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Changes in Essentialist Beliefs About Cognitive Aging Predicts Changes in Mental Health: Evidence From a 10-Year Longitudinal Study

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**Changes in Essentialist Beliefs about Cognitive Aging Predicts Changes in Mental Health: Evidence  
From a 10-Year Longitudinal Study**

### **Abstract**

The belief that aging-related cognitive decline is inevitable is associated with impaired cognitive performance of older adults. Little is, however, known about the association between changes in essentialist beliefs about cognitive aging and mental health in the long term and among both younger and older adults. From a theoretical perspective, it would be expected that changes in essentialist beliefs about cognitive aging predict changes in mental health among older adults compared to younger adults. These differential associations have not yet been prospectively investigated. Using longitudinal data, the association between changes in essentialist beliefs about cognitive aging and mental health outcomes and the moderation effect of age were assessed. Mental health included well-being and mental illness (depression, anxiety, and panic symptoms). Data from adult participants ( $n = 4963$  with a mean age of 55.41 years, range 28 to 84 years) in a U.S. national, longitudinal study were analyzed. A series of two-wave latent change score models indicated that changes in essentialist beliefs about cognitive aging are associated with changes in well-being and mental illness. Age did not moderate the relationship between changes in essentialist beliefs about aging and changes in mental health (i.e., mental illness and well-being). The present study highlights change-to-change dynamics between essentialist beliefs about cognitive aging and mental health, regardless of age.

*Keywords:* aging attitudes, essentialism, well-being, mental health, ageism, beliefs about aging

### **Public Significance Statement**

The present study suggests that essentialist beliefs about cognitive aging do indeed matter for mental health. Changes in essentialist beliefs about cognitive aging are associated with changes in mental health regardless of age. This has implications for the development of interventions designed to reduce negative views of aging across the entire life course.

## **Changes in Essentialist Beliefs about Cognitive Aging Predicts Changes in Mental Health: Evidence From a 10-Year Longitudinal Study**

Essentialist beliefs about aging can be defined as individuals' beliefs about aging as a biologically determined and inevitable process (e.g., Shrira et al., 2022; Weiss et al., 2019; Weiss & Weiss, 2016). Shrira et al. (2022) proposed a conceptual hierarchy of subjective views of aging, according to which age stereotypes and essentialist beliefs about aging are included in the category of generalized subjective views of aging "referring to socially shared beliefs about the aging process and about older adults in general" (p. 25).

There is theory and evidence suggesting that the internalization of society's negative views of aging can have a detrimental effect on older people's sense of self and identity (Whitbourne & Sneed, 2002). The internalization of negative views on aging is conducive to deleterious consequences in terms of loneliness and cognitive and physical outcomes (e.g., Brothers et al., 2021; Chasteen et al., 2015; Hu et al., 2020; Levy & Leifheit-Limson, 2009; Pikhartova et al., 2016; Syme & Cohn, 2021). There is evidence from qualitative studies that older people without any objective cognitive impairment report anxiety, fear, and concern related to cognitive decline (e.g., Bennett et al., 2017; Buckley et al., 2015; Köttl et al., 2021; Newton, 2019). In addition, self-perceptions of aging, including fear of cognitive decline, are negatively associated with self-esteem (Marquet et al., 2019).

Although beliefs about aging in midlife might have a preparatory role for mental health in old age, according to Miche et al. (2014), older adults have been the focus of most previous research. Throughout adulthood, the tendency for some people to feel younger than their chronological age has been documented (Rubin & Berntsen, 2006).

### **The Relationship between Negative Beliefs about Aging and Mental Health**

There are theoretical reasons for assuming that negative beliefs about aging may be considered a risk factor for mental health. According to a bio-social-cognitive model of ageism (Bugental & Hehman,

2007), the negative effects associated with the internalization of society's negative views of older people are due to expectations that act as self-fulfilling prophecies via a process of self-stereotyping. Levy et al. (2014) argue that the internalization of negative views of aging by older people can act as environmental stressors. There is evidence that essentialist beliefs about aging play an important role in determining the impact of negative age stereotypes (Weiss, 2018). Specifically, consistent with the stereotype reactance hypothesis, Weiss found that, when negative age stereotypes were activated, older adults who believe that aging-related changes are not inevitable reported resilience and performance improvements because they feel challenged and are committed to the idea that things can be changed. Therefore, the mere presence of negative age stereotypes may not be sufficient to produce an effect. The idea that aging-related changes are malleable or inevitable (i.e., essentialist beliefs about aging) could have a more proximal role in shaping the negative effects associated with the internalization of society's negative views of older people. Indeed, essentialist beliefs about aging are defined in terms of (im)mutability rather than valence (Weiss, 2022).

