



# Age Discrepancies Across Two Decades: Desiring to be Younger Is Associated with Daily Negative Affect Over Three Waves of Assessment

Jennifer R. Turner<sup>1</sup> · Nikki L. Hill<sup>2</sup> · Sakshi Bhargava<sup>2</sup> · Caroline Madrigal<sup>3,4</sup> · David M. Almeida<sup>5</sup> · Jacqueline Mogle<sup>1</sup>

Accepted: 16 May 2022 / Published online: 26 May 2022  
© Society for Prevention Research 2022

## Abstract

Negative perceptions of aging and older adulthood, including the idealization of youth, are common in the United States. Past work has found that holding negative perceptions of aging is closely associated with poor mental and physical health consequences, yet few studies have examined how these perceptions impact day-to-day experiences. The current study had two objectives: (1) investigate whether age discrepancy (specifically desiring to be *younger* than one's chronological age) was related to daily negative affect and (2) examine whether this relationship changed as participants aged over time. We utilized the *Midlife in the United States* (MIDUS) diary study, a longitudinal measurement burst study with three waves of 8-day daily diaries indexing approximately 20 years. Participants ( $N = 2398$ ;  $M_{age}$  [baseline] = 46.85,  $SD = 12.24$ ; 54.7% women; 92.4% White) reported their desired age as well as daily negative affect at each wave. Using multilevel modeling, we examined whether age discrepancy predicted daily negative affect across 3 waves of observation. Results supported a significant relationship between age discrepancy and daily negative affect. However, no interactions among age discrepancy and baseline age or time across study were found. This suggests that the relationship between age discrepancy and daily negative affect was consistent across waves and participants over a 20-year period and provides evidence for the pernicious effect of deidentifying with one's real age on daily life. Daily experiences can act as potential risk or protective factors and shape developmental trajectories. Reducing ageism through societal interventions or increasing personal acceptance of aging through targeted interventions are two potential pathways of promoting health and well-being across the lifespan.

**Keywords** MIDUS · Negative aging perceptions · Desired age · Daily experiences · Negative affect

## Introduction

The United States (U.S.) has an aging conundrum: Americans are getting older, yet negative attitudes and stereotypes towards older adults, also known as ageism, is common

among people of all ages (Kite et al., 2005; Nelson, 2002). Furthermore, ageism operates at both personal and societal levels (Levy, 2009; Levy & Banaji, 2002; Nelson, 2016), which makes it challenging to address anti-aging bias directly. According to one estimate, up to 80% of adults ages 50 years and older have reported experiencing at least one form of ageism in their daily lives (e.g., "People assume I do not do anything important or valuable"). However, more than one-third of those same individuals also endorsed negative perceptions of aging (e.g., "Feeling lonely is part of getting older"; Allen et al., 2020). Negative perceptions of aging are associated with poorer mental and physical health and lower rates of health-promoting behaviors (Levy, 2009; Sargent-Cox et al., 2012; Wurm et al., 2013). This holds implications for optimal functioning across the lifespan and societal health at large. In fact, a recent study reported that the U.S. spends upwards of \$63 billion per year in excess healthcare costs addressing the impact of ageism on related health conditions (Levy et al., 2020). This provides a concrete example

✉ Jennifer R. Turner  
jrt5643@psu.edu

- <sup>1</sup> Edna Bennett Pierce Prevention Research Center, Pennsylvania State University, 314 Biobehavioral Health Building, University Park, PA 16802, USA
- <sup>2</sup> Ross and Carol Nese College of Nursing, Pennsylvania State University, University Park, PA, USA
- <sup>3</sup> Center of Innovation in Long-Term Services and Supports, Providence VA Medical Center, Providence, RI, USA
- <sup>4</sup> Department of Health Services, Policy and Practice, School of Public Health, Brown University, Providence, RI, USA
- <sup>5</sup> Department of Human Development and Family Studies, Pennsylvania State University, University Park, PA, USA

of how negative aging perceptions impact society, but does not explain how these experiences may permeate day-to-day functioning. In this study, we utilized a micro-level perspective, through daily diary methods, to examine how negative aging self-perceptions, operationalized as desiring to be younger, impacts individuals' daily mood over three waves of data indexing approximately 20 years.

Daily experiences influencing broader developmental trajectories align with the *Lifespan Developmental Theory* (Baltes, 1987, 1997), which indicates that development is a continuous process modifiable through lifestyle and societal interventions. A secondary principle is that culture (i.e., societal resources passed on to future generations) can support healthy development. Unfortunately, cultural resources can be a double-edged sword in lifespan development, especially when discussing entrenched social perceptions such as ageism and youth-focus (Nelson, 2011). On the one hand, accumulated cultural resources have led to advances in medical science and longer, healthier lifespans (i.e., a *fourth age*; Baltes, 1997). Alternatively, stereotypes and attributes given to out-groups like older adults are also passed on through the cultural consciousness (e.g., “over the hill” birthday cards).

Levy's (2009) *Stereotype Embodiment Theory* (SET), and by extension internalized and implicit ageism (e.g., Levy & Banaji, 2002; Nosek et al., 2002), provides nuance to the role of culture in perpetuating age-related bias. From this lens, negative aging stereotypes are first made salient in child- and young adulthood when there is more distinction between in-groups and out-groups. Over the life course, as people are repeatedly exposed to negative viewpoints toward older adults, they come to accept and internalize these viewpoints (Levy, 2009; Nelson, 2011). Ageism may be less relevant to younger adults, yet the internalized beliefs about aging can have downstream negative consequences as these individuals age. For example, many chronic conditions among U.S. adults (Centers for Disease Control and Prevention, n.d.), like arthritis, cardiovascular disease, diabetes, and obesity are often viewed as “normal,” age-associated illnesses (Gignac et al., 2006; Jura & Kozak, 2016). This is concerning for lifespan prevention research as experiences and behaviors enacted earlier in life can shape future trajectories (Baltes, 1987; Levy & Myers, 2004), potentially mitigating the worst consequences of these illnesses.

