

UC Irvine

UC Irvine Previously Published Works

Title

Psychological Well-being Relates to Healthcare and Financial Decision Making in a Study of Predominantly White Older Adults.

Permalink

<https://escholarship.org/uc/item/2331v4sf>

Journal

Journal of Applied Gerontology, 42(8)

Authors

Glover, Crystal
Stewart, Christopher
Yu, Lei
[et al.](#)

Publication Date

2023-08-01

DOI

10.1177/07334648231157368

Peer reviewed



Published in final edited form as:

J Appl Gerontol. 2023 August ; 42(8): 1770–1780. doi:10.1177/07334648231157368.

Psychological Wellbeing Relates to Healthcare and Financial Decision Making in a Study of Predominantly White Older Adults

Crystal M. Glover, PhD^{1,2,3,*}, Christopher C. Stewart, PhD⁴, Lei Yu, PhD^{1,3}, Robert S. Wilson, PhD^{1,2,3}, Melissa Lamar, PhD^{1,2}, David A. Bennett, MD^{1,3}, Patricia A. Boyle, PhD^{1,2}

¹Rush Alzheimer's Disease Center, Rush University Medical Center, Chicago, Illinois 60612

²Department of Psychiatry and Behavioral Sciences, Rush Medical College, Chicago, Illinois 60612

³Department of Neurological Sciences, Rush Medical College, Chicago, Illinois 60612

⁴Department of Neurology, Indiana University School of Medicine, Indianapolis, Indiana 46202

Abstract

The purpose of this study was to test the hypotheses that psychological wellbeing is associated with healthcare and financial decision making in older adults, and that this association varies by level of cognitive function. Participants were 1082 older adults (97% non-Latino White; 76% women; mean age=81.04 years, SD=7.53) without dementia (median MMSE score=29.00, IQR=27.86–30.00). In a regression model adjusted for age, gender, and years of education, higher levels of psychological wellbeing were associated with better decision making (estimate=0.39, standard error [SE]=0.11, $p<0.001$), as was better cognitive function (estimate=2.37, SE=0.14, $p<0.0001$). In an additional model, an interaction of psychological wellbeing and cognitive function was significant (estimate=-0.68, SE=0.20, $p<0.001$), such that higher levels of psychological wellbeing were most beneficial for decision making among participants with lower levels of cognitive function. Higher levels of psychological wellbeing may help sustain decision making among older persons, particularly those with lower levels of cognitive function.

Keywords

Older Adults; Cognitive Aging; Psychological Wellbeing; Decision Making

*Corresponding author at: Rush Alzheimer's Disease Center, Rush University Medical Center, 1750 West Harrison Street, Suite 1000, Chicago, Illinois 60612 United States of America. Tel: +1 312-563-1077 Fax: +1 312-942-4154 Crystal_Glover@rush.edu.

Author Contributions: CMG, LY, and PAB contributed to the conception and design of the research study; CMG, LY, and PAB drafted the work; CMG, LY, CCS, RSW, DAB, ML, and PAB revised the work critically for important intellectual content; CMG, LY, CCS, RSW, DAB, ML, and PAB provided approval for publication of the content; CMG and PAB agree to be accountable for all aspects of the work.

Declaration of Any Conflict of Interest: The authors report no conflicts with any product mentioned or concept discussed in this article.

Institutional Review Board: The MAP Study and decision making substudy were approved by an Institutional Review Board (Protocol Number 07071201) at Rush University Medical Center. All participants signed an informed consent document for each study.

Introduction

Healthcare and financial decision making is critically important for maintaining health and independence, especially for older adults (Agarwal et al., 2009; Jacobson et al., 2014; Moyer & Marson, 2007). Accumulating evidence suggests that many older adults are vulnerable to poor decision making in these domains (Finucane et al., 2002; Finucane et al., 2005; Spreng et al., 2016). For example, in the healthcare domain, many older adults have difficulties understanding eligibility criteria for Medicare Part D, taking part in enrollment processes, and selecting cost-effective prescription drug coverage (Heiss et al., 2013; Rivera-Hernandez et al., 2020; Stults et al., 2018). Older adults also encounter challenges in the financial domain and are vulnerable to fees for late credit card payments, subprime home equity loans and lines of credit, and mismanagement of retirement funds (Agarwal et al., 2009; Hammond et al., 2017; Howard & Yazdipour, 2014). Overall, poor healthcare and financial decision making is associated with numerous deleterious outcomes for older adults, including susceptibility to financial fraud and scams, medication nonadherence, incident dementia, and early mortality (Burnes et al., 2017; Naci et al., 2014; Stewart et al., 2019).

Considering the many adverse outcomes associated with poor healthcare and financial decision making, it is vital to identify factors that facilitate better decision making among older adults. We conceptualize decision making as a complex ability supported by diverse resources, including many that are uniquely impacted by aging (Amundsen, 2021; Boyle et al., 2022; Han et al., 2016; Spreng et al., 2016; Stewart et al., 2018). For instance, an established, foundational relationship exists between cognition and decision making, and it is widely recognized that aging is associated with deteriorating cognitive resources (Boyle et al., 2013a; Centers for Disease Control, 2015; Han et al., 2016; Stewart et al., 2018). In our conceptual framework, psychological and experiential factors also impact decision making and related behavioral economic outcomes, and we further hypothesize that these factors may be most impactful in the context of diminished cognitive resources (Boyle et al., 2022). Burgeoning evidence suggests that psychological resources contribute to decision making in older age with some operating independently of cognition but many interacting with cognition to affect decision making (Amundsen, 2021; Glover et al., 2021; James et al., 2011; Miyashita et al., 2021; Stewart et al., 2020). For example, we have found that risk aversion is associated with decision making independent of cognition, but loneliness interacts with cognition to affect decision making (Boyle et al., 2012a; Stewart et al., 2020). Notably, in our work, the effects of psychological and experiential factors were most prominent among older adults with lower cognition (Glover et al., 2021; Stewart et al., 2020; Stewart et al., In Press).

