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BRIEF REPORT

Choosing to be happy?

**Age differences in ‘maximizing’ decision strategies
and experienced emotional well-being**

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Abstract (75-100 words)

Maximizing is a decision strategy that seeks the very best option, which is more elaborate and potentially more regret-inducing than choosing an option that is ‘good enough.’ In surveys with a large national sample, we find that older adults are less likely than younger adults to self-report maximizing, which is associated with their better experienced well-being reported two years later. This pattern holds after controlling for demographic characteristics and negative life events. Our findings suggest that older adults could possibly be opting for decision strategies that make them happier. We discuss implications for interventions that aim to improve decision making.

Keywords: aging, decision making, maximizing, emotional well-being

Choosing to be happy?

Age differences in ‘maximizing’ decision strategies and experienced emotional well-being

People of all ages face decisions that potentially affect their experienced emotional well-being. Different decision strategies can be applied to making decisions. Maximizing is a decision strategy in which options are extensively searched and compared, with the goal of selecting the one that is the very best (Edwards, 1954). Satisficing is an alternative decision strategy that seeks an option that is good enough on key attributes of interest (Simon, 1955, 1956). Choosing to maximize thus involves accepting the costs of spending more time and cognitive effort so as to obtain the benefit of selecting the best option that is available. Yet, achieving the goals of maximizing can be difficult when the best option is not that much better from ones that can pass for ‘good enough’ (Simon, 1955, 1956). Maximizing can even be counterproductive when it is impossible to identify the best option, due to for example ill-defined goals, large numbers of similar options, time limitations, or other complexities common to life decisions (Payne, Bettman, & Johnson, 1993).

Decision strategies may change with age. Empirical studies show that older adults search fewer options, prefer smaller choice sets, and consider less information, as compared to younger adults (Besedeš, Deck, Sarangi, & Shor, 2012; Johnson, 1990, 1993; Hanoch et al., 2011; Mata & Nunes, 2010; Reed, Mikels, & Simon, 2008, Reed, Mikels, & Löckenhoff, 2013). Thus, older adults may be less likely than younger adults to apply maximizing strategies to their decision making.

Individual differences in the tendency to maximize (rather than satisfice) are often measured with Schwartz et al’s (2002) self-report scale. Higher overall ratings on this scale reflect more maximizing, while lower overall ratings on this scale reflect more satisficing. Empirical evidence has confirmed that people who have stronger tendencies to maximize, as

reported on this scale, search more alternatives before making their choice (Chowdhury, Ratneswar, & Mohanty, 2009; Dar-Nimrod et al., 2009; Yang & Chiou, 2010). The scale has three components that may each be relevant to understanding how people make decisions (Nenkov, Morrin, Ward, Schwartz, & Hurland, 2008): (a) the tendency to *search for alternatives* even after good options have been identified; (b) the tendency to create *decision difficulty* due to wanting the best decision outcome even when it is difficult to identify, and (c) the tendency to apply *high standards* when making decisions. Which tendencies best represent the ‘maximizer’ has been debated (Diab, Gillespie, & Highhouse, 2008; Lai, 2010).

Schwartz et al.’s (2002) conceptualization of maximizing includes the excessive search for alternatives, which leads individuals to question whether their decisions could have been better. Although such ‘counterfactual thinking’ may generate ideas for improving future decisions (Roese, 1997), it can also cause self-blame and regret (Davis, Lehman, Silver, Wortman, & Ellard, 1996; Zeelenberg & Pieters, 2007). Continuing to search for better options after decisions are made can undermine satisfaction, even with relatively good outcomes (Iyengar, Wells, & Schwartz, 2006; Lai, 2011; Sparks, Ehrlinger, & Eibach, 2012).

To date, we are unaware of any studies that have examined age differences in alternative search or the Schwartz et al.’s (2002) other components. Many studies of Schwartz et al.’s (2002) scale involved students or other convenience samples with limited age diversity. The two studies that did examine the relationship between adult age and maximizing found inconsistent results, reporting no significant correlation (Parker et al., 2007), and that older adults maximize less (Tanius et al., 2009). Neither study used a national life-span sample, or reported correlations between age and the alternative search component.

Yet, there is reason to believe that older adults will be less inclined than younger adults to search for better alternatives to the extent that it contributes to feelings of dissatisfaction. Older adults are less likely than younger adults to self-report internal conflicts about what

they should have done differently (Riediger & Freund, 2008), which is central to Schwartz et al.'s (2002) conceptualization of maximizers' alternative search (Iyengar et al., 2006; Lai, 2011; Sparks et al., 2012). There is also evidence that the negative relationship between age and counterfactual thinking may contribute to older adults' better emotional well-being (Riediger & Freund, 2008). Several studies suggest that emotional well-being is preserved or even improves with increasing age (Carstensen et al., 2011; Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Charles, Reynolds, & Gatz, 2001; Kessler & Staudinger, 2009).

Here, we present the first study to examine age differences in components of Schwartz et al.'s (2002) maximizing vs. satisficing scale, and their association with experienced emotional well-being as reported two years later. We follow previous studies of age differences in experienced emotional well-being in terms of distinguishing between negative affect and positive affect, because age differences in negative affect may be more pronounced (Carstensen et al., 2000; Charles et al., 2001; Kessler & Staudinger, 2009). Our analyses also take into account demographic variables as well as low income and negative life events, as they have been suggested as possible contributors to well-being (Kahneman, & Deaton, 2007) and may vary with the tendency to maximize vs. satisfice (Parker et al., 2007). Thus, we have two main research questions. First, are there age differences in the maximizing vs. satisficing tendency and especially its alternative search component? Second, are age differences in experienced emotional well-being associated with the maximizing vs. satisficing tendency and especially its alternative search component?