The belief that age-related declines are inevitable can be considered an environmental stressor and mental health is among the stress-related outcomes. Specifically, based on the stress-vulnerability model (Quaedflieg & Smeets, 2013), essentialist beliefs about aging can act as environmental factors that influence the onset and course of mental health problems. This assertion is supported by the risks of ageism model (Swift et al., 2017), which predicts that negative beliefs about aging (including the beliefs that age-related declines are inevitable) affect the determinants of active aging (i.e., preservation and development of both physical and mental health and quality of life). In addition, essentialist beliefs about aging were found to be related to stronger stress responses and a relatively older subjective age across adulthood (Weiss & Diehl, 2021; Weiss et al., 2019; Weiss & Weiss, 2016).

There is clear evidence that subjective age (defined as how old people feel irrespective of their chronological age), awareness of age-related change (defined as awareness of positive and negative age-

related changes), and self-perceptions of aging (defined as how people interpret their own aging process) are associated with mental health (Dutt et al., 2018; Tully-Wilson et al., 2021; Westerhof et al., 2023). However, subjective age, awareness of age-related change, and self-perceptions of aging are different from individuals' beliefs about aging as an inevitable and biologically determined process. In the conceptual hierarchy of subjective views of aging of Shrira et al. (2022), essentialist beliefs about aging are included in the category of generalized subjective views of aging, which is related but conceptually different from the category of personal views of aging, including subjective age, awareness of age-related change, and self-perceptions of aging. Most of these longitudinal studies investigated the relationship between beliefs about aging and mental health over a short-term time. Longitudinal research that offers the possibility to investigate not only short-term effects is needed to better our understanding of the long-term consequences of beliefs about aging. Moreover, these longitudinal studies have examined only one aspect of mental health.

### **The Moderating Role of Age**

There is evidence suggesting that children as young as three years old hold negative and ambivalent views of older adults (Mendonça et al., 2018). The stereotype embodiment theory (Levy, 2009) posits that social representations and stereotypes of old age are implicitly internalized over the lifespan. As people pass through different age groups during their life course, the internalization of negative attitudes and stereotypes of older adults is unconsciously embodied. Unlike other social groups, such as those based on gender, ethnicity, or nationality, where the definition of ingroup and outgroup membership may be permanent during the lifespan, young and middle-aged adults' perception of older adults as an outgroup is temporary if they live long enough. Thus, the boundaries between different age groups are temporary, and the ingroup group members (e.g., young and middle-aged adults) are expected to become part of the outgroup members (i.e., the old age group) as people age (Lev et al., 2018). According to the theory of stereotype embodiment (Levy, 2009; Levy et al., 2014),

as people enter into old age, the internalization of negative attitudes and stereotypes of older adults becomes a risk factor for mental health. In addition, according to social identity theory (Tajfel & Turner, 1986), the manifestation of ageism among different age groups is expected to have a different impact on mental health. Starting from this premise, Lev et al. (2018) argue that:

By examining different age groups in relation to social identity theory, we can infer that young and middle-aged adults might create a positive unique identity, which consists of their age group, by differentiating themselves from and elevating themselves above the old age group. (p. 61)

Social identity theory posits that a positive self-identity of ingroup members (e.g., young and middle-aged adults) could be achieved by derogating members of the outgroup (e.g., old age) and by emphasizing the positive distinctiveness of one's group (Tajfel, 1982; Tajfel & Turner, 1986). For instance, a positive self-identity of young and middle-aged adults could be achieved by derogating the old age group (Lev et al., 2018). However, social identities based on age group are transient in nature. As it was argued, it is important to distinguish the role of essentialist beliefs about aging and that of related concepts (e.g., age stereotypes). Previous research revealed that people hold essentialist beliefs about a wide range of social categories including age groups (e.g., Haslam et al., 2000; Prentice & Miller, 2007) and that such beliefs play an important role in the social identity processes (Bastian & Haslam, 2008). A positive social identity provides individuals with support, meaning, and agency and this process ultimately influences their health and well-being (e.g., Ball & Nario-Redmond, 2014; Jetten et al., 2017). However, given that social identity based on age groups is in constant transition over the lifespan, aging determines a transition from membership in a current in-group to membership in an out-group (North & Fiske, 2012; Packer & Chasteen, 2006). Therefore, as people age, the belief that age-related declines are inevitable (i.e., an outgroup members' characteristic) might become more salient as an environmental stressor.

## The Present Study

The present study extends previous longitudinal studies of the relationship between subjective views of aging and mental health by investigating the long-term association between essentialist beliefs about cognitive aging and mental health. According to the two continua model of mental health, well-being and mental illness constitute separate correlated unipolar domains (Keyes, 2002, 2005; Westerhof & Keyes, 2010)<sup>1</sup>. Therefore, the focus of the present study addresses the longitudinal relationship between essentialist beliefs about aging and both well-being and mental illness. Keyes (2005) operationalized mental illness as encompassing symptoms of depression, generalized anxiety, panic disorder, and alcohol dependence. In the present study, mental illness was operationalized as encompassing symptoms of depression, generalized anxiety, and panic disorder<sup>2</sup>. Depression and anxiety disorders are the most common mental disorders (Steel et al., 2014).

