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BRIEF REPORT

Restricting Future Time Perspective Reduces Failure to Act after a Missed Opportunity

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Abstract

Inaction inertia occurs when missing an attractive opportunity (vs. not having been offered it) decreases the likelihood of acting on another similar opportunity. We experimentally manipulated future time perspective to reduce inaction inertia. Middle-aged and older adults from the Health and Retirement Study were randomly assigned to imagining restricted or expansive time left to live, or to no instructions. Across age, imagining a restricted future (v. the other two instructions) reduced inaction inertia and future time perspective. Imagining living longer increased future time perspective among relatively younger participants. Consequences of restricted time perspective for decisions and life regrets are discussed.

Key Words: future time perspective; motivation; decision making; inaction inertia; regret

Restricting Future Time Perspective Reduces Failure to Act after a Missed Opportunity

Most life regrets stem from inaction rather than from action (Gilovich & Medvec, 1995). Inaction inertia occurs when failing to act after missing an attractive opportunity versus not (Tykocinski, Pittman, & Tuttle, 1995). For instance, a missed opportunity to purchase a desired item at a 50% discount reduced consumers' willingness to purchase the same item later at a 20% discount compared to when the first discount was not missed (Arkes, Kung & Hutzel, 2002; Zeelenberg, Nijstad, van Putten, & van Dijk, 2006). Inaction inertia is posited to stem from regret about past inaction (Tykocinski & Ortmann, 2011). Inducing rumination about regretting past inaction increased inaction inertia (van Putten, Zeelenberg & van Dijk, 2007, 2009). By comparison, making it more difficult to associate a past purchasing opportunity with a present one by narrowing eligibility for the past discount reduced inaction inertia (van Putten et al., 2007, 2009). Focusing on the past has also been posited to promote sunk-cost bias, which involves throwing good money after bad due to concerns about irretrievable losses from the past (Thaler, 1980; Tykocinski & Ortmann, 2011). Less rumination about past failures decreased sunk-cost bias (Bruine de Bruin, Strough, & Parker, 2014; Strough, Schlosnagle & DiDonato, 2011), as did instructions to imagine a restricted future, which presumably shifted thoughts away from the past (Strough, Schlosnagle, Karns, Lemaster, & Pichayayothin, 2014).

Socioemotional selectivity theory posits that older adults have limited future time perspective, or a sense of less time remaining until death (Carstensen, 2006; Carstensen, Isaacowitz & Charles, 1999). Older adults' limited future time perspective is theorized to motivate prioritization of better emotional well-being in the "here and now" (Carstensen et al., 2011).

Much research on future time perspective uses correlational rather than experimental methods (see Loeckenhoff & Rutt's 2015 review). In experiments, future time perspective is limited when ending of life (or life stages) are cued, for example by imagining limited life expectancy (e.g., Allemand, 2008) or moving across the country alone (Frederickson & Carstensen, 1990). Only two experiments examined whether limiting future time perspective affected decisions. The first found that college students who imagined shorter lifetimes had less sunk-cost bias than a control group (Strough et al., 2014). The second found that limiting future time perspective through imagining a move (vs. expanded life expectancy) increased choices for low-arousal health care options (Jiang, Fung, Sims, Tsai, & Zhang, 2016).

Experiments that limit (vs. expand) future time perspective have demonstrated effects on outcomes other than decisions. Restricting future time perspective by imagining moving across the country alone (vs. no-instruction control) increased preferences for spending time with more familiar partners among adults of all ages (Frederickson & Carstensen, 1990). It also increased forgiveness towards friends among younger and older adults, compared to imagining living 20 years longer than expected and a no-instruction control group (Cheng & Yim, 2008). Among younger and older adults, imagining a limited (vs. expanded) life expectancy also increased forgiveness towards a friend (Allemand, 2008) and recall of positive over negative pictures (Barber, Opitz, Martins, Sakaki, & Mather, 2016).

