



ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/camh20

Self-perceptions of aging and depressive symptoms: the mediating role of loneliness

Dikla Segel-Karpas, Ella Cohn-Schwartz & Liat Ayalon

To cite this article: Dikla Segel-Karpas, Ella Cohn-Schwartz & Liat Ayalon (2022) Self-perceptions of aging and depressive symptoms: the mediating role of loneliness, Aging & Mental Health, 26:7, 1495-1501, DOI: 10.1080/13607863.2021.1991275

To link to this article: https://doi.org/10.1080/13607863.2021.1991275



Published online: 20 Oct 2021.



🕼 Submit your article to this journal 🗗

Article views: 366



View related articles



🌔 🛛 View Crossmark data 🗹

Self-perceptions of aging and depressive symptoms: the mediating role of loneliness

Dikla Segel-Karpas^a (D), Ella Cohn-Schwartz^b (D) and Liat Ayalon^c (D)

^aDepartment of Gerontology, University of Haifa, Haifa, Israel; ^bDepartment of Public Health, Faculty of Health Sciences, Ben-Gurion University of the Negev, Be'er Sheva, Israel; ^cLouis and Gabi Weisfeld School of Social Work, Bar Ilan University, Ramat Gan, Israel

ABSTRACT

Objectives: Depression is a major health concern for both individuals and societies. Hence, understanding the risk factors for depression is of importance. As individuals grow older, the way in which they perceive the aging process may have a significant influence on their physical and mental health. More negative perceptions of aging could put individuals at risk for social withdrawal, causing lone-liness and resulting in higher levels of depressive symptoms.

Methods: We use the Health and Retirement Survey, a large and longitudinal dataset spanning over a period of 8 years, to examine a model in which loneliness mediates the relationship between self-perceptions of aging and depressive symptoms.

Results: Our findings suggest that loneliness indeed mediates the relationship between self-perceptions of aging and depressive symptoms.

Conclusions: The results highlight to the importance of the way people view the aging process in shaping their social and mental well-being. Practitioners may want to address self-perceptions of aging when helping older adults cope with loneliness and depressive symptoms.

ARTICLE HISTORY

Received 5 September 2020 Accepted 6 October 2021

KEYWORDS

Self-perceptions of aging; depressive symptoms; loneliness

Introduction

The human ability to perceive a developmental trajectory from childhood to old age results in a subjective perception of the aging process (Diehl et al., 2014). This perception can be more positive, suggesting that the aging process entails possibilities and advantages, or it can be more negative, highlighting the physical, mental and social costs of aging (Laidlaw et al., 2007). The way individuals perceive their aging process may affect not only their mental state, reflected in such variables as depressive symptoms, but also their social functioning and perceived loneliness (Shiovitz-Ezra et al., 2018). Loneliness, or the perception of a lack of social relationships, is expected, in turn, to affect depressive symptoms (Cacioppo et al., 2006).

In this study, we examine whether the relationship between self-perceptions of aging (SPA) and depressive symptoms is mediated by loneliness. Understanding the risk factors for loneliness and depressive symptoms is of importance due to their greater prevalence in older adulthood (Laborde-Lahoz et al., 2015; Victor & Yang, 2012) and their harmful consequences for psychological, social and physical functioning (Hawkley & Cacioppo, 2010; Mushtaq et al., 2014). Given the aging of the population and the overall negative stereotypes that characterize older adulthood (Ayalon & Tesch-Römer, 2018), examining how older adults' self-perceptions of their aging process might affect their mental state is of relevance to a growing proportion of the population, and may pave the way to interventions aimed at facilitating a more positive outlook of the aging process, resulting in better mental health.

Depressive symptoms and self-perceptions of aging

Depression and depressive symptoms are a major concern for health care providers and policy makers around the world, as

CONTACT Dikla Segel-Karpas 🐼 dsegel@univ.haifa.ac.il © 2021 Informa UK Limited, trading as Taylor & Francis Group they come with a considerable personal and social cost. Close to 14% of older adults in the United States suffer from major depression, and another 14% suffer from subsyndromal depression (Laborde-Lahoz et al., 2015). Other studies indicate lower rates of depression that range from 5% to 10% of older adults, depending on the criteria and subsample used (Sjöberg et al., 2017). Nevertheless, depression and depressive symptoms have significant associations with physical and cognitive health declines, decreased social functioning, and increased health-care utilization and labor force withdrawal (Brailean et al., 2016; Dong et al., 2020; Mausbach & Irwin, 2017; Segel-Karpas et al., 2018b). Financially, the cost of depression was estimated at 2.5 trillion dollars in 2010, and is expected to more than double by 2030 (Trautmann et al., 2016).