METHOD

Participants

We obtained online survey data from RAND's American Life Panel (<https://alpdata.rand.org/>). A national life-span sample was initially recruited through random digit dialling for the University of Michigan's national surveys. Additional recruitment

efforts aimed to reach more members of underrepresented populations. Interested individuals were given equipment and internet access, if they needed it to join the panel. After they join the panel, members are invited to participate in web surveys, for about \$20 per 30 minutes. Our sample included 2221 panel members who had completed our measures on two surveys. Their mean age was 50.71 ($Mdn=52$; $SD=14.43$; range 18-91; 5th-95th percentile=25-73; $IQR=40-61$). A total of 41.9% had a college degree, 88.5% were white, 39.7% were male, and median income was in the \$50,000-\$59,999 range. Of the 3227 who were invited, 2623 (81.3%) completed the first survey. Of those, 2235 (85.2%) completed the second survey. Six were excluded because their self-reported age was inconsistent across the two surveys. We thus retained 2221 of the initial 3227 (68.8%) for our analyses. Retained panel members were somewhat older ($M=50.71$, $SD=14.43$ vs. $M=46.10$, $SD=15.77$), $t(3216)=-8.14$, $p<.001$, and more likely to be white (88.5% vs. 86.0%), $\chi(1)=4.19$, $p=.04$, and female (60.3% vs. 55.4%), $\chi(1)=6.88$, $p=.01$, as compared to those who were not retained. They showed no significant difference in income or education ($p>.10$). We controlled for these variables in our analyses.

Procedure

We conducted a secondary analysis of online data from two surveys conducted two years apart. Survey 1 involved the maximizing measure and was fielded in September-October 2010. Survey 2 involved the other measures and was fielded in May-July 2012. In the American Life Panel online database, the surveys are referred to as MS153 and MS244.

Survey 1.

Maximizing and components. Participants completed Schwartz et al.'s (2002) 13-item measure, which has three components (Nenkov et al., 2008). Six items asked about alternative search (e.g., "No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities"), four about decision difficulty (e.g., "I often find it difficult to shop for a gift for a friend"), and three about high standards (e.g., "I never settle

for second best”).¹ Participants rated each (1=completely disagree; 7=completely agree). Internal consistency was sufficient for overall scores ($\alpha=.70$), but varied for components ($\alpha=.67$ for alternative search; $\alpha=.62$ for decision difficulty; $\alpha=.66$ for high standards). Mean scores were computed for overall maximizing ($M=3.77$, $SD=.82$), alternative search ($M=3.38$, $SD=1.15$), decision difficulty ($M=3.52$, $SD=1.24$), and high standards ($M=4.89$, $SD=1.09$).

Survey 2.

Emotional well-being. Participants rated how they felt yesterday, on positive (enjoyment, happiness, interest, enthusiasm, content) and negative items (anger, depression, sadness, stress, worry, frustration, fatigue, loneliness, boredom, pain). Because Survey 2 was designed for a methodological study (Kapteyn, Lee, Tassot, Vonkova, & Zamarro, in press), participants were randomly assigned to one of three response scales: yes/no, 1-5 ratings, or 0-6 ratings. Internal consistency was sufficient for each ($\alpha \geq .85$ for positive affect; $\alpha \geq .84$ for negative affect). Mean scores for positive and negative affect were standardized into z -scores for each scale ($M=.00$, $SD=1.00$) to warrant analyses across scales.²

Negative life events. Questions were asked in two stages. First, participants responded to yes/no questions to indicate whether or not they had experienced specific life events during the past 5 years. Second, if they had experienced an event, they indicated when it happened, on a scale from 1-5 years ago. We focus on the negative events reported in the last year, because those would have happened after the first survey, and because recent events are more relevant to people's current well-being. Conclusions about relationships between age, maximizing and well-being are unaffected by the choice of time period, or whether or not life events were included as covariates. The specific life events (and the percent who experienced them in the previous year) included having involuntarily lost their job for reasons other than retirement (5.3%), been unemployed and looking for work for more than three months (4.7%), moved to a worse residence or neighborhood (1.6%), been robbed or had their house

burglarized (2.5%), been the victim of fraud (5.6%), had a heart attack (.3%), had a stroke (.1%), had cancer (1.4%), stayed in a nursing home (.6%), gotten divorced/separated from spouse/partner (3.5%), and experienced the death of their spouse/partner (1.0%), their father (2.5%), or their mother (3.0%). On average, participants experienced 2.5% ($SD=4.9$) of these life events over the previous year.

RESULTS

Correlations between age, maximizing, and emotional well-being

Table 1 shows correlations between age, maximizing, and experienced emotional well-being. Older adults reported being less inclined to maximize (or more inclined to satisfice), as compared to younger adults. In partial correlations controlling for other component scales, age was negatively correlated with engaging in alternative search and creating decision difficulty, but not to applying high standards.^{3,4} Moreover, older adults reported better experienced emotional well-being than younger adults, as seen in higher ratings of positive affect, and lower ratings of negative affect. Additionally, participants who reported less overall maximizing indicated more positive affect and less negative affect, as did those reporting less alternative search and decision difficulty. The tendency to set high standards was unrelated to reported emotions (see also Diab et al., 2008).

Linear regressions predicting emotional well-being

In linear regressions controlling for negative life events, income, education, race, and gender, age was still associated with more positive affect and less negative affect (Table 2; Models 1a and 2a).⁵ The relationship between age and both emotion measures was reduced after considering the significant contributions of overall maximizing vs. satisficing (Table 2; Models 1b and 2b), or component tendencies (Table 2; Models 1c and 2c).

