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RESEARCH ARTICLE

Self-perceptions of aging mediate the longitudinal relationship of hopelessness and depressive symptoms

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Objectives: The purpose of the current study was to examine the hypothesis that the prospective relationship between hopelessness and depressive symptoms is mediated by self-perceptions of aging.

Methods: Data from 3 waves of the US Health and Retirement Study (2008, 2012, and 2014) were used (N = 4606; age M = 65.3, 55.5% female). In mediation analyses, hopelessness in 2008 was the independent variable, self-perceptions of aging in 2012 were the mediator, and depressive symptoms in 2014 were the outcome variable.

Results: After controlling for covariates, hopelessness in 2008 was an independent predictor of self-perceptions of aging in 2012 ($\beta = -.10$, $P < .001$), and self-perceptions of aging in 2012 was an independent predictor of depressive symptoms in 2014 ($\beta = -.41$, $P < .001$). Hopelessness in 2008 showed both direct ($\beta = .09$, $P < .001$) and indirect ($\beta = .03$, $P < .001$) effects on depressive symptoms in 2014, indicating partial mediation by change in self-perceptions of aging.

Conclusions: As hypothesized, change in self-perceptions of aging partially mediated the relationship of hopelessness with depressive symptoms 6 years later. Findings are consistent with a conceptualization of hopelessness as broad negative expectations about the future that may contribute to negative self-perceptions of aging and subsequent changes in depressive symptoms. Reducing hopelessness, increasing hope, and improving self-perceptions of aging have potential to reduce and prevent depressive symptoms for older adults. Future research should examine the mechanisms of these interrelationships and other aging outcomes.

KEYWORDS

depression, Health and Retirement Study, hopelessness, self-perceptions of aging

1 | INTRODUCTION

An individual's views regarding how well she or he is aging have emerged as an important predictor of physical health, life satisfaction, mental well-being, and mortality years into the future.[1] These "self-perceptions of aging" (SPA) are multidimensional, including positive and negative aspects of growing older across various domains, such as physical health, roles, and wisdom.[2,3] Older adults who develop more negative SPA experience an increase in subjective age—they feel older.[4] They also experience steeper declines in physical health and die earlier, compared with adults who hold more positive SPA. These findings for physical health and mortality have been observed in numerous longitudinal epidemiological studies and were recently confirmed in a meta-analysis of 19 such studies.[5] In 1 study, older adults with positive SPA lived a median of 22.6 years after baseline, whereas those with negative SPA lived a median of 15 years.[6] It appears that SPA predict later health more strongly than health predicts later SPA,[7] creating a self-fulfilling prophecy[8] that is at least partially explained by physical, behavioral, and psychological pathways.[3] Older adults with negative SPA are more likely to have greater inflammation 4 years later, which mediates survival.[9] They engage in fewer health-promoting behaviors,[10,11] adaptive coping strategies during a serious health event,[8] and active and social leisure pursuits.[12] They also experience greater declines in cognitive functioning,[13] particularly if they are frail.[14]

In addition to living longer and being physically healthier, older adults with positive SPA have fewer depressive symptoms.[15-18] In addition to being the most disabling condition worldwide,[19] depressive symptoms lead to other deleterious outcomes in later life, including

suicide and all-cause mortality, and may in fact contribute to the poorer health behaviors and health outcomes[20] seen in older adults with negative SPA.

To prevent or ameliorate depressive symptoms and other adverse outcomes of negative SPA, we might ask, what factors contribute to developing SPA? Far fewer studies have been conducted that examine predictors of SPA compared with studies of outcomes of SPA.[1] Theories of views on aging posit that people learn aging stereotypes from a young age, which they internalize and which contribute to SPA as they grow older.[3] Consistent with these theories, older adults who perceive more negative aging stereotypes[21] and age discrimination also report more negative SPA.[15] It also appears that middle-aged and older adults who experience health, functional, or mental health declines will experience more negative SPA subsequently,[22,23] suggesting potential feedback loops among physical health, mental health, and SPA.[1]

