2017-07-04

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Macrae, CN

10.1080/15298868.2016.1264465
Self and Identity
Informa UK Limited

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Saving For Your Future Self: The Role of Imaginary Experiences

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Word Count: 7808

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Abstract

Despite increased longevity, many people fail to save the funds necessary to support their retirement. In an attempt both to elucidate and remedy this failing, research exploring the 'future-self continuity' hypothesis has revealed that temporal discounting is decreased and saving increased when connections between one's current and future self are strengthened. Here we explored the possibility that a basic component of mental imagery — spatial visual perspective — may be an important determinant of people's decisions to spend now or save for the future. The results of two experiments supported this prediction. Rates of saving were enhanced when a distant-future event was generated from a third-person versus first-person vantage point, an effect that was mediated by visual bodily awareness during mental imagery.

Keywords: self, prospection, mental imagery, visual perspective, intertemporal choice

Saving For Your Future Self: The Role of Imaginary Experiences

Around the world, the number of senior citizens is rising. In 1901, men and women in the U.K. lived, on average, until they were around 47 years of age. Fast-forward just over a century to 2014 and life expectancy had almost doubled (i.e., men ~ 85 years, women ~ 87 years, Public Health England, 2016). Although the benefits of living longer are considerable, older adults also face a raft of significant challenges during their twilight years. Foremost among these is financial stability (McKinsey Global Institute, 2008). To avoid a penurious and miserable existence, monetary resources (e.g., savings, pension plans) must keep pace with the escalating costs of increased longevity. Herein lies a problem, however. For many older adults, savings rates fall woefully short of the levels needed to support a comfortable lifestyle. In the U.S., for example, economists have estimated that individuals typically accumulate only a third of the money needed to maintain pre-retirement levels of consumption (Berheim, Forni, Gokhale, & Kotlikoff, 2000). The situation in the U.K. is similarly bleak, with a staggering 89% of the workforce failing to prioritize saving for retirement and 29% having no savings at all (www.uk.reuters.com, 2015). The message then is sobering. Failure to act (i.e., save) today can have regrettable consequences tomorrow (Ersner-Hershfield, Garton, Ballard, Samanez-Larkin, & Knutson, 2009a).

Saving and Intertemporal Choice

Overlooking the financial obligations of later life can be traced to a psychological phenomenon termed *temporal discounting* — the tendency to undervalue future rewards, particularly when compared to immediate (and often inferior) alternatives (Chapman, 1996; Chapman & Elstein, 1995; Frederick, Loewenstein, & O'Donoghue, 2002). For example, a single scoop of strawberry ice cream (or $10) today often trumps the promise of an entire carton (or $20) in several weeks time. Where finances are concerned, neglecting the future may arise for a variety

of reasons. For many individuals, income levels are simply insufficient to enable funds to be directed into pension plans or deposit accounts: for others, unavoidable spending commitments in the present (e.g., mortgage payments, childcare) overwhelm the benefits of long-term financial planning. In other words, when potential insolvency looms large, saving for the future is an unrealistic ambition. Even when people possess the capacity to save, however, discounting continues to occur. Set against the tepid allure of distant rewards, immediate prizes are more arousing, emotional and gratifying (e.g., Mischel, 1974; Mischel, Ebbesen, & Raskoff Zeis, 1972; Mischel, Shoda, & Rodriguez, 1989). Driving these contrasting feelings are differences in the products of temporal construal. Whereas experiences in the far-off future tend to be characterized in an abstract, conceptual manner, representations of the here-and-now are rich in experiential (e.g., hedonic) detail (see Trope & Liberman, 2003, 2010). Little wonder, therefore, that actions with instant gratification (e.g., spending) are so difficult to resist.

