

## Research Article

# Measuring (Non)Essentialist Beliefs About the Process of Aging

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## Abstract

**Objectives:** We validated an aging mindset measure that captures beliefs about the process of aging. Specifically, we introduce a brief 4-item and an extended 10-item measure assessing (non)essentialist beliefs about aging.

**Methods:** We report findings from one longitudinal and one cross-cultural study, including young, middle-aged, and older adults between 18 and 88 years. The studies established (retest) reliability and measurement invariance as well as convergent and discriminant validity of the measures.

**Results:** First, in a longitudinal study ( $N = 124$ , 50–84 years) including 4 measurement occasions, we showed that the 4-item scale assessing (non)essentialist beliefs about aging has good retest reliability and convergent as well as discriminant validity (e.g., awareness of age-related change). Second, in a large cross-cultural sample ( $N = 1,080$ , 18–82 years) of participants in the United States and Germany, we established an extended 10-item measure of (non)essentialist beliefs about aging, providing support for a 2-factor structure as well as measurement invariance across samples within and across countries (the United States and Germany), age groups (young, middle-aged, and older adults), as well as across men and women.

**Discussion:** Our results highlight the importance of distinguishing between fixed versus malleable aging beliefs in research on aging and life-span development.

**Keywords:** Aging mindsets, Attitudes toward aging, Awareness of aging, Essentialism, Subjective aging

Aging theories highlighting the role of nature versus nurture have been persistently and critically debated over the last century (Lerner, 1984). On the one hand, biological determinism highlights the link between genes and longevity in the aging process. On the other hand, the concept of human plasticity emphasizes the potential for systematic change and adaptation across the life span. A wealth of research has demonstrated that individuals' attitudes toward aging, including beliefs and expectations about desirable (gains) and undesirable (losses) aging-related characteristics, can have profound influences on their own aging (Diehl et al., 2014).

Recently, research has confirmed that people differ not only in their beliefs and expectations regarding aging-related gains and losses, but also in their beliefs regarding the fixed (“aging is set in stone”) or malleable (“age is just a number”) nature of aging (Weiss, 2018; Weiss & Weiss, 2016; Weiss et al., 2016, 2019). Specifically, essentialist beliefs about aging construe aging as a “fixed rather than malleable process including a set of inevitable and uncontrollable changes that occur over time” (Weiss et al., 2016, pp. 997–998). According to this line of research, some people perceive aging-related changes as relatively inherent, immutable, and inevitable (i.e.,

essentialist view), whereas others perceive these changes as relatively modifiable, changeable, or flexible (i.e., [non] essentialist view). Studies suggest that a more flexible view of aging (nonessentialism) is linked to adults' tendency to feel younger than their chronological age (Weiss et al., 2019). In addition, a more fixed view of aging (essentialism) has been shown to be associated with feeling threatened by aging-related changes and a more limited future time perspective (Weiss et al., 2016). Studies also show that (non)essentialist beliefs moderate the impact of negative age stereotypes on cognitive performance and physiological reactivity (Weiss, 2018; Weiss & Weiss, 2016). Specifically, a more malleable view of aging helps older adults to mitigate the detrimental consequences of negative age stereotypes and low social status.

Previous research on views of aging has mostly looked at age stereotypes, awareness of age-related change, or self-perceptions of aging with regard to perceived aging-related gains and losses (Diehl & Wahl, 2010; Kornadt et al., 2020; Levy, 2009; Sarkisian et al., 2005), but less so on whether people perceive aging-related change as a fixed or a malleable process. Furthermore, previous research on mindsets has examined essentialist beliefs about social categories (race, gender, and age; Haslam et al., 2000; Prentice & Miller, 2007) and people's implicit theories about the nature of human traits and abilities (personality, intelligence, and memory performance; Dweck, 2008; Dweck & Leggett, 1988; Plaks & Chasteen, 2013). Hence, there is a lack of research validating a measure capable of capturing beliefs about the *process* of aging. Previous research assessing (non)essentialist beliefs about aging ([N]EBA) using a short four-item scale was based on the assumption of an underlying latent construct of a person's beliefs about the process of aging, which is consistent across populations, time, cultural contexts, and participant sex. However, to date, this assumption has not been tested explicitly.