Relationships between age, maximizing, and emotional well-being

Our next analyses examined whether age differences in overall maximizing and alternative search statistically contributed to age differences in emotional well-being.

The role of overall maximizing. We used 1,000 bootstrapping resamples (Preacher & Hayes, 2008) to examine the role of overall maximizing in the relationship between age and each measure of experienced emotional well-being, while statistically controlling for negative life events, income, education, race, and gender. Age was entered as a continuous variable, with unstandardized (B) estimates reflecting changes related to one year of age. As seen in three steps, the relationship between age and each type of emotional well-being was partly accounted for by overall maximizing (95% CI=.001, .003 for positive affect; 95% CI=-.003, -.002 for negative affect). First, age was related to less overall maximizing ($B=-.011$, $p<.001$). Second, less overall maximizing was related to better emotional well-being ($B=-.158$, $p<.001$ for positive affect; $B=.229$, $p<.001$ for negative affect). Third, the relationship between age and emotional well-being ($B=.004$, $p=.006$ for positive affect, $B=-.009$, $p<.001$ for negative affect) was reduced after taking into account overall maximizing ($B=.002$, $p=.121$ for positive affect; $B=-.006$, $p<.001$ for negative affect).

The role of maximizing scale components. Our next analyses were similar to the first, but replaced overall maximizing with its three components. As seen in three steps, the relationship between age and each measure of emotional well-being was statistically accounted for by alternative search (95% CI=.001, .002 for positive affect; 95% CI=-.003, -.001 negative affect) but not decision difficulty (95% CI=.000, .001 for positive affect; 95% CI=-.001, .000 negative affect) or high standards (95% CI=.000, .000 for positive affect; 95% CI=.000, .000 negative affect). First, age was related to less alternative search ($B=-.021$, $p<.001$). Second, less alternative search was related to each measure of better emotional well-being ($B=-.066$, $p<.01$ for positive affect; $B=.102$, $p<.001$ for negative affect). Third, the

relationship between age and better emotional well-being ($B=.004$, $p=.006$ for positive affect, $B=-.009$, $p<.001$ for negative affect) was reduced after taking into account alternative search ($B=.002$, $p=.117$ for positive affect, $B=-.006$, $p<.001$ for negative affect).

DISCUSSION

Maximizing is a decision strategy that involves searching for alternatives with the goal of selecting the best option (Edwards, 1954), instead of satisficing by settling for one that is 'good enough' (Simon, 1955, 1956). However, individuals who tend to search excessively for alternatives are prone to questioning their choices, and feeling unhappy (Schwartz et al., 2002). Searching for better options after completing a choice can undermine satisfaction, even with relatively good outcomes (Iyengar et al., 2006; Lai, 2011; Sparks et al., 2012).

Our findings show that older adults are less likely than younger adults to self-report maximizing tendencies. Older adults were especially less inclined to engage in the alternative search component of maximizing. Moreover, older adults' lesser maximizing and alternative search was associated with better experienced emotional well-being, including more positive affect and less negative affect. These findings held after taking into account negative life events and demographic variables. Possibly, older adults are more likely than younger adults to engage in decision strategies that keep them happy.

Like any study, ours had limitations. Most notably, one limitation is that we have no direct evidence of the mechanisms that underlie the presented findings. We speculate that different mechanisms may explain why older adults are less inclined than younger adults to engage in maximizing, including alternative search (Peters & Bruine de Bruin, 2012; Strough, Parker, & Bruine de Bruin, 2015). First, older adults face cognitive declines that make it harder to correctly implement complex decision rules like maximizing (Bruine de Bruin, Parker, & Fischhoff, 2012; Del Missier, Mäntylä, Hansson, Bruine de Bruin, & Parker, 2013), which contributes to their preferences for smaller choice sets (Liu, Wood, & Hanoch,

2015). Second, the finding that older adults are less likely than younger adults to engage in excessive alternative search may reflect their increased motivation to optimize positive affective experiences (Carstensen, 1992), and their reduced willingness to spend effort on difficult tasks they no longer enjoy (Bruine de Bruin, McNair, Taylor, Summers, & Strough, 2015; Strough, Bruine de Bruin, & Peters, 2015). Third, it is also possible that older adults have learned from experience with previous life decisions that striving for the very best poses threats to their emotional well-being that they are motivated to avoid. Indeed, it has been argued that older adults may have learned insights relevant to decision making from life experience (Bruine de Bruin, Strough, & Parker, 2014; Li, Baldassi, Johnson, & Weber, 2013; Li, Goa, Enkavi, Zaval, Weber, & Johnson, 2015; Yates & Patalano, 1999).

Another limitation is that our data about older adults' decision strategies are based on self-reports rather than observing actual decision processes. However, empirical evidence has shown that alternative search in actual consumer choices is indeed more elaborate among individuals who self-report stronger maximizing tendencies on the Schwartz et al. (2002) scale (Chowdhury et al., 2009; Dar-Nimrod et al., 2009; Yang & Chiou, 2010). Our finding that older adults self-report less alternative search are also in line with studies showing that older adults consider less information, search fewer options, and want smaller choice sets (Johnson, 1990, 1993; Hanoch et al., 2011; Mata & Nunes, 2010; Reed et al., 2008, 2013).