Most previous research has focused on negative psychological attributes and relatively little is known about the associations between positive psychological constructs and decision making (Denburg et al., 2009; Gautam & Mathur, 2018; Kang et al., 2019; Lichtenberg et al., 2016; Lichtenberg et al., 2020; Nguyen et al., 2013). One exception is our recent finding that purpose in life – a positive psychological construct that refers to one’s sense of meaning and investment in life experiences – is associated with better decision making among older adults, especially those with poorer cognitive function (Stewart et al., In Press). Purpose in life, however, is only one component of the larger construct of psychological wellbeing,

which refers to one's broader sense that life is good and marked by active and meaningful engagement and positive interactions with others. Psychological wellbeing consists of six domains (i.e., autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance) and is a construct of particular interest due to its robust associations with a range of positive outcomes in aging, including better mental health, longer life expectancies, and disability- and disease-free longevity (Boccardi & Boccardi, 2019; Dodge et al., 2012; Gheno, 2021; Kafka & Kozma, 2002; Ryff, 2014; Ryff & Keyes, 1995; Wilson et al., 2013; Zanninotto & Steptoe, 2019). Thus, it is possible that the benefits of psychological wellbeing extend into other life domains such as decision making. Furthermore, from an intervention standpoint, it is important to understand whether potential beneficial effects of psychological wellbeing are mainly due to purpose in life or additional domains of wellbeing.

Here, we extended our prior work by testing the hypotheses that psychological wellbeing is associated with healthcare and financial decision making among community-dwelling older adults without dementia and interacts with the level of cognitive function to influence decision making. We also aimed to understand whether the association of psychological wellbeing with decision making is independent of related but conceptually distinct negative psychological attributes – depressive symptoms and anxiety. We then explored relationships between six domains of psychological wellbeing and decision making to understand whether the relationship between psychological wellbeing and decision making is attributed to one or more specific domains. Lastly, we examined whether the interaction between psychological wellbeing and cognition was general in nature or domain-specific by examining five specific cognitive domains (i.e., episodic memory, visuospatial ability, perceptual speed, semantic memory, and working memory). Study results may provide insight into the role of psychological wellbeing in decision making among older adults and highlight potential avenues for decision making interventions.

Methods

Participants

Participants were from the Rush Memory and Aging Project (MAP), an ongoing clinical-pathologic cohort study of aging (Bennett et al., 2018). MAP began enrollment in 1997, with recruitment of non-demented, community-dwelling older adults who are tested within their homes. MAP participation includes a thorough clinical evaluation consisting of medical history, neurological examination, cognitive function testing, risk factor assessment, and organ donation at death. A MAP substudy on decision making began in 2010 and included assessments of healthcare and financial decision making (Boyle et al., 2012a, 2012b). All participants report their race (e.g., White) and ethnicity (i.e., Hispanic: yes or no) based on categories from the 1990 United States Census Bureau as well as their gender (i.e., male or female), date of birth, years of education, and income. Annual income is measured using the Show-Card Method from the Established Populations for Epidemiologic Studies of the Elderly, in which participants are asked to select 1 (\$0.00 to \$4,999) of 10 (\$75,000 and over) levels of total annual family income (Huntley et al., 1993). Both MAP and the substudy on decision making were approved by an Institutional Review Board (Protocol

Number 07071201) at Rush University Medical Center. All participants signed an informed consent document for each study. Data can be requested at <https://www.radc.rush.edu>. Eligibility for these analyses required the absence of dementia at the baseline assessment of the decision making substudy based on a review of medical history, neurological examination, and cognitive function testing; then classified by a clinician using the criteria of the Joint Working Group of the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (Bennett et al., 2018). Of 1315 alive MAP participants, 127 had not yet completed the decision making substudy at the time of the current analyses, 66 were diagnosed with dementia, and 40 had missing data for variables of interest, including decision making. As a result, 1082 participants were included in the current analyses.

Assessment of Healthcare and Financial Decision Making

Healthcare and financial decision making was measured using a validated, performance-based instrument developed for use in older adults and to reflect feasible real-world healthcare and financial decisions that they may face in their daily lives (Finucane & Gullion, 2010; Finucane et al., 2005; Stewart et al., 2018). The measure consisted of 12 items - a 6-item healthcare component and a 6-item financial component. Each component consisted of three simple items and three complex items. Participants viewed tables displaying information about HMO plans or mutual funds then answered questions requiring comprehension and integration of the tabulated information. For example, one simple healthcare item consisted of a table displaying five characteristics of three HMO plans (i.e., member satisfaction, preventive care strategies, access to specialists, customer service, and premiums), and asked participants the following question: "Look at the information provided and tell me, what percentage of members are very satisfied with physician access?" One complex healthcare item displayed the same five characteristics for six additional HMO plans (i.e., nine plans in total) and asked participants the following question: "You don't want any HMO that is below average on member satisfaction, customer service, or access to specialists. Finally, you DO want an HMO that is above average on preventive care strategies. Based on the information in the table below, which HMO should you choose?" The total number of items answered correctly was summed for each participant (range=0–12), with higher scores indicating better decision making. This measure has demonstrated sufficient internal consistency, and is associated with other important decision making resources (i.e., cognitive function, health and financial literacy, and risk aversion) and adverse outcomes in old age (i.e., accelerated cognitive decline, incident Alzheimer's dementia, and mortality) (Boyle et al., 2013b; Stewart et al., 2018; Stewart et al., 2019).

Assessment of Psychological Wellbeing

Psychological wellbeing was measured using a modified version of Ryff's Scales of Psychological Wellbeing (Wilson et al., 2013). The modified scale consists of 18 items, including 3 items each that assess 6 domains of psychological wellbeing: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. One item from the positive relations with others domain indicated, "People would describe me as a giving person, willing to share my time with others." An item from the environmental mastery domain stated, "I am good at managing the responsibilities

of daily life.” Participants were asked to rate each item according to how the item applied to them using a 7-point Likert-type scale with response options: 1=strongly agree, 2=agree, 3=slightly agree, 4=neither agree nor disagree, 5=slightly disagree, 6=disagree, and 7=strongly disagree. Positively worded items were reverse coded and then all three item responses for each domain were averaged to create a domain-specific score (e.g., a score for the domain of personal growth), and all item responses were averaged to create a total psychological wellbeing score. Higher scores indicated greater psychological wellbeing.