Although experimentally limiting future time perspective has consistently promoted choices that maximize positive emotions, findings about expanding future time perspective are mixed. Expanding time perspective through instructions to imagine living 20 years longer than expected (vs. no instruction) decreased older adults' preferences for familiar partners (Fung, Carsensen, & Lutz, 1999). Yet, a study that used the same manipulation with somewhat older

participants in their seventies and eighties found no difference (Segerstrom, Geiger, Combs, & Boggero, 2016). Expanding future time perspective by imagining living 20 years longer than expected (vs. no-instruction control) decreased forgiveness in older but not in younger adults (Cheng & Yim, 2008). These unexpected findings have been attributed to 'expansive' instructions being less effective for younger people who already perceive an expansive future (Cheng & Yim, 2008) and to older adults' social preferences depending on whether loved ones also have an expanded life expectancy (Segerstrom et al., 2016). Moreover, imagining living 20 more years may seem unrealistic to people in their eighties. One study showed that instructions to imagine living 120 years (vs. a restricted life expectancy) increased future time perspective similarly among those aged 18-35 years and 60-74 years (Barber et al., 2016). However, because a no-instruction control group was not included, it is unclear whether the limited instruction decreased future time perspective, the expansive instruction increased future time perspective, or both.

For the two studies that examined whether future time perspective instructions affect decisions, results were also mixed for expanding future time perspective. Among college students, expanding future time perspective by imagining a long life did not affect sunk-cost bias as compared to a control group (Strough et al., 2014). The other study had no control group, leaving it unclear whether the instructions to expand vs. limit future time perspective produced the reported effects (Jiang et al., 2016).

The Current Study

Here, we investigated whether restricted and expansive future time perspective manipulations affect inaction inertia compared to a no-instruction control group, thus examining effects of each separately. We recruited a national sample of middle-aged and older adults, while

prior research on this topic used student samples (e.g., Tykocinski et al., 1995; Zeelenberg et al., 2006) or convenience samples of adults of unspecified ages (Kumar, 2004; Tsiros, 2009). Behavioral decision-making phenomena are not necessarily consistent across the life span (Bruine de Bruin, Parker, & Fischhoff, 2012). Specifically, our research questions were:

1. Does the effectiveness of instructions for changing future time perspective vary with age in a sample of middle-aged and older adults?
2. Is inaction inertia present in a national sample of middle-aged and older adults?
3. Do experimental manipulations of future time perspective affect inaction inertia and does their influence vary with age?

Method

Participants

A sample of 719 middle-aged and older adults was randomly selected from the U.S. Health and Retirement Study (HRS, Juster & Suzman, 1995). The HRS is a longitudinal study of approximately 20,000 U.S. adults age 50 and older conducted by the University of Michigan, with funding from the National Institute on Aging and Social Security Administration (https://hrs.isr.umich.edu/documentation). The final sample included 700 adults (M age =66.74, SD = 10.95 yrs, 31-94 yrs) most of whom were women (55%), White/Caucasian (79%) and non-Hispanic (90%). Nineteen participants were excluded because they skipped the three future time perspective items. They were significantly older than their 700 counterparts (M = 75.95, SD = 11.81 vs. M = 66.74, SD = 10.95) $F(1, 718) = 13.03$, $p < .05$, but did not differ in gender or race ($p>.10$).

Biannual HRS surveys since 1992 have included experimental modules about emergent issues. Our 2014 HRS module is available online

(http://hrsonline.isr.umich.edu/modules/meta/2014/core/qnaire/online/Module_3.pdf and http://hrsonline.isr.umich.edu/modules/meta/2014/core/codebook/h14_00.html). Participants were randomly assigned to a face-to-face or telephone interview, which did not affect the results. Participants were paid $80-$100 for participation in the 2014 HRS. The study was approved by the University of Michigan's Institutional Review Board.