Among other factors, one's SPA was found to predict the development of depressive symptoms in older adults. SPA is a construct that is included, together with other constructs, under the umbrella term of "subjective aging"-a term suggesting that human beings are able to reflect on their developmental trajectories (Diehl et al., 2014). This reflective ability means that age is not just the time elapsed from a person's birth, but that people ascribe meaning to the aging process. SPA can be defined as one's expectations, experiences and feelings about the process of growing old (Hess, 2006; Kornadt & Rothermund, 2015). These expectations and feelings can range from positive attitudes, suggesting that old age is a period with developmental possibilities and potential gains, to negative attitudes, implying that older adulthood is a period of inevitable physical, mental and social deterioration (Laidlaw et al., 2007). According to the stereotype embodiment theory, as individuals approach old age, the attitudes and stereotypes that were internalized during the life course become relevant to the self and affect their physical and mental health (Levy,



Check for updates

2009). Older adults tend to perceive and interpret age-related changes in light of the general aging-related expectations and feelings they have (Levy et al., 2002). Hence, as people grow older, their SPA may become more prominent, shaping their experiences and behaviors, and ultimately affecting their physical and mental health.

Experimental and observational studies have consistently demonstrated that SPA exerts effects on individuals' physical and mental health. In a longitudinal study, Levy and Myers (2004) found that older adults with a positive SPA engaged to a greater extent in preventive health behaviors. In line with this, positive SPA is positively related to better functional health and longevity (Levy et al., 2002; Levy, Slade, Kunkel, et al., 2002). While positive SPA has positive effects on behaviors, the effect that negative perceptions have is almost three times larger (Meisner, 2012).

Mental health was also found to be associated with SPA (Cohn-Schwartz et al., 2021). In a cross-sectional study in rural Australia, more positive self-perceptions of aging were positively linked to well-being and negatively linked with depression and anxiety (Bryant et al., 2012). SPA was also found to mediate the relationship between receipt of care and depressive symptoms, such that receipt of care was associated with more negative perceptions of aging, and these in turn were predictive of depressive symptoms (Kwak et al., 2014). SPA was also found to mediate the longitudinal relationship between perceived age discrimination and depressive symptoms (Han & Richardson, 2015).

Despite studies linking SPA to depressive symptoms, the mechanisms responsible for this association are yet to be understood. In the current study, we suggest loneliness could be one such mechanism, and examine whether the relationship between SPA and depressive symptoms is mediated via loneliness. In other words, we argue that having more negative perceptions of the aging process in older adults will result in greater social difficulties—expressed in loneliness. which, in turn, will be positively associated with depressive symptoms.

Self-perceptions of aging and loneliness

Loneliness is defined as a perceived gap between one's desired and obtained social relationships. The gap can be qualitative in nature, suggesting a perceived lack of intimacy, or quantitative, suggesting fewer social relationships than desired (Peplau & Perlman, 1982; Weiss, 1973). Loneliness seems to follow a non-linear trajectory, where it is most prevalent in younger adulthood and in very old age (Victor & Yang, 2012; Yang & Victor, 2011). Losses to one's social network are thought to be the main reason for increased loneliness in older adulthood, rather than intra-individual psychological processes (Luhmann & Hawkley, 2016). Nevertheless, a person's perception of their aging process may generate meaningful changes in his or her social behavior, and result in loneliness.

There are several reasons why SPA may affect loneliness. First, old age is often perceived as a time of loneliness. In a study of adults aged 50 and over, a third had reported that they expect to be lonely in old age, and a quarter agreed that old age is a time of loneliness (Pikhartova et al., 2016). This means that in general, negative age stereotypes may include assumptions about social connectedness and loneliness. These expectations can act as a self-fulfilling prophecy. Second, they can reduce one's motivation to socialize, as socialization may be perceived

to be futile if isolation and loneliness are inevitable parts of the aging process (Menkin et al., 2017). Third, negative SPA may increase one's rejection sensitivity and anxiety in social situations, thus reducing the willingness to interact, resulting in increasing loneliness (Menkin et al., 2017). Finally, negative SPA and the fear of social rejection may increase older adults' hostile behavior, which in turn may deter others from interacting with them, resulting in greater loneliness (Barefoot et al., 1993; Menkin et al., 2017; Segel-Karpas & Ayalon, 2020; Shiovitz-Ezra et al., 2018).

Support for this theoretical proposition is found in a few studies, according to which self-perceptions of aging are predictive of social relationships and loneliness in older adults. Pikhartova et al. (2016) found that perceptions of old age as a time of loneliness and the expectation of becoming lonelier with age were both predictive of experienced loneliness. However, this study focused on perceptions of aging that are specific to loneliness, while a more general outlook on aging might also entail higher loneliness. In other studies, positive perceptions of aging were predictive of making new friends and of higher levels of perceived social support (Menkin et al., 2017), as well as of formal and informal social involvement (Schwartz et al., 2021). Taking a different perspective and looking into the moderating role of subjective age (that is, how old a person feels like), Spitzer et al. (2019) found that those who feel older than their chronological age were less able to benefit from their close social relationships for the alleviation of loneliness. The authors suggest that feeling older than one's age creates a sense of alienation from age peers, who tend to feel younger than their chronological age, thus reducing the ability to enjoy social interactions.