Acknowledging the challenges of intertemporal choice, various remedies have been proposed in an attempt to enhance the valuation of future rewards and encourage saving (Ho, Lim, & Camerer, 2006). Two in particular have proved popular: either diminish the attraction of the present by persuading people to pre-commit to saving at a later date (Ariely & Wertenbroch, 2002; Thaler & Benartzi, 2004); or encourage them to consider the benefits that can be accrued from diverse ways of spending in the future (Frederick, Novemsky, Wang, Dhar, & Nowlis, 2009; Nenkov, Inman, & Hulland, 2008). In other words, lessening the lure of today or increasing the appeal (and requirements) of tomorrow facilitates saving. Of theoretical relevance to the current inquiry, an interdisciplinary viewpoint has also been advanced that identifies a different pathway to improved financial decision-making. According to various philosophers, economists and psychologists, a critical determinant of intertemporal choice is the degree to which a person is connected with his or her future self (e.g., Hershfield, 2011; Mitchell, Schirmer, Ames, & Gilbert, 2011; Parfit, 1971, 1987; Schelling, 1984; Thaler & Shefrin, 1981). As Bartels and Urminsky (2011,

p. 183) report, "…a person values future outcomes in proportion to how much she feels, at that moment, that the current self's important psychological characteristics will persist in the future self." What this viewpoint therefore implies is that saving for later life should be enhanced when continuity between one's current self and future self is high.

Saving and Future-Self Continuity

Underpinning the continuity-based account of intertemporal choice is the assumption that, rather than comprising a monolithic, unitary entity, self is a collection of distinct identities that overlap with each other (to varying degrees) over time (e.g., Higgins, 1987; Markus & Nurius, 1986; McConnell, 2011; Roberts & Donahue, 1994). From this standpoint, self-continuity is believed to fluctuate as a function of temporal distance, such that a person will feel more congruent with her potential self in the near (e.g., 12 months) than distant (e.g., 20 years) future. Indeed, if one travels too deeply into the future, psychological connectivity may be severed altogether, with one's future-self acquiring the status of an entirely different person (Mitchell et al., 2011; Parfit, 1971; Pronin, Olivola, & Kennedy, 2008; Pronin & Ross, 2006; Wakslak, Nussbaum, Liberman, & Trope, 2008). For example, participants are more likely to ascribe stable personality traits to their distant future than current-self (Pronin & Ross, 2006), mirroring their tendency to ascribe dispositional attributions to other people (Nisbett, Caputo, Legant, & Maracek, 1973). The ramifications of this temporal discontinuity for financial planning are obvious. If one's future-self is essentially a different person, saving for later life has little appeal (Hershfield, 2011).

A substantial body of evidence supports the contention that temporal discounting is influenced by future self-continuity (Bartels & Rips, 2010; Bartels & Urminsky, 2011; Ersner-Hershfield et al., 2009a; Ersner-Hershfield, Wimmer, & Knutson, 2009b; Hershfield et al., 2011). In a brain imaging investigation, for example, Ersner-Hershfield et al. (2009b) required participants to make personality judgments about their current-self, future-self and other people. Among

participants for whom thinking about their current and future self was most similar (i.e., as indexed by activity in the ventromedial prefrontal cortex), devaluation of monetary rewards over time was least pronounced. Bolstering these findings, higher-levels of future self-continuity have also been shown to predict actual financial security in the real world. In a sample of working adults (aged 20-86 years) in San Francisco, future self-similarity was found to be positively associated with accumulated assets, such as material possessions, investments, and savings (Ersner-Hershfield et al., 2009a).

If future self-continuity facilitates saving, an important question arises — how can the critical connection between one's current and prospective self be strengthened? In an ingenious series of experiments, Hershfield et al. (2011) tackled this problem using immersive virtual environments (Blascovich & Bailenson, 2011). Their reasoning was straightforward. Once given an opportunity to interact with age-progressed renderings (i.e., self as a senior citizen) of themselves in virtual reality (VR), people should experience greater future self-continuity and make smarter (e.g., less impatient) monetary decisions. Intriguingly, not only was this exactly what they found, but the beneficial effects of this manipulation only emerged when participants had direct exposure to their future self, interacting with any elderly avatar did not attenuate temporal discounting and facilitate saving (i.e., priming 'older adults' did not promote saving, Bargh & Chartrand, 1999). Although promising, it is worth noting that this intervention rests on the availability of a technology (i.e., VR) that is expensive and currently beyond the reach of most individuals.[1] Fortunately, however, a substitute simulator capable of generating comparable experiences is readily accessible to all — the human mind (Gilbert & Wilson, 2009).