To address this gap, we validated a short 4-item and an extended 10-item scale assessing (N)EBA in a (a) longitudinal and (b) cross-cultural study including young, middle-aged, and older adults. First, we examined the retest reliability and potential modifiability of (N)EBA in a longitudinal study across four measurement occasions. Second, in order to overcome limitations of previous studies and potential methodological shortcomings of the short scale in Study 1 (e.g., limited sample size, potential measurement error, and internal consistency as a function of the low number of items), we developed an extended 10-item scale to assess (N)EBA, confirming its invariance across age, sex, and cultural groups (Meredith, 1993). In addition, we tested a two-factor structure of the scale in a larger sample of adults. Taken together, by conducting a detailed analysis of (N)EBA, the goal of the present studies was to validate a measure that distinguishes between fixed versus malleable beliefs about the process of aging that can be applied in research on aging and life-span development.

## Study 1

The first goal of the present research was to confirm that the 4-item scale to assess (N)EBA which has been used in previous studies (Weiss, 2018; Weiss et al., 2016, 2019) has good retest reliability and convergent as well as discriminant validity. We also examined the potential modifiability of (non)essentialist about aging in this longitudinal study across four occasions of measurement.

## Method Study 1

### Participants and Procedure

The longitudinal study consisted of four measurement occasions across 12 weeks (Weeks 0, 4, 8, and 12) and included 124 participants between 50 and 84 years of age ( $M = 63.73$  years,  $SD = 8.28$  years; 77.4% women). Participants had been recruited for an intervention study to increase physical activity and resided in a mid-sized city in the Front Range area of Colorado. Most participants were Caucasian (90.0%), married (67.5%), and had an annual income between \$50,000 and \$150,000 (68.4%). The educational level was high, with an average of 17.5 years of education ( $SD = 2.45$  years). Participants were, on average, satisfied with their lives ( $M = 4.52$ ,  $SD = 0.76$ ; 1 = *very poor*, 6 = *very good*) and in good health ( $M = 4.81$ ,  $SD = 0.83$ ; 1 = *very poor*, 6 = *very good*). After the baseline assessment, participants were randomly assigned to an intervention or control group that had a physical activity and an educational component. The educational component differed between the treatment and the control groups, with participants in the treatment group taking part in a program on changing negative views of aging, whereas participants in the control group received a generic program on the topic of successful aging (for more details see Brothers & Diehl, 2017).

### Measures

#### (Non)essentialist beliefs about aging

(N)EBA were assessed with a four-item scale (Weiss et al., 2016) anchored from 1 (*do not agree*) to 6 (*absolutely agree*). The (N)EBA scale includes two items assessing beliefs about the relative immutable nature of aging and two items assessing the relative flexible and modifiable nature of aging (see Table 1 for items and factor loadings). To compute an overall score, we reverse scored the two nonessentialism items and averaged all four items, with higher values representing essentialist beliefs about aging. (N)EBA was measured at four occasions during the study and the internal consistencies (i.e., Cronbach  $\alpha$ s) were 0.72, 0.55, 0.64, and 0.68, respectively.

#### Other variables

We included chronological age, sex (coded as 0 for men and 1 for women), years of education, and general health (SF36; Ware & Sherbourne, 1992) and two aging attitude measures. First, we included measures of Awareness

of Aging-Related Change (AARC; gain and loss; Diehl & Wahl, 2010) consisting of a 50-item scale assessing AARC gains and AARC losses. The 25 items for AARC gains and AARC losses captured distinct behavioral domains (i.e., health, cognitive functioning, interpersonal relationships, socioemotional functioning, and lifestyle). Cronbach  $\alpha$ s for each of the two scales assessing AARC gains (e.g., “With my increasing age, I realize that I have become wiser”; 1 = *not at all* to 5 = *very much*) or AARC losses (e.g., “With my increasing age, I feel increasingly isolated from the world around me”) ranged between 0.78 and 0.84 across the four measurement occasions. Second, we included a measure of Expectations Regarding Aging (ERA; Sarkisian et al., 2005) consisting of 12 items (e.g., “Being lonely is just something that happens when people get old”; 1 = *definitely true* to 4 = *definitely false*). Cronbach  $\alpha$ s of the scale ranged between 0.84 and 0.87 across the four measurement occasions.

## Results Study 1

### Temporal Stability

Repeated-measures analysis of variance yielded a significant effect of time, Wilks'  $\Lambda = 0.79$ ,  $p < .001$ , revealing a significant quadratic effect  $F(1, 103) = 23.88$ ,  $p < .001$ ,

**Table 1.** Items and Standardized Factor Loadings for the Four-Item Version of the (N)EBA Scale, Study 1

Item	(N)EBA
1.To a large extent, a person's age biologically determines his or her abilities.	0.74
2.Aging is an irreversible biological process and cannot be influenced.	0.76
3.Age is just a number and does not say much about a person. R	0.68
4.No matter at what point in life, you can always influence your own aging. R	0.77

Note: (N)EBA = (non)essentialist beliefs about aging; R = reverse scored.