Loneliness and depressive symptoms

Loneliness has also been shown to be associated with depressive symptoms. In a review of the literature, Mushtag et al. (2014) reported that while depression and loneliness share common attributes such as pain and helplessness, they are distinct in that lonely persons believe that their loneliness could be alleviated by the formation of close social bonds, whereas pain and helplessness represent a pessimistic outlook on the future. Longitudinal studies suggest that loneliness is predictive of the development of depressive symptoms and depression. In a longitudinal study conducted over a period of two years, loneliness was found to affect the prognosis of depression and the severity of its symptoms, and was associated with poorer outcomes (Holvast et al., 2015). Similarly, in a study exploring the role of the transition to retirement, loneliness was found to predict depressive symptoms two years later, and the harmful effect of loneliness was stronger among those who transitioned to retirement during the study. The authors suggest that due to the lack of a structured daily routine that includes social interaction, loneliness may take a greater toll (Segel-Karpas et al., 2018a). Finally, to examine the possible reciprocity in the effects of loneliness and depressive symptoms, Cacioppo et al. (2010) examined a cross-lagged model of loneliness and depressive symptoms over a period of 5 years, and concluded that it is loneliness that predicts depressive symptoms, rather than the other way around.

Taking the reviewed literature into account, in the current study, we used three waves of the Health and Retirement Study and examined the longitudinal associations between SPA, loneliness and depression symptoms in three time points over a period of eight years. We hypothesize that:

H1: Positive SPA will be negatively associated with subsequent depressive symptoms.

H2: Positive SPA will be negatively associated with subsequent loneliness.

H3: Loneliness will mediate the association between SPA and depressive symptoms.

Methods

Sample

The current study is based on data from the Health and Retirement Study (HRS), a biennial, nationally representative survey of adults aged 50 and older and their partners, regardless of age, in the contiguous United States. The main interview is conducted in a face-to-face format, followed by a self-administered questionnaire. This "leave-behind" questionnaire obtains information about participants' psychosocial circumstances. This information is collected in each biennial wave from a rotating (random) 50% of the panel participants who completed the face-to-face interview. In 2008, the psychosocial questionnaire incorporated, for the first time, measures of self-perceptions of aging. The respondents who received this questionnaire in 2008 also received it in 2012 and 2016.

The current study focused on adults who were aged 50 and older in 2008 and who completed the psychosocial questionnaire during that measurement. In 2008, 16,862 respondents over the age of 50 were interviewed face-to-face, out of which 6,641 completed the psychosocial questionnaire, which constituted the study sample. Of them, 4,178 participated in the 2012 survey or the 2016 survey. As in other studies, attrition analyses suggested that those 2008 respondents who continued their participation, were on average (p < .05) younger, more likely to be women, better educated, had better health and less depressive symptoms, were less lonely and had better SPA than the baseline sample. They were also less likely to be white and had more financial difficulties. We used full information maximum likelihood (FIML) to address issues regarding missing data, due to this method's ability to reduce selective attrition biases using all available data.

The sample in the current study (Table 1) was 69 years old on average, and almost two-thirds were women, with over 12 years of education. They were mostly non-Hispanic white. Participants reported one symptom of depression, a medium amount of loneliness and a relatively positive SPA.

Table 1. Sample characteristics of the study.

Measures

Depressive symptoms

Number of depressive symptoms was assessed via the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). Participants were asked whether they had (1) or had not (0) experienced any of seven symptoms "much of the time during the past week." Example items are "I could not get going" and "I felt that everything I did was an effort." The original scale used in the HRS also contained a question about being lonely. We removed this item for the current study as loneliness was used as a mediator. For the descriptive and bivariate analyses, we used the manifest scale, which measures the sum of these seven items such that a higher score indicated a higher number of depressive symptoms (range: 0–7). This scale had good internal reliability at T1 (α =0.78) and T3 (α =0.77). The SEM analysis included the CESD as a latent factor, composed of three parcels.

Self-perceptions of aging

Adults' perceptions of their aging were assessed using eight items based on the "Attitudes toward aging" subscale of the "Philadelphia Geriatric Center Morale Scale" (Liang & Bollen, 1983). This scale assesses participants' positive and negative evaluation of their experiences of aging (for example: "Things keep getting worse as I get older"; "So far, I am satisfied with the way that I am aging"). Each item has response options ranging from "Strongly disagree" (1) to "Strongly agree" (6). A manifest item of SPA was obtained by reverse coding negatively phrased items and averaging the scores across all eight items. The final score was set to "missing" if there were more than four items with missing values. The scale had good internal reliability at T1 (a = 0.82). The latent variable was composed of two manifest variables: mean scores of the four items on positive SPA and of the four items on negative SPA.