People spend substantial periods of time imagining their future selves, simulating likely events and experiences (Gilbert & Wilson, 2009; Smallwood & Schooler, 2006; Suddendorf & Corballis, 2007; Szpunar, 2010). They do so for good reason. By previewing the future, it is possible to anticipate how best to think, feel and act in just about any conceivable situation (Gilbert

& Wilson, 2009). In this regard, perhaps the most potent aspect of Hershfield and colleague's (2011) immersive methodology was not that it served to presage future action, but rather it enabled participants (i.e., college students) to preview their appearance in 50 years time. Highlighting the physical changes associated with aging (e.g., shrinking, wrinkling, graying, balding) in this way likely increased the visual salience of their elderly self (i.e., "that's how I'll look when I'm 70"), thus strengthened future-self continuity and led participants to prioritize saving over spending (Hershfield, 2011). In other words, exposure to their elderly appearance enhanced the connection between participants' current and future selves.

As the hypothesized association between visual awareness of the body and future-self continuity has yet to be examined (Hershfield et al., 2011), we explored this relation in a preliminary investigation (see Supplemental Online Material). As expected, visual awareness of their body as an older adult was positively correlated with participants' estimates of future-self continuity. This demonstration is valuable as it affirms that the ability to preview one's future appearance does not necessitate visiting a VR laboratory — mental imagery can trigger comparable effects (Gilbert & Wilson, 2009; Moulton & Kosslyn, 2009). As such, much like encountering one's prospective self in an immersive environment (Hershfield et al., 2011), imagining oneself in the distant future should have the capacity (at least under certain conditions) to encourage saving, a possibility we explored in our first experiment.

Experiment 1

A natural property of mental imagery provides an easy conduit to highlight the physical changes associated with aging. When simulating future events (e.g., a post-retirement Caribbean cruise), one of two vantage points can be adopted. A first-person (i.e., egocentric) perspective in which, consistent with perception, events are envisaged though one's own eyes, or a third-person (i.e., allocentric) vantage point whereby episodes are viewed from an outside point-of-view (see

Libby & Eibach, 2011). While an extensive literature has demonstrated important vantage-point effects on cognition and behavior (e.g., Christian, Miles, Kenyeri, Mattschey, & Macrae, 2016; Christian, Parkinson, Macrae, Miles & Wheatley, 2015; Libby, Shaeffer, Eibach, & Slemmer, 2007; Libby, Valenti, Hines, & Eibach, 2014; Macrae, Sundar Raj, Best, Christian, & Miles, 2013), emphasis in the current experiment falls primarily on the different visual experiences these viewpoints provide. Notably, that one's appearance — hence elderly self — is more visually salient when future events are imagined from a third-person than first-person perspective (Frederickson & Roberts, 1997; Libby & Eibach, 2011). In turn, this enhanced visual salience should encourage saving rather than spending (Hershfield et al., 2011).

Interestingly, a similar prediction can be derived from competing — though closely related — theoretical approaches. In the cognitive domain, for example, visual perspective has been shown to emphasize different types of information. Whereas first-person imagery facilitates access to associative evaluations of a simulated event, third-person imagery increases reliance on propositional self-knowledge (Libby & Eibach, 2011; Libby et al., 2014). It is entirely possible, therefore, that self-relevant knowledge (e.g., 'being comfortable in later life is important to me'), accessed via third-person imagery, may encourage saving over spending (Libby et al., 2014). That is, a third-person vantage point may stimulate people to think about the broader meaning of events and their relation to oneself, thereby potentially enhancing future-self continuity (Libby & Eibach, 2011). Relatedly, Construal-level theory (CLT, see Trope & Liberman, 2003, 2010) contends that people tend to represent psychologically distant events on the basis of their essential, prototypical features. It is conceivable, therefore, that abstract construal, triggered via third-person imagery, may emphasize prudence over indulgence, at least among individuals for whom saving is an important part of their self-concept (Fujita, Henderson, Eng, Trope, & Liberman, 2006; Libby et al., 2007, 2014).