SET also theorizes a key transition period where general negative age stereotypes become self-stereotypes. This occurs when the person who previously engaged in stereotyped beliefs against a group, becomes a member of that targeted group (Levy, 2009). As middle-aged and older adults reconcile their previous negative beliefs about aging with their current group status, this can foster negative aging perceptions, expectations, and even a desire to return to a younger age (Kotter-Grühn & Hess, 2012; Levy et al., 2009). Baltes (1997) noted that as individuals age, the size of the

discrepancy between real and desired age often increases (“Seventy-year-olds, for instance, would like to be on average about 10 years younger. For 90-year-olds, the discrepancy is increased to about 25 years”, p. 369). This trend likely reflects both awareness of general negative perceptions of aging as well as fear of personal suboptimal aging outcomes.

Few individuals identify with their chronological age. Instead, depending on the domain being assessed (e.g., physical appearance, cognition), many people identify with other-aged groups (Kotter-Grühn et al., 2016), with most discrepancies tending to skew younger (Rubin & Berntsen, 2006). Age discrepancies are associated with health outcomes, yet whether the impact is positive or negative depends on how the discrepancy is conceptualized. Reporting a lower subjective age compared with one's chronological age (i.e., *feeling younger*) has been linked to greater life satisfaction, lower depressive symptoms, and better mood (e.g., higher positive and lower negative affect; Debreczeni & Bailey, 2021; Stephan et al., 2011; Westerhof & Barrett, 2005). In contrast, *desiring* or *wishing* to be younger may reflect deidentifying with one's real age and could be considered a proxy for negative aging perceptions (Baltes, 1997; Kotter-Grühn & Hess, 2012; Levy, 2009). In their seminal work examining age identities across the lifespan (ages 14–83 years), Montepare and Lachman (1989) found that age discrepancies were associated with fears of aging and life satisfaction, with stronger effects for younger and midlife adults. Specifically, individuals with older age identities had the highest life satisfaction and the lowest fear of aging. Similarly, an experimental study found that when negative age-related stereotypes were salient to older adults, it promoted dissociation from membership in their own age group (Weiss & Lang, 2012). Together, these studies suggest that desiring to be younger may be influenced by internalized ageism shaping perceptions of what it means to be an older adult.

Negative aging perceptions can lead to poor physical and psychological outcomes (Kotter-Grühn & Hess, 2012; Levy et al., 2009; Sargent-Cox et al., 2012; Wurm et al., 2013), whereas positive aging perceptions and expectations tend to promote preventative health behaviors (e.g., healthier diet, regular exercise; Levy & Myers, 2004) and are linked to decreased mortality (Levy et al., 2002; Westerhof et al., 2014). Levy et al. (2002) found that over approximately 20 years, individuals with more negative perceptions of aging (compared to average) lived a median of 7.6 fewer years than their counterparts with more positive aging perceptions. Thus, at a broader level, it seems clear that negative age stereotypes and discrepancy between real and ideal age is associated with many poor health outcomes, yet how they may affect day-to-day functioning or emotional well-being is less understood. Recent work supports the role of daily events and mood differences in influencing broader outcomes. Turner et al. (2021) found that daily responses

to experiences, such as memory lapses, and the associated change in affect can influence overall life satisfaction. Negative aging perceptions could also act as a daily stressor that influences daily affect with resultant distal outcomes. Our study goals were to examine how desiring to be younger (i.e., *age discrepancy*) is associated with daily negative affect, and whether this relationship changes longitudinally. We had two primary hypotheses:

*Hypothesis 1:* Larger discrepancies between actual and younger desired age would be associated with greater daily negative affect, given that negative aging perceptions are associated with poor psychological and well-being outcomes.

*Hypothesis 2:* As participants age, discrepancies between actual and desired age would be associated with worse mood outcomes (i.e., age of participant would moderate the relationship between age discrepancy and daily negative affect).

## Methods

### Overview of the Midlife in the United States Study

The *Midlife in the United States Study* (MIDUS; <http://midus.wisc.edu/>) is a National Institute on Aging (NIA)-funded longitudinal survey collected approximately every 10 years, beginning in 1995. The overall goal of MIDUS is to shed light on the least examined part of the lifespan—midlife—by following a large national sample of individuals living in the U.S., aged 25–75 years at the time of the initial assessment. To this end, the MIDUS study assesses family, life, and leisure characteristics, as well as health functioning and well-being. MIDUS is currently in its third wave of data collection (i.e., MIDUS-3) and continues to reassess many of the same individuals from the first and second waves of measurement.

A MIDUS subcomponent of key relevance for our current investigation is the daily diary measurement burst design, known as the *National Study of Daily Experiences* (NSDE). A measurement burst study involves repeatedly assessing participants using intensive measurement methods, such as daily diary, over time (i.e., bursts or waves; Nesselrode, 1991). The NSDE is comprised of a randomly recruited subset of participants from the broader MIDUS sample who consent to be assessed over an 8-day period and reported on daily experiences of stress, social engagement, health, affect, and many other measures outside the scope of the current study. On average, participants in the NSDE completed the daily assessments approximately 2 years after completing each wave of the MIDUS survey (range = 0–6 years).

At baseline (i.e., wave 1), the response rates for the NSDE from the overall MIDUS survey was 70.6%, and the average time elapsed between survey and daily diary assessments was 1.20 years ( $SD = .40$ ). At wave 2, the response rate was 66.4%, and the average time elapsed was 1.62 years ( $SD = 1.23$ ). Finally, at wave 3, the response rate was 58.0%, and the average time elapsed was 4.77 years ( $SD = .68$ ).

### Participants and Procedures

Participants were shared between the MIDUS and the NSDE; however, the types of data collected differed between the two studies. We used the items from MIDUS that pertained to demographic information, including chronological age and the age they desired to be. In NSDE, we used assessments of affective states and experiences of stress on each given day. Given our overall study goal of assessing how age discrepancy influences daily affect, we combined survey and daily diary approaches. Participants from the broader MIDUS study were included if they participated in at least one wave of the 8-day NSDE study and reported their desired age.