Based on the stress-vulnerability model (Quaedflieg & Smeets, 2013), the bio-social-cognitive model of ageism (Bugental & Hehman, 2007), the theory of stereotype embodiment (Levy, 2009; Levy et al., 2014), and social identity theory (North & Fiske, 2012; Packer & Chasteen, 2006; Tajfel, 1982; Tajfel & Turner, 1986), the following hypotheses were formulated:

Hypothesis 1: Changes in essentialist beliefs about aging will predict changes in mental illness and well-being.

Hypothesis 2: Age will moderate the relationship between changes in both essentialist beliefs about aging and mental health (i.e., mental illness and well-being) such that the relationship is stronger for chronologically older adults compared to chronologically younger people.

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<sup>1</sup> Following this conceptual framework, in the current manuscript, mental health is used an umbrella term encompassing well-being and mental illness.

<sup>2</sup> Alcohol abuse was not included in the current study because an anonymous reviewer argued that alcohol abuse is a behavioral outcome.



## Method

### Transparency and Openness

Data used was from the open-access, publicly available MIDUS dataset. The Method section reports how sample size, any data exclusions, any manipulations, and all measures were determined. The study design, hypotheses, and analytic plan were not pre-registered. All MIDUS data are made publicly available via the University of Michigan Inter-university Consortium of Political and Social Research at the following link: <https://www.icpsr.umich.edu/web/ICPSR/series/203>. The analysis code is available at the following link: [https://osf.io/m28fu/?view\\_only=9532d649eea343ba8d14cf084ae8c65d](https://osf.io/m28fu/?view_only=9532d649eea343ba8d14cf084ae8c65d). SPSS and Mplus were used for the analyses.

### Design and Sample

This research used data from the Midlife in the United States (MIDUS) study. The MIDUS project is a national, longitudinal study of a wide age range of people in the United States. The data collection consisted of phone interviews and self-administered questionnaires. Specifically, data from MIDUS II (2004–2006; Ryff et al., 2021) and MIDUS III (2013-2014; Ryff et al., 2019) was used because MIDUS II was the first survey that included a measure of beliefs concerning aging-related changes. Of the original MIDUS I participants ( $N = 7108$ ), 4963 and 3294 participants successfully completed the second wave (MIDUS II) and the third wave (MIDUS III) of the study, respectively. Table 1 presents the sociodemographic features of the sample. Female participants were 53.3%. Participants' age ranged from 28 to 84 years at T1. The self-identified race of participants included Caucasian/White (90.6%), African American/Black (4.6%), American Indian/Alaskan Native (1.6%), Asian (0.5%), Native Hawaiian or Pacific Islander (0.1%), and Other (2.6%). More information about the study's methodology and main findings can be found elsewhere (Brim et al., 2004; Ryff & Krueger, 2018). MIDUS data collection is approved by the Education and Social/Behavioral Sciences and the Health Sciences IRBs at the University of Wisconsin-Madison.

## **Measurements**

### ***Mental illness***

The World Health Organization Composite International Diagnostic Interview short-form (CIDI-SF; Kessler et al., 1998) was used to measure symptoms of depression, panic attack, and generalized anxiety. A latent factor was extracted from the three scores representing symptoms of depression, panic attack, and generalized anxiety. Higher scores on the latent factor indicate greater mental illness. The internal reliability was satisfactory ( $\omega = .76$  at T1 and  $.79$  at T2). The Greek letter  $\omega$  stands for McDonald's omega and represents an alternative measure of reliability that offers numerous advantages over Cronbach's alpha (e.g., McNeish, 2018).

### ***Well-being***

Well-being was assessed using Ryff's theoretical framework (Ryff, 1989). In MIDUS II and III a 42-item version of Ryff's scale was used (Boylan & Ryff, 2015). Each item was rated on a 7-point scale ranging from 1 (*Strongly agree*) to 7 (*Strongly disagree*). According to Ryff's theoretical framework, there are six dimensions of psychological well-being: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. A latent variable was extracted from pooling items that represent each of the six dimensions of psychological well-being. The internal reliability was excellent ( $\omega = .90$  at T1 and  $.90$  at T2).