Although several overlapping literatures converge on the prediction that third-person imagery should facilitate saving (Trope & Liberman, 2003, 2010; Libby & Eibach, 2011), the current work departs from these viewpoints in that it does not rely on differences in cognitive factors, such as self-knowledge or life goals (Libby et al., 2007; Libby et al., 2014), to drive the effect of interest. Instead, simply seeing oneself in the future as an older adult may be sufficient to prioritize saving over spending (see also Hershfield et al., 2011). Accordingly, exploiting the demonstration that third-person (vs. first-person) imagery tends to be the favored vantage point when events in the distant future are simulated (Macrae et al., 2015; Pronin & Ross, 2006), our first experiment explored the effects of visual perspective on people's saving/spending decisions. Compared to individuals who report adopting a first-person vantage point when imagining their distant-future self, we expected third-person imagers to exhibit a greater propensity to save for a later date.

Method

Participants

One hundred undergraduates (52 females, M_{age} = 21.20, SD = 1.20) took part in the research on a voluntary basis.[2] The experiment was reviewed and approved by the School of Psychology's Ethics Committee.

Materials and Procedure

Participants were greeted by a female experimenter and randomly assigned to one of the conditions. The experimenter explained that the task entailed a brief period of mental imagery, after which aspects of their imaginary experience would be probed. Participants were instructed to imagine taking a mid-afternoon walk, along a quiet beach, in 40 years time (i.e., when aged around

60 years). Once the instructions were fully understood, participants closed their eyes and spent 20 seconds imagining the event.

Following the guided imagery, participants were required to select, from two possibilities, the vantage point that best described the image they had formed of the event (Pronin & Ross, 2006): (a) I saw the scene from my original point of view (not as an external observer would see it). I did not see myself in the image, since it was as though I was looking at the event through my own eyes; or (b) I saw the scene as an observer might see it (not from my original point of view). I saw myself in the image, since it was as though I was looking at the event through the eyes of an observer. Next, in a modified money allocation task (Hershfield et al., 2011), participants were asked, "If you unexpectedly received £1000 (~$1500), how much would you choose to spend at the current time and how much would you save for the future?" The values provided were required to sum to £1000 (~$1500). Participants were then debriefed, thanked and dismissed.

Results

Visual Perspective

A chi-square test confirmed that participants were more likely to simulate the distant future from a third-person (62%) than first-person (38%) perspective, χ^2 (1, N = 100) = 5.76, p = .016.

Savings

An independent samples *t*-test yielded an effect of the vantage point adopted during mental imagery on the proportion of money participants were prepared to save (vs. spend), such that savings were greater following third-person (M = .62, SD = .19) than first-person (M = .45, SD = .24) imagery, t(98) = 3.92, p < .001, d = 0.81, 95% CI: [.08, .26].

Discussion

These findings support the prediction that the visual perspective adopted during future-related imagery can influence saving decisions. Not only did participants prefer third-person (vs. first-person) imagery when simulating their distant-future self (Macrae et al., 2015; Pronin & Ross, 2006), adoption of this vantage point also increased saving rates by around 17% (i.e., £170, ~$255). In other words, third-person imagery triggered prudent rather than impatient choices. Although, at least in the context of VR, it has been shown that exposure to an impersonal/unfamiliar senior citizen does not increase saving (Hershfield et al., 2011), it is feasible that priming effects of this kind could emerge during prospection. Accordingly, to rule out this possibility, additional data were collected in a task in which participants imagined an elderly adult walking along a beach, after which their saving/spending decisions were probed (see Supplemental Online Material). These data confirmed that simply imagining an older adult does not encourage saving.

Experiment 2

Guiding the current investigation is the assumption that the visual salience of one's future-self influences saving/spending decisions (Hershfield et al., 2011). Thus far, however, the results of Experiment 1 provide only indirect support for this viewpoint. Accordingly, the goal of our second experiment was to explore directly the effects of vantage point on visual awareness of the body and saving decisions. Modifying the procedure adopted in Experiment 1, on this occasion participants were explicitly instructed to visualize a distant-future event (i.e., beach walk) from either a first-person or third-person vantage point (Macrae et al., 2015), after which their saving/spending decisions and levels of bodily awareness during the imaginary experience were probed. We expected saving rates to be higher following third-person (vs. first-person) imagery, reflecting increased visual salience during mental simulation.

Method

Participants and Design

One hundred undergraduates (62 females, M_{age} = 20.92, *SD* = 1.57) took part in the research on a voluntary basis.[2] The experiment had a single factor (Visual Perspective: first-person or third-person) between participants design and was reviewed and approved by the School of Psychology's Ethics Committee.