We initially identified 2476 participants who met the inclusion criteria. Given our research question, we excluded participants who reported desiring to be *older* than their current chronological age ( $n = 72$ ), or an extreme value (i.e., > 50 years younger;  $n = 6$ ), as they may be substantially different from the majority of participants and the small sample size prevented meaningful subgroup analysis. This left a final analysis sample of 2398 participants (see Table 1 for sample demographic information). At baseline (i.e., MIDUS-1), the age range of our sample was 24–74 years ( $M_{\text{age}} = 46.85$ ,  $SD = 12.24$ ), 54.7% women, and the majority were White (92.4%). Given the low frequency of other races (7.6%) in our sample, we combined them into an “other” category for analyses; “other” included Black, Native American or American Eskimo, Asian or Pacific Islander, and Other. Approximately half (51.5%) of participants reported some experience with college or a college degree. Participants completed 33,882 daily diaries across the three assessment waves, and average compliance across the 8 days was moderate ( $M_{\text{wave1}} = 4.41$ ,  $SD = 3.17$ ,  $M_{\text{wave2}} = 6.44$ ,  $SD = 2.92$ , and  $M_{\text{wave3}} = 5.06$ ,  $SD = 3.44$ ).

### Measures

#### Age Discrepancy

One item assessed desired age: “Now imagine you could be any age. What age would you like to be?” Age discrepancy was computed as *current chronological age – desired age*.

**Table 1** Descriptive information for demographic and key study variables at baseline

Variable	Descriptive statistics
Age, <i>M</i> ( <i>SD</i> )	46.85 (12.24)
Gender	
Men, <i>n</i> (%)	1086 (45.29)
Women, <i>n</i> (%)	1312 (54.71)
Race	
White, <i>n</i> (%)	2215 (92.37)
Others, <i>n</i> (%)	183 (7.63)
Education	
High school or less, <i>n</i> (%)	805 (33.57)
College experience: 2-year degree or < 4 years, <i>n</i> (%)	742 (30.94)
College degree, <i>n</i> (%)	494 (20.60)
Post-graduate education, <i>n</i> (%)	357 (14.89)
Age discrepancy, <i>M</i> ( <i>SD</i> )	15.32 (10.21)
Daily negative affect, <i>M</i> ( <i>SD</i> )	.33 (.49)
Daily stress	
Yes, <i>n</i> (%)	892 (65.68)
No, <i>n</i> (%)	466 (34.32)

## Time

To assess participant aging over the three assessment waves, the time elapsed was measured by subtracting the age at baseline from age at any given wave (*current age* – *baseline age*).

## Daily Negative Affect

Negative affect measured across 8 days and 3 waves of assessment was our dependent variable. Participants were asked during their daily survey to respond on a 5-point Likert-type scale “How much of the time today did you feel...?” with the descriptors of “so sad nothing could cheer you up,” “nervous,” “restless or fidgety,” “hopeless,” “everything was an effort,” and “worthless.” The response options were *none of the time* (0), *a little of the time* (1), *some of the time* (2), *most of the time* (3), and *all of the time* (4). Responses were summed and averaged to create a composite negative affect scale (range = 0 to 4; *M* = 0.33, *SD* = 0.49). Because negative affect was measured daily and over three assessment waves, we computed the reliability of this measure using guidelines by Hox et al. (2017). This uses an adjusted form of the ICC assuming error in the residual is distributed equally across assessments. Using the average number of completed daily surveys (i.e., 15), the ICC was .51 and the reliability was .94.

## Covariates

The following covariates were included in all models: stress, gender, race, and education. Stress was included as a variable at the daily level, as it could impact how much negative mood participants reported on a given day and was coded as 0 (*no stressor reported*) or 1 (*any stressor reported*). Types of daily stressors included arguments, negative events at work, school, or home, and experiences of discrimination. Gender (women [0], men [1]) and race (White [1], Other [0]) were also dichotomous variables. Education was coded such that participants who completed a high school education (33.6%) were 1, participants who had some college experience (30.9%) were 2, participants who completed a 4-year degree (20.6%) were 3, and participants with some graduate school experience, or a master’s or professional degree (14.9%) were 4.

## Analytic Plan

We first computed descriptive statistics and correlations among key study variables. Next, we examined changes in age discrepancies across time to determine whether age discrepancies changed within an individual as they aged. To examine the effect of age discrepancy and changes in age discrepancies over time on daily negative affect, we used three-level multilevel models (MLM) with restricted maximum likelihood (REML) estimation where day was nested in wave and wave was nested in person (SAS *proc mixed*). As this study was conducted over three distinct waves and included daily diary assessments, we wanted to account for potentially missing values and loss due to attrition within the model.<sup>1</sup> MLM with a REML estimation accounts for potentially missing values at both the day and wave levels in longitudinal studies, such that if a participant is unresponsive to a particular assessment or wave all available data is still incorporated into the overall multilevel estimates (Hox et al., 2017). All models included random intercepts at the person and wave levels so that participants could differ from each other in their average overall negative affect at baseline, and a participant could differ from themselves in their average negative affect across waves. Models were conducted in a stepwise manner, and during model building interactions were first entered separately to gauge unique predictive effects prior to analyzing the full models (which included all interactions). Model 1 included time and age discrepancy at each wave, and average age discrepancy for each person centered around the sample mean (i.e., grand mean centered).

<sup>1</sup> Of the 2,398 total participants, *n* = 1,646 (68.6%) completed all three waves of data collection, *n* = 473 completed two waves (19.7%), and *n* = 279 only completed one wave (11.6%).