### ***Essentialist beliefs about cognitive aging***

Essentialist beliefs about cognitive aging were measured using a three-item scale from the Personality in Intellectual Aging Contexts scale (Lachman, 1986; Lachman et al., 1982). Specifically, this scale assesses beliefs concerning cognitive aging-related changes. This scale was used in previous research investigating essentialist beliefs about cognitive aging (e.g., Weiss et al., 2019; Weiss & Weiss, 2016). The items are worded as follows: "It's inevitable that my intellectual functioning will decline as I get older," "The older I get, the harder it is to think clearly," and "My mental capacity (sharpness) is

bound to decline.” The scale was anchored from 1 (*strongly agree*) to 7 (*strongly disagree*). A latent variable was constructed ( $\omega = .75$  at T1 and  $.74$  at T2) with higher scores indicating higher levels of essentialist beliefs about cognitive aging.

### ***Age stereotypes***

Age stereotypes were added as a covariate in the analysis following the request of an anonymous Reviewer. Age stereotypes were measured only at MIDUS I using the “Images of Life Change” scale. Participants were asked to rate how well 13 adjectives (e.g., calm, energetic) and domains (e.g., work, finances) described “people in their late 60ies” on a 10-point scale ranging from 0 (*not at all/worst*) to 10 (*very much/best*). Based on previous research (Kornadt, 2016; Kornadt & Kandler, 2017), items were grouped into four subscales: Family/Relationships, Fitness/Energy, Work/Life, and Wisdom. A latent variable was extracted from pooling items that represent each of the four subscales. The internal reliability was adequate ( $\omega = .78$ ).

### **Statistical Analysis**

Using a Monte Carlo-based method (Zhang & Liu, 2018) to determine the required sample size for latent change score models, the power for detecting a small change ( $d = 0.10$ ) with a sample size of 3000 and two measurement occasions was higher than .90. To test the first hypothesis, two-wave latent change score (2W-LCS) models (Henk & Castro-Schilo, 2016) were conducted. Figure 1 shows the path diagram of the 2W-LCS model used in the current study. To test the second hypothesis, latent moderated structural equations (Asparouhov & Muthén, 2021) were used (Figure 2). A maximum likelihood estimation with robust standard errors (MLR) was used, except in cases where the measures of mental health symptoms were heavily right-skewed. Heavily right-skewed variables were treated as ordinal, and a robust weighted least squares estimator using a diagonal weight matrix (WLSMV) was employed. Under WLSMV estimation, the pairwise present method (Asparouhov & Muthén, 2010) was used to manage the missing data. For the MLR estimator, the full information maximum likelihood

(FIML) approach was employed to manage the missing data. To control for spurious effects, gender, age, education, and age stereotypes were included as covariates in all analyses.

### Results

Comparisons on the main study variables for completers and non-completers were performed. Completers and non-completers did not significantly differ on mental illness,  $F(1, 4962) = 1.99, p = .158, \eta^2 = .00$ . Completers and non-completers did significantly differ on well-being (higher scores among completers),  $F(1, 4025) = 48.61, p < .001, \eta^2 = .01$ , essentialist beliefs (higher scores among completers),  $F(1, 4919) = 10.67, p = .001, \eta^2 = .00$ , age (lower age among completers),  $F(1, 4961) = 49.52, p < .001, \eta^2 = .01$ , education (higher scores among completers),  $\chi^2(11) = 151.397, p < .001, V = .175$ , and gender (women were more likely to be completers),  $\chi^2(1) = 10.452, p < .001, \Phi = .046$ . However, except for education, the effect sizes were small or even negligible.

Table 2 reports the means, standard deviations, and correlations for study variables. Before testing the model, the longitudinal measurement invariance was tested. According to Chen (2007), a criterion of a  $-.01$  change in CFI, paired with changes in SRMR of  $.030$  (for metric invariance) or  $.015$  (for scalar invariance) is considered appropriate for invariance tests. Table 3 displays the results of invariance tests. Full configural, metric, and scalar invariance were established for mental illness, well-being, and essentialist beliefs about cognitive aging.

The mean of the mental health latent change score factor was nonsignificant,  $\mu_{\Delta MH} = 0.23, p > .05$ , while its variability was significant,  $\sigma^2 = 0.97, p < .001$ . In addition, the well-being latent change score factor was nonsignificant,  $\mu_{\Delta WB} = -0.29, p > .05$ . There was significant variability in well-being change scores,  $\sigma^2 = 0.97, p < .001$ . Finally, the mean of the essentialist beliefs latent change score factor was nonsignificant,  $\mu_{\Delta EBA} = 0.27, p > .05$ , while its variability was significant,  $\sigma^2 = 0.99, p < .001$ . Overall, these findings indicate that there was not a clear decreasing or increasing trend in the overall sample in mental health, well-being, and essentialist beliefs. Notwithstanding, significant heterogeneity in the

amount of within-person change in these variables was found, suggesting that individuals followed different trajectories (e.g., some individuals decreased, and others increased).