Loneliness

The three-item short form of the revised UCLA Loneliness Scale (Hughes et al., 2004) was used as a measure of loneliness. An example of an item used is "How often do you feel you lack companionship?," with response options ranging from "hardly ever or never" (1) to "often" (3). The three items were reverse coded such that higher scores indicated greater loneliness. The scale showed acceptable internal reliability at T1 (a=0.80) and T2 (a=0.80). For the manifest variable, used in the descriptive and bivariate analyses, scores were summed to provide a

Variable	Mean (SD)	%	Range
Depressive symptoms T1	1.13 (1.64)		0–7
Depressive symptoms T3	1.22 (1.71)		0–7
Loneliness T1	4.43 (1.60)		3–9
Loneliness T2	4.38 (1.58)		3–9
SPA T1	3.88 (1.06)		1–6
Age	69.42 (9.76)		50-100
Gender: women		59.83%	
Education (years)	12.61 (3.11)		0–17
Ethnicity: White		76.92%	
Ethnicity: Black		12.31%	
Ethnicity: Hispanic		8.53%	
Ethnicity: Other		2.24%	
Financial difficulty	1.94 (1.01)		1–5
Self-rated health	3.12 (1.08)		1–5

loneliness score ranging from 3 to 9, with higher scores indicating greater loneliness. The latent variable was based on the three manifest items.

Covariates

Age was measured as a continuous variable. Education was measured as years of education. Race was divided into four categories: "White," "Black" (non-Hispanic blacks), "Hispanic" and "other." Financial difficulty was measured using the following question: "How difficult is it for you/your family to meet monthly payments on you/your family's bills?" Response options ranged from "Not at all difficult" (1) to "Completely difficult" (5). Physical health was measured as self-rated health, using a single question asking respondents to rate their health from "excellent" (1) to "poor" (5). We recoded the answers such that a higher score indicated better perceived health.

Data analysis

The analyses began with descriptive statistics of the data, followed by Pearson correlations of the study variables. We then ran two structural equation models (SEM); the first did not include covariates and the second added the covariates. In both models, depressive symptoms at T3 were predicted using the T1 SPA, both directly and also mediated by T2 loneliness. Depressive symptoms, loneliness and SPA were modeled as latent variables to account for measurement error. Depressive symptoms were measured as a latent factor composed of three parcels: two parcels were the mean score of two items each and the remaining parcel was the mean score of three items. The seven items were combined into three parcels based on their original order in the questionnaire (i.e. Parcel 1: felt depressed, everything an effort; Parcel 2: restless sleep, was happy, felt sad; Parcel 3: get going, enjoyed life) (Kline, 2011). To balance the positive and negative items, we moved the "enjoyed life" item to the third parcel, such that it was not in the same parcel as "was happy." Factor analysis showed that all the variables belonged to a single construct. Loneliness was a latent factor made of the three items from the UCLA Loneliness Scale. SPA was a latent factor composed of two variables of the mean positive SPA and mean negative SPA. The covariates in the analyses were measured as manifest variables.

We used the Lavaan package in R for SEM model estimation (Rosseel, 2012). Full information maximum likelihood (FIML) was used to handle missing data. The models were run with a maximum likelihood estimator with robust standard errors (MLR) to allow variables to deviate from multivariate normality. The use of MLR entailed adjustment of model comparisons to better approximate chi-square under non-normality (Satorra & Bentler, 2010). Model fit was evaluated primarily based on the criteria of CFI > .95, SRMR < .08 and RMSEA < .08 (Hooper et al., 2008). Factorial invariance of the latent variables was measured across measurement points with a series of increasingly stringent tests (Meredith, 1993). We used the criteria suggested by Cheung and Rensvold (2002) to determine factorial invariance in large samples, in which a decrease in CFI of more than .01 indicates that additional constraints imposed on the model (compared to a previous model) are not justified. The test of factorial invariance demonstrated strong factorial invariance. The factor loadings and intercepts of the latent factors were therefore set to equality at the two measurements. The indirect effects were calculated through bootstrapping set at 5000 samples. Confidence intervals were calculated using this method, yielding a 95-percentile confidence interval.

Results

Table 2 shows the Pearson correlations between the study variables. It shows that adults with more positive SPA at baseline had fewer depressive symptoms at baseline and at T3. They were also less lonely at both T1 and T2. Additionally, adults who were lonelier reported a greater number of depressive symptoms. Those with a more positive SPA were also younger, more educated, and rated their health as better. Greater loneliness and a larger number of depressive symptoms were associated with being a woman, being less educated and with worse health.

The first SEM model predicted depressive symptoms at T3 using SPA and loneliness, without including covariates (not shown). The model showed good fit to the data ($\chi^2 = 289.56$, df=72, CFI = 0.99, RMSEA = 0.02, SRMR = 0.02). SPA at baseline predicted loneliness at T2 and depressive symptoms at T3. Additionally, loneliness at T2 also predicted depressive symptoms at T3. Analysis of the indirect effect showed that loneliness partly mediated the effect of SPA on subsequent depressive symptoms (B = -0.008, bootstrapped 95% CIs [-0.012, -0.005], p < .001).