A third limitation refers to the lack of longitudinal data on how decision strategies change as people age. We conducted secondary data analyses of a panel that completed self-reports of decision making, and of emotional well-being two years later. Assessments of emotional well-being would have been needed at both times to draw conclusions about alternative search predicting subsequent changes in well-being, and assessments of alternative search and emotional well-being would have been needed at both times to analyze developmental change. Our cross-sectional data preclude causal conclusions about the effect

of age-related changes in alternative search on older adults' emotional well-being (e.g., Lindenberger, van Oertzen, Ghisletta, & Hertzog, 2011; Maxwell & Cole, 2007). The reported analyses only warrant conclusions about statistical contribution of cross-sectional age differences in alternative search to cross-sectional age differences in emotional well-being. Because age and cohort are confounded in our cross-sectional design (Schaie, 1965), the observed patterns could reflect either age differences or cohort effects, with older participants' lesser use of maximizing strategies reflecting their coming of age in a time when there were fewer options (e.g., Schwartz, 2004). Although we are unaware of longitudinal studies on individual differences in maximizing and alternative search, we do note that longitudinal studies have shown that aging is related to better emotional well-being (Carstensen et al., 2011).

Our findings are relevant to developers of interventions that aim to improve people's decisions. Possibly, limiting alternative search will make people feel better about their choices. Older adults already want smaller choice sets (Liu, Wood, & Hanoch, 2015; Reed et al., 2008, 2013). Younger adults also benefit from smaller choice sets, in terms of making better decisions, overcoming decision inertia, and feeling more satisfied (e.g., Besedeš et al., 2012; Botti & Iyengar, 2006; Hanoch et al., 2011; Iyengar & Lepper, 2000; Tanius et al., 2009). Thus, it should be possible to design choice environments that promote good decision outcomes and emotional well-being across the life span.

FOOTNOTES

1 Survey 1 included three alternatives to Schwartz et al.'s (2002) component measures. First, we computed Nenkov et al.'s (2008) short-form scores for Schwartz et al.'s components ($r=.81$, $p<.001$ for alternative search, $r=.86$, $p<.001$ for decision difficulty; $r=.91$, $p<.001$ for high standards). Each yielded the results patterns reported here, which were less pronounced for positive affect (see Supplemental Materials.) Two other scales (Diab et

- al., 2008; Lai, 2010) focused on a single construct. Both were more similar to Schwartz et al. (2002)'s high standards ($r=.79, p<.001$ for Diab; $r=.77, p<.001$ for Lai) than to decision difficulty ($r=.15, p<.001$ for Diab; $r=.09, p<.001$ for Lai) or alternative search ($r=.32, p<.001$ for Diab; $r=.11, p<.001$ for Lai). Replacing Schwartz et al.'s (2002) high standards with either score did not alter main conclusions of our analyses (Supplemental Materials).
- 2 Alternative analyses that used raw responses while controlling for response mode yielded similar conclusions (Supplemental Materials).
 - 3 We examined the correlation between age and each of Schwartz et al.'s (2002) items. We found significant negative correlations with each of the six alternative search items (from $r=-.29$ to $r=-.07$; each $p<.01$), and with only one of the four decision difficulty items ($r=-.06, p<.01$). Age was not systematically correlated to the three high standards items, with correlations ranging from negative ($r=-.06, p<.01$) to positive ($r=.05, p=.02$).
 - 4 Without controlling for other component scales, older age was negatively related to alternative search ($r=-.27, p<.001$), while being unrelated to decision difficulty ($r=-.03, p=.12$), and having high standards ($r=-.03, p=.24$).
 - 5 Older adults were significantly less likely to report negative life events in the past year ($r=-.10, p<.001$), being white ($r=.16, p<.001$) and being male ($r=.05, p=.01$). There was a marginal relationship between age and having a college degree ($r=.04, p=.07$). Age was unrelated to below-median income ($r=-.03, p=.22$). Overall conclusions were unaffected by whether or not our regression analyses controlled for these variables.

REFERENCES

- Besedeš, T., Deck, C., Sarangi, S., & Shor, M. (2012). Age effects and heuristics in decision making. *The Review of Economics and Statistics*, *94*, 580-595.
- Botti, S., & Iyengar, S.S. (2006). The dark side of choice: When choice impairs social welfare. *Journal of Public Policy & Marketing*, *25*, 24-38.
- Bruine de Bruin, W., Dombrovski, A.Y., Parker, A.M., Szanto, K. (in press). Late life depression, suicidal ideation, and attempted suicide: The role of individual differences in maximizing, regret, and negative decision outcomes. *Journal of Behavioral Decision Making*.
- Bruine de Bruin, W., McNair, S., Taylor, A.L., Summers, B., & Strough, J. (2015). 'Thinking about numbers is not my idea of fun': Need for cognition mediates age differences in numeracy performance. *Medical Decision Making*. *35*, 22-26.
- Bruine de Bruin, W., Parker, A.M. & Fischhoff, B. (2012). Explaining adult age differences in decision-making competence. *Journal of Behavioral Decision Making*, *25*, 352-360.
- Bruine de Bruin, W., Strough, J., & Parker, A.M. (2014). Getting older isn't all that bad: Better decisions and coping when facing 'sunk costs.' *Psychology and Aging*, *29*, 642-647.
- Carstensen, L.L. (1992). Social and emotional patterns in adulthood: Support for socio-emotional selectivity theory. *Psychology and Aging*, *7*, 331-338.
- Carstensen, L.L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, G.R., Brooks, K.P., & Nesselroade, J.R. (2011). Emotional experience improves with age: Evidence based over 10 years of experience sampling. *Psychology and Aging*, *26*, 21-33.