Materials and Procedure

Participants were greeted by a female experimenter and randomly assigned to one of the conditions. The experimenter explained that the task entailed a brief period of mental imagery, after which some questions would be asked. Participants were instructed to imagine taking a mid-afternoon walk, along a quiet beach, in 40 years time (i.e., when aged around 60 years). Prior to the guided imagery, participants were instructed about the visual perspective they were required to adopt during the task (Libby & Eibach, 2011). Those in the first-person condition were told, "When you imagine the beach walk, please picture it from a first-person perspective. Visualize the event from your own viewpoint — that is, see the event through your own eyes." Alternatively, participants in the third-person condition were instructed, "When you imagine the beach walk, please picture it from a third-person perspective. Visualize the event from an external viewpoint — that is, see the event as if through the eyes of another person." Once the instructions were fully understood, participants closed their eyes and spent 20 seconds imagining the event.

Following the guided imagery, participants answered two questions. The first question asked, "To what extent did you feel visually aware of your body during the beach walk?" Responses were given on a 9-point scale with appropriate anchors (i.e., 1 = not at all aware, 9 = highly aware). As in Experiment 1, the second question asked, "If you unexpectedly received £1000 (~$1500), how

much would you choose to spend at the current time and how much would you save for the future?" Participants were then debriefed, thanked and dismissed.

Results

Visual Bodily Awareness

An independent samples *t*-test revealed an effect of Visual Perspective on participants' ratings of bodily awareness during the imaginary experience, such that awareness was higher following third-person (M = 5.32, SD = 1.96) than first-person (M = 4.30, SD = 2.10) imagery, $t(98) = 2.51$, $p = .014$, $d = 0.50$, 95% CI: [0.21, 1.83].

Savings

An independent samples *t*-test yielded an effect of Visual Perspective on the proportion of money participants were prepared to save (vs. spend), such that savings were greater following third-person (M = .65, SD = .30) than first-person (M = .51, SD = .36) imagery, $t(98) = 2.11$, $p = .037$, $d = 0.42$, 95% CI: [.01, .27].

Mediation by Visual Bodily Awareness

Regression analyses were undertaken to test whether bodily awareness mediated the relation between Visual Perspective and savings (Baron & Kenny, 1986; Hayes, 2012). The results revealed that visual awareness of the body uniquely predicted how much participants were prepared to save for the future ($B = 0.06$, $SE = 0.02$, $p < .0001$). However, when bodily awareness was included simultaneously in the model, the relation between Visual Perspective and savings was eliminated ($B = 0.08$, $SE = 0.06$, *ns*). Bootstrapping procedures (5000 re-samples) were used to test the

significance of the indirect effect. These confirmed that visual bodily awareness exerted a significant indirect effect on savings (indirect effect = 0.06; 95% bootstrapped confidence intervals, CI: [.01, .14], see Figure 1).

Insert Figure 1 Here

Discussion

Extending prior research (Hershfield, 2011), these findings support the hypothesis that, via shifts in awareness of the body, future savings are increased when one's self is imagined from a third-person rather than a first-person vantage point. Moreover, visual salience during mental imagery mediates the relation between vantage point and the amount of money participants are prepared to save (vs. spend). Together with the results of Experiment 1, this suggests that mental imagery exerts considerable influence on the outcomes of intertemporal choices.

General Discussion

Acknowledging the widening gap between life expectancy and post-retirement savings, here we explored how a basic facet of mental imagery — spatial visual perspective — can influence decisions to spend now or save for the future. In two studies, our findings revealed the potential financial benefits of imagining one's future self from a third-person vantage point. First, savings were elevated when a distant-future event (i.e., beach walk) was spontaneously generated from a

third-person rather than a first-person perspective (Expt. 1). Second, adoption of a third-person (vs. first-person) vantage point during guided visual imagery increased savings via heightened awareness of one's appearance as an older adult (Expt. 2). Thus, whether encountered in an immersive environment (Hershfield et al., 2011) or generated in the mind's eye, visual exposure to one's future self influences the products of intertemporal choice. As Hershfield (2011, p. 401) has reported, "when the future self is imbued with realism and vividness…people are more willing to make sacrifices today that may benefit them at some point in the years to come."