Table 3 presents the results of the main model, following the addition of covariates to the model, which showed good fit to the data ($\chi^2 = 1287.45$, df = 144, CFI = 0.97, RMSEA = 0.03, SRMR = 0.02). Those who had more positive SPA at baseline also reported lower loneliness at T2. Loneliness at T2 was also predicted by baseline loneliness, while those who were Hispanic were less lonely, compared to non-Hispanic white. This model explained 48% of the variance in T2 loneliness. Depressive symptoms at T3 were predicted by SPA at baseline and by loneliness at T2. These depressive symptoms were

Tab	le 2.	Pearson correlations	between th	e study variables
-----	-------	----------------------	------------	-------------------

	Depressive symptoms T3	Loneliness T1	Loneliness T2	SPA T1	Age	Gender: women	Education (years)	Financial difficulty	Self-rated health
Depressive symptoms T1	0.48***	0.31***	0.33***	-0.36***	-0.00	0.11***	-0.19***	0.29	-0.35***
Depressive symptoms T3	-	0.40***	0.33***	-0.44***	-0.02*	0.09***	-0.19***	0.29	-0.37***
Loneliness T1		-	0.58***	-0.40***	-0.03*	0.05***	-0.12***	0.09	-0.22***
Loneliness T2			-	-0.36***	-0.00	0.10***	-0.09***	0.85*	-0.24***
SPA T1				-	-0.18***	0.00	0.20***	0.10	0.46***
Age					_	-0.03*	-0.13***	-0.16	-0.11***
Gender: women						_	-0.05***	0.14	-0.00
Education (years)							_	-0.30	0.29***
Financial difficulty								-	-0.65**
Note.									
*p < .05,									

^тр <.01, тр < .001.

Table 3. SEM mediation models of depression at follow-up.

Variable	B (SE)	Beta
Loneliness		
SPA T1 \rightarrow Loneliness T2	-0.11 (0.03)	-0.19***
Loneliness T1 \rightarrow Loneliness T2	0.56 (0.03)	0.56***
Depressive symptoms T1 \rightarrow Loneliness T2	0.02 (0.06)	0.01
Depressive symptoms		
SPA T1 \rightarrow Depressive symptoms T3	-0.05 (0.01)	-0.16***
Loneliness T2 \rightarrow Depressive symptoms T3	0.09 (0.01)	0.17***
Depressive symptoms T1 \rightarrow Depressive symptoms T3	0.32 (0.03)	0.33***
Covariates		
Age \rightarrow Loneliness T2	0.00 (0.00)	-0.01
Gender (women) \rightarrow Loneliness T2	0.06 (0.01)	0.06***
Education (years) \rightarrow Loneliness T2	0.00 (0.00)	-0.01
Ethnicity: Black ^a \rightarrow Loneliness T2	0.01 (0.02)	0.01
Ethnicity: Hispanic ^a \rightarrow Loneliness T2	-0.09 (0.03)	-0.06***
Ethnicity: Other ^a \rightarrow Loneliness T2	0.01 (0.04)	0.00
Financial difficulty \rightarrow Loneliness T2	-0.01 (0.01)	-0.01
Self-rated health \rightarrow Loneliness T2	0.00 (0.01)	-0.01
Age \rightarrow Depressive symptoms T3	0.00 (0.00)	0.03*
Gender (women) \rightarrow Depressive symptoms T3	0.02 (0.01)	0.05**
Education (years) \rightarrow Depressive symptoms T3	0.00 (0.00)	-0.05**
Ethnicity: Black ^a \rightarrow Depressive symptoms T3	0.03 (0.01)	0.04**
Ethnicity: Hispanic ^a \rightarrow Depressive symptoms T3	0.01 (0.01)	0.02
Ethnicity: Other ^a \rightarrow Depressive symptoms T3	0.01 (0.02)	0.01
Financial difficulty \rightarrow Depressive symptoms T3	0.01 (0.00)	0.04*
Self-rated health \rightarrow Depressive symptoms T3	-0.02 (0.01)	-0.09***
<u>R²</u>	0.48	

Note.

p < .001.

^aReference: Non-Hispanic white.

also associated with baseline older age, female gender, Black ethnicity, financial difficulty and worse self-rated health. This model explained 42% of the variance in depressive symptoms. We examined the indirect effect of SPA on depressive symptoms through loneliness. The indirect effect was -0.009, bootstrapped 95% CIs [-0.016, -0.005], indicating the effect was significant (p < .001). Thus, SPA predicted depressive symptoms both directly and indirectly, via loneliness (see Figure 1).

Discussion

Depression is a major public health concern, affecting a large proportion of adults around the world (Sjöberg et al., 2017) and bearing significant emotional and financial costs (Trautmann et al., 2016). As depression poses a substantial risk for mortality (Gilman et al., 2017), it is important to identify potential risk and protective factors of relevance. Similar to depression, loneliness has received much attention, especially in the second half of life, its negative effects being equated to a pandemic (Palgi et al., 2020). Our findings add to the existing literature by identifying a potential mechanism, stressing the important role of SPA as a potential precipitator of both conditions.

SPA has been shown to be a potent factor in people's aging process. SPA affects people's health behaviors (Klusmann et al., 2019), physical stability and falls (Ayalon et al., 2016), ability to recover from illness, health (Luo & Li, 2020), and even mortality (Levy & Bavishi, 2018). Socially, SPA likely plays a major role, as it reflects a self-fulfilling prophecy: Those individuals who hold more negative views about their own aging may view older age as a time of loneliness and social losses, which, in turn, may reflect their sense of inadequate social relations, as manifested in higher levels of loneliness.