**Table 2** Intercorrelations among key study variables at baseline

	1	2	3	4	5	6	7
1. Age	-						
2. Gender	-.01	-					
3. Education	-.05**	.11***	-				
4. Race	.05**	.04*	.02	-			
5. Age discrepancy	.63***	.06***	-.12***	-.001	-		
6. Negative affect	-.13***	-.02	-.03	-.05*	-.02	-	
7. Daily stress	-.17***	-.02	.14***	.001	-.12***	.24***	-

Correlations for continuous variables (i.e., age, age discrepancy, and negative affect) are Pearson's  $r$  and correlations for categorical variables (i.e., gender, education, race, and daily stress) are Kendall's  $\tau$

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

This allowed us to look at how age discrepancies related to daily negative affect at each wave, as well as whether a general tendency to desire to be younger impacted daily negative affect. Model 2 included the same predictors as model 1, but incorporated covariates and is reported in the results. We also considered interactions between age discrepancy and our age terms (i.e., baseline age and time; model 3). This tests whether the impact of age discrepancy depends on (1) how old a participant was at the first wave (baseline age) or (2) changes in a participant's age across the study.

MLM results are reported as unstandardized coefficients. To gauge the size of the effect of age discrepancies, we computed model-based estimates of the amount of increase in negative affect given different possible age discrepancies (SAS estimate command in *proc mixed*). Sample weights were not used in our analyses as there is no consensus on the best use of weighting in longitudinal data.

## Results

Preliminary analyses showed significant intercorrelations among key study variables at baseline (see Table 2). Age was correlated with age discrepancy ( $r = .63, p < .001$ ), stress ( $r = -.17, p < .001$ ), and negative affect ( $r = -.13, p < .001$ ), such that older individuals reported larger age discrepancies and lower negative affect and stress compared to younger individuals in the sample. Gender was positively correlated with education ( $r = .11, p < .001$ ) and age discrepancy ( $r = .06, p < .001$ ), such that men reported both greater education and greater age discrepancies than women. Education was also correlated with age discrepancy ( $r = -.12, p < .001$ ) and stress ( $r = 0.14, p < .001$ ), such that more educated individuals reported lower age discrepancy and higher stress compared to their counterparts.

Average age discrepancy differed by wave of assessment: at baseline, age discrepancy was 15.32 ( $SD = 10.21$ ), at the second wave age discrepancy was 20.47 ( $SD = 11.33$ ), and at the third wave age discrepancy was 24.36 ( $SD = 11.47$ ).

This result was expected as participants were also older at each wave of assessment, and greater age discrepancies were associated with older age. To clarify the potential role of time, we examined how age discrepancy differed by decade and wave and found more consistency than difference based on time of life (see Supplementary Fig. 1). As one example, at baseline, participants aged 60–69 years reported an average age discrepancy of 23.88 years. At wave two, participants who had previously been in their 50 s during the baseline assessment and were now 60–69 years reported a discrepancy of 24.90, and at wave three, participants who had first been 40–49 years of age at baseline and were now in their 60 s reported a discrepancy of 24.86 (see Supplementary Table 1 for full results).

After accounting for stress, baseline age, gender, race, and education, results showed a significant association of time with daily negative affect ( $b = -0.001, SE = 0.001, p = .020$ ), such that as individuals aged, they reported lower negative affect (see Table 3 for all estimates). Supporting hypothesis 1, age discrepancy was significantly related to daily negative affect ( $b = 0.002, SE = 0.001, p = .008$ ). At waves when individuals reported larger age discrepancies (i.e., difference between desired and real age was larger), they also reported higher daily negative affect. Compared to individuals who reported no age discrepancy, individuals who reported a 5-year age discrepancy had an average increase in daily negative affect by 0.180 units on a 4-point scale, while individuals who reported a 15-year age discrepancy had an increase in negative affect by 0.191 units. Thus, the impact of age discrepancy on daily negative affect was larger than the effect of experiencing a daily stressor on a given day ( $b = 0.118, SE = 0.003, p < .001$ ).

Hypothesis 2 was not supported. Neither baseline age nor time significantly interacted with age discrepancy in the simplified or full models ( $ps = .976$  and  $.489$ , respectively), indicating that the magnitude of associations between age discrepancy and negative affect did not differ between younger and older adults at baseline or change as people aged.

**Table 3** Results from multilevel models examining the association of time and age discrepancy with negative affect

Construct	Model 1 <i>b</i> ( <i>SE</i> )	Model 2 <i>b</i> ( <i>SE</i> )	Model 3 <i>b</i> ( <i>SE</i> )
<b>Predictors</b>			
<i>Intercept</i>	0.162*** (0.011)	0.176*** (0.021)	0.182*** (0.022)
<i>Baseline age</i>	−0.003*** (0.0004)	−0.003*** (0.0004)	−0.003*** (0.001)
<i>Time</i>	−0.002** (0.001)	−0.001* (0.001)	−0.002+ (0.001)
<i>Age discrepancy</i>	0.001+ (0.001)	0.001+ (0.001)	0.001 (0.001)
<i>Average age discrepancy</i>	0.002** (0.001)	0.002** (0.001)	0.002*** (0.001)
<i>Age discrepancy × baseline age</i>	-	-	0.000001 (0.00003)
<i>Age discrepancy × time</i>	-	-	0.00003 (0.00005)
<b>Covariates</b>			
<i>Daily stress</i>	-	0.118*** (0.003)	0.118*** (0.003)
<i>Gender: Men (ref = women)</i>	-	−0.022* (0.009)	−0.022* (0.009)
<i>Race: White (ref = others)</i>	-	−0.017 (0.017)	−0.017 (0.017)
<i>Education: Some college experience(ref = HS or less)</i>	-	−0.045*** (0.011)	−0.045*** (0.011)
<i>Education: College degree (ref = HS or less)</i>	-	−0.072*** (0.013)	−0.072*** (0.013)
<i>Education: Graduate experience or graduate degree(ref = HS or less)</i>	-	−0.048*** (0.014)	−0.048*** (0.014)

Model 1 includes main effects of predictors only. Model 2 includes main effects of predictors and covariates. Model 3 includes main effects of predictors, covariates, and interactions

HS high school

\*\*\*  $p < .001$ . \*\*  $p < .01$ . \*  $p < .05$ . +  $p < .10$

## Discussion

The current study examined how deidentifying with one's current age potentially influences day-to-day experiences and mood. Findings suggest that desiring to be younger (*age discrepancy*) has a stable impact on participants' daily life. Specifically, we identified that greater age discrepancies in desiring to be younger predicted higher daily negative mood, an effect that was consistent regardless of participant age or over time. These results hold important implications for the pernicious relationship between negative aging perceptions and lifespan health and well-being outcomes, as described in more detail below.