Stable personality characteristics likely play a role in SPA. For example, negative SPA have been predicted by greater neuroticism,[16,22,24] lower extraversion,[16,22] and greater rigidity.[21] Other domains of individual differences have also been found to correlate with SPA, including a measure of hope that involves perceived goal-pursuit abilities,[25,26] loss of control,[17] level of productivity and perceived usefulness on a daily level,[27] and preparing for the future.[28]

Three studies examined SPA as a mediator between personality or social characteristics and depressive symptoms, all using longitudinal data from the US Health and Retirement Study (HRS). Han and Richardson[15] found that participants who reported more age discrimination had lower SPA 4 years later, which predicted worse depressive symptoms at the second time point. Kwak and colleagues[17] reported that older adults who reported receiving more care in 2006 reported lower SPA in 2008 and worse depressive symptoms in 2010, with SPA as a partial mediator. Third, using cross-sectional data, SPA and self-efficacy mediated relationships between neuroticism and extraversion with depressive symptoms; SPA was a much stronger mediator than self-efficacy.[16]

Consistent with these findings, models of SPA theorize that personality characteristics are likely to be important antecedents, leading to calls for more research on personality.[1,2] One important personality characteristic that may contribute to SPA involves a person's expectations regarding the future and efforts to achieve desired outcomes (ie, goal pursuits). Several correlates of SPA (ie, hope, control, productivity and usefulness, and preparing for the future) involve goal pursuits—an individual's attitudes, expectations, and behaviors regarding trying to achieve desired positive outcomes in the future. Neuroticism may also relate to negative expectations or fears that goals will not be achieved, as it is thought to involve self-generated thoughts regarding threats or problems.[29] In its extreme form, expectations regarding goal pursuits can be conceptualized by hopelessness, which is defined as expecting negative outcomes in one's future.[30] Although sometimes considered part of the constellation of depressive symptoms, hopelessness is a relatively stable personality trait representing a person's characteristic expectations regarding positive or negative outcomes.[31] Independently of depressive symptoms, hopelessness is remarkably consistent over an 8-year period for HRS participants (r = 0.52, P < .001).[32] Individuals who are hopeless are more likely to have neurotocism and depressive symptoms, think of suicide, die, and have worse physical

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Key points

- Changes in self-perceptions of aging in 2012 partially mediated the relationship between hopelessness in 2008 and depressive symptoms in 2014, using data from the US Health and Retirement Survey and controlling for relevant covariates.

- Findings are consistent with a conceptualization of hopelessness as broad negative expectations about the future that may contribute to negative self-perceptions of aging and subsequent depressive symptoms.

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and social functioning, compared with people who are not hopeless.[33-37]

Hopelessness represents broad expectations for one's future in general, whereas SPA represents one's perceptions specific to how one is aging. A hallmark of hopelessness is withdrawing from goal pursuits, not pursuing goals, and not expecting positive outcomes.[30] These characteristics describe what is found for older adults with negative SPA, including feelings of loss of control, low use of coping strategies, and disengaging from activities. A person's expectations for goal pursuits develop in childhood and early adulthood,[38] with evidence that school-aged children vary in their levels of hope, which predicts social and educational outcomes.[39] Although SPA also develop over one's lifetime, they are theorized to become more relevant in midlife and beyond.[40] Moreover, as noted previously, hopelessness represents stable expectations regarding the future in general, whereas SPA represent specific perceptions of one's aging that become more salient over time. Therefore, we used 3 waves of HRS data over a 6-year period, and we made an a priori prediction that older adults who felt more hopeless in 2008 would report more depressive symptoms in 2014, with this relationship being at least partially mediated by negative SPA in 2012.