Assessment of Cognitive Function

Participants completed a battery of 21 performance-based measures of cognitive function (Bennett et al., 2018; Wilson et al., 2002). Two tests, the Mini-Mental State Examination (MMSE) and Complex Ideational Material, were used for descriptive or diagnostic purposes only. The remaining 19 performance-based tests assessed 5 domains of cognitive function: 1) episodic memory (7 tests: Word List Memory, Recall, and Recognition from the CERAD neuropsychological battery; immediate and delayed recall of Logical Memory Story A and the East Boston Story); 2) visuospatial ability (2 tests: Judgment of Line Orientation and Standard Progressive Matrices); 3) perceptual speed (4 tests: the oral version of the Symbol Digit Modalities Test, Number Comparison, Stroop Color Naming, and Stroop Word Reading); 4) semantic memory (3 tests: Category Fluency, Boston Naming, and the National Adult Reading Test); and 5) working memory (3 tests: Digit Span subtests [forward and backward] of the Wechsler Memory Scale-Revised and Digit Ordering). Participants’ raw scores on each of the 19 performance-based tests were converted to z-scores using the baseline mean and standard deviation of the full MAP cohort (Wilson et al., 2005). All 19 z-scores were averaged to yield a composite score of global cognitive function for each participant. The five specific cognitive domains were calculated by averaging the z-scores from the tests in each cognitive domain.

Other Covariates: Depressive Symptoms and Anxiety

Depressive symptoms were assessed using a modified 10-item version of the Center for Epidemiologic Studies Depression (CES-D) Scale (Kohout et al., 1993). Participants were asked whether or not (0=no and 1=yes) they experienced each of ten symptoms during a majority of the time during the previous week. A sample question included, “I felt that people disliked me.” Positively worded or positive attributes (e.g., “I was happy.”) were reverse coded so that the participant’s response was consistent with being a depressive symptom. All items were then summed for a total number of reported symptoms with higher scores indicating more depressive symptoms.

Anxiety was measured using a modified 10-item version of the Anxiety Trait Scale from the State-Trait Anxiety Inventory (Wilson et al., 2003). Participants were asked whether or not (0=no and 1=yes) they generally experienced ten affective states (e.g., “I lack self-confidence.”). Positively worded or positive attributes (such as, “I feel pleasant.”) were reverse coded so that the participant’s response was consistent with anxious feelings. Items were then summed for a total number of reported experiences with higher scores indicating more anxiety.

Analyses

First, we assessed bivariate associations of demographic characteristics (i.e., age, gender, and years of education), psychological wellbeing, and global cognitive function with decision making using Pearson correlations or *t*-tests, as appropriate. Second, we examined associations of psychological wellbeing and global cognitive function with decision making (the continuous outcome variable) in a series of linear regression models. The initial model examined direct associations of both psychological wellbeing and global cognitive function with decision making after adjusting for age, gender, and years of education. For the core model, we then added an interaction term for psychological wellbeing with global cognitive function to the initial model to examine whether psychological wellbeing interacts with global cognitive function to impact decision making. Third, to address potential confounding by depressive symptoms and anxiety, we performed two separate linear regression models with additional terms for each psychological factor and its interaction with cognition. Fourth, to explore the potential role(s) of specific domains of psychological wellbeing, we repeated the core model but replaced psychological wellbeing with each of the six domains of wellbeing in separate linear regression models. Lastly, we repeated the core model but replaced global cognition with five specific cognitive domains in five separate linear regression models to understand possible impacts of five specific cognitive domains. Estimates from linear regression models represent unstandardized regression coefficients.

We also performed secondary analyses to examine the role of income in the relationships between psychological wellbeing and global cognitive function with decision making. To do so, we re-ran the previous core model to include income as a covariate and an interaction term for income and psychological wellbeing. All analyses were conducted using SAS software, version 9.4 of the SAS system for Linux.

Results

Participant Characteristics

Participants (N=1082; 97% non-Latino White; 76% women) had a mean score of 7.96 (SD=2.65) on the decision making measure, with women (*Mean*=7.74, *SD*=2.67) scoring lower than men on average (*Mean*=8.67, *SD*=2.44) ($t_{1081} = -5.01, p < .0001$). In bivariate analyses, younger age (Pearson's $r = -0.31, p < .0001$), more years of education (Pearson's $r = 0.36, p < .0001$), higher levels of psychological wellbeing (Pearson's $r = 0.28, p < .0001$), and higher levels of global cognitive function (Pearson's $r = 0.57, p < .0001$) were associated with higher scores on the decision making measure. Additional descriptive information is reported in Table 1.

Associations of Psychological Wellbeing with Healthcare and Financial Decision Making

Both higher levels of psychological wellbeing (estimate=0.39, standard error [SE]=0.11, $t_{1076} = 3.42, p < 0.001$) and higher global cognitive function (estimate=2.37, SE=0.14, $t_{1076} = 17.36, p < 0.0001$) were associated with better decision making. Furthermore, in a second model that included an interaction term for psychological wellbeing with global cognitive function, the interaction was significant (estimate=-0.68, SE=0.20, $t_{1074} = -3.36,$

$p < 0.001$), such that higher levels of wellbeing were associated with better decision making particularly among participants with lower global cognitive function. See Figure 1.

Potential Confounders: Depressive Symptoms and Anxiety

Depressive symptoms and anxiety were not associated with decision making - neither independently nor in interaction with global cognitive function. Moreover, the inclusion of depressive symptoms and anxiety did not substantially change the association of psychological wellbeing or the interaction between psychological wellbeing and global cognitive function with decision making. See Tables 2 and 3.

Relation of Six Domains of Psychological Wellbeing and Healthcare and Financial Decision Making

Significant main effects existed for five of the six domains: autonomy, environmental mastery, personal growth, positive relations with others, and purpose in life. A significant main effect did *not* exist for the domain of self-acceptance. We also observed significant interactions between global cognitive function and four of the six domains of psychological wellbeing. Higher levels of autonomy, environmental mastery, personal growth, and purpose in life were associated with better decision making, especially among participants with lower global cognitive function. We did *not* observe significant interactions between global cognitive function and two domains of psychological wellbeing – self-acceptance and positive relations others. See Table 4.

Relationships between Psychological Wellbeing and Five Cognitive Domains

We observed significant interactions for the domains of perceptual speed and working memory; specifically, psychological wellbeing was particularly beneficial for decision making among persons with lower perceptual speed and working memory abilities. See Table 5.