- Carstensen, L.L., Pasupathi, M., Mayr, U., & Nesselroade, J.R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology, 79*, 644-655.
- Charles, S.T., Reynolds, C.A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology, 80*, 136-151.
- Chowdhury, T.G., Ratneshwar, S., & Mohanty, P. (2009). The time-harried shopper: Exploring the differences between maximizers and satisficers. *Marketing Letters, 20*, 155-167.
- Dar-Nimrod, I., Rawn, C.D., Lehman, D.R., & Schwartz, B. (2009). The maximization paradox: the costs of seeking alternatives. *Personality and Individual Differences, 46*, 631-635.
- Davis, C.G., Lehman, D.R., Wortman, C.B., Silver, R.C., & Thompson, S.C. (1995). The undoing of traumatic events. *Personality and Social Psychology Bulletin, 21*, 109-124.
- Del Missier, F., Mäntylä, T., Hansson, P., Bruine de Bruin, W., & Parker, A.M. (2013). The multifold relationship between memory and decision making: An individual differences study. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 39*, 1344-1364.
- Edwards, W. (1954). The theory of decision making. *Psychological Bulletin, 51*, 380-417.
- Hanoch, Y., Wood, S., Barnes, A., Liu, P.J., & Rice, T. (2011). Choosing the right medicare prescription drug plan: The effect of age, strategy selection, and choice set size. *Health Psychology, 30*, 719-727.
- Diab, D.L., Gillespie, M.A., & Highhouse, S. (2008). Are maximizers really unhappy? The measurement of maximizing tendency. *Judgment and Decision Making, 3*, 364-370.

- Iyengar, S.S., & Lepper, M.R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, *79*, 995-1006.
- Iyengar, S. S., Wells, R. E., & Schwartz, B. (2006). Doing better but feeling worse. Looking for the “best” job undermines satisfaction. *Psychological Science*, *17*, 143-150.
- Johnson, M.M.S. (1990). Age differences in decision making: A process methodology for examining strategic information processing. *Journal of Gerontology: Psychological Sciences*, *45*, P75-P78.
- Johnson, M.M.S. (1993). Thinking about strategies during, before, and after making a decision. *Psychology and Aging*, *8*, 231-241.
- Kahneman, D., & Deaton, A. (2007). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences*, *107*, 16489-16493.
- Kapteyn, A., Lee, J., Tassot, C., Vonkova, H., & Zamarro, G. (in press). Dimensions of subjective well-being. *Social Indicators Research*.
- Kessler, E.M., & Staudinger, U.M. (2009). Affective experience in adulthood and old age; the role of affective arousal and perceived affect regulation. *Psychology and Aging*, *24*, 349-362.
- Lai, L. (2010). Maximizing without difficulty: A modified maximizing scale and its correlates. *Judgment and Decision Making*, *5*, 164-175.
- Lai, L. (2011). Maximizing and customer loyalty: Are maximizers less loyal? *Judgment and Decision Making*, *6*. 307-313.
- Li, Y., Baldassi, M., Johnson, E.J., & Weber, E.U. (2013). Complementary cognitive abilities: Economic decision making and aging. *Psychology and Aging*, *28*, 595-613.

- Li, Y., Gao, J., Enkavi, A.Z., Zaval, L., Weber, E.U., & Johnson, E.J. (2015). Sound credit scores and financial decisions despite cognitive aging. *Proceedings of the National Academy of Sciences*, *112*, 65-69.
- Lindenberger, U., von Oertzen, T., Ghisletta, P., & Hertzog, C. (2011). Cross-sectional age variance extraction: What's change got to do with it? *Psychology and Aging*, *26*, 34-47.
- Liu, P.J., Wood, S., & Hanoch, Y. (2015). Choice and aging: Less is more. In T. Hess, J. Strough, & C. Löckenhoff (Eds.) *Aging and decision making: Empirical and applied perspectives*. London UK: Elsevier Academic Press (pp. 309-327).
- Mata, R., & Nunes, L. (2010). When less is enough: Cognitive aging, information search, and decision quality in consumer choice. *Psychology and Aging*, *25*, 289-298.
- Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, *12*, 23-44.
- Nenkov, G.Y., Morrin, M., Ward, A., Schwartz, B., & Hulland, J. (2008). A short form of the maximization scale: Factor structure, reliability and validity studies. *Judgment and Decision Making*, *3*, 371-388.
- Parker, A.M., Bruine de Bruin, W., & Fischhoff, B. (2007). Maximizing vs. satisficing: Decision-making styles, competence, and outcomes. *Judgment and Decision Making*, *2*, 342-350.
- Payne, J.W., Bettman, J.R., & Johnson, E.J. (1993). *The adaptive decision maker*. New York, NY: Cambridge University Press.
- Peters, E. & Bruine de Bruin, W. (2012). Aging and decision skills. In M. K. Dhami, A. Schlottmann & M. Waldmann (Eds.). *Judgment and Decision Making as a Skill: Learning, Development, and Evolution*. New York, NY: Cambridge University Press.
- Polman, E. (2010). Why are maximizers less happy than satisficers? Because they maximize positive and negative outcomes. *Journal of Behavioral Decision Making*, *23*, 179-190.

- Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavioral Research Methods, 40*, 879-91.
- Reed, A.E., Mikels, J.A., & Simon, K.I. (2008). Older adults prefer less choice than younger adults. *Psychology and Aging, 23*, 671-675.
- Read, A.E., Mikels, J.A., & Löckenhoff, C.E. (2013). Preferences for choice across adulthood: Age trajectories and potential mechanisms. *Psychology and Aging, 28*, 625-632.
- Riediger, M. & Freund, A.M. (2008). Me against myself: Motivational conflicts and emotional development in adulthood. *Psychology and Aging, 23*, 479-494.
- Roese, N.J. (1997). Counterfactual thinking. *Psychological Bulletin, 121*, 133-148.
- Schaie, K. W. (1965). A general model for the study of developmental problems. *Psychological Bulletin, 64*, 92-107.
- Schwartz, B. (2004). *The paradox of choice: Why more is less*. New York: HarperCollins Publishers.
- Schwartz, B. Ward, A., Monterosso, J. Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*, 1178-1197.
- Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics, 59*, 99-118.
- Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review, 63*, 129-138.
- Sparks, E.A., Ehrlinger, J., & Eibach, R.P. (2012). Failing to commit: Maximizers avoid commitment in a way that contributes to reduced satisfaction. *Personality and Individual Differences, 52*, 72-77.