In line with past work suggesting that older adults are typically more content and less negative than younger adults (see Charles & Carstensen, 2010 for review), we found that aging was associated with small decreases in daily negative affect over the course of this study. Age-related differences in the emotional experience that favor reductions in negative affect may be a protective, health-promoting factor (Charles et al., 2016). However, our study findings reinforce that wanting to be younger may be a concurrent risk factor for poorer outcomes, as past research has found links between negative affect and increased inflammation and poor cardiovascular functioning (Diener & Chan, 2011; Suls & Bunde, 2005). We found that desiring to be even 1 year younger than one's actual age was associated with an increase in the negative affect of the same magnitude, and these effects were

stable regardless of participant age. Thus, our results suggest that desiring to be younger may minimize the frequently found "age advantage" in emotional well-being (Charles & Carstensen, 2010). Additionally, most participants reported wanting to be considerably younger than only one year (the sample average was 15.32 years). However, one interesting consideration is that as participants aged, the general age discrepancy pattern was maintained—younger individuals typically had smaller age discrepancies compared to older individuals, yet as participants aged they more closely approximated previous waves' data. A greater similarity across waves likely speaks to the insidious culture of a youth-focused society.

Negative affect and stress at the daily level is linked to poorer physical and psychological health outcomes over long time periods, including increased risk of affective disorders and chronic illness (Charles et al., 2013; Piazza et al., 2013; Sin et al., 2015). Likewise, endorsing negative perceptions of aging, including self-stereotyping and internalized ageism, are also associated with worse health and well-being outcomes (Levy, 2009; Sargent-Cox et al., 2012; Wurm et al., 2013). Using age discrepancy as our proxy for negative perceptions of aging, we found that desiring to be an average of 5 years younger had an influence on the daily mood that was *larger* in magnitude than the effect of experiencing a daily stressor on a given day (i.e., .182 compared to .118). Daily stress is associated with psychological "wear and tear" (i.e., Charles et al., 2013) and other negative outcomes, it

follows that age discrepancy experienced daily may behave similarly. Thus, one possible mechanism for how negative aging expectations influence long-term health outcomes is through consistent activation of daily negative affect, and maybe even acting as a type of chronic, daily stressor in the lives of older adults (e.g., Allen, 2016).

An additional unexpected finding was the stability of the relationship between age discrepancy and negative affect over the three waves of assessment. Regardless of participant age, desiring to be younger was associated with consistent increases in daily negative affect, as evidenced by the lack of interactions between baseline age and aging over time. This suggests that intervening to reduce idealizations of a younger age could potentially occur at any period during the lifespan; however, earlier interventions may help mitigate the impact on daily negative affect. This finding aligns with assertions from the aforementioned *Lifespan Developmental Theory* (Baltes, 1987, 1997) by highlighting the many opportunities to address aging stigma and potentially impact mood and other health trajectories. Many studies examine the negative mental and physical health outcomes stemming from ageism only after an illness has already been reported, which reduces the opportunities for prevention. Recognizing that it is never too early or too late to address a person's internalized ageism is a key first step to advancing prevention research.

Reducing the stigma experienced by older adults, including what is conveyed by society, perceived by individuals, and internalized, holds important implications for health and well-being as people age. The Institute of Medicine (IOM) Model (Institute of Medicine, 1994) provides guidance for structuring potential interventions to reduce age-related stigma. In this model, there are differing levels of prevention based on risk factors that can target the individual (i.e., selected, indicated) or universal prevention that can be implemented broadly. Our findings can help inform both of these approaches, particularly given that associations were found across the adult lifespan. At the individual level, negative age stereotypes and negative self-perceptions of aging can be reduced with targeted interventions. For example, an implicit-positive-age-stereotype intervention strengthened positive self-perceptions of aging in older adults, and these, in turn, improved physical function (Levy et al., 2014). Interventions that promote satisfaction with one's current age are other potential pathways to improve health outcomes and improve daily affect. At the societal level, a recent systematic review found that interventions with educational content, intergenerational contact, and those that combined both components significantly reduced self-reported ageism (Burnes et al., 2019). Furthermore, such interventions may be especially effective with adolescent and young adults, highlighting the potential of intergenerational programs that benefit the larger society. One example is the Age-Friendly

University (AFU) network, institutions of higher education that commit to becoming more age-friendly in programs and policies, including promoting intergenerational learning and encouraging older adult participation in all core university activities (GSA, 2021).

Relatedly, we identified two individual difference factors (i.e., gender and education) that could serve as indicators for future prevention efforts, given preliminary evidence of their impact on the age discrepancy-negative affect relationship. We found that on average, men tend to report *larger* age discrepancies than women. A significant relationship between age discrepancy and gender is not surprising, but the direction of the association was striking. Women tend to place increased importance on physical appearance compared to men, especially regarding aging (Åberg et al., 2020), suggesting that anti-aging bias may be more salient within this group. One element that could partially explain this unexpected result is the role of the media (television, magazines). Media provides an outlet for conveying perspectives on what type of aging is deemed culturally acceptable, if not necessarily realistic (Vickers, 2007). Older men typically outnumber older women on television (e.g., Baumann & de Laat, 2012); thus, there may be more opportunities for social comparison and aging dissatisfaction among older men. Importantly, perceptions of aging are comprised of many factors and media representation likely does not exclusively predicate women's perceptions of aging; future work should further delve into the dimensions that comprise these complex judgments. One additional caveat to this correlational finding is that our sample was exclusively based in the U.S. It is expected there are differences to be found in other countries that may minimize aging discrepancies displayed in the media, such as those that prioritize broader representation of older adults (e.g., Japan; Prieler et al., 2015). Together, while this literature highlights how media could be a risk factor for negative perceptions of aging, the inverse is also true. Media could also serve as a protective factor by widening portrayals of older adulthood to better encompass the diversity of aging.