**Table 2.** Means, Standard Deviations, and Bivariate Correlations for Variables, Study 1

Variables	M	SD	1	2	3	4	5	6	7
1. Chronological age	63.73	8.28	—						
2. Sex	0.77	0.42	-0.23*	—					
3. Education (years)	17.48	2.42	0.11	-0.29**	—				
4. SF36 (general health)	70.95	15.29	0.18*	-0.12	0.14	—			
5. (N)EBA <sub>T0</sub> (Week 0)	2.36	0.94	-0.15	-0.12	0.01	-0.24**	—		
6. (N)EBA <sub>T1</sub> (Week 4)	2.00	0.73	0.13	-0.23*	0.03	-0.17	0.66***	—	
7. (N)EBA <sub>T2</sub> (Week 8)	2.08	0.77	0.08	-0.21*	0.17	-0.27**	0.63***	0.62***	—
8. (N)EBA <sub>T3</sub> (Week 12)	2.18	0.85	0.09	-0.19	0.09	-0.26**	0.58***	0.58***	0.76***

Note: (N)EBA = (non)essentialist beliefs about aging; N = 124; age range = 50–84 years; sex: 0 = male, 1 = female.

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

$\eta^2 = 0.19$ . Analyses indicated that for both conditions (N)EBA changed in very similar ways (i.e., the effect of Condition, or the Condition  $\times$  Occasion interaction was nonsignificant,  $ps > .85$ ). Specifically, participants' essentialist beliefs about aging decreased in both groups, and aging was perceived as more modifiable from baseline to Weeks 4, 8, and 12 (Supplementary Figure S1). Pairwise comparisons showed that essentialist beliefs about aging assessed at T1, T2, and T3 were significantly different from baseline ( $ps < .02$ ). In addition, essentialist beliefs about aging assessed at T1 differed significantly from those assessed at T3 ( $t(107) = -2.28$ ,  $p = .02$ ), indicating a slight increase 12 weeks after the intervention.

In addition, test–retest stability analyses suggested that (N)EBA remained quite consistent across time. The average intercorrelation between (N)EBA was  $r = 0.64$  ( $ps > .001$ ) and the test–retest stability coefficients ranged from 0.58 to 0.76 across the four measurement occasions (Table 2). The results showed that the test–retest reliability only declined slightly across time (from 0.66 and 0.62 to 0.58). Although the time interval for retesting was rather short in the current study, these test–retest stabilities are in the range of personality traits (Roberts & DelVecchio, 2000).

### Associations With Other Variables and Constructs

With regard to other variables, we found no consistent associations with sex, level of education, and chronological age (Table 2). However, general health was negatively associated with essentialist beliefs about aging, such that adults with better health reported a more malleable view of aging. Finally, we examined associations with other aging attitude measures in order to determine whether essentialist beliefs about aging have a pattern of relations with other aging attitude constructs. In line with previous research (Weiss, 2018; Weiss et al., 2016), analyses supported the discriminant and convergent validity of the scale, as essentialist beliefs about aging were moderately associated with other aging attitude measures (Supplementary Table S1). Specifically, averaged across all

assessments, AARC with a focus on losses was positively associated with essentialist aging beliefs ( $r = 0.34$ ,  $ps < .05$ ), whereas AARC with a focus on gains was negatively associated with essentialist aging beliefs ( $r = -0.25$ ,  $ps < .05$ ). In addition, averaged across all assessments, ERA, including physical and mental health, and cognitive functioning were moderately negatively associated with essentialist beliefs ( $r = -0.41$ ;  $ps < .01$ ).

## Discussion Study 1

Study 1 provides the first evidence that (N)EBA assessed with a brief four-item scale remain quite consistent and stable across time. More specifically, we found that across a 3-month period test-retest stability coefficients of the four-item (N)EBA scale were good and close to the stability coefficients reported in the literature on personality traits (Roberts & DelVecchio, 2000). Furthermore, in line with previous research, the results suggest that (N)EBA can be altered. Specifically, in the current study, participants were exposed to educational and physical activity interventions and, as a consequence, were more likely to believe after the 4-week intervention that age is just a number and that aging is in principle malleable. Importantly, this attitude change remained effective for 2 months after completion of the intervention. Thus, (N)EBA appear to be modifiable and not “set in stone.”