- Strough, J., Bruine de Bruin, W., & Peters, E. (2015). New perspectives on motivating better decisions in older adults. *Frontiers in Psychology*, 6, 1-10.
- Strough, J., Parker, A.M., & Bruine de Bruin, W. (2015). Understanding life-span developmental changes in decision-making competence. In T. Hess, J. Strough, & C. Löckenhoff (Eds.) *Aging and decision making: Empirical and applied perspectives*. London UK: Elsevier Academic Press (pp. 235-257).
- Tanius, B.E., Wood, S., Hanoch, Y., & Rice, T. (2009). Aging and choice: Applications to Medicare Part D. *Judgment and Decision Making*, 4, 92-101.
- Yang, M.L., & Chiou, W.B. (2010). Looking online for the best romantic partner reduces decision quality: The moderating role of choice-making strategies. *Cyberpsychology, Behavior, and Social Networking*, 13, 207-210.
- Yates, J.F., and Patalano, A.L. (1999). Decision making and aging. In D.C. Park, R.W. Morrell, and K. Shifren (Eds.), *Processing of medical information in aging patients: Cognitive and human factors perspectives* (pp. 31-54). Mahwah, NJ: Lawrence Erlbaum.
- Zeelenberg, M., & Pieters, R. (2007) A theory of regret regulation 1.0. *Journal of Consumer Psychology*, 17, 3–18.

Table 1: Correlations between age, maximizing, and emotional well-being.

	Age	Emotional well-being	
		Positive affect	Negative affect
<i>Maximizing vs. satisficing</i>			
Overall	-.20***	-.14***	.20***
Alternative search ^a	-.28***	-.08***	.13***
Decision difficulty ^a	-.06*	-.13***	.14***
High standards ^a	-.02	.06*	-.03
<i>Emotional well-being</i>			
Positive affect	.07**	-	-.63***
Negative affect	-.14***	-.63***	-

^a Partial correlations controlling for other component scales. * $p < .05$; ** $p < .01$; *** $p < .001$. Note: Age is a continuous variable. Reported correlations with age also held in a 'trimmed sample' including only the 90% of participants whose ages fell between the 5th and 95th percentile (Supplemental Materials).

Table 2: Linear regressions (β) on measures of emotional well-being.

	Positive affect			Negative affect		
	Model 1a	Model 1b	Model 1c	Model 2a	Model 2b	Model 2c
Age	.06**	.04	.04	-.13***	-.09***	-.11***
<i>Maximizing vs. satisficing</i>						
Overall	-	-.13***	-	-	.19***	-
Alternative search	-	-	-.08**	-	-	.12***
Decision difficulty	-	-	-.13***	-	-	.14***
High standards	-	-	.05*	-	-	-.02
<i>Co-variates</i>						
Negative life events	-.05*	-.04*	-.05*	.12***	.12***	.12***
Below-median income	-.06*	-.05*	-.05*	.07**	.06**	.05*
College degree	.08***	.07**	.06**	-.08***	-.07**	-.05*
White	.00	-.01	.00	.03	.05*	.04
Male	-.01	.02	.01	-.05*	-.09***	-.09***

* $p < .05$; ** $p < .01$; *** $p < .001$. Note: Age is a continuous variable. Reported relationships of affect with age, maximizing and components held in a ‘trimmed’ sample including only the 90% of participants whose ages fell between the 5th and 95th percentile (Supplemental Materials).

SUPPLEMENTARY MATERIALS

Choosing to be happy? Age differences in ‘maximizing’ decision strategies and experienced emotional well-being (Published in: *Psychology and Aging*)

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In these Supplemental Materials, we present alternative analyses in which we replaced (1) the full sample with in a trimmed sample from which very old and very young outliers are removed; (2) component measures of Schwartz et al.’s (2002) scale with alternative component measures; (3) standardized affect ratings with raw affect ratings, and controlling for affect response scale. For each, we examine whether the main conclusions of our paper hold. That is, we used 1,000 bootstrapping resamples (Preacher & Hayes, 2008) to examine whether the relationship between age and each measure of affect is statistically explained by older adults’ lesser tendency to engage in alternative search (Table 1). Where needed, we also present additional auxiliary analyses (described below.)

1. Analyses with trimmed sample

Our full sample included 2221 panel members, whose mean age was 50.71 ($Mdn=52$; $SD=14.43$; range 18-91; 5th-95th percentile=25-73; $IQR=40-61$). To examine whether relationships with age are robust, we re-analyzed the data after removing outliers. Specifically, we trimmed the distribution by including only the 90% of participants whose ages fell between the 5th and 95th percentile (i.e., ages 25-73). Doing so reduced the sample to 2021 participants, whose mean age was 50.48 ($Mdn=52$; $SD=12.38$; range 25-73; 5th-95th percentile=28-69; $IQR=41-60$).

Table 2 shows correlations between age, maximizing, and experienced emotional well-being (for comparison, see Table 1 of the paper.) All correlations that were reported for the

full sample also held in the trimmed sample. One additional significant correlation emerged in our analyses of the trimmed sample. That is, age was positively correlated to applying high standards in partial correlations controlling for other component measures.