Procedure and Measures

Participants were randomly assigned to restrictive or expansive future time perspective instructions, or no instructions. Following prior research (Allemand, 2008; Fung et al., 1999; Strough et al., 2014), the restrictive group (n=220) was asked to "imagine that because of a critical illness, you have not much longer to live." The expansive group (n=244) was asked to "imagine that last week you found out from your doctor about a new medical advance that ensures that you will enjoy many more years beyond the age you expected to live in reasonably good health." We did not ask participants to imagine living "20 more years," as it could seem unrealistic to older adults. The control group (n=236) received no instruction.

Next, participants were told, "Imagine that you would like to have a couch in your room." They received two scenarios from Zeelenberg et al. (2006) about purchasing opportunities.[1] The first scenario described a missed opportunity to purchase a desired new couch at a 50% discount, and a 20% discount available next week. The second scenario only described the 20% discount on the desired couch next week. After reading each scenario, participants were asked, "How likely would you be to wait to buy the couch using the 20% discount next week?" They rated purchasing likelihood on a six-point scale (1=very unlikely to wait to buy the couch, 6=very

[1] A separate group (n=737) saw two sunk-cost scenarios from Strough et al. (2014). Sunk-cost bias was evident, but the instructions did not alter future time perspective while making the decision or influence sunk-cost bias (see online supplement).

likely to wait to buy the couch). Lower ratings on the first scenario relative to the second indicate inaction inertia.

Finally, three manipulation check items assessed the effectiveness of the restrictive and expansive future time perspective instructions relative to no instruction, using a six-point scale (1=very untrue, 6=very true): two items from Carstensen and Lang (1996; "I have a sense time is running out; As I get older, I begin to experience time as limited") and one from Strough et al. (2016, "I have limited time left to live my life"). HRS survey time precluded using more items, so we selected a cohesive set that matched our manipulation of perceived life expectancy (Fung & Isaacowitz, 2016; Rohr, John, Fung, & Lang, 2017; Strough et al., 2016). Internal consistency was sufficient to average ratings ($\alpha = .86$). Higher ratings indicated perceiving a more limited future while making the decision.

Covariates

Health. Self-reported health was assessed on a 5-point scale (1 = excellent, 2 = very good, 3 = good, 4 = fair, or 5 = poor; Lawton, Moss, Fulcomer, & Kleban, 1982).

Fluid Cognitive ability. HRS assessed fluid cognitive ability through immediate recall (of 10 listed words), delayed recall (same list), backward counting (from 20 to 10), and serial 7s (starting with 100, sequentially subtract 7 five times). The sum of correct items across tasks yielded a score between 0 and 27. Higher scores indicated greater fluid cognitive ability (Crimmins, Kim, Langa, & Weir, 2011).

Results

Does the effectiveness of instructions for changing future time perspective vary with age in a sample of middle-aged and older adults?

A hierarchical linear regression tested whether instructions changed future time perspective and interacted with age (see online supplement for correlations). Step 1 included two experimental group dummy codes (comparing the restrictive group to the other two, and the expansive group to the other two), a continuous age variable, and covariates for perceived health and fluid cognitive ability. Step 2 added interaction terms between age and each experimental group's dummy code to test moderation of instructions by age.

The restrictive group (M=3.96, SE=.12) reported significantly shorter future time perspectives than the no-instruction control (M=3.31, SE=.12) and expansive (M=3.17, SE=.11) groups, B=.18, SE= .17, t=4.38, p < .0001). The dummy code for the expansive group was nonsignificant, t=-.46, p=.64. After accounting for covariates and dummy codes, the association between older age and shorter future time perspective was not significant (B=.07, SE= .01, t=1.78, p = .08). Both covariates, worse perceived health (B=.15, SE=.07, t = 3.97, p <.001) and poorer fluid cognitive abilities (B=-.12, SE=.02, t = -2.92 p <.01), were significantly associated with perceiving shorter future time.