The current findings are noteworthy for several reasons. Previously, it has been suggested that mental imagery may neither be a popular nor indeed effective strategy for previewing one's future self (Hershfield et al., 2011). Here, we provide preliminary evidence to challenge questions of efficacy; however, it is perhaps easy to see why imagery has not, yet, become wildly popular. Although capable of imagining the myriad physical changes that accompany aging, individuals may rarely do so either because of its difficulty or because of the potentially unflattering self-portrayals it yields (e.g., 'I've put on 40 pounds'). In addition, even when one's future self is imagined, it may not be in a manner conducive to influencing intertemporal choice. For example, young adults may seldom preview themselves in their post-retirement years (i.e., preferring to imagine near future events) and on the odd occasion when they do the resultant imagery may be abstract and schematic in nature rather than concrete and visual (Libby & Eibach, 2011; Trope & Liberman, 2003, 2010). Countering these observations however, as demonstrated herein, when distant future events are simulated from a third-person (vs. first-person) vantage point, mental imagery does appear to influence people's decisions (albeit hypothetical) to save or spend. Given that many individuals tend to naturally simulate the distant future from a third-person perspective (Macrae et al., 2015; Pronin & Ross, 2006), the challenges may reside in getting them to imagine situations far beyond the here-and-now and ensuring they do so in ways that promote self-continuity (Hershfield, 2011).

That third-person imagery is the favored strategy when imagining distant future events (Macrae et al., 2015; Pronin & Ross, 2006) raises an interesting question when considering the current findings. Specifically, if people predominantly adopt a third-person vantage point when simulating the distant future (see Expt. 1), might there be costs (e.g., negative affect, cognitive load) associated with adopting a non-preferred perspective (i.e., first-person perspective) that impact saving? While the current work cannot rule out this possibility, it seems unlikely that decreased mood or cognitive load would be driving the effects seen here for a couple of reasons. First, although people routinely report simulating events from a single perspective (Libby & Eibach, 2011), research has shown that they are quite capable of adopting both viewpoints and periodically switch from one vantage point to another (Berntsen & Rubin, 2006; Heubner & Fredrickson, 1999; Rice & Rubin, 2009; Robinson & Swanson, 1993). Moreover, while third-person imagery may prevail when simulating the distant future (Expt. 1), an estimated 60.5% of individuals in western cultures spontaneously adopt a first-person perspective when their minds wander (Christian et al., 2013), suggesting this vantage point is a very familiar mode of simulation. Second, compared to a third-person perspective, first-person imagery is accompanied by greater sensorimotor activity, which often translates to a richer affective experience (Christian et al., 2015; Kross, Ayduk, & Mischel, 2005; Verduyn, Van Mechelen, Kross, Chezzi, & Van Bever, 2012). Imagining a positive event (e.g., a beach walk) is therefore likely to be less positive if viewed from a third-person vantage point, as it reduces the visceral (e.g., pain/pleasure) intensity of the imagined event (Christian et al., 2015). Nevertheless, to address the wider implications of instructing a specific visual perspective, research would benefit from measures that tap the consequences of adopting a non-favored vantage point during mental simulation.

The benefits of third-person imagery extend beyond future saving decisions. Compared to when events are generated from a first-person perspective, third-person imagery protects the self from maladaptive forms of introspection (Ayduk & Kross, 2008; Kross et al., 2005), increases

achievement motivation (Vasquez & Buehler, 2007), diminishes egocentrism (Golubickis, Tan, Falben, & Macrae, 2016; Macrae et al., 2016), attenuates the planning fallacy (Buehler, Griggin, Lam, & Deslauriers, 2012), reduces dietary temptation and consumption (Christian et al., 2016), and facilitates actions consistent with self-conceptualizations (Libby, Eibach, & Gilovich, 2005; Libby, Valenti, Pfent, & Eibach, 2011; Libby et al., 2014). In the current investigation, third-person imagery fostered saving by increasing awareness of one's body. It is worth noting, however, that increased bodily awareness during imaginary experiences can also precipitate some decidedly undesirable outcomes — most notably, the problem of self-objectification. Objectification theory (Frederickson & Roberts, 1997) strives to understand the causes and consequences of bodily dissatisfaction that are so prevalent among women in Western society. According to this theoretical account, self-objectifying women engage in habitual body surveillance (i.e., third-person imagery), resulting in discontent, shame, and lowered self-esteem. As such, it would be inappropriate to trumpet third-person imagery as a panacea for people's judgmental failings. Depending upon the specific task circumstances and decisions at hand, it is probable that this imagery perspective can either help or hinder social-cognitive functioning and self-construal (Christian, Miles, Parkinson, & Macrae, 2013).