Our findings point to the fact that this negative loop does not end here. SPA not only affects people's sense of perceived

loneliness but also people's depressive symptoms, an effect that is partially mediated by loneliness. There is currently a growing recognition of the important part that loneliness plays in older people's lives, including their mental well-being. The present study adds to the literature by pointing to the important role of SPA in determining people's loneliness and subsequent depressive symptoms.

Despite its strengths, the findings should be viewed with caution, as they are not causal in nature but suggest, rather, a temporal trend. The focus on a single country is yet another limitation, and the analysis should be expanded to other countries, in the future. Nevertheless, our findings suggest that interventions that aim to alleviate loneliness and/or depressive symptoms in the second half of life should be particularly aware of people's SPA. Under the current climate, however, it is important to acknowledge the fact that older adults and society at large have been exposed to particularly negative messages about older people's vulnerability and burden to society (Ayalon, 2020). As such, we might expect even higher levels of loneliness and subsequent depressive symptoms in years to come. There are several possible measures to help recover and improve social and personal views on aging, which, if taken, could result in an improved aging process of current and future older adults. These can include changing the way older adults are portrayed in the media, which tends to strengthen existing age stereotypes. Other suggested interventions that aim to address SPA in younger adults and children include increasing the opportunities for intergenerational contact, which can help mitigate the perception of older adults as "others" and generate more accurate expectations for older adulthood. Finally, at the personal level, several studies found that increasing older adults' awareness of positive aspects of aging and changing negative misconceptions about aging could have a positive impact (Kotter-Grühn, 2015).

^{*}p < .05, .03, p<.01,



Figure 1. The SEM mediation models of SPA, loneliness and depression at follow-up. *Note*. *p < .05, **p < .01, ***p < .001; beta coefficients are shown; circles represent latent variables and rectangles represent observed variables; the model controlled for the covariates: age, gender, education, ethnicity, financial difficulty, self-rated health, loneliness T1, depressive symptoms T1.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The HRS (Health and Retirement Study) is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan.

ORCID

Dikla Segel-Karpas (D http://orcid.org/0000-0002-6054-0469 Ella Cohn-Schwartz (D http://orcid.org/0000-0001-9623-1820 Liat Ayalon (D http://orcid.org/0000-0003-3339-7879

References

- Ayalon, L. (2020). There is nothing new under the sun: Ageism and intergenerational tension in the age of the COVID-19 outbreak. *International Psychogeriatrics*, 32(10), 1221–1224. https://doi.org/10.1017/ S1041610220000575
- Ayalon, L., Shiovitz-Ezra, S., & Roziner, I. (2016). A cross-lagged model of the reciprocal associations of loneliness and memory functioning. *Psychology and Aging*, *31*(3), 255–261. https://doi.org/10.1037/pag0000075
- Ayalon, L., & Tesch-Römer, C. (2018). Introduction to the section: Ageism— Concept and origins BT. In L. Ayalon & C. Tesch-Römer (Eds.), *Contemporary perspectives on ageism* (pp. 1–10). Springer International Publishing.
- Barefoot, J. C., Beckham, J. C., Haney, T. L., Siegler, I. C., & Lipkus, I. M. (1993). Age differences in hostility among middle-aged and older adults. *Psychology and Aging*, 8(1), 3–9. https://doi.org/10.1037/0882-7974.8.1.3
- Brailean, A., Comijs, H. C., Aartsen, M. J., Prince, M., Prina, A. M., Beekman, A., & Huisman, M. (2016). Late-life depression symptom dimensions and cognitive functioning in the Longitudinal Aging Study Amsterdam (LASA). *Journal of Affective Disorders*, 201, 171–178. https://doi. org/10.1016/j.jad.2016.05.027
- Bryant, C., Bei, B., Gilson, K., Komiti, A., Jackson, H., & Judd, F. (2012). The relationship between attitudes to aging and physical and mental health in older adults. *International Psychogeriatrics*, 24(10), 1674–1683. https://doi.org/10.1017/S1041610212000774