To evaluate whether changes in beliefs about cognitive aging predict changes in mental health, two-wave latent change score models were fit. Results from these models can be found in Table 4. Change in essentialist beliefs about cognitive aging between T1 and T2 positively predicted change in mental illness,  $b = 0.15$ ,  $SE = 0.07$ ,  $p < .05$ . Fit indexes show that the model for mental illness fit the data well,  $\chi^2(105) = 360.36$ ,  $p < .001$ , RMSEA = .022, CFI = .95. Further, individuals with lower latent change scores on essentialist beliefs about cognitive aging tended to have higher latent change scores on well-being,  $b = -0.10$ ,  $SE = 0.03$ ,  $p < .05$ . The model for well-being showed an acceptable fit to the data,  $\chi^2(200) = 2873.33$ ,  $p < .001$ , RMSEA = .056, CFI = .93. Therefore, Hypothesis 1 was supported.

To estimate the proportion of total shared variance accounted for by essentialist beliefs about cognitive aging, the difference between the proportion of variance in the dependent variable that can be explained by the full model and the proportion of variance in the model consisting solely of the covariates was calculated. This change in  $R^2$  ( $\Delta R^2$ ) represents the difference in the proportion of variance in mental health accounted for by essentialist beliefs about cognitive aging. When essentialist beliefs about cognitive aging were added to the models, the changes in  $R^2$  for the prediction of mental illness and well-being were  $\Delta R^2 = .022$  and  $.009$ , respectively. The magnitude of these effects was small according to Cohen (1988).

To test hypothesis 2, latent moderated structural equations were conducted to test for the moderator role of age. The beliefs about cognitive aging  $\times$  age interaction term did not predict changes

in mental illness,  $b = 0.02$ ,  $SE = 0.08$ ,  $p > .05$ , and well-being,  $b = 0.05$ ,  $SE = 0.03$ ,  $p > .05$ . Therefore, Hypothesis 2 was not supported<sup>3</sup>.

### Discussion

The first aim of the current study was to investigate whether changes in essentialist beliefs about cognitive aging predict changes in mental health over a ten-year period. To test this relationship, two mental health indicators were included in the analysis. Overall, the results were generally consistent with the first hypothesis. Specifically, changes in essentialist beliefs about cognitive aging were predictive of changes in mental illness (i.e., depressive symptoms, panic attack symptoms, anxiety symptoms) and well-being (i.e., psychological well-being). Effect sizes were small.

The finding that changes in essentialist beliefs about cognitive aging were predictive of changes in mental health has important theoretical and practical implications. According to the theory of stereotype embodiment (Levy, 2009), as people grow up, they tend to internalize age stereotypes. The internalization of these age stereotypes might generate expectations that function as self-fulfilling prophecies (Levy & Leifheit-Limson, 2009; Wurm et al., 2013). Specifically, if an individual believes that her or his cognitive abilities will inevitably decline, this might become a self-fulfilling prophecy, and experiencing cognitive decline might then challenge her or his mental health. Based on the theory of stereotype embodiment (Levy, 2009), essentialist beliefs about cognitive aging may exert their influence along behavioral and physiological pathways in addition to the psychological (i.e., expectations) pathway. For instance, the behavioral pathway may suggest that people holding essentialist beliefs about cognitive aging may be significantly less likely to engage in physical activity, and this, in turn, may lead to poorer mental health outcomes.

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<sup>3</sup> Following the request of an anonymous reviewer, additional analyses were conducted to investigate nonlinear effects of age. These nonlinear effects of age were non-significant.

The finding that changes in essentialist beliefs about cognitive aging predicted changes in mental health might also be explained by fears and concerns regarding the aging process. Specifically, it is possible to hypothesize that people would be troubled or distressed by the prospect of a future in which their cognitive decline is an inevitable outcome of aging. There is evidence that fears and concerns regarding one's future aging are associated with mental health symptoms, including depression, and this relationship is stronger for people with a higher level of ageist beliefs (Bergman & Segel-Karpas, 2021). It is also possible to hypothesize that the fears and concerns regarding one's future aging may operate on an unconscious level in a manner similar to age stereotypes (Levy, 2009). In other words, people might not be fully aware of such fears and concerns.

The novelty of the current study is that it demonstrates the long-term relationship between essentialist beliefs about cognitive aging and a different domain (i.e., mental health). According to the 'stereotype-matching effect' (Levy & Leifheit-Limson, 2009), the impact of age stereotypes is stronger when the stereotype content corresponds to the outcome domain. An important topic for future research to investigate is the question of whether the association between essentialist beliefs about mental illness in old age and mental health is greater than that between essentialist beliefs about cognitive aging and mental health, as would be expected from the stereotype-matching effect.