Secondary Analyses

The direct effect of income was not statistically significant (estimate=0.06, SE=0.04, $t_{1034}=1.52$, $p=0.13$). Furthermore, the interaction between income and psychological wellbeing was not statistically significant (estimate= -0.06, SE=0.05, $t_{1034}= -1.19$, $p=0.23$). However, main effects for both psychological wellbeing (estimate=0.44, SE=0.13, $t_{1034}=3.41$, $p<0.001$) and global cognitive function (estimate=1.98, SE=0.17, $t_{1034}=11.35$, $p<0.0001$) as well as their interaction (estimate= -0.69, SE=0.22, $t_{1034}= -3.12$, $p=0.002$) remained significant with the inclusion of income and its interaction with psychological wellbeing in the model.

Discussion

The current study tested the hypotheses that psychological wellbeing is associated with healthcare and financial decision making among community-dwelling older adults without dementia and that wellbeing interacts with the level of cognitive function to influence decision making. Psychological wellbeing was associated with better decision making, with higher levels of wellbeing most beneficial for decision making among participants with

lower levels of global cognitive function. These associations persisted after adjusting for depressive symptoms and anxiety, suggesting that the impact of psychological wellbeing is relatively independent of these characteristics of psychological distress. Notably, four specific domains of psychological wellbeing - autonomy, environmental mastery, personal growth, and purpose in life - were related to decision making, particularly for participants with poorer global cognitive function. These results suggest that multiple aspects of psychological wellbeing may confer benefit to decision making in older age. Furthermore, psychological wellbeing interacted with two specific cognitive domains, perceptual speed and working memory, such that higher levels of wellbeing were associated with better decision making among persons with slower perceptual speed and poorer working memory. The current study suggests that a general sense of contentedness, active and meaningful participation in one's own life, and positive engagement with others facilitate better decision making among older adults, especially those with diminished cognitive function. It is important to identify factors that modify the foundational relationship between cognition and decision making for two key reasons: 1) such factors represent potentially modifiable intervention targets, and 2) this approach allows us to identify groups of vulnerable older adults (e.g., those with diminished cognition). Hence, these results have important implications regarding targets to investigate for more focused interventions to improve decision making among older adults.

Positive psychological resources are associated with numerous favorable functional and health outcomes in aging, yet previous research on decision making, specifically, has largely focused on the role of negative psychological factors (Boccardi & Boccardi, 2019; Dodge et al., 2012; Glover et al., 2021; Gheno, 2021; Kafka & Kozma, 2002; Stewart et al., 2020; Wilson et al., 2013; Zanninotto & Steptoe, 2019). The current study results add to a burgeoning body of research centering on positive psychological attributes. Importantly, these results extend our understanding of the scope of outcomes affected by positive psychological factors and suggest that psychological wellbeing can provide additional opportunities for people to thrive or flourish in older age, including in the realm of decision making. Thriving reflects more than merely surviving or living in the absence of negative psychological attributes or ailments—rather, thriving denotes active participation and engagement in one's life and related activities (Diener et al, 2017; Martinson & Berridge, 2015). We postulate that higher levels of psychological wellbeing is essential to thriving in older age, including better decision making.

The current findings also extend our emerging work demonstrating that positive psychological resources play a critical role in decision making among older adults with diminished cognitive abilities (Glover et al., 2021; Stewart et al., 2020; Stewart et al., In Press). For example, we reported that more frequent engagement in cognitive activity – a positive psychological resource – was associated with better decision making, particularly among older adults with lower levels of cognitive function (Glover et al., 2021). We suspect that positive psychological resources are especially beneficial in the context of relatively lessened cognitive abilities because older adults can leverage such attributes to compensate in the face of lower levels of cognitive function. Taken together, our work suggests that opportunities offered by positive psychological resources can be particularly advantageous

to a specific subgroup of older adults – those with lower levels of cognitive function - and that this subgroup may represent a target group for intervention studies.

It is unknown exactly why positive psychological attributes might benefit decision making when cognitive resources are low. Perhaps a greater sense of psychological wellbeing provides older adults with lower levels of cognitive function, especially slower perceptual speed and poorer working memory, with the energy and motivation needed to seek and effortfully process information to make better decisions (Boyle et al., 2008; Boyle et al., 2012c). Another possibility is the presence of the “stability-despite-loss-paradox,” where older adults’ psychological wellbeing remains stable in aging, even in the context of decreased cognitive function (Braun et al., 2017; Gerstorf et al., 2007). For example, older adults with consistently elevated levels of psychological wellbeing may feel secure or confident in their ability to go about their daily activities, despite cognitive loss, due to a general sense of contentedness, openness to seeking information, and engagement with others, which allows them to focus more on making sound decisions. Relatedly, older adults with a greater sense of psychological wellbeing may more readily accrue knowledge through positive and meaningful engagement with their environments and others that, in turn, can be used to make better decisions (Ryff et al., 2016). Lastly, psychological wellbeing and related constructs may enhance neurologic health either by promoting neural efficiency or through known associations with lower clinical stroke risk and fewer macroscopic lacunar infarcts, and the ability to facilitate a person’s general functionality despite accumulating Alzheimer’s brain pathology (Boyle et al., 2010; Boyle et al., 2012c; Kim et al., 2013; Yu et al., 2015). Thus, psychological wellbeing may strengthen a person’s brain and benefit decision making through better brain health, particularly in the face of lower cognitive functioning.

Current study findings have important implications for interventions and suggest that motivational interviewing and cognitive behavioral therapy focused on wellbeing may facilitate better decision making and promote other positive health and functional outcomes in aging. Previous evidence has suggested that psychological wellbeing is amenable to intervention and that improvements in wellbeing lead to more positive physical and psychological health outcomes (Stochl et al., 2018; Ryff et al., 2016; Thomson et al., 2018; Walshe et al., 2020). Indeed, psychological wellbeing may be an ideal therapeutic target as it is a modifiable psychological resource, related to positive outcomes in aging, and may enhance motivation in relation to decision making and a host of other healthy behaviors (Ryff et al., 2016). Furthermore, it is possible that evidence-based intervention strategies may strengthen psychological wellbeing among older adults with diminished cognitive abilities to improve their decision making, in part, through peer support and confidence-building (Stochl et al., 2018; Thomson et al., 2018). Future research may address optimal intervention strategies to bolster psychological wellbeing.