At Step 2, there was a significant interaction between age and the expansive (B=.51, SE=.02, t=2.03, p =.04), but not the restrictive (B=-.18, SE= .02, t=-.66, p=.51) instruction (Figure 1).[2] That is, future time perspective was significantly less limited in the expansive group compared to the restrictive and control groups among participants who were relatively younger rather than older.[3]

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[2] When included to assess potential nonlinear effects, quadratic and cubic functions of age were nonsignificant.

[3] Following Hayes and Montoya (2017), we computed the Johnson-Neyman region of significance, which suggested that groups differed significantly among participants younger but not older than age 52. The Johnson-Neyman procedure was designed to identify the specific values at which groups differed significantly, unlike a simple slopes approach that examines differences at arbitrary values like plus or minus one standard deviation from the mean.

Is inaction inertia present in a national sample of middle-aged and older adults?

Participants displayed inaction inertia by being less willing to act on the attractive opportunity of buying a couch at discount, after missing the earlier opportunity (M =4.28, SE=.08) rather than not (M=4.71, SE=.07), F (1,699)=36.33, p<.001, η^2_p=.05.

Do experimental manipulations of future time perspective affect inaction inertia and does their effectiveness vary with age?

We computed a linear mixed model on willingness to purchase, with a within-subject factor for whether it was measured after missing the earlier opportunity versus not, a between-subject factor for assigned instructions (restrictive, expansive, control), and age measured as a continuous variable. Covariates were perceived health and fluid cognitive ability.

The first answer to this research question was seen in a significant main effect of instructions (F (2,694)=10.54, p<.001, η^2_p=.03) which indicated that the restrictive instruction (M=4.05, SE=.11) reduced willingness to wait to purchase at a discount compared to the other two groups (expansive M=4.65, SE=.12, control M=4.76, SE=.12, respectively) who did not differ from each other. However, this was qualified by an interaction of whether or not the earlier opportunity had been missed F (2,694)=6.55, p= .001, η^2_p=.02. Follow-up paired t-tests to isolate the interaction showed inaction inertia only for participants receiving control (t(235)=-6.01, p<.001) and expansive (t(243)=-3.38, p=.001) instructions, with reported purchasing likelihood being significantly lower after missing the earlier opportunity rather than not (see Figure 2). However, restrictive instructions led to similar reported purchasing likelihood after missing the

earlier opportunity rather than not, t(219)=-.99, p=.32, suggesting that imagining a restricted future reduced inaction inertia.[4]

The second answer to the research question was seen in the three-way interaction between age, assigned instructions, and whether the earlier opportunity had been missed was not significant, F(2,694) = 1.48, p=.23, indicating that the instructions were similarly effective across age.

When considering covariates, we found no significant relationship between perceived health and purchasing likelihood, while greater fluid cognition was associated with increased purchasing likelihood, regardless of whether or not the earlier opportunity had been missed, F (1,694)=9.54, p=.002, η^2_p=.01 (see online supplement).

Discussion

We tested whether experimentally manipulating future time perspective influenced inaction inertia, or failing to act on an attractive opportunity after having missed another. Restricted future time perspective instructions reduced inaction inertia relative to expansive

[4] Follow-up mediation analyses using Hayes' (2018) PROCESS macro for a multi-categorical predictor variable examined whether experimental group differences in purchasing likelihood when the sale had been missed were accounted for by future time perspective. Two dummy codes (comparing the restrictive group to the other two, and the expansive group to the other two) were used. As in the primary analyses, the dummy code that compared the restrictive group to the other two was significant but the dummy code that compared the expansive group to the other two was not. Specifically, purchasing likelihood was lower in the restrictive group compared to the expansive and control group (b=-.39, se=.20, p=.05). The restrictive group perceived more limited future time compared to the expansive and control group (b=.72, se=.17, p<.0001). However, more limited future time was associated with greater purchasing likelihood (b=.16, se=.04, p=.0003). Accordingly, the direct effect of the restrictive instructions on reduced purchasing likelihood was stronger (b=-.51, se=.20, p=.01) after accounting for the indirect effect through limited future time (b=.12, se=.04), indicating suppression. Thus, group differences in purchasing likelihood were not accounted for by future time perspective. A test of moderated mediation indicated that the direct and indirect paths between the experimental groups and purchasing likelihood were not moderated by age.