- Cacioppo, J. T., Hawkley, L. C., & Thisted, R. A. (2010). Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago Health, Aging, and Social Relations Study. *Psychology and Aging*, 25(2), 453–463. https://doi. org/10.1037/a0017216
- Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. *Psychology and Aging*, 21(1), 140–151. https://doi.org/10.1037/0882-7974.21.1.140
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of- fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 9(2), 233–255. https://doi.org/10.1207/ S15328007SEM0902_5
- Cohn-Schwartz, E., Segel-Karpas, D., & Ayalon, L. (2021). Longitudinal dyadic effects of aging self-perceptions on health. *The Journals of Gerontology: Series B*, 76(5), 900–909. https://doi.org/10.1093/geronb/ gbaa082
- Diehl, M., Wahl, H.-W., Barrett, A. E., Brothers, A. F., Miche, M., Montepare, J. M., Westerhof, G. J., & Wurm, S. (2014). Awareness of aging: Theoretical considerations on an emerging concept. *Developmental Review*, 34(2), 93–113. https://doi.org/10.1016/j.dr.2014.01.001
- Dong, L., Freedman, V. A., & Mendes de Leon, C. F. (2020). The association of comorbid depression and anxiety symptoms with disability onset in older adults. *Psychosomatic Medicine*, 82(2), 158. https://journals.lww. com/psychosomaticmedicine/Fulltext/2020/02000/The_Association_ of_Comorbid_Depression_and_Anxiety.5.aspx
- Gilman, S. E., Sucha, E., Kingsbury, M., Horton, N. J., Murphy, J. M., & Colman, I. (2017). Depression and mortality in a longitudinal study: 1952–2011. *Canadian Medical Association Journal*, 189(42), E1304–E1310. https:// doi.org/10.1503/cmaj.170125
- Han, J., & Richardson, V. E. (2015). The relationships among perceived discrimination, self-perceptions of aging, and depressive symptoms: A longitudinal examination of age discrimination. *Aging & Mental Health*, 19(8), 747–755. https://doi.org/10.1080/13607863.2014.962007
- Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, 40(2), 218–227. http://download.springer.com/ static/pdf/536/art%253A10.1007%252Fs12160-010-9210-8.pdf?auth66=1397163330_030fec9acd65ba5ca6c415d0e69db93c&ext=.pdf
- Hess, T. M. (2006). Attitudes toward aging and their effects on behavior. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 379–406). Academic Press.
- Holvast, F., Burger, H., de Waal, M. M. W., van Marwijk, H. W. J., Comijs, H. C., & Verhaak, P. F. M. (2015). Loneliness is associated with poor prognosis

in late-life depression: Longitudinal analysis of the Netherlands study of depression in older persons. *Journal of Affective Disorders*, *185*, 1–7. https://doi.org/10.1016/j.jad.2015.06.036

- Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *The Electronic Journal of Business Research Methods*, 6(1), 53–60.
- Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, 26(6), 655–672. https://doi. org/10.1177/0164027504268574
- Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). The Guilford Press.
- Klusmann, V., Sproesser, G., Wolff, J. K., & Renner, B. (2019). Positive self-perceptions of aging promote healthy eating behavior across the life span via social-cognitive processes. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 74(5), 735–744. https://doi. org/10.1093/geronb/gbx139
- Kornadt, A. E., & Rothermund, K. (2015). Views on aging: Domain-specific approaches and implications for developmental regulation. *Annual Review of Gerontology and Geriatrics*, *35*(1), 121–144.
- Kotter-Grühn, D. (2015). Changing negative views of aging: Implications for intervention and translational research. Annual Review of Gerontology and Geriatrics, 35(1), 167–2015. https://doi. org/10.1891/0198-8794.35.167
- Kwak, M., Ingersoll-Dayton, B., & Burgard, S. (2014). Receipt of care and depressive symptoms in later life: The importance of self-perceptions of aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 69(2), 325–335. https://doi.org/10.1093/geronb/gbt128
- Laborde-Lahoz, P., El-Gabalawy, R., Kinley, J., Kirwin, P. D., Sareen, J., & Pietrzak, R. H. (2015). Subsyndromal depression among older adults in the USA: Prevalence, comorbidity, and risk for new-onset psychiatric disorders in late life. *International Journal of Geriatric Psychiatry*, 30(7), 677–685. https://doi.org/10.1002/gps.4204
- Laidlaw, K., Power, M. J., & Schmidt, S. (2007). The attitudes to ageing questionnaire (AAQ): Development and psychometric properties. *International Journal of Geriatric Psychiatry*, 22(4), 367–379. https://doi. org/10.1002/gps.1683
- Levy, B. R. (2009). Stereotype embodiment: A psychosocial approach to aging. *Current Directions in Psychological Science*, *18*(6), 332–336. https://doi.org/10.1111/j.1467-8721.2009.01662.x
- Levy, B. R., & Bavishi, A. (2018). Survival advantage mechanism: inflammation as a mediator of positive self-perceptions of aging on longevity. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 73(3), 409–412. https://doi.org/10.1093/geronb/gbw035
- Levy, B. R., & Myers, L. M. (2004). Preventive health behaviors influenced by self-perceptions of aging. *Preventive Medicine*, 39(3), 625–629. https:// doi.org/10.1016/j.ypmed.2004.02.029
- Levy, B. R., Slade, M. D., & Kasl, S. V. (2002). Longitudinal benefit of positive self-perceptions of aging on functional health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 57(5), P409–P417. https://doi.org/10.1093/geronb/57.5.p409
- Levy, B. R., Slade, M. D., Kunkel, S. R., & Kasl, S. V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, 83(2), 261–270. https://doi.org/10.1037//0022-3514.83.2.261
- Liang, J., & Bollen, K. A. (1983). The structure of the Philadelphia Geriatric Center Morale Scale: A reinterpretation. *Journal of Gerontology*, 38(2), 181–189. https://doi.org/10.1093/geronj/38.2.181
- Luhmann, M., & Hawkley, L. C. (2016). Age differences in loneliness from late adolescence to oldest old age. *Developmental Psychology*, 52(6), 943–959. https://doi.org/10.1037/dev0000117
- Luo, M. S., & Li, L. W. (2020). Are self-perceptions of aging associated with health trajectories among middle-aged and older adults? *The Gerontologist*, 60(5), 841–850. https://doi.org/10.1093/geront/gnz092
- Mausbach, B. T., & Irwin, S. A. (2017). Depression and healthcare service utilization in patients with cancer. *Psycho-oncology*, *26*(8), 1133–1139. https://doi.org/10.1002/pon.4133
- Meisner, B. A. (2012). A meta-analysis of positive and negative age stereotype priming effects on behavior among older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 67(1), 13–17. https://doi.org/10.1093/geronb/gbr062