A second aim of the current study was to investigate the moderating role of age in the relationship between essentialist beliefs about aging and mental health. The findings did not provide any evidence of a moderating role of age. According to both the theory of stereotype embodiment (Levy, 2009) and the social identity theory (Lev et al., 2018) in relation to negative beliefs about older people in general (i.e., based on age stereotypes), younger adults may have an incentive for holding such views because of benefits they receive. The findings of the present study provide no evidence of mental health and well-being benefits for younger adults holding essentialist beliefs about aging. On the contrary, the evidence seems to support a "negative aging beliefs cause harm" hypothesis when it

comes to the mental health of both younger and older people. On the basis of previous theorization and research, it was assumed that the vulnerability to negative age beliefs was associated with the formation or salience of self-perceived identity as older adults (Levy, 2009; Levy & Banaji, 2002). The theoretical implication of the current work is that the vulnerability to negative age beliefs may originate well before the activation of older individuals' old age identities. Given that negative age beliefs are posited to influence functioning on an unconscious level (Levy, 2009), it seems plausible to hypothesize the role of an unconscious prospect of growing old among younger adults. Obviously, a possible moderating role of age cannot be ruled out if other age groups (e.g., adolescents) had been considered.

The practical implication of this study emphasizes the importance of changing negative views of aging not only in older people but also in younger adults for their own good, as well as for the greater good. Interventions to reduce negative age beliefs should be implemented at the micro, meso, and macro levels (Steward, 2022). In addition, potential routes for changing negative age beliefs include increasing the knowledge of children and young adults about old age, providing opportunities for intergenerational contact, and adjusting the description and portrayal of middle-aged and older adults in the media (Kotter-Grühn, 2015).

There are a number of limitations and directions for future research that should be noted. First, although participants in the MIDUS were recruited as a national sample of United States adults, due to the nature of the longitudinal design, the current study included a subsample of the initial MIDUS national sample. Second, despite the strength of a prospective design, the correlational nature of the data does not permit firm conclusions about the causality of the relationships. For instance, changes in mental health could drive changes in how individuals report essentialist beliefs about cognitive aging, rather than the other way around. In addition, the relationship may be due to a third variable. Future research is needed to investigate the effects of essentialist beliefs about cognitive aging by using an experimental design. Third, the approach for estimating longitudinal relationships relies on the



assumption of no unmeasured confounding. A risk of biased estimates exists when the assumption of no unmeasured confounding is violated. In the current study, to remove confounding, covariates were added to the model. For instance, the inclusion of the baseline measurement as a covariate can provide a control for the presence of confounding. Although data on age stereotypes was collected only at MIDUS I (ten years before), there is evidence from longitudinal research indicating that age stereotypes remain stable over the life span (e.g., Kornadt et al., 2017; Levy et al., 2011) and that there are environmental and genetic effects contributing to stable individual differences in age stereotypes across life (Kornadt & Kandler, 2017). Fourth, the use of self-report measures might be affected by biases, including social desirability. Fifth, as the current study was conducted in the United States, the generalizability of the findings in different countries may be limited. There is theory and evidence suggesting a worldwide variation in the presence and content of age beliefs (Wilińska et al., 2018). Sixth, although selective dropout cannot be ruled out, this is expected to be negligible because of the small differences between completers and non-completers on the main study variables. Seventh, the age differences investigated could also correspond to cohort effects. Future studies employing more measurement occasions would be needed to investigate if the associations between essentialist beliefs and mental health actually change as participants get older. Eighth, in the current study, essentialist beliefs about cognitive aging were assessed. Future studies might investigate the role of other essentialist beliefs (e.g., about age-related change in mental or physical health). Ninth, the current study investigated changes in the long-term, with a lag length of about 10 years. Future studies with shorter lag lengths should be carried out to determine whether similar results are observed.

## **Conclusion**

In the United States, the internalization of age beliefs permeates society and begins in childhood and extends into old age. The present study demonstrates that changes in essentialist beliefs are longitudinally associated with changes in mental health over a ten-year period. Moreover, such a

relationship is similar in younger and older adults. These findings underscore the idea that essentialist beliefs about cognitive aging may be associated with worse mental health regardless of age.

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**Table 1***Sociodemographic Characteristics of the Sample (MIDUS II)*

	<i>M/%</i>	<i>SD</i>
Gender (female)	53.3%	—
Age	55.41	12.45
Income	71363.52	60463.400
Education level		
No school/some grade school (1-6)	0.3	—
Eighth grade/junior high school (7-8)	1.3	—
Some high school (9-12 no diploma/no GED)	4.6	—
GED	1.2	—
Graduated from high school	25.5	—
1 to 2 years of college, no degree yet	17.9	—
3 or more years of college, no degree yet	4.2	—
Graduated from 2-year college, vocational school, or associate degree	7.9	—
Graduated from a 4- or 5-year college, or bachelor's degree	19.3	—
Some graduate school	3.1	—
Master's degree	10.0	—
PH.D. or other equivalent professional degree	4.6	—