2 | METHODS

2.1 | Data source

The HRS is a nationally representative sample of Americans aged 50 and older and their spouse of any age.[41] Since 2006, the psychosocial questionnaire has been administered to a rotating 50% of the core panel participants every 4 years. The present study is based on all respondents aged 50 and older who completed the psychosocial questionnaire in 2008 and 2012 and had complete data for hopelessness and SPA (N = 4606). At the time of analysis, these were the most recent waves of data available for the study variables, with hopelessness and SPA measured every 4 years in the mail-in psychosocial questionnaire and depressive symptoms measured every 2 years in the face-to-face interview. No new cohort of participants was added in 2008. For the years 2008 to 2012, response rate to the core HRS survey was around 90%, and the overall

response rate to the psychosocial questionnaire was around 70%. All participants provided informed consent, and all HRS study procedures were approved by the University of Michigan Institutional Review Board.

Those who had complete data on hopelessness and SPA in 2008 and SPA in 2012 (N = 4606) were significantly younger (mean [SE] = 65.8 [0.19], mean [SE] = 70.0 [0.34], $P < .001$), more educated (mean [SE] = 13.1 [0.09], Mean [SE] = 12.4 [0.14], $P < .001$), and more likely to be women (55.5% vs 52.6%, $\chi^2[1]$ = 4.98, $P = .04$) than those who did not complete these scales on the 2012 psychosocial questionnaire (N = 2161). They also reported lower hopelessness (mean [SE] = 2.3 [0.03], mean [SE] = 2.6 [0.04], $P < .001$), more positive SPA (mean [SE] = 4.0 [0.02], mean [SE] = 3.7 [0.03], $P < .001$), and fewer depressive symptoms (mean [SE] = 1.3 [0.05], mean [SE] = 1.7 [−0.4], $P < .001$).

3 | MEASURES

3.1 | Depressive symptoms

An 8-item version of the Center for Epidemiological Studies-Depression[42,43] was used as part of the core interview to assess depressive symptoms, using a yes-no response format. This version has been used in multiple waves of the HRS and has similar psychometric properties as the original Center for Epidemiological Studies-Depression.[44,45] After reverse-coding appropriate items, a total score was calculated (range 0-8), with a higher score indicating greater depressive symptoms. Depressive symptoms measured in 2008 and 2014 were used in this study (α = .81-.82).

3.2 | Hopelessness

The HRS measures hopelessness by using 4 items. Two items are from Everson et al[46]: "I feel it is impossible for me to reach the goals that I would like to strive for" and "The future seems hopeless to me and I can't believe that things are changing for the better." Two additional items were from Beck and colleagues[30]: "I don't expect to get what I really want" and "There is no use in trying to get something I want because I probably won't get it." A composite mean score was calculated (range 1-6), with higher scores indicating more hopelessness. This measure of hopelessness has shown stability over time in the HRS and expected relationships with other constructs, such as gender, education, depressive symptoms, and loneliness.[32,47] Hopelessness measured in 2008 was used in this study (α = .84).

3.3 | Self-perceptions of aging

An 8-item measure was used. The first 5 questions were the "attitude toward own aging" subscale of the Philadelphia Geriatric Center Morale Scale.[48] The remaining 3 questions were used in other studies[49]: "So far, I am satisfied with the way I am aging," "The older I get the more I have to stop doing things that I liked," and "Getting older has brought with it many things that I do not like." Following the instructions provided by the HRS, a composite mean score was calculated after reverse-scoring relevant items (range 1-6), so that a higher

score indicated more positive SPA. It has adequate criterion validity by its associations with health status, loneliness,[49] and preventive health service use.[50] Self-perceptions of aging measured in 2008 and 2012 were used in this study (α = .81-.82).

3.4 | Demographic variables

Age in 2008, gender, years of education, and number of chronic conditions (eg, cancer, heart condition, or arthritis; 0-7) were gathered based on self-report.

4 | ANALYSIS

We first ran descriptive statistics. Next, we assessed mediation with hopelessness measured in 2008 as the independent variable and SPA measured in 2012 as the mediator. The dependent variable was depressive symptoms measured in 2014. Covariates included age, gender, education, medical status, and 2008 SPA.