instructions and no-instruction controls. These results align with prior studies of college students which showed that restricting future time perspective changed decisions whereas expanding it had no effect (Strough et al., 2014). Thus, effects of future time perspective manipulations generalized to a different type of decision and an older adult sample.

Our findings add to two prior experiments on future time perspective and decision making (Jiang et al., 2016; Strough et al., 2014). Both inaction inertia and sunk-cost bias are said to reflect a failure to let go of the past (Tykocinski & Ortmann, 2011). Imagining a limited life expectancy may be incompatible with worrying about the past thereby decreasing inaction inertia and sunk-cost bias (van Putten et al., 2009). Effects of imagining a limited life expectancy were even stronger after accounting for future time perspective, perhaps by controlling for naturally occurring variation in future time perspective. Imagining a limited life expectancy could change decision-making processes beyond the ones we examined, by for example reducing regret (van Putten et al., 2009), construing events as more concrete (Trope & Lieberman, 2000), or focusing more on the "here and now," as socioemotional theory posits (Carstensen, 2006).[5] Additional research is needed to identify mechanisms whereby imagining a limited life expectancy affects decisions.

Imagining a limited life expectancy reduced future time perspective. Imagining living longer increased future time perspective only among relatively younger participants, without affecting inaction inertia. Elsewhere, we found the same instructions to be effective for restricting college students' time perspective but ineffective for expanding it (Strough et al.,

[5] Experiments of future time perspective ask participants to think of themselves as having restrictive or expansive life expectancy while considering the same events. Experiments of temporal construal ask participants to think of events as being in the present or in the future. Though instructions differ, it would be worthwhile to explore whether manipulating future time perspective affects construal levels

2014). Limited life expectancy instructions may be more powerful than expansive ones, in part because expansive instructions depend on the person's subjective life expectancy prior to the instruction (Rappange, Brouwer, & van Exel, 2016).

A strength of our study was the use of a national sample and experimental methods to investigate future time perspective. Whereas prior inaction inertia research was based mostly on college students, our findings suggest that inaction inertia is a robust phenomenon replicable in an age diverse sample. Yet, because our youngest participants were in their thirties, differences in inaction inertia and the effectiveness of restricted future time perspective in reducing it across the full age spectrum remain unclear. Our cross-sectional sample precludes distinguishing age-related change from cohort effects (Schaie, 1965). Our scenarios likely underestimated emotional reactions to missed opportunities because they were hypothetical. Further research is needed to examine whether focusing on the future helps people to ruminate less about past inaction (Wrosch, Bauer, & Scheier, 2005).

Additional research could also investigate whether imagining a restricted future helps people to overcome other instances of inaction inertia, such as refusing to sell poorly performing stocks after missing an opportunity to do so (Tycokinski, Israel, & Pittman, & 2004), and other types of decisions (Klapproth, 2008; Lockenhoff & Rutt, 2015).

Our findings have implications for research on behavioral decision making and life-span psychology. Encouraging a focus on a restricted future after missing an attractive opportunity helped people to overcome a failure to act when given a second chance. Moreover, imagining a restricted future may be useful when missing experiences rather than material goods, because regret over inaction is greater for the former than the latter (Rosenzweig & Gilovich, 2012). Of course, people do not regret all inaction because not all missed options are attractive (van Putten,

2013). Ultimately, helping people to seize second chances (even if they may be rare) may reduce life regrets and enhance psychological well-being across the life span.