Extending basic demonstrations of vantage-point differences in cognition and behavior (e.g., Macrae et al., 2013), recent research has sought to elucidate the specific mechanisms through which these effects arise. To date, a couple of prominent pathways have been identified. As previously noted, Libby et al. (2014) have demonstrated important vantage-point effects in the accessibility of different types of information. Specifically, whereas first-person imagery facilitates access to associative evaluations of a simulated event, third-person imagery increases reliance on propositional self-knowledge (Libby & Eibach, 2011). Complementing this work, elsewhere it has been shown that first-person simulations are accompanied by richer sensorimotor experiences than their third-person equivalents (Christian et al., 2016; Christian et al., 2015; Macrae et al., 2016;

Miles, Christian, Masilamani, Volpi, & Macrae, 2014). Rather than operating independently, it is likely these cognitive and sensorimotor processes work in tandem during mental simulation. Take, for example, the current findings. Although awareness of the body mediated the relation between vantage point and savings, it is possible that propositional self-knowledge (e.g., 'financial stability is important to me'), accessed via third-person imagery, also contributed to the emergence of this effect (Libby et al., 2014). A useful task for future research will therefore be to explicate how vantage point influences the diverse components of psychological construal (Trope & Liberman, 2003, 2010) and how these in turn impact self-continuity and intertemporal choice.

In exploring how visual perspective influences intertemporal choice, the current investigation comprises an interesting beginning. Nevertheless, to establish the generality and scope of the effects observed, further research is required. Several lines of inquiry would be useful. For example, work should consider the effects of visual perspective on fine-grained measures of temporal discounting together with actual rates of saving outside the laboratory (Bartels & Rips, 2010; Ersner-Hershfield et al., 2009a). In standard discounting tasks, participants must choose between a smaller immediate reward (e.g., $2,000 to $25,000) and a delayed larger reward (e.g., $75,000 to $100,000), over variable temporal intervals (e.g., 35 to 50 years). Based on their decisions and application of the popular hyperbolic function as a model to describe the decline of subjective value with increasing delays (Mazur, 1987), it is possible to calculate a discount parameter (i.e., *k*) that varies across participants. This discount parameter expresses the steepness of the discounting function and the rate of decline in the value of rewards (i.e., larger values of *k* signify greater temporal discounting). Of specific interest would be the extent to which discount rates are influenced by the vantage point (i.e., first-person vs. third-person) adopted during future-related imagery.

In addition, it would also be valuable to explore if differences in the structural characteristics of imaginary experiences are associated with the accumulation of wealth (and indeed

other resources) in everyday settings. Revealing vantage-point effects on hypothetical financial decisions is one thing, demonstrating that these differences extend to actual saving behavior in the real world a quite different (and important) matter (Ersner-Hershfield et al., 2009a). When considering vantage-point differences in financial judgments, it would also be interesting to reframe the decision such that the positive option (i.e., saving) is associated with benefits in the here-and-now rather than distant future. Elsewhere, Segar, Eccles, and Richardson (2011) have advocated rebranding health promotion to focus more on the immediate than remote advantages of healthy behaviors. Guiding this suggestion is the observation that immediate payoffs serve as a stronger motivation for certain behaviors than distant goals. Exploring how vantage point differences in visual imagery moderate the appeal of saving for the present will be a valuable addition to the literature.

