those that change our lives, positively or negatively and are major factors in determining who and what we will become. Here at the Smith Group, we believe that choices require us to define our goals and priorities in life—and choose what is really important to us.

Whether it is about the career we aspire to, the family we want to have, or the lifestyle we want to adopt, we at the Smith Group believe that **we always have a choice.**

Constraints Condition

The Wilson Group

You are considering applying for a job in the Wilson Group, a mid-sized manufacturing company with headquarters close to your home. The Wilson Group **has provided you with a brochure** containing **company information and values**.

Review the information on the following pages then answer the questions that follow.

THE WILSON GROUP EMPLOYMENT BROCHURE

Choice is a catchword in our liberal, individualistic society, but it is rarely a reality. Regardless of how much decision-making power people think they have, in many situations, the choices people have are very limited. Here at the Wilson Group, we believe

that it is important to be aware of the environmental constraints that influence our behavior and choices.

People are not "free" agents unconstrained by their contexts, biological predispositions, resources and culture.

Even the everyday, simple choices we think we make, such as what to wear or eat, are constrained, let alone the life-defining choices such as who to marry and how many children to have.

Clearly everyone has at least some choice in life, but **our choices are constrained** by both biological predisposition and a wide range of other environmental factors.

Some argue that people always have a choice. **However, at the Wilson Group, we believe that people do not choose their race, their sex, and other biologically determined characteristics** -- and these all tremendously affect the possibilities and opportunities they have.

Think of the people who try to adopt healthy lifestyle habits to overcome biological predispositions for obesity. Undoubtedly, they have a certain degree of control over their illnesses—they can adopt a healthy life style in the hope of affecting the progress of their diseases, but at the end of day, their ability to fight the biological predisposition is extremely limited.

At the Wilson Group, we believe that it is important to recognize that is it forces (that are out of our control) like our biology and the context that often lead to opportunity or constraint.

Or think of our careers. At the Wilson Group, we believe that although a career is important for us to provide financially for ourselves and our families, but we often have very little choice in our career after considering all of the environmental factors.

A 2018 study found that only 51% of people in the USA are satisfied with their work. We believe that genetic predisposition, the working environment and our personality have a lot to do with how satisfied we are at work. Furthermore, because of the importance of our jobs to be able to provide financially for our families, we often must stick with our job without any choice.

At the Wilson Group, we recognize that we may not always have a choice of what to study, which job to apply for, when to change jobs, and when to retire. Some people are simply more likely than others to be satisfied in work because of their life situation, their personality, and their genes.

At the Wilson Group we believe that, although we have some control in our lives, in the long run it is environmental constraint that determine our satisfaction in life.

The point is that, as much power we think we have in making choices, at the Wilson Group we recognize that in the long run **our free will is limited.**

Some people believe that there is always a choice.

In reality, the situations that change our lives positively or negatively and determine who and what we will become are greatly affected by factors that are beyond our control.

Appendix D: Summary of Study Designs

Chapter	Study	IV	DV	Sample
2	1	Choice manipulation	Self-reported physical strength	US adults
2	2	Choice manipulation	Self-inflation (sociogram task)	Singaporean undergraduates
2	3	Choice manipulation	Attention to independence related stimuli (lexical decision task)	Singaporean undergraduates
2	4	Choice manipulation	Employee voice	US adults, Indian adults, Singaporean undergraduates
3	1	Choice scale	Cognitive flexibility (card sorting task)	US adults
3	2	Choice scale	Cognitive flexibility (water jug task)	US adults
3	3	Choice manipulation	Cognitive flexibility (stock investment task)	Singaporean undergraduates
3	4	Choice manipulation	Sunk cost bias (project investment scenarios)	Singaporean undergraduates

Table 6. Summary of study designs