We followed a standard mediation model that incorporates time in its design.[51] We started by regressing the dependent variable, depressive symptoms in 2014, on the independent variable: hopelessness, controlling for depressive symptoms in 2008, SPA in 2008, and number of medical conditions and demographic characteristics in 2008. Next, we regressed SPA in 2012 on hopelessness, controlling for SPA in 2008, number of medical conditions, and demographic characteristics. A subsequent model regressed the dependent variable, depressive symptoms in 2014, on the independent variable, hopelessness, and the mediator, SPA in 2012, controlling for SPA in 2008, number of medical conditions, and demographic characteristics.

Mediation was examined by using bootstrapping, with N = 5000 bootstrap resamples, to test whether changes in SPA evaluated in 2012 mediated the relationship between hopelessness in 2008 and changes in depressive symptoms in 2014, controlling for all potential covariates assessed in 2008. Bootstrapping draws 5000 random samples to estimate indirect effects in each sample. This provides an approximation of the sampling distribution of the indirect effect, which is used to obtain a 95% confidence interval around the indirect effect.[52] When the 95% confidence interval does not contain zero, the effect is considered significant. All analyses were conducted in STATA/SE 13.0,[53] using the SVY command to designate the data as survey data. As detailed elsewhere,[54] the HRS utilized a multistage, area-clustered, stratified sample design involving over sampling of racial and ethnic minority older adults and residents of Florida. The SVY command accounts for this complex sampling design, including weights, clustering, and stratification.

5 | RESULTS

Table 1 presents sample characteristics and correlations among variables. Slightly more participants were female (55.5%), and on average, the participants were 65 years old, had 13 years of education, and had 4 chronic conditions at baseline. There were significant correlations among hopelessness, SPA, and depressive symptoms within and across time points.

TABLE 1 Sample characteristics and intercorrelations between variables (N = 4606)

	Mean (SE)/N (%)	1	2	3	4	5	6	7	8
1. Age in 2008	65.3 (.19)								
2. Gender: female (1 = male, 2 = female)	2792 (55.5%)	−.01							
3. Years of education	13.1 (.09)	−.16**	−.02**						
4. Number of chronic conditions in 2008 (0-7)	4.2 (1.3)	.31**	.00	−.15**					
5. Depressive symptoms in 2008 (0-8)	1.2 (.05)	.01	.09**	−.21**	.22**				
6. Self-perceptions of aging in 2008 (1-6)	1.8 (.02)	−.18**	.01	.20**	−.31**	−.44**			
7. Hopelessness in 2008 (1-6)	2.3 (.03)	.09	−.02	−.31**	.17**	.36**	−.50**		
8. Self-perceptions of aging in 2012 (1-6)	3.9 (.03)	−.20**	.02*	.19**	−.29**	−.32**	.62**	−.40**	
9. Depressive symptoms in 2014 (0-8)	1.3 (.05)	.01	.08**	−.19**	.21**	.52**	−.41**	.32**	−.41**

*P < .05.

**P < .001.

Table 2 presents the results of the regression analyses. Less hopelessness in 2008 was associated with more positive SPA in 2012 (β = −.10, P < .001), even when SPA in 2008 and all other covariates were included in the model. More hopelessness in 2008 was associated with more depressive symptoms in 2014 (β = .10, P = .01), once adjusted for all covariates and SPA in 2012. Self-perceptions of aging in 2008 and 2012 were also significant predictors of depressive symptoms, so that more negative SPA predicted more depressive symptoms in 2014. In the full model (Table 2, right columns), SPA in 2012 were the strongest predictor of depressive symptoms (β = −.41, P < .001), and SPA in 2008 were marginally significant (β = −.10, P = .06).

The results suggest that SPA in 2012 serve as a partial mediator of the relationship between hopelessness in 2008 and depressive symptoms in 2014. Bootstrap estimates and bias-corrected confidence intervals suggested that both the indirect, β = .03 (.02; .05), and the direct, β = .09 (.04; .14), effects of hopelessness in 2008 on depressive symptoms in 2014 were significant. The total effect also was significant, β = .12 (.07; .17). See Figure 1.