Table 3 shows linear regressions predicting positive affect and negative affect, with main findings being similar to those in the full sample (for comparison, see Table 2 of the paper). Indeed, the Preacher and Hayes' (2008) bootstrapping models indicated that the relationship between age and each affect measure was statistically explained by older adults' lower ratings of overall maximizing, as measured on the Schwartz et al. (2002) scale (Table S3). When the models considered the three component measures instead of the overall measure, older adult's reduced tendency to engage in alternative search was the one component that statistically explained the relationship between age and each measure of affect (Table 1). Thus, analyses of the trimmed sample and analyses of the full sample yielded similar conclusions.

2. Analyses with raw affect scores

Participants were randomly assigned to reporting affect on a yes/no response scale, a 1-5 response scale, or a 0-6 response scale. Here, we repeat the main analyses from the paper while considering the raw affect ratings rather than standardized affect ratings, while controlling for response scale as well as demographic covariates.

We conducted linear regressions predicting raw positive affect and raw negative affect, while controlling for response scales (Table 4; for comparison, see Table 2 of the paper). According to Preacher and Hayes' (2008) procedures, Schwartz et al.'s (2002) overall maximizing measure statistically explained the relationship between age and each raw affect measure, while taking into account response scales (Table 1). When we repeated these analyses to examine the role of Schwartz et al.'s (2002) component measures, we found that

only age-related reductions in alternative search statistically explained the relationship between age and each raw affect measure (Table 1). However, this association was marginally significant for raw positive affect (Table 1), even though it had been significant ($\alpha=.05$) in the analyses on the standardized positive affect ratings that were reported in the paper. Yet, analyses of raw affect ratings and standardized affect ratings yielded similar patterns.

3. Analyses with alternative scales

Replacing Schwartz et al. (2002) components with Nenkov et al. (2008) components

We computed Nenkov et al.'s (2008) short-form versions of Schwartz et al.'s components. That is, Nenkov et al. (2008) reduced Schwartz et al.'s (2002) component measures to just two items each (from six for alternative search, four for decision difficulty, and three for high standards.) Table 5 shows that Nenkov et al.'s (2008) components were highly correlated to Schwartz et al.'s (2002) components, possibly due to overlapping items. However, unlike Nenkov et al.'s (2008) samples, the internal consistency of the Nenkov et al. (2008) short-form component scores in our sample was much lower than seen with Schwartz et al.'s component scores, for alternative search ($\alpha=.32$ vs $\alpha=.67$), and decision difficulty ($\alpha=.44$ vs $\alpha=.62$), with the exception being high standards ($\alpha=.71$ vs $\alpha=.66$).

Table 6 shows linear regression analyses predicting positive affect and negative affect, while replacing the Schwartz et al. (2002) components with Nenkov et al.'s (2008) short-form alternatives (for comparison, see Model 1c in Table 2 of the paper). As seen in Table 1, Preacher and Hayes' (2008) bootstrapping procedures yielded similar conclusions as our original analyses, when applied to negative affect. That is, that the relationship between older age and less negative affect was statistically explained by older adult's lesser alternative search. The relationship between older age and more positive affect was not statistically

explained by Nenkov et al.'s (2008) alternative search component, perhaps reflecting the low reliability of the measure.

Replacing Schwartz et al.'s (2002) high standards components with alternative scales.

Our dataset included items that allowed us to compute Diab et al.'s (2008) 9-item alternative measure of high standards and Lai's (2010) 5-item measure of maximizing without difficulty, both of which aimed for a unified construct. Each alternative scale had good internal consistency ($\alpha=.80$ for Diab; $\alpha=.74$ for Lai). Table 5 displays correlations for these scales, suggesting that each was more similar to Schwartz et al.'s (2002) high standards components than to decision difficulty or alternative search, perhaps due to overlapping items. Yet, the correlations in Table 5 suggest that both scales also captured some of the decision difficulty and alternative search components.

Table 6 shows linear regressions predicting positive affect and negative affect, while replacing Schwartz et al.'s high standards component measure with Diab et al.'s (2008) or Lai's (2010) scale, while retaining Schwartz et al.'s (2002) measures of alternative search and decision difficulty (for comparison, see Model 1c in Table 2 of the paper). Preacher and Hayes' bootstrapping procedures confirmed that the relationship between older age and affect measures was statistically explained by an age-related reduction in alternative search. Thus, these analyses yielded similar conclusions as the original analyses.

References

- Diab, D.L., Gillespie, M.A., & Highhouse, S. (2008). Are maximizers really unhappy? The measurement of maximizing tendency. *Judgment and Decision Making*, 3, 364-370.
- Lai, L. (2010). Maximizing without difficulty: A modified maximizing scale and its correlates. *Judgment and Decision Making*, 5, 164-175.

- Nenkov, G.Y., Morrin, M., Ward, A., Schwartz, B., & Hurland, J. (2008). A short form of the maximization scale: Factor structure, reliability and validity studies. *Judgment and Decision Making*, 3, 371-388.
- Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavioral Research Methods*, 40, 879-91.
- Schwartz, B. Ward, A., Monterosso, J. Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology*, 83, 1178-1197.

Table 1: Bootstrap confidence intervals for indirect effects (Preacher and Hayes, 2008).

	Positive affect				Negative affect			
	Overall	Alternative Search	Decision difficulty	High standards	Overall	Alternative Search	Decision difficulty	High standards
Trimmed sample	(.001, .002)	(.001, .002)	(.000, .001)	(.000, .001)	(-.004, -.002)	(-.003, -.002)	(-.001, .000)	(.000, .000)
Raw affect responses	(.001, .002)	(.001, .002) ^a	(.000, .001)	(.000, .000)	(-.002, -.001)	(-.002, -.001)	(-.001, .000)	(.000, .000)
Nenkov scale	-	(.000, .002) ^b	(.000, .000)	(.000, .000)	=	(-.002, -.001)	(.000, .000)	(.000, .000)
Diab scale	-	(.001, .002)	(.000, .001)	(-.001, .000)	-	(-.003, -.001)	(-.001, .000)	(.000, .000)
Lai scale	-	(.001, .002)	(.000, .001)	(.000, .000)	-	(-.003, -.001)	(-.001, .000)	(.000, .000)

Note: Confidence intervals including .000 do not yield significant findings. All but one of the confidence intervals are set at 95%. Compare to

Table 2 in the paper.