The current study has limitations and strengths. One limitation is the homogeneity among study participants regarding race and gender as well as the high years of education of participants. Currently, we are collecting data regarding decision making among older adults belonging to racial and ethnic minoritized communities, in addition to older persons with fewer years of education. A second limitation is the cross-sectional nature of the

current study. While we hypothesize that psychological wellbeing is associated with decision making and interacts with the level of cognitive function to influence decision making, this is a cross sectional study and it is possible that directionality occurs in the opposite way, such that decision making impacts psychological wellbeing. Longitudinal data collection in our cohorts is ongoing; hence, we will be better able to address directionality of the relationships between various psychological constructs, particularly psychological wellbeing, and decision making as well as how these associations change over time. A third potential limitation is that the findings in the current study may not translate to broader or a different set of healthcare and financial decisions faced by older adults. Conversely, this study has several strengths including a well-characterized group of community-dwelling older adults without dementia and used established measures of psychological wellbeing, cognitive function, and healthcare and financial decision making. We also adjusted for important covariates including depressive symptoms and anxiety, which increases confidence in our findings. Overall, the current study demonstrates the important role of psychological wellbeing, a positive psychological resource, in relation to healthcare and financial decision making in old age, particularly in the context of diminished cognitive function.

Acknowledgements:

We would like to thank all MAP study and Decision Making substudy participants. We also would like to thank all staff at the Rush Alzheimer's Disease Center.

Funding:

This work was supported by grants from the National Institute on Aging [grant numbers: R01AG034374, R01AG033678, and R01AG060376 to PAB; P30AG072975, P30AG010161, and R01AG17917 to DAB].

References

- Agarwal S, Driscoll JC, Gabaix X, et al. (2009). The Age of Reason: Financial Decisions over the Life Cycle and Implications for Regulation. *Brookings Papers on Economic Activity* (Fall 2009), 51–101.
- Amundsen D (2021). Digital Technologies as a Panacea for Social Isolation and Loneliness among Older Adults: An Intervention Model for Flourishing and Wellbeing: Visual Technologies as a Panacea for Social Isolation. *Video Journal of Education and Pedagogy*, 5(1), 1–14.
- Bennett DA, Buchman AS, Boyle PA et al. (2018). Religious Orders Study and Rush Memory and Aging Project. *J Alzheimers Dis*, 64(s1), S161–S189. doi:10.3233/JAD-179939 [PubMed: 29865057]
- Boccardi M, & Boccardi V (2019). Psychological wellbeing and healthy aging: focus on telomeres. *Geriatrics*, 4(1), 25. [PubMed: 31023993]
- Boyle PA, Buchman AS, Barnes LL, & Bennett DA (2010). Effect of a purpose in life on risk of incident Alzheimer disease and mild cognitive impairment in community-dwelling older persons. *Archives of general psychiatry*, 67(3), 304–310. [PubMed: 20194831]
- Boyle PA, Buchman AS, Wilson RS, et al. (2012c). Effect of purpose in life on the relation between Alzheimer disease pathologic changes on cognitive function in advanced age. *Archives of general psychiatry*, 69(5), 499–504. [PubMed: 22566582]
- Boyle PA, Wilson RS, Schneider JA, Bienias JL, & Bennett DA (2008). Processing resources reduce the effect of Alzheimer pathology on other cognitive systems. *Neurology*, 70(17), 1534–1542. [PubMed: 18354077]

- Boyle PA, Wilson RS, Yu L et al. (2013b). Poor decision making is associated with an increased risk of mortality among community-dwelling older persons without dementia. *Neuroepidemiology*, 40(4), 247–252. doi:10.1159/000342781 [PubMed: 23364306]
- Boyle P, Yu L, Buchman A et al. (2012a). Risk aversion is associated with decision making among community-based older persons. *Frontiers in psychology*, 3, 205. [PubMed: 22754545]
- Boyle PA, Yu L, Mottola G, Innes K, & Bennett DA (2022). Degraded Rationality and Suboptimal Decision-Making in Old Age: A Silent Epidemic with Major Economic and Public Health Implications. *Public Policy & Aging Report*.
- Boyle PA, Yu L, Wilson RS et al. (2012b). Poor decision making is a consequence of cognitive decline among older persons without Alzheimer's disease or mild cognitive impairment. *PLoS one*, 7(8).
- Boyle PA, Yu L, Wilson RS, et al. (2013a). Cognitive decline impairs financial and health literacy among community-based older persons without dementia. *Psychology and aging*, 28(3), 614. [PubMed: 23957225]
- Braun T, Schmukle SC, & Kunzmann U (2017). Stability and change in subjective well-being: The role of performance-based and self-rated cognition. *Psychology and Aging*, 32(2), 105–117. [PubMed: 28287781]
- Burnes D, Henderson CR Jr, Sheppard C, et al. (2017). Prevalence of financial fraud and scams among older adults in the United States: A systematic review and meta-analysis. *American journal of public health*, 107(8), e13–e21.
- Denburg NL, Weller JA, Yamada TH, Shivapour DM, Kaup AR, LaLoggia A, ... & Bechara A (2009). Poor decision making among older adults is related to elevated levels of neuroticism. *Annals of Behavioral Medicine*, 37(2), 164–172. [PubMed: 19350336]
- Diener E, Heintzelman SJ, Kushlev K, Tay L, Wirtz D, Lutes LD, & Oishi S (2017). Findings all psychologists should know from the new science on subjective well-being. *Canadian Psychology/psychologie canadienne*, 58(2), 87.
- Dodge R, Daly AP, Huyton J, & Sanders LD (2012). The challenge of defining wellbeing. *International journal of wellbeing*, 2(3).
- Finucane ML, & Gullion CM (2010). Developing a Tool for Measuring the Decision-Making Competence of Older Adults. *Psychology and Aging*, 25(2), 271–288. doi:10.1037/a0019106.supp [PubMed: 20545413]
- Finucane ML, Mertz CK, Slovic P, et al. (2005). Task complexity and older adults' decision-making competence. *Psychology and Aging*, 20 (1), 71–84. doi:10.1037/0882-7974.20.1.71.supp [PubMed: 15769215]
- Finucane ML, Slovic P, Hibbard JH, et al. (2002). Aging and decision-making competence: an analysis of comprehension and consistency skills in older versus younger adults considering health-plan options. *J. Behav. Decis. Mak* 15, 141–164. doi: 10.1002/bdm.407
- Gautam A and Mathur R (2018). Influence of mindfulness on decision making and psychological flexibility among aircrew. *Journal of Psychosocial Research*, 13(1),199–207.
- Gheno I (2021) Building a Network Around Wellbeing Services that Empower Older Adults. In: Andreoni G, Mambretti C (eds) *Digital Health Technology for Better Aging*. Research for Development. Springer, Cham. 10.1007/978-3-030-72663-8_16
- Glover CM, Yu L, Stewart CC, Wilson RS, Bennett DA, & Boyle PA (2021). The Association of Late Life Cognitive Activity with Healthcare and Financial Decision-Making in Community-Dwelling, Nondemented Older Adults. *The American Journal of Geriatric Psychiatry*, 29(2), 117–125. [PubMed: 32646635]
- Han SD, Boyle PA, James BD et al. (2016). Discrepancies between cognition and decision making in older adults. *Aging clinical and experimental research*, 28(1), 99–108. [PubMed: 25995167]
- Heiss F, Leive A, McFadden D, Winter J (2013). Plan selection in Medicare Part D: Evidence from administrative data. *Journal of Health Economics*, 32(6), 1325–1344. [PubMed: 24308882]
- Howard JA, & Yazdipour R (2014). Retirement planning: Contributions from the field of behavioral finance and economics. *Investor Behavior—The Psychology of Financial Planning and Investing*, 285–305.