Compared to gender, greater educational attainment was associated with less age discrepancy. This result aligns with past work that examined factors associated with ageism globally and found that having lower educational attainment significantly predicted the likelihood of holding high ageist attitudes, whereas those who had completed college were more likely to have low ageist attitudes (Officer et al., 2020). There are many reasons that participants with more education may not desire to be younger, but two possibilities stem from greater exposure to perceived out-group individuals through broader educational experiences or greater acceptance of differing lifespan trajectories. Parallels are often drawn between ageism and sexism when discussing in-group/out-group relationships (Fiske, 2017). Garaigordobil

(2014) found that greater education was associated with a reduction of all types of sexism (e.g., hostile, benevolent) but increased empathy. If education fosters increased empathy generally, similar patterns between ageism and education may also exist. Finally, as mentioned prior, age-friendly initiatives like AFUs can improve age inclusivity and foster cross-generational engagement, thereby stimulating positive aging perceptions (GSA, 2021; Montepare et al., 2020).

### Limitations and Future Directions

Given the potential importance of these findings, it is critical to acknowledge the context of the current results. Participants in MIDUS may be particularly aware of their age and changes they are experiencing with aging, such as transitions to retirement or differences in daily functioning, given their engagement with the study. Furthermore, MIDUS is a national sample but is relatively homogeneous (e.g., primarily non-Hispanic White). These contextual factors suggest a necessary next step is to replicate these findings in other samples to establish the broader generalizability of the effects of internalized ageism. Another potential limitation to the interpretation of the current results is the wide time intervals in the MIDUS. Although the study indexes 20 years of aging, there is a sparsity of measurement that means wave-to-wave changes in age discrepancies are less precisely assessed. Past work supports discontinuous or nonlinear relationships between age, well-being, and affect (e.g., Charles et al., 2001; Gerstorf et al., 2010), and the relationship between age discrepancy and age may behave similarly. Age discrepancies may vary widely within each decade of aging or at even more fine-grained timescales (e.g., within or across days when someone experiences age discrimination); however, this cannot be examined in these data. Future work should consider how these internalized attitudes change and within what time frame to better pinpoint transition periods, such as those suggested by SET (Levy, 2009). Similarly, the impact of internalized ageism on daily negative affect could suggest a mechanism for how this cultural and societal stigma, in turn, affects health. Previous work has found that increases in daily negative affect predict poorer health outcomes in the future. Our study has identified one potential source of this increased negative affect in internalized ageism.

A related limitation is that—while most participants completed all three waves of data collection in MIDUS and the NSDE—a sizable percentage of participants were lost to attrition during the course of the 20-year study period (approximately 31.4%). One advantage of utilizing MLM techniques to analyze longitudinal data is that participants with partial data are maintained in the model and influence the overall estimates (Hox et al., 2017). However, from a practical perspective, there are considerations that may impact our interpretation of results stemming from overall study attrition. Of

key consideration is the possibility of participant mortality, such that in the third wave of data collection the number of participants who were in their ninth decade constituted less than .01% of the full sample, and results may not generalize to other individuals of a similar age. While past work found that among the oldest of participants there was a trend towards increased desire to be younger (Baltes, 1997), we cannot directly assess or make conclusions about these individuals. Similarly, our results have highlighted how the negative consequences of desiring to be younger than one's chronological age compound based on the amount of age discrepancy reported (i.e., difference between wishing to be 5 or 15 years younger). Thus, it is possible that those who desired to be the youngest may also have the worst mental and physical health outcomes that could relate to attrition during the course of this study.

### Conclusions

The current study investigated how desiring to be a younger age may impact daily negative mood, which extends past work on negative aging perceptions and their associations with poor health outcomes. We found that over three waves of assessment, spanning a period of approximately 20 years, wishing to be younger than one's current chronological age (a proxy for internalized ageism and negative aging perceptions), was associated with increases in daily negative affect of a larger magnitude than the experience of a daily stressor; this indicates that desiring to be younger may be its own form of chronic stress. Furthermore, the stability of the relationship between age discrepancy and negative affect, both over time and by age of participant, has mixed implications. On the one hand, this suggests that age discrepancy is equally negative and consistently associated with poorer daily mood outcomes for all people. On the other hand, this also implies that experiences and behaviors to reduce this discrepancy could be implemented at any time during the lifespan with potentially positive outcomes. Negative aging perceptions are comprised of many factors related to both personal decisions and the institutionalized, cultural significance of ageism. With this in mind, we believe it is essential to employ preventative strategies or interventions at multiple levels to aid in reducing internalized aging idealizations and thereby promote health and well-being throughout the lifespan.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s11221-022-01386-0>.

**Funding** This work was partially supported by the NIA (grant number R01AG062605 to JM) and the VA Office of Academic Affiliation Advanced Fellowship in Health Services Research (to CM; Center of Innovation in Long-Term Services and Supports, Providence VA Medical Center). The funders had no role in study design, analysis, interpretation, or preparation of the manuscript.



This study uses publicly available data from the MIDUS study. Since 1995, the MIDUS study has been funded by the following: John D. and Catherine T. MacArthur Foundation Research Network and the NIA (grant numbers P01-AG020166 and U19-AG051426).

## Declarations

**Ethics Approval** Data collection in the MIDUS study was approved by the Institutional Review Board at the University of Wisconsin. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the Helsinki Declaration of 1964 and its later amendments.