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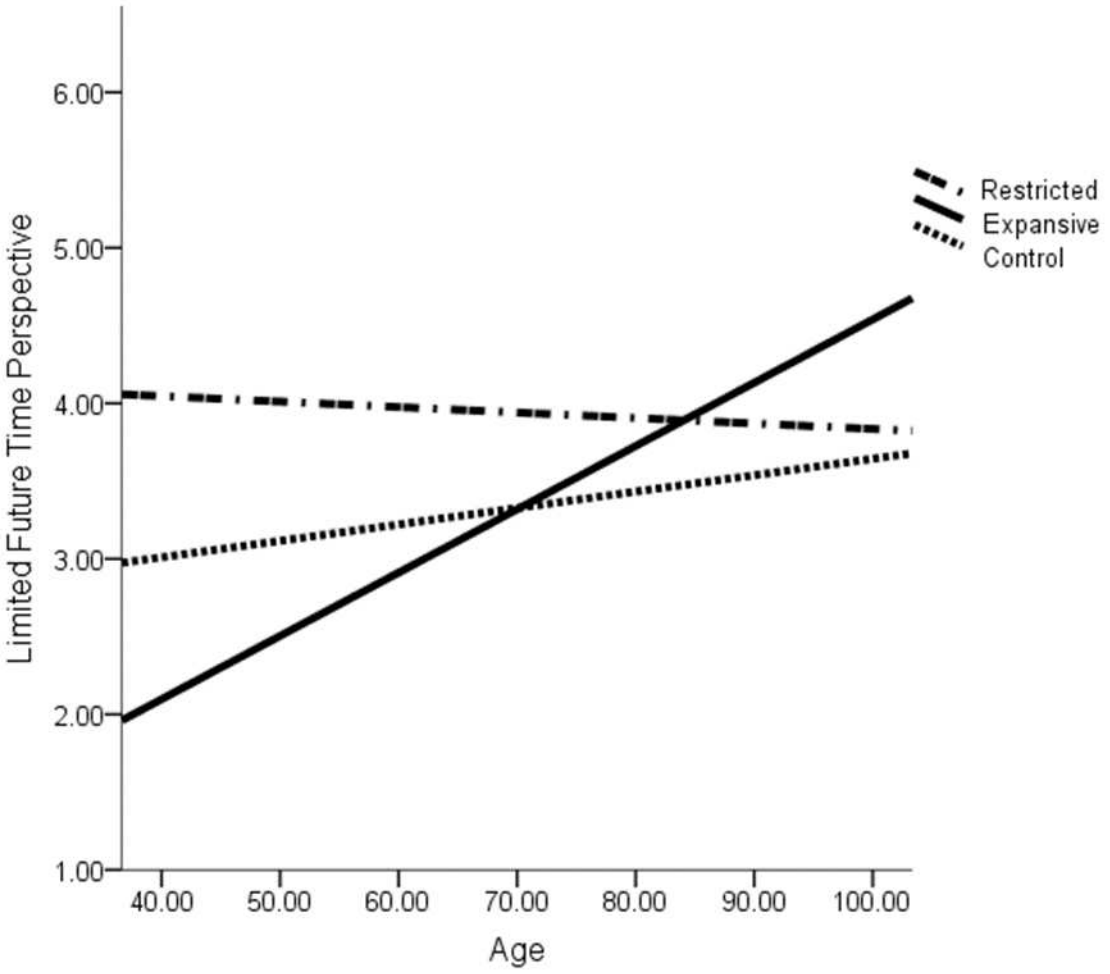

Figure 1. Limited future time perspective for restricted (se=1.88), expansive (se=1.70) and control (se=1.75) instruction groups. Higher scores indicate more limited future time perspective.