- Menkin, J. A., Robles, T. F., Gruenewald, T. L., Tanner, E. K., & Seeman, T. E. (2017). Positive expectations regarding aging linked to more new friends in later life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 72(5), 771–781. https://doi.org/10.1093/ geronb/gbv118
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525–543. https://doi.org/10.1007/ BF02294825
- Mushtaq, R., Shoib, S., Shah, T., & Mushtaq, S. (2014). Relationship between loneliness, Psychiatric disorders and physical health? A review on the psychological aspects of loneliness. *Journal of Clinical and Diagnostic Research*, 8(9), 1–4. https://doi.org/10.7860/JCDR/2014/10077.4828
- Palgi, Y., Shrira, A., Ring, L., Bodner, E., Avidor, S., Bergman, Y., Cohen-Fridel, S., Keisari, S., & Hoffman, Y. (2020). The loneliness pandemic: Loneliness and other concomitants of depression, anxiety and their comorbidity during the COVID-19 outbreak. *Journal of Affective Disorders*, 275, 109– 111. https://doi.org/10.1016/j.jad.2020.06.036
- Peplau, L. A., & Perlman, D. (1982). Perspectives on Loneliness. In L. A. Peplau & D. Perlman (Eds.), *Loneliness: A sourcebook of current theory, research and therapy*. Wiley-Interscience.
- Pikhartova, J., Bowling, A., & Victor, C. (2016). Is loneliness in later life a self-fulfilling prophecy? Aging & Mental Health, 20(5), 543–549. https:// doi.org/10.1080/13607863.2015.1023767
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401. https://doi.org/10.1177/014662167700100306
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. Journal of Statistical Software, 48(2), 1–36. https://doi.org/10.18637/jss. v048.i02
- Satorra, A., & Bentler, P. M. (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika*, 75(2), 243–248. https:// doi.org/10.1007/s11336-009-9135-y
- Schwartz, E., Ayalon, L., & Huxhold, O. (2021). Exploring the reciprocal associations of perceptions of aging and social involvement. *The Journals of Gerontology: Series B*, *76*(3), 563–573. https://doi.org/10.1093/geronb/ gbaa008
- Segel-Karpas, D., & Ayalon, L. (2020). Loneliness and hostility in older adults: A cross-lagged model. *Psychology and Aging*, 35(2), 169–176. https://doi.org/10.1037/pag0000417
- Segel-Karpas, D., Ayalon, L., & Lachman, M. E. (2018a). Loneliness and depressive symptoms: The moderating role of the transition into retirement. *Aging and Mental Health*, 22(1), 135–140. https://doi.org/10.1080/13607863.2016.1226770
- Segel-Karpas, D., Ayalon, L., & Lachman, M. E. (2018b). Retirement and depressive symptoms: A 10-year cross-lagged analysis. *Psychiatry Research*, 269, 565–570. https://doi.org/10.1016/j.psy-chres.2018.08.081
- Shiovitz-Ezra, S., Shemesh, J., & McDonnell/Naughton, M. (2018). Pathways from ageism to loneliness BT. In L. Ayalon & C. Tesch-Römer (Eds.), *Contemporary perspectives on ageism* (pp. 131–147). Springer International Publishing.
- Sjöberg, L., Karlsson, B., Atti, A.-R., Skoog, I., Fratiglioni, L., & Wang, H.-X. (2017). Prevalence of depression: Comparisons of different depression definitions in population-based samples of older adults. *Journal of Affective Disorders*, 221, 123–131. https://doi.org/10.1016/j. jad.2017.06.011
- Spitzer, N., Segel-Karpas, D., & Palgi, Y. (2019). Close social relationships and loneliness: The role of subjective age. *International Psychogeriatrics*, 1– 5. https://doi.org/10.1017/S1041610219001790
- Trautmann, S., Rehm, J., & Wittchen, H.-U. (2016). The economic costs of mental disorders: Do our societies react appropriately to the burden of mental disorders? *EMBO Reports*, 17(9), 1245–1249. https://doi. org/10.15252/embr.201642951
- Victor, C. R., & Yang, K. (2012). The prevalence of loneliness among adults: A case study of the United Kingdom. *The Journal of Psychology*, *146*(1–2), 85–104. https://doi.org/10.1080/00223980.2011.613875
- Weiss, R. (1973). Loneliness: The experience of emotional and social isolation. The MIT Press.
- Yang, K., & Victor, C. (2011). Age and loneliness in 25 European nations. Ageing and Society, 31(8), 1368–1388. https://doi.org/10.1017/ S0144686X1000139X