**Consent to Participate** Informed consent was obtained from all participants included in the MIDUS study.

**Conflict of Interest** The authors declare no competing interests.

## References

- Åberg, E., Kukkonen, I., & Sarpila, O. (2020). From double to triple standards of ageing. Perceptions of physical appearance at the intersections of age, gender and class. *Journal of Aging Studies*, 55, 100876. <https://doi.org/10.1016/j.jaging.2020.100876>
- Allen, J. O. (2016). Ageism as a risk factor for chronic disease. *The Gerontologist*, 56, 610–614. <https://doi.org/10.1093/geront/gnu158>
- Allen, J. O., Solway, E., Kirch, M., Singer, D., Kullgren, J., & Malani, P. (2020). *Everyday ageism and health*. University of Michigan National Poll on Healthy Aging. <http://hdl.handle.net/2027.42/156038>. Accessed 19 Jul 2021.
- Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23, 611–626. <https://doi.org/10.1037/0012-1649.23.5.611>
- Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundation of developmental theory. *American Psychologist*, 52, 366–380. <https://doi.org/10.1037/0003-066X.52.4.366>
- Baumann, S., & de Laat, K. (2012). Socially defunct: A comparative analysis of the underrepresentation of older women in advertising. *Poetics*, 40, 514–541. <https://doi.org/10.1016/j.poetic.2012.08.002>
- Burnes, D., Sheppard, C., Henderson, C. R., Wassel, M., Cope, R., Barber, C., & Pillemer, K. (2019). Interventions to reduce ageism against older adults: A systematic review and meta-analysis. *American Journal of Public Health*, 109, e1–e9. <https://doi.org/10.2105/AJPH.2019.305123>
- Centers for Disease Control and Prevention. (n.d.). *Health and economic costs of chronic diseases*. National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). <https://www.cdc.gov/chronicdisease/about/costs/index.htm>. Accessed 19 Jul 2021.
- Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology*, 61, 383–409. <https://doi.org/10.1146/annurev.psych.093008.100448>
- Charles, S. T., Leger, K. A., & Urban, E. J. (2016). Emotional experience and health: What we know, and where to go from here. In A. D. Ong & C. E. Löckenhoff (Eds.), *Emotion, aging, and health* (pp. 185–204). American Psychological Association. <https://doi.org/10.1037/14857-010>
- Charles, S. T., Piazza, J. R., Mogle, J., Sliwinski, M. J., & Almeida, D. M. (2013). The wear and tear of daily stressors on mental health. *Psychological Science*, 24, 733–741. <https://doi.org/10.1177/0956797612462222>
- Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology*, 80, 136–151. <https://doi.org/10.1037/0022-3514.80.1.136>
- Debrezeni, F. A., & Bailey, P. E. (2021). A systematic review and meta-analysis of subjective age and the association with cognition, subjective well-being, and depression. *The Journals of Gerontology: Series B*, 76, 471–482. <https://doi.org/10.1093/geronb/gbaa069>
- Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being*, 3, 1–43. <https://doi.org/10.1111/j.1758-0854.2010.01045.x>
- Fiske, S. T. (2017). Prejudices in cultural contexts: Shared stereotypes (gender, age) versus variable stereotypes (race, ethnicity, religion). *Perspectives on Psychological Science*, 12, 791–799. <https://doi.org/10.1177/1745691617708204>
- Garaigordobil, M. (2014). Sexism and empathy: Differences as a function of sociodemographic variables and relations between both constructs. In A. M. Columbus (Ed.), *Advances in psychology research* (pp. 59–80). Nova Science Publishers.
- Gerstorff, D., Ram, N., Mayraz, G., Hidajat, M., Lindenberg, U., Wagner, G. G., & Schupp, J. (2010). Late-life decline in well-being across adulthood in Germany, the United Kingdom, and the United States: Something is seriously wrong at the end of life. *Psychology and Aging*, 25, 477–485. <https://doi.org/10.1037/a0017543>
- Gignac, M. A. M., Davis, A. M., Hawker, G., Wright, J. G., Mahomed, N., Fortin, P. R., & Badley, E. M. (2006). “What do you expect? You’re just getting older”: A comparison of perceived osteoarthritis-related and aging-related health experiences in middle- and older-age adults. *Arthritis Care & Research*, 55, 905–912. <https://doi.org/10.1002/art.22338>
- Hox, J. J., Moerbeek, M., & van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications* (3rd ed.). Routledge/Taylor & Francis Group.
- Institute of Medicine (US) Committee on prevention of mental disorders, Mrazek, P. J., & Haggerty, R. J. (Eds.). (1994). *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*. National Academies Press (US).
- Jura, M., & Kozak, L. P. (2016). Obesity and related consequences to ageing. *Age*, 38, 23. <https://doi.org/10.1007/s11357-016-9884-3>
- Kite, M. E., Stockdale, G. D., Whitley, B. E., & Johnson, B. T. (2005). Attitudes toward younger and older adults: An updated meta-analytic review. *Journal of Social Issues*, 61, 241–266. <https://doi.org/10.1111/j.1540-4560.2005.00404.x>
- Kotter-Grühn, D., & Hess, T. M. (2012). The impact of age stereotypes on self-perceptions of aging across the adult lifespan. *The Journals of Gerontology: Series B*, 67, 563–571. <https://doi.org/10.1093/geronb/gbr153>
- Kotter-Grühn, D., Kornadt, A. E., & Stephan, Y. (2016). Looking beyond chronological age: Current knowledge and future directions in the study of subjective age. *Gerontology*, 62, 86–93. <https://doi.org/10.1159/000438671>
- Levy, B. (2009). Stereotype embodiment: A psychosocial approach to aging. *Current Directions in Psychological Science*. <https://doi.org/10.1111/2Fj.1467-8721.2009.01662.x>
- Levy, B., & Banaji, M. R. (2002). Implicit ageism. *Ageism: Stereotyping and Prejudice Against Older Persons* (pp. 49–75). MIT Press.
- Levy, B., & Myers, L. M. (2004). Preventive health behaviors influenced by self-perceptions of aging. *Preventive Medicine*, 39, 625–629. <https://doi.org/10.1016/j.ypmed.2004.02.029>
- Levy, B., Pilver, C., Chung, P. H., & Slade, M. D. (2014). Subliminal strengthening: Improving older individuals’ physical function over