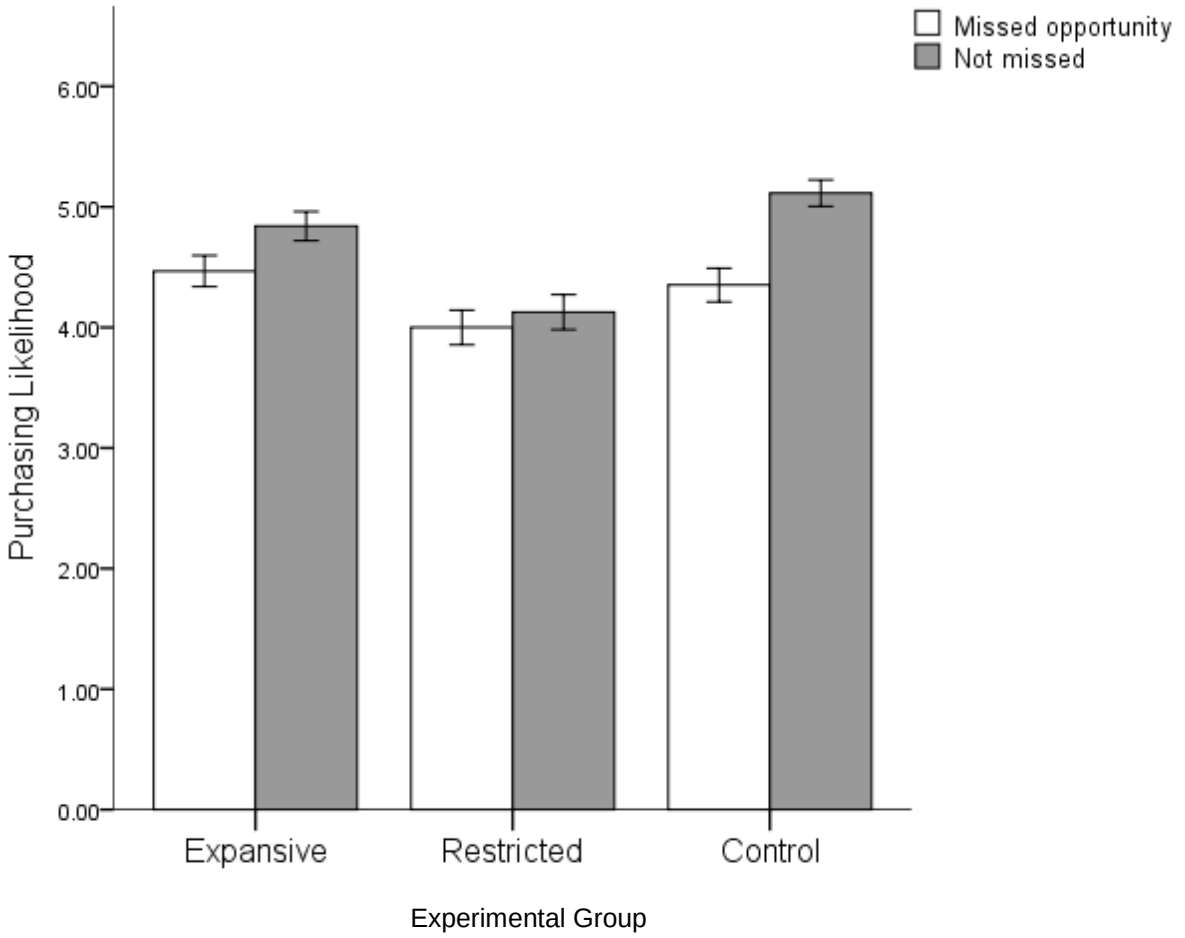

Figure 2. Purchasing likelihood when prior purchasing opportunity was missed versus not missed by experimental group. Higher scores indicate greater purchasing likelihood.

Supplementary Analyses of Sunk-Cost Scenarios

Methods

A separate group of 737 participants (M=67.14, SD=10.90, range 22-97) saw a pair of sunk-cost scenarios from Strough, Schlosnagle, Karns, Lemaster & Pichayayothin (2014). The first portrayed a sunk-cost scenario about deciding whether to continue to eat a paid-for dessert after feeling full. The second scenario was the same except the dessert was free. Participants indicated their decision on a scale that ranged from 1= definitely stop eating, to 6= definitely continue eating.