6 | DISCUSSION

Consistent with hypotheses, older adults who were more hopeless at baseline were more depressed 6 years later, which was partially

explained by having more negative SPA 4 years after baseline. These findings are consistent with prior research that has shown hopelessness to prospectively predict depressive symptoms[35] and SPA to mediate relationships between personality characteristics and depressive symptoms.[16] It is notable that the prospective relationships held over 6 years, even after controlling for concurrent levels of hopelessness, SPA, and depressive symptoms. Thus, although causality cannot be determined, the findings support the notion that a general expectation that one's future will be negative (ie, hopeless) contributes to perceiving one's aging more negatively and that both hopelessness and lowered SPA contribute to future changes in depressive symptoms (ie, direct effect of hopelessness and mediating effect through SPA). The findings contribute to the literature about factors that may influence SPA, including ageism, age stereotypes, and personality characteristics like hopelessness.[3]

The main strengths of the study are the large, nationally representative sample and ability to examine prospective relationships across 3 waves. One consideration is that HRS participants excluded for incomplete data had worse scores for hopelessness, SPA, and depressive symptoms. Another consideration was that no new cohort was added to the HRS in 2008. These sample characteristics raise the possibility that the findings may not generalize to the most hopeless, depressed participants with negative SPA. Also, we included some but not all potential control variables, controlling for demographics and health

TABLE 2 Regression analyses predicting self-perceptions of aging in 2012 and depressive symptoms in 2014

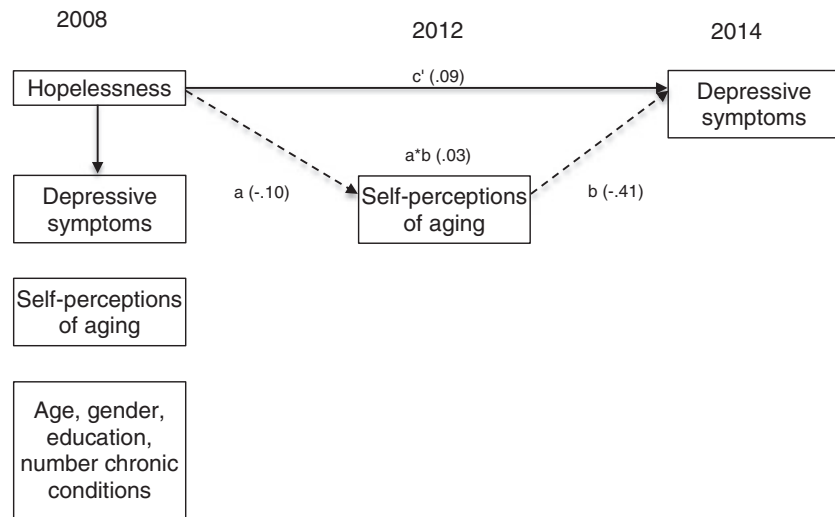|	Self-Perceptions of Aging in 2012		Depressive Symptoms in 2014			
	β (SE)	P	β (SE)	P	β (SE)	P
Age in 2008	−.01 (.00)	<.001	.01 (.003)	<.01	.00 (.00)	.46
Gender	.02 (.03)	.58	.18 (.05)	<.01	.18 (.05)	<.01
Years of education	.01 (.01)	.04	−.02 (.01)	.12	−.02 (.01)	.22
Number of chronic conditions in 2008 (0-7)	−.08 (.01)	<.001	.08 (.03)	.01	.04 (.03)	.10
Depressive symptoms in 2008 (0-8)	−.04 (.01)	<.001	.40 (.02)	<.001	.39 (.02)	<.001
Hopelessness in 2008 (1-6)	−.10 (.01)	<.001	.14 (.03)	<.001	.10 (.03)	<.01
Self-perceptions of aging in 2008 (1-6)	.51 (.02)	<.001	−.30 (.05)	<.001	−.10 (.05)	.06
Self-perceptions of aging in 2012 (1-6)	–	–	–	–	−.41 (.04)	<.001
F (df)	(7.50) = 284.7	<.001	(7.50) = 105.9	<.001	(8.49) = 140.0	<.001
R^2	.47		.34		.37	