- Huntley J, Ostfeld AM, Taylor JO et al. (1993). Established populations for epidemiologic studies of the elderly: Study design and methodology. *Aging Clinical and Experimental Research*, 5(1), 27–37. [PubMed: 8481423]
- Jacobson G, Swoope C, Perry M, et al. (2014). How are Seniors Choosing and Changing Health Insurance Plans? Findings from Focus Groups with Medicare Beneficiaries. Kaiser Family Foundation, 1–22.
- James BD, Wilson RS, Barnes LL et al. (2011). Late-life social activity and cognitive decline in old age. *Journal of the International Neuropsychological Society*, 17(6), 998–1005. DOI: 10.1017/S1355617711000531 [PubMed: 22040898]
- Kafka GJ, & Kozma A (2002). The construct validity of Ryff's scales of psychological well-being (SPWB) and their relationship to measures of subjective well-being. *Social Indicators Research*, 57(2), 171–190.
- Kang Y, Strecher VJ, Kim E, & Falk EB (2019). Purpose in life and conflict-related neural responses during health decision-making. *Health Psychology*, 38(6), 545. [PubMed: 31008647]
- Kim ES, Sun JK, Park N, & Peterson C (2013). Purpose in life and reduced incidence of stroke in older adults: 'The Health and Retirement Study'. *Journal of psychosomatic research*, 74(5), 427–432. [PubMed: 23597331]
- Lichtenberg PA, Campbell R, Hall L, & Gross EZ (2020). Context matters: Financial, psychological, and relationship insecurity around personal finance is associated with financial exploitation. *The Gerontologist*, 60(6), 1040–1049. [PubMed: 32211847]
- Lichtenberg PA, Sugarman MA, Paulson D, Ficker LJ, & Rahman-Filipiak A (2016). Psychological and functional vulnerability predicts fraud cases in older adults: Results of a longitudinal study. *Clinical Gerontologist*, 39(1), 48–63. [PubMed: 27065511]
- Martinson M and Berridge C (2015). Successful aging and its discontents: A systematic review of the social gerontology literature. *The gerontologist*, 55(1), 58–69. [PubMed: 24814830]
- Miyashita J, Kohno A, Yamamoto Y, Shimizu S, Azuma T, Takada T, ... & Fukuhara S (2021). How psychosocial factors contribute to Japanese older adults' initiation of advance care planning discussions: a qualitative study. *Journal of Applied Gerontology*, 40(10), 1180–1188. [PubMed: 32233717]
- Moye J, & Marson DC (2007). Assessment of decision-making capacity in older adults: an emerging area of practice and research. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 62(1), P3–P11. [PubMed: 17284555]
- Naci H, Soumerai SB, Ross-Degnan D, et al. (2014). Medication affordability gains following Medicare Part D are eroding among elderly with multiple chronic conditions. *Health Affairs*, 33(8), 1435–1443. [PubMed: 25092846]
- Nguyen CM, Barrash J, Koenigs AL, Bechara A, Tranel D, & Denburg NL (2013). Decision-making deficits in normal elderly persons associated with executive personality disturbances. *International Psychogeriatrics*, 25(11), 1811–1819. [PubMed: 23906413]
- Rivera-Hernandez M, Blackwood KL, Moody KA, & Trivedi AN (2021). Plan switching and stickiness in Medicare advantage: a qualitative interview with Medicare advantage beneficiaries. *Medical Care Research and Review*, 78(6), 693–702. [PubMed: 32744130]
- Ryff CD (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and psychosomatics*, 83(1), 10–28. [PubMed: 24281296]
- Ryff CD, Heller AS, Schaefer SM, Van Reekum C, & Davidson RJ (2016). Purposeful engagement, healthy aging, and the brain. *Current behavioral neuroscience reports*, 3(4), 318–327. [PubMed: 28534002]
- Ryff CD, & Keyes CLM (1995). The structure of psychological well-being revisited. *Journal of personality and social psychology*, 69(4), 71–727.
- Spreng RN, Karlawish J, & Marson DC (2016). Cognitive, social, and neural determinants of diminished decision-making and financial exploitation risk in aging and dementia: A review and new model. *Journal of elder abuse & neglect*, 28(4–5), 320–344. [PubMed: 27644698]
- Stewart CC, Yu L, Glover CM, et al. (2020). Loneliness interacts with cognition in relation to healthcare and financial decision making among community-dwelling older adults. *The Gerontologist*. 60(8):1476–84. [PubMed: 32574350]