Participants received the same future time perspective intervention about imagining limited or expansive future as those who saw the inaction inertia scenarios. A no-instruction control group was also included. After making the decision, participants rated the same three items assessing whether the intervention changed limited future time perspective when making the decisions.

Results

Sunk-cost bias was evident, as shown in greater rated likelihood of continuing to eat a dessert, even after feeling full, when it was paid for (M=2.25, SD=1.60) versus free (M=2.12, SD=1.60), t (736)=-2.75, p=.006. For each participant, we computed a sunk-cost bias score by subtracting the rated willingness of continuing to eat the free dessert from the rated willingness of continuing to eat the dessert that was paid for. Larger scores indicated greater sunk-cost bias. The correlation between age and sunk-cost bias was small r=-.03 and nonsignificant, p>.25.

The future time perspective intervention did not yield expansive (M=3.32 SD=1.81), limited (M=3.56, SD=1.83) and control (M=3.24 SD=1.77) groups that differed in views of limited time

when making the decision, $F(2,707)=2.14$, $p=.12$, $\eta^2_p = .006$. Accordingly, the intervention did not influence sunk-cost bias $F\ (2,734)=.14$, $p>.250$, $\eta^2_p=.00$.

A moderation analysis using Hayes' PROCESS macro showed that the intervention was not moderated by age when comparing the two intervention groups to the control group $t(5,731)=-1.15$, $p=.250$, 95% CI [-.030, .008] or the intervention groups to each other $t(5,731)=-.38$, $p=.70$, 95% CI [-.025, .017].

Supplementary Tables

Table 1

All Participants: Study Variable Correlations

Variable	1	2	3	4	5	6
1. Age	-	.10*	-.06	.01	-.31***	.02
2. Limited Future Time Perspective		-	.09*	.07	-.17***	.17***
3. Purchasing Likelihood: Missed Opportunity			-	.58***	.10**	-.04
4. Purchasing Likelihood: Opportunity not missed				-	.12**	-.08*
5. Fluid Cognition					-	-.26***
6. Self-Rated Health						-

Note. n = 700, p < .05*, p < .01**, p < .001***

Table 2

Expansive Group: Study Variable Correlations

Variable	1	2	3	4	5	6
1. Age	-	.26***	-.05	.02	-.30***	.08
2. Limited Future Time Perspective		-	-.004	-.02	-.21**	.19**
3. Purchasing Likelihood: Missed Opportunity			-	.62***	.13*	-.17**
4. Purchasing Likelihood: Opportunity not missed				-	.23***	-.24***
5. Fluid Cognition					-	-.27***
6. Self-Rated Health						-

Note. n = 244, p < .05*, p < .01**, p < .001***

Table 3

Restricted Group: Study Variable Correlations

Variable	1	2	3	4	5	6
1. Age	-	-.02	-.09	-.13	-.29***	-.10
2. Limited Future Time Perspective		-	.29***	.33***	-.04	.06
3. Purchasing Likelihood: Missed Opportunity			-	.61***	.10	.02
4. Purchasing Likelihood: Opportunity not missed				-	.08	.07
5. Fluid Cognition					-	-.12
6. Self-Rated Health						-

Note. n = 220, $p < .05$*, $p < .01$**, $p < .001$***

Table 4

Control Group: Study Variable Correlations

Variable	1	2	3	4	5	6
1. Age	-	.06	-.04	.08	-.31***	.04
2. Limited Future Time Perspective		-	.05	-.01	-.28***	.28***
3. Purchasing Likelihood: Missed Opportunity			-	.51***	.10	.02
4. Purchasing Likelihood: Opportunity not missed				-	.11	-.12
5. Fluid Cognition					-	-.35***
6. Self-Rated Health						-

Note. n = 236, p < .05*, p < .01**, p < .001***