FIGURE 1 A mediation model of hopelessness on changes in depressive symptoms, via changes in self-perceptions of aging. C' represents the direct effect of the independent variable: hopelessness on the dependent variable: depressive symptoms, controlling for relevant covariates. The indirect effect of the independent variable on the dependent variable through the mediator, self-perceptions of aging, is represented as $a * b$

conditions, to focus on the main variables of hopelessness, SPA, and depressive symptoms. A number of health and personality characteristics relate to hopelessness, SPA, and depressive symptoms, such as neuroticism. An additional limitation is the lack of information regarding mechanisms by which SPA mediates the relationship between hopelessness and depressive symptoms. Other studies have suggested that older adults with negative SPA perceive less control,[17] feel less productive and useful,[27] and engage in fewer health[10,11] and other activities.[12,28]

Thus, in future research, it would be valuable to explore other covariates, potential feedback loops, and possible mechanisms by which hopelessness and SPA relate to depressive symptoms, such as attaining meaningful personal goals, preparing for aging, and engaging in health-promoting behaviors. We also might wonder how age stereotypes relate to hopelessness to influence SPA? Perhaps greater exposure to age stereotypes contributes to feeling hopeless, and/or perhaps more hopeless individuals are affected more negatively by age stereotypes than more hopeful individuals (ie, a moderating relationship).

The current findings suggest that middle-aged and older adults might benefit from interventions that reduce hopelessness and that foster hope and positive SPA to reduce or prevent depressive symptoms and related negative outcomes. SPA are theorized to derive from ageist messages we receive beginning in childhood[2,40,55] efforts to foster positive SPA span population, group, and individual-level interventions. Recently, Levy[56] called for top-down, social and policy interventions (eg, workforce and child education) as well as bottom-up advocacy (eg, aging rights movement). The World Health Organization[57] proposed a number of steps to reduce ageism, including laws that prohibit age discrimination, public education campaigns, and laws and policies that ensure older adults' inclusion.

At an individual or small-group level, a small number of interventions have been designed to improve older adults' SPA or related dimensions of views on aging, although none focused on or measured depression. All interventions have a common theme of presenting positive images or views regarding aging. Three interventions focused on improving SPA and physical activity, resulting in improvements in both domains. Along with standard strategies to increase physical activity (eg, education, goal-setting, and problem-solving related to physical activity), the interventions improved SPA by helping participants become aware of age stereotypes and adopt positive beliefs related to aging and exercise.[58-60] These strategies to target SPA encouraged older adults to perceive that they could work toward goals to increase their physical activity, which may relate to hope (ie, beliefs about abilities to pursue goals). In 2 other interventions, older adults' subjective age and handgrip performance improved after positive feedback about their handgrip performance,[61] and their age stereotypes and physical functioning improved after being exposed subliminally to positive aging stimuli.[62]

If hopelessness impacts SPA, then another approach is to reduce hopelessness—or increase hopefulness. For adults who are already depressed, psychotherapy reduces hopelessness, according to a meta-analysis including cognitive-behavioral and other therapies.[63] Another intervention was designed to increase hope, by helping individuals or small groups pursue meaningful goals. This intervention has improved hope, reduced hopelessness, and reduced distress in a small number of studies, including with depressed older adults.[64,65] Future research could examine whether improving hopelessness or hope by using 1 of these interventions could thereby improve SPA and treat or prevent depressive symptoms. Another strategy might be to combine the hope intervention with SPA interventions, to help adults and older adults resist negative age stereotypes and negative SPA, and pursue meaningful and rewarding goals.

7 | CONCLUSION

In summary, as hypothesized, changes in older adults' SPA partially mediated the relationship between hopelessness and changes in depressive symptoms 6 years later. Findings are consistent with a conceptualization of hopelessness as broad negative expectations about the future that may contribute to negative perceptions of one's aging process and subsequent depressive symptoms. Future research should examine the mechanisms of these interrelationships, as well as interventions to reduce hopelessness, improve hope and goal pursuits,

and improve SPA, which may reduce and prevent depressive symptoms.

CONFLICT OF INTEREST

None declared.

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