**Table 2**

*Means, Standard Deviations, and Correlations (Ordinal) for Study Variables*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Mental illness T1	0.32	0.86	—									
2. Mental illness T2	0.29	0.84	.35*	—								
3. Well-being T1	38.47	5.85	-.23*	-.16*	—							
4. Well-being T2	38.47	5.77	-.21*	-.23*	.72*	—						
5. Essentialist beliefs T1	3.86	1.48	-.10*	-.07*	.29*	.25*	—					
6. Essentialist beliefs T2	3.69	1.43	-.08*	-.06*	.25*	.28*	.47*	—				
7. Age stereotypes	6.28	0.86	-.05*	-.07*	.15*	.14*	.00	.01	—			
8. Gender	—	—	-.26*	-.26*	.06*	.06*	.09*	.08*	.20*	—		
9. Age	55.41	12.45	.09*	.08*	.06*	.06*	-.26*	-.26*	.20*	.00	—	
10 Education	—	—	-.11*	-.10*	.14*	-.15*	-.15*	-.09*	.07*	-.10*	-.13*	—

*Note.* \* $p < .01$ .

Table 3.

*Overall Longitudinal Measurement Equivalence/Invariance Model Fitting Indices and Comparison*

Model	$\chi^2(df)$	CFI	SRMR	$\Delta CFI$	$\Delta SRMR$
<b>Mental illness</b>					
Configural	109.962(8)*	0.955	0.041	—	—
Metric (weak) <sup>1</sup>	—	—	—	—	—
Scalar (strong)	148.324(28)*	0.947	0.041	0.008	0.000
<b>Well-being</b>					
Configural	742.220(47)*	0.971	0.059	—	—
Metric (weak)	762.959(52)*	0.971	0.057	0.000	0.002
Scalar (strong)	818.151(57)*	0.969	0.056	0.002	0.001
<b>Essentialist beliefs</b>					
Configural	27.977(7)*	0.995	0.027	—	—
Metric (weak)	30.605(9)*	0.995	0.024	0.000	0.003
Scalar (strong)	32.088(11)*	0.995	0.021	0.000	0.003

Note. df = degrees of freedom;

CFI = comparative fit index;

SRMR = standardized root mean-square residual;

\*  $p < .001$ ;

<sup>1</sup>The metric setting is not allowed for weighted least squares. Muthen (2018) recommends skipping the metric step with ordinal outcomes and instead comparing the scalar model to the configural.

**Table 4***Parameter Estimates from the Two-Wave LCS Model*

	Change in mental illness			Change in well-being		
	<i>b</i> *	<i>SE</i>	<i>p</i>	<i>b</i> *	<i>SE</i>	<i>p</i>
Gender	0.06	0.06	.299	0.02	0.02	.273
Age	-0.02	0.06	.765	-0.12	0.02	<.001
Education	0.01	0.05	.918	0.02	0.02	.371
Age stereotypes	-0.09	0.05	.065	0.08	0.02	.001
Change in essentialist beliefs about cognitive aging	0.15	0.07	.034	-0.10	0.03	<.001

*Note.* Standardized estimates are reported. *SE* = standard error.

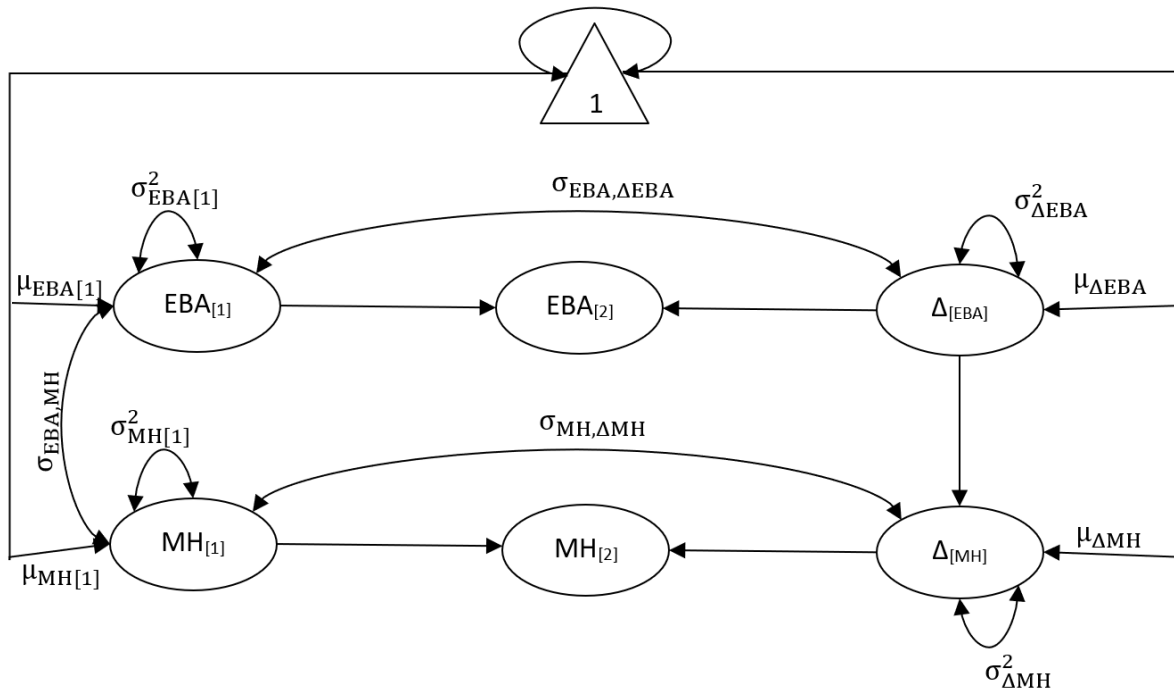
$R^2 = .033$  (mental illness) and  $.030$  (well-being)