- time with an implicit-age-stereotype intervention. *Psychological Science*, 25, 2127–2135. <https://doi.org/10.1177/2F0956797614551970>
- Levy, B., Slade, M. D., Chang, E.-S., Kanno, S., & Wang, S.-Y. (2020). Ageism amplifies cost and prevalence of health conditions. *The Gerontologist*, 60, 174–181. <https://doi.org/10.1093/geron/gny131>
- Levy, B., 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, 261–270. <https://doi.org/10.1037/0022-3514.83.2.261>
- Levy, B., Zonderman, A. B., Slade, M. D., & Ferrucci, L. (2009). Age stereotypes held earlier in life predict cardiovascular events in later life. *Psychological Science*, 20, 296–298. <https://doi.org/10.1111/j.1467-9280.2009.02298.x>
- Montepare, J. M., Farah, K. S., Bloom, S. F., & Tauriac, J. (2020). Age-Friendly Universities (AFU): Possibilities and power in campus connections. *Gerontology & Geriatrics Education*, 41, 273–280. <https://doi.org/10.1080/02701960.2020.1726744>
- Montepare, J. M., & Lachman, M. E. (1989). “You’re only as old as you feel”: Self-perceptions of age, fears of aging, and life satisfaction from adolescence to old age. *Psychology and Aging*, 4, 73–78. <https://doi.org/10.1037/0882-7974.4.1.73>
- Nelson, T. D. (Ed.) (2002). *Ageism: Stereotyping and prejudice against older persons*. MIT Press.
- Nelson, T. D. (2011). Ageism: The strange case of prejudice against the older you. In R. L. Wiener & S. L. Willborn (Eds.), *Disability and Aging Discrimination: Perspectives in Law and Psychology* (pp. 37–47). Springer. [https://doi.org/10.1007/978-1-4419-6293-5\\_2](https://doi.org/10.1007/978-1-4419-6293-5_2)
- Nelson, T. D. (2016). Ageism. *Handbook of prejudice, stereotyping, and discrimination* (2nd ed., pp. 337–353). Psychology Press.
- Nesselroade, J. R. (1991). Interindividual differences in intraindividual change. *Best methods for the analysis of change: Recent advances, unanswered questions, future directions* (pp. 92–105). American Psychological Association. <https://doi.org/10.1037/10099-006>
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice*, 6, 101–115. <https://doi.org/10.1037/1089-2699.6.1.101>
- Officer, A., Thiyagarajan, J. A., Schneiders, M. L., Nash, P., & De La Fuente-Nunez, V. (2020). Ageism, healthy life expectancy and population ageing: How are they related? *International Journal of Environmental Research and Public Health*, 17, 3159. <https://doi.org/10.3390/ijerph17093159>
- Piazza, J. R., Charles, S. T., Sliwinski, M. J., Mogle, J., & Almeida, D. M. (2013). Affective reactivity to daily stressors and long-term risk of reporting a chronic physical health condition. *Annals of Behavioral Medicine*, 45, 110–120. <https://doi.org/10.1007/s12160-012-9423-0>
- Prieler, M., Kohlbacher, F., Hagiwara, S., & Arima, A. (2015). The representation of older people in television advertisements and social change: The case of Japan. *Ageing and Society*, 35, 865–887. <https://doi.org/10.1017/S0144686X1400004X>
- Rubin, D. C., & Berntsen, D. (2006). People over forty feel 20% younger than their age: Subjective age across the lifespan. *Psychonomic Bulletin & Review*, 13(5), 776–780. <https://doi.org/10.3758/BF03193996>
- Sargent-Cox, K. A., Anstey, K. J., & Luszcz, M. A. (2012). The relationship between change in self-perceptions of aging and physical functioning in older adults. *Psychology and Aging*, 27, 750–760. <https://doi.org/10.1037/a0027578>
- Sin, N. L., Graham-Engeland, J. E., Ong, A. D., & Almeida, D. M. (2015). Affective reactivity to daily stressors is associated with elevated inflammation. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 34, 1154–1165. <https://doi.org/10.1037/hea0000240>
- Stephan, Y., Caudroit, J., & Chalabaev, A. (2011). Subjective health and memory self-efficacy as mediators in the relation between subjective age and life satisfaction among older adults. *Ageing & Mental Health*, 15, 428–436. <https://doi.org/10.1080/13607863.2010.536138>
- Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of overlapping affective dispositions. *Psychological Bulletin*, 131, 260–300.
- The Gerontological Society of America. [GSA] (2021). *Age-Friendly University (AFU) Global Network*. The Gerontological Society of America. <https://www.geron.org/programs-services/education-center/age-friendly-university-afu-global-network>. Accessed 23 Aug 2021.
- Turner, J. R., Mogle, J., Hill, N., Bhargava, S., & Rabin, L. (2021). Daily memory lapses and affect: Mediation effects on life satisfaction. *Journal of Happiness Studies*. <https://doi.org/10.1007/s10902-021-00481-3>
- Vickers, K. (2007). Aging and the media. *Californian Journal of Health Promotion*, 5(3), 100–105. <https://doi.org/10.32398/cjhp.v5i3.1256>
- Weiss, D., & Lang, F. R. (2012). “They” are old but “I” feel younger: Age-group dissociation as a self-protective strategy in old age. *Psychology and Aging*, 27, 153–163. <https://doi.org/10.1037/a0024887>
- Westerhof, G. J., & Barrett, A. E. (2005). Age identity and subjective well-being: A comparison of the United States and Germany. *The Journals of Gerontology: Series B*, 60, S129–S136. <https://doi.org/10.1093/geronb/60.3.S129>
- Westerhof, G. J., Miche, M., Brothers, A. F., Barrett, A. E., Diehl, M., Montepare, J. M., Wahl, H.-W., & Wurm, S. (2014). The influence of subjective aging on health and longevity: A meta-analysis of longitudinal data. *Psychology and Aging*, 29, 793–802. <https://doi.org/10.1037/a0038016>
- Wurm, S., Warner, L., Ziegelmann, J., Wolff, J. K., & Schüz, B. (2013). How do negative self-perceptions of aging become a self-fulfilling prophecy? *Psychology and Aging*. <https://doi.org/10.1037/a0032845>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.