^a 90% confidence interval

^b Neither the 95% confidence interval nor the 90% confidence interval replicated the original finding.

Table 2: Correlations between age, maximizing, and emotional well-being, in the trimmed sample (aged 25-73).

	Emotional well-being		
	Age	Positive affect	Negative affect
<i>Maximizing vs. satisficing</i>			
Overall	-.16***	-.14***	.20***
Alternative search ^a	-.24***	-.08***	.13***
Decision difficulty ^a	-.05*	-.14***	.14***
High standards ^a	.05*	.06*	-.04
<i>Emotional well-being</i>			
Positive affect	.07**	-	-.63***
Negative affect	-.14***	-.63***	-

^a Partial correlations controlling for other component scales. * $p < .05$; ** $p < .01$; *** $p < .001$. Note: Age is a continuous variable. Compare to Table 1 in the paper.

Table 3: Linear regressions (β) on measures of emotional well-being, in the trimmed sample (aged 25-73).

	Positive affect			Negative affect		
	Model 1a	Model 1b	Model 1c	Model 2a	Model 2b	Model 2c
Age	.06**	.04	.04	-.13***	-.10***	-.10***
<i>Maximizing vs. satisficing</i>						
Overall	-	-.13***	-	-	.19***	-
Alternative search	-	-	-.07**	-	-	.12***
Decision difficulty	-	-	-.13***	-	-	.14***
High standards	-	-	.05*	-	-	-.02
<i>Co-variates</i>						
Negative life events	-.04	-.04	-.04	.11***	.10***	.11***
Below-median income	-.08**	-.07**	-.07**	.09***	.09***	.09***
College degree	.09***	.08**	.07**	-.09***	-.08**	-.07**
White	-.01	-.02	-.01	.04	.06*	.05*
Male	-.01	.02	.01	-.05*	-.08***	-.08***

* $p < .05$; ** $p < .01$; *** $p < .001$. Note: Age is a continuous variable. Compare to Table 2 in the paper.

Table 4: Linear regressions (β) on raw scores of emotional well-being (controlling for affect response scale.)

	Positive affect			Negative affect		
	Model 1a	Model 1b	Model 1c	Model 2a	Model 2b	Model 2c
Age	.02*	.01	.01	-.08***	-.06***	-.06***
<i>Maximizing vs. satisficing</i>						
Overall	-	-.06***	-	-	.09***	-
Alternative search	-	-	-.04**	-	-	.05**
Decision difficulty	-	-	-.06***	-	-	.08***
High standards	-	-	.03**	-	-	-.02
<i>Co-variates</i>						
Negative life events	-.03*	-.03*	-.03*	.07***	.07***	.07***
Below-median income	-.02	-.02	-.02	.03	.03	.02
College degree	.03*	.02	.02	-.05**	-.04**	-.04*
White	.01	.00	.01	.03	.03*	.03
Male	.00	.01	.01	-.03	-.04**	-.04**

* $p < .05$; ** $p < .01$; *** $p < .001$. Note: Age is a continuous variable. All models controlled for the affect measures' response scale. Compare to Table 2 in the paper.

Table 5: Pearson correlations between maximizing vs. satisficing measures.

	1	2	3	4	5	6	7	8
1. Schwartz et al.'s (2002) alternative search	–							
2. Schwartz et al.'s (2002) decision difficulty	.31***	–						
3. Schwartz et al.'s (2002) high standards	.17***	.08***	–					
4. Nenkov et al.'s (2008) alternative search	.81***	.20***	.15***	–				
5. Nenkov et al.'s (2008) decision difficulty	.27***	.86***	.05*	.18***	–			
6. Nenkov et al.'s (2008) high standards	.09***	.03	.91***	.09***	.02	–		
7. Diab et al.'s (2008) scale	.32***	.16***	.79***	.33***	.12***	.69***	–	
8. Lai's (2010) scale	.11***	.09***	.77***	.10***	.06**	.63***	.77***	–

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 6: Linear regressions (β) on emotional well-being, using replacement scales.

	Positive affect			Negative affect		
	Model 1c:	Model 1c:	Model 1c:	Model 2c:	Model 2c:	Model 2c:
	Nenkov	Diab	Lai	Nenkov	Diab	Lai
Age	.05*	.04	.03	-.10***	-.09***	-.09***
<i>Maximizing vs. satisficing components</i>						
Alternative search	-.05*	-.08**	-.07**	.08**	.11***	.12**
Decision difficulty	-.08***	-.13***	-.13***	.12***	.14***	.14***
High standards	.04*	.03	.03	-.02.	.01	.00
<i>Co-variates</i>						
Negative life events	-.05*	-.05*	-.05*	.12***	.12***	.12***
Below-median income	-.05*	-.05*	-.05*	.06**	.06**	.06**
College degree	.07**	.06**	.06**	-.07**	-.06**	-.06**
White	.00	.00	.00	.03	.04	.04
Male	.01	.01	.01	-.08***	-.09***	-.09***

* $p < .05$; ** $p < .01$; *** $p < .001$. Note: Nenkov et al.'s (2008) components replaced all of Schwartz et al.'s (2002) components. Diab (2008) and Lai (2008) scales replaced 'high standards' component. Age is a continuous variable. Compare to Models 1c and 2c in Table 2 of the paper.