The fit indices of the model predicting mental illness were  $\chi^2(105) = 360.36$ ,  $p < .001$ , CFI = .95, RMSEA = .022.

The fit indices of the model predicting well-being were  $\chi^2(200) = 2873.33$ ,  $p < .001$ , CFI = .93, RMSEA = .056.

**Figure 1**

*Path Diagram of the Two-Wave Latent Change Score Model.*

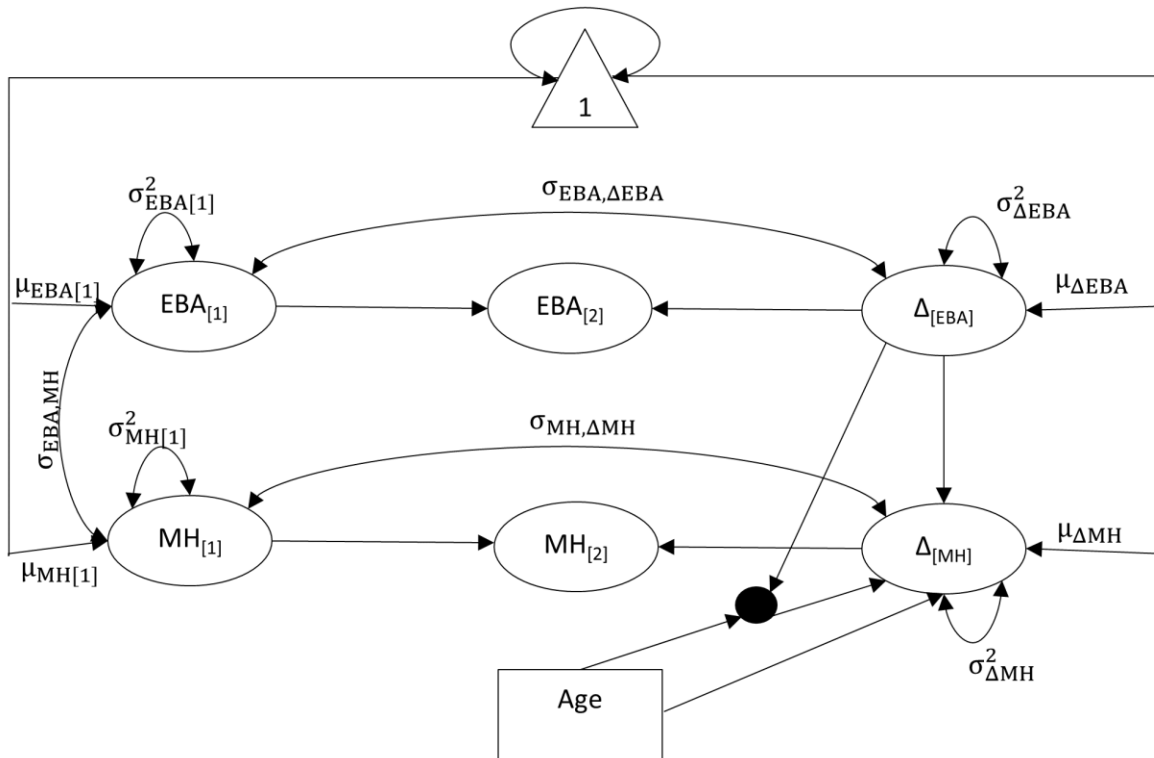


*Note.* EBA= essentialist beliefs about aging, MH=mental health. Deltas indicate latent change scores.



**Figure 2**

*Path Diagram of the Two-Wave Latent Change Score Model Including the Latent Moderation Effects of Age.*



*Note.* EBA= essentialist beliefs about aging, MH=mental health. Deltas indicate latent change scores.