- Stewart CC, Yu L, Glover CM, et al. (In Press). Purpose in Life and Cognition Interact to Impact Healthcare and Financial Decision Making in Old Age. *Journal of Applied Gerontology*.
- Stewart CC, Yu L, Lamar M, et al. (2019). Associations of health and financial literacy with mortality in advanced age. *Aging clinical and experimental research*, 1–7.
- Stewart CC, Yu L, Wilson RS et al. (2018). Correlates of healthcare and financial decision making among older adults without dementia. *Health Psychol*, 37(7), 618–626. doi:10.1037/hea0000610. [PubMed: 29565601]
- Stochl J, Sonesson E, Wagner AP, Khandaker GM, Goodyer I, & Jones PB (2019). Identifying key targets for interventions to improve psychological wellbeing: replicable results from four UK cohorts. *Psychological medicine*, 49(14), 2389–2396. [PubMed: 30430959]
- Stults CD, Baskin AS, Bundorf MK and Tai-Seale M (2018). Patient experiences in selecting a Medicare Part D prescription drug plan. *Journal of patient experience*, 5(2),147–152. [PubMed: 29978032]
- Thomson LJ, Lockyer B, Camic PM, & Chatterjee HJ (2018). Effects of a museum-based social prescription intervention on quantitative measures of psychological wellbeing in older adults. *Perspectives in Public Health*, 138(1), 28–38. [PubMed: 29130869]
- United States Census Bureau Report, 1990. Last accessed September 20, 2022 from <https://www2.census.gov/library/publications/decennial/1990/cp-1/cp-1-1.pdf>
- Walshe C, Roberts D, Calman L, Appleton L, Croft R, Skevington S, ... & Perez Algorta G (2020). Peer support to maintain psychological wellbeing in people with advanced cancer: findings from a feasibility study for a randomised controlled trial. *BMC palliative care*, 19(1), 1–13. [PubMed: 31900221]
- Wilson RS, Barnes LL, De Leon CM, et al. (2002). Depressive symptoms, cognitive decline, and risk of AD in older persons. *Neurology*, 59(3), 364–370. [PubMed: 12177369]
- Wilson RS, Bienias JL, Mendes de Leon CF et al. (2003). Negative affect and mortality in older persons. *American Journal of Epidemiology*, 158(9), 827–835. [PubMed: 14585760]
- Wilson RS, Barnes LL, Krueger KR et al. (2005). Early and late life cognitive activity and cognitive systems in old age. *Journal of the International Neuropsychological Society*, 11(4), 400–407. [PubMed: 16209420]
- Wilson RS, Boyle PA, Segawa E, et al. (2013). The influence of cognitive decline on well-being in old age. *Psychology and aging*, 28(2), 304. [PubMed: 23421323]
- Yu L, Boyle PA, Wilson RS, et al. (2015). Purpose in life and cerebral infarcts in community-dwelling older people. *Stroke*, 46(4), 1071–1076. [PubMed: 25791714]
- Zaninotto P, & Steptoe A (2019). Association between subjective well-being and living longer without disability or illness. *JAMA network open*, 2(7), e196870–e196870. [PubMed: 31290992]

What This Paper Adds

- Positive psychological resources are associated with numerous favorable functional and health outcomes in aging, yet previous research on decision making, specifically, has largely focused on the role of negative psychological factors.
- Multiple aspects of psychological wellbeing, a positive psychological construct encompassing six domains including purpose in life, may confer benefit to healthcare and financial decision making in older age.
- These associations persisted after adjusting for depressive symptoms and anxiety, negative psychological attributes, suggesting that the impact of psychological wellbeing is relatively independent of psychological distress.

Applications of Study Findings

- Psychological wellbeing is amenable to intervention and improvements in wellbeing may benefit decision making in aging, in addition to promoting positive physical and psychological health outcomes.
- Motivational interviewing and cognitive behavioral therapies focused on psychological wellbeing may facilitate better decision making and promote other positive health and functional outcomes in aging.
- Evidence-based intervention strategies may strengthen psychological wellbeing among older adults with diminished cognitive abilities to improve their decision making, in part, through peer support and confidence-building.

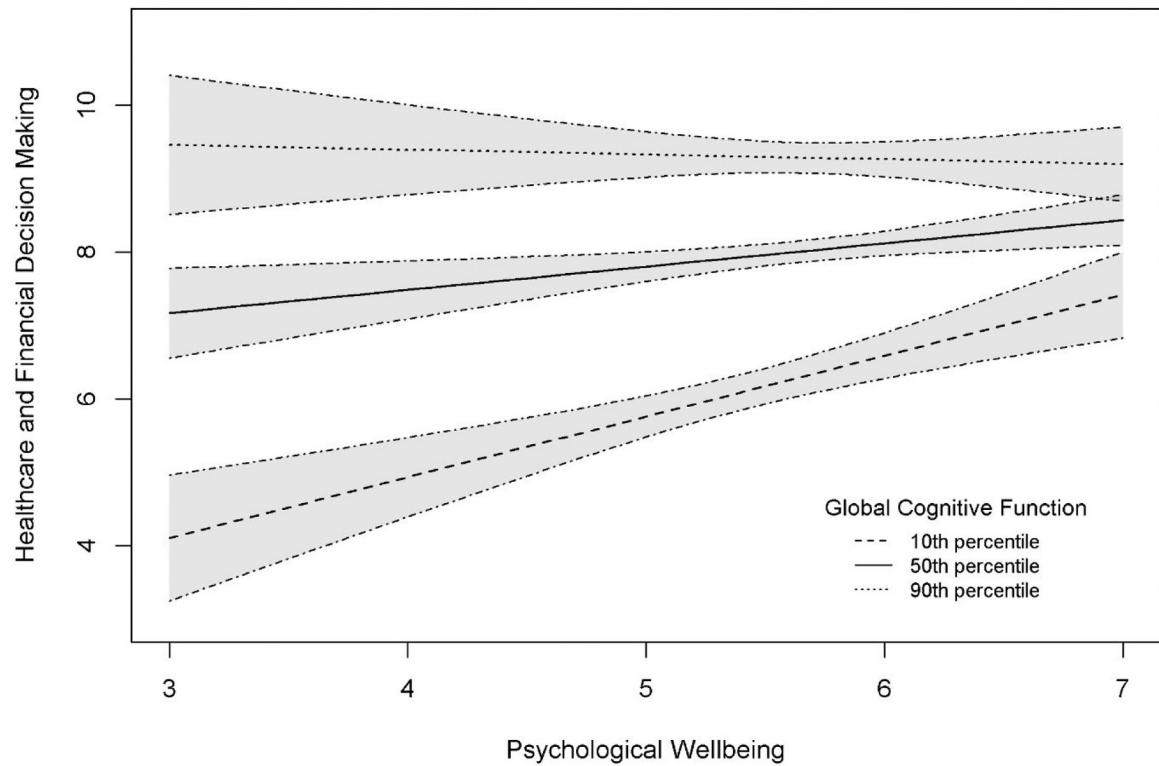


Figure 1.