Given reported cultural, individual, and contextual variation in the adoption of imagery perspectives and future-self connectivity (e.g., Addis, Wong, & Schacter, 2008; Christian et al., 2013; Cohen, Hoshino-Browne, & Leung, 2007; Zhang, Kong, Zhang, & Li 2015), it will be essential for further research to investigate how these factors influence intertemporal choice. For example, do cultural differences (i.e., collectivist vs. individualistic) in the adoption of imagery perspectives impact rates of saving at a societal level? To date, the prevalence of first- and third-person visual perspectives has not be studied extensively in Eastern societies (Christian et al., 2013), although Asian-Americans have been shown to utilize a third-person vantage point more readily than Euro-Americans during memory retrieval (Cohen et al., 2007). Of interest, therefore, will be research exploring the extent to which cultural differences in vantage point shape people's financial decisions and actual saving behavior. Similarly, differences across the lifespan offer another important topic for investigation. Notwithstanding the composition of the current sample, younger adults have a tendency to be present-focused (Addis et al., 2008); precisely the mind set that may obscure the desirability of saving for the future. It will be valuable, therefore, to explore how

differences in future-connectivity shape both the process and products of mental simulation across cultures and individuals.

If future-self continuity holds the key to reducing temporal discounting and improving saving, of critical importance is how psychological connectivity with one's prospective self is assessed. Adapted from relationships research (Aaron, Aaron, & Smollan, 1992), the most common method to date has been to require participants to choose a set of Euler circles (i.e., current self vs. future self) that range from depicting no overlap between the selves to almost complete overlap (see Supplemental Online Material). Importantly, this approach has been successful both when the basis of future similarity is unspecified (Ersner-Hershfield et al., 2009a) and when it is tied to specific personal attributes (e.g., beliefs, values; Bartels & Rips, 2010). Given current emphasis on the visual salience of one's appearance as an older adult (Hershfield et al., 2011), bodily awareness seemed like a direct and appropriate proxy for estimates of future-self continuity. It is likely that probing levels of awareness cemented the idea that participants were viewing the self in the future rather than another person (Hershfield, 2011; Pronin & Ross, 2006). In this way, the current measure represents more than a check on the manipulation of visual perspective. Indeed, it is possible to generate actions in which first-person imagery may elevate visual awareness of one's body, such as simulations of undressing, showering, and trimming one's toenails. The critical distinction is one of degree. Whereas first-person imagery typically (although not always) elevates experiential awareness (Christian et al., 2015), third-person imagery typically (although not always) increases visual awareness of one's physical body (Frederickson & Roberts, 1997).

Exclusive reliance on explicit (i.e., self-report) measures of self-continuity, however, may fail to capture the diverse and nuanced ways in which people are connected with their future selves. In this regard, much could be gained from the development and application of implicit measures to chart changes in self-continuity through time and how these are influenced by the specific components of self (e.g., physical self, psychological self) under consideration (Quoidbach, Gilbert,

& Wilson, 2013). In addition, bodily awareness can take a variety of forms. Aside from appreciation of one's physical appearance, mental imagery can also furnish kinaesthetic, interoceptive, and propositional information (e.g., Callow & Hardy, 2004; Christian et al., 2015; Libby et al., 2014). What is more, these components display systematic variation as a function of the vantage point adopted. For example, whereas interoceptive awareness is heightened following the adoption of a first-person (vs. third-person) vantage point (Christian et al., 2015), kinaesthetic imagery has been associated with a third-person (vs. first-person) viewpoint (Callow & Hardy, 2004). Therefore, whether bodily awareness aids or hinders decision-making likely reflects the complex interplay of several factors, including the specific experiential aspects of mental imagery under consideration, the task context, and the person running the mental simulation.

Conclusion

People retire earlier, live longer, and yet save less than they ever did before. Noting the tensions this can create, here we demonstrated that, via enhanced awareness of the body, adoption of a third-person (vs. first-person) vantage point during future-related imagery can encourage prudence, such that saving for the future is more attractive than spending in the present. What this suggests is that mental imagery may potentially be harnessed to facilitate financial wellbeing in later life.

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Footnotes

[1]Potentially widening consumer access to basic immersive technology, Sony's PlayStation VR Headset currently retails at $399. In addition, for as little as $0.99 people can preview their elderly face using apps such as AgingBooth.

[2]An *a priori* sample size calculation based on the average effect size reported by Hershfield et al. (2011) - G*Power, $d = 0.67$, $\alpha = .05$, power = 80%) revealed a requirement of 98 participants. This sample size is consistent with previous research exploring the effects of perspective taking and temporal construal on mental simulation (e.g., Libby et al., 2014; Macrae et al., 2015).