The Relationship between Psychological Wellbeing (X-axis) and Healthcare and Financial Decision Making (Y-axis) at the 10th, 50th, and 90th Percentiles of Global Cognitive Function (Lines).

* Based on a multivariable linear regression model controlling for age, gender, and years of education. Significance was tested using a *t*-statistic with degrees of freedom of 1074.

Table 1:

Participant Characteristics (N=1082).

Characteristics	Range of Scores	Mean (SD)
Age	58.81 – 100.78	81.04 (7.53)
Gender, Women (%)		823 (76%)
Ethnicity and Race, Non-Latino White (%)	1039 (97%)	
Years of Education	5.00 – 30.00	15.60 (3.11)
Income, Median (IQR)	1 – 10 (\$0.00 to \$75,000 and over)	8 (\$35,00 to \$49,999)
MMSE Score, Median (IQR)	17.00 – 30.00	29.00 (27.86–30.00)
Healthcare and Financial Decision Making	0.00 – 12.00	7.96 (2.65)
Psychological Wellbeing	1.00 – 7.00	5.58 (0.58)
Global Cognitive Function	–1.59 – 1.60	0.23 (0.51)
Depressive Symptoms, Median (IQR)	0.00 – 10.00	0.00 (0.00–1.00)
Anxiety Median (IQR)	0.00 – 10.00	1.00 (0.00–2.00)

Table 2:

Associations of Psychological Wellbeing, Global Cognitive Function, and Depressive Symptoms with Healthcare and Financial Decision Making.

Terms	Estimate	Standard Error	<i>t</i> -Statistic	<i>p</i> -Value
Psychological Wellbeing	0.55	0.13	4.30	<0.0001
Global Cognitive Function	6.92	1.26	5.48	<0.0001
Depressive Symptoms	0.04	0.05	0.80	0.42
Psychological Wellbeing X Global Cognitive Function	-0.80	0.22	-3.63	0.0003
Depressive Symptoms X Global Cognitive Function	-0.12	0.09	-1.34	0.18

* Based on a multivariable linear regression model controlling for age, gender, and years of education. Significance was tested using a *t*-statistic with degrees of freedom of 1072.

Table 3:

Associations of Psychological Wellbeing, Global Cognitive Function, and Anxiety with Healthcare and Financial Decision Making.

Terms	Estimate	Standard Error	<i>t</i> -Statistic	<i>p</i> -Value
Psychological Wellbeing	0.46	0.13	3.55	0.0004
Global Cognitive Function	2.11	0.18	11.48	<0.0001
Anxiety	0.007	0.04	0.16	0.87
Psychological Wellbeing X Global Cognitive Function	-0.73	0.23	-3.23	0.001
Anxiety X Global Cognitive Function	-0.11	0.08	-1.31	0.19

* Based on a multivariable linear regression model controlling for age, gender, and years of education. Significance was tested using a *t*-statistic with degrees of freedom of 1034.

Table 4:

Associations of Six Specific Domains of Psychological Wellbeing and Global Cognitive Function with Healthcare and Financial Decision Making.

Terms	Estimate	Standard Error	<i>t</i> -Statistic	<i>p</i> -Value
Model 1				
Self-Acceptance	0.12	0.07	1.56	0.12
Global Cognitive Function	2.35	0.15	15.70	<0.0001
Self-Acceptance X Global Cognitive Function	-0.18	0.14	-1.34	0.18
Model 2				
Autonomy	0.23	0.08	3.05	0.002
Global Cognitive Function	2.25	0.15	15.28	<0.0001
Autonomy X Global Cognitive Function	-0.42	0.14	-3.04	0.002
Model 3				
Environmental Mastery	0.18	0.08	2.27	0.02
Global Cognitive Function	2.32	0.14	16.22	<0.0001
Environmental Mastery X Global Cognitive Function	-0.28	0.14	-2.04	0.04
Model 4				
Personal Growth	0.28	0.09	3.14	0.002
Global Cognitive Function	2.30	0.14	15.90	<0.0001
Personal Growth X Global Cognitive Function	-0.29	0.15	-1.96	0.0502
Model 5				
Positive Relations with Others	0.21	0.08	2.72	0.007
Global Cognitive Function	2.32	0.15	15.97	<0.0001
Positive Relations with Others X Global Cognitive Function	-0.25	0.13	-1.89	0.0584
Model 6				
Purpose in Life	0.28	0.07	3.81	0.0002
Global Cognitive Function	2.38	0.14	17.33	<0.0001
Purpose in Life X Global Cognitive Function	-0.39	0.12	-3.14	0.002

* Based on multivariable linear regression models controlling for age, gender, and years of education. Significance was tested using a *t*-statistic with degrees of freedom of 1072 for each of the six Models.

Table 5:

Associations of Psychological Wellbeing and Five Specific Cognitive Domains with Healthcare and Financial Decision Making.

Terms	Estimate	Standard Error	<i>t</i> -Statistic	<i>p</i> -Value
Model 1				
Psychological Wellbeing	0.62	0.13	4.74	<0.0001
Episodic Memory	0.87	0.14	6.01	<0.0001
Psychological Wellbeing X Episodic Memory	-0.28	0.18	-1.59	0.11
Model 2				
Psychological Wellbeing	0.58	0.12	4.87	<0.0001
Visuospatial Ability	0.98	0.11	8.79	<0.0001
Psychological Wellbeing X Visuospatial Ability	-0.20	0.14	-1.39	0.16
Model 3				
Psychological Wellbeing	0.36	0.11	3.22	<0.0001
Perceptual Speed	1.31	0.11	11.43	0.001
Psychological Wellbeing X Perceptual Speed	-0.50	0.13	-3.75	0.0002
Model 4				
Psychological Wellbeing	0.45	0.12	3.74	0.0002
Semantic Memory	1.57	0.14	10.94	<0.0001
Psychological Wellbeing X Semantic Memory	-0.05	0.18	-0.27	0.79
Model 5				
Psychological Wellbeing	0.69	0.12	5.62	<0.0001
Working Memory	0.80	0.11	6.99	<0.0001
Psychological Wellbeing X Working Memory	-0.37	0.15	-2.48	0.01

* Based on multivariable linear regression models controlling for age, gender, and years of education. Significance was tested using a *t*-statistic with degrees of freedom of 1074 for Model 1, 1063 for Model 2, 1067 for Model 3, 1067 for Model 4, and 1075 for Model 5.