More years of education and better health were associated with a more malleable view of aging, which is consistent with previous findings showing that individuals with higher education and better health tend to have also more positive self-perceptions of aging (Diehl et al., 2014; Sarkisian et al., 2005). Finally, the study provided evidence for convergent and divergent validity of the (N)EBA scale by revealing moderate associations with constructs capturing AARC as well as ERA. These findings indicate that the (N)EBA scale assesses participants' beliefs about aging in a reliable and valid way. According to this (N)EBA are not only related to constructs assessing adults' subjective perceptions of aging but are also sufficiently distinct from these measures.

A limitation of Study 1 is the relatively low internal consistencies of the four-item scale in the second and third waves, which might result because of the limited number of items that were included in the assessments and the limited sample size. Another explanation for the low internal consistencies is that the settings changed in which participants completed the scale. At the first occasion, participants completed the questionnaire in a one-on-one session with a tester, whereas they completed the questionnaire in a group setting with a time limit at the second occasion or by themselves at home at the third occasion. Thus, although our research shows preliminary evidence that the (N)EBA scale is suitable for the measurement of (N)EBA over time, further independent studies are needed to support this observation.

## Study 2

The second goal of the present research was to validate an extended 10-item measure of (N)EBA confirming a proposed two-factor structure. The short format of the four-item scale assessing (N)EBA does not allow for a multifactor solution and may lead to enhanced measurement error and lower internal consistencies. Furthermore, it is still an open question whether (N)EBA should be considered a unidimensional construct and classified along a continuum defining aging-related change as fixed versus malleable or potentially a multidimensional construct representing two interrelated or possibly independent dimensions. In this cross-cultural study, we also tested for measurement invariance within and across countries (the United States and Germany), age groups (young, middle-aged, and older adults), and across sex.

## Method Study 2

### Participants and Procedure

Our overall sample included participants between 18 and 82 years of age ( $N = 1,080$ ;  $M = 45.08$  years,  $SD = 15.76$  years; 49.6% women) from the United States ( $n = 717$ ; 18–82 years; 47.8% women; 76% were non-Hispanic white) and Germany ( $n = 363$ , 19–80 years; 53.4% women). We surveyed participants in the United States and Germany through commissioned professional panel providers who recruited participants from online panels. A quota ensured an equal distribution of age (18–82 years) and sex (male and female) groups. The educational level (i.e., level of education: 1 = none, 2 = high school diploma/GED, 3 = associates degree, 4 = bachelor's degree, 5 = master's degree, and 6 = doctorate degree) was high (the United States:  $M = 3.56$ ,  $SD = 1.09$ ; Germany:  $M = 3.27$ ,  $SD = 1.51$ ). Participants were, on average, satisfied with their lives (the United States:  $M = 3.98$ ,  $SD = 1.45$ ; Germany:  $M = 4.03$ ,  $SD = 1.36$ ; 0 = *totally unsatisfied* and 6 = *totally satisfied*) and in good health (the United States:  $M = 4.15$ ,  $SD = 1.26$ ; Germany:  $M = 3.91$ ,  $SD = 1.82$ ; 0 = *poor* and 6 = *excellent*).

### Measures

#### (Non)essentialist beliefs about aging

(N)EBA were assessed with an extended 10-item scale (see Table 3 for items). The scale was anchored from 0 = *do not agree* to 6 = *absolutely agree*, with five items assessing the beliefs that aging-related changes are relatively fixed (essentialism) and five items assessing the belief that aging-related changes are relatively malleable (nonessentialism). Cronbach's alpha of the entire aging essentialism scale (nonessentialism items were reverse scored) was 0.81 (the United States: 0.84; Germany: 0.72).

#### Additional variables

We included chronological age, sex (coded as 0 for men and 1 for women), level of education (none, high school

**Table 3.** Items and Standardized Factor Loading for EBA and (N)EBA for the 10-Item Extended Version of the Scale, Study 2

Item	(N)	
	EBA	EBA
1.Age is just a number and does not say much about a person.	0.51	
2.No matter at what point in life, you can always influence your own aging.	0.78	
3.The effects and outcomes of aging can be changed.	0.78	
4.Everyone, no matter how old a person is, can significantly change how he or she is aging.	0.78	
5.People can substantially change how they are aging.	0.82	
6.Aging is an irreversible biological process and cannot be influenced.		0.64
7.To a large extent, a person’s age biologically determines his or her abilities.		0.55
8.Aging is set in stone and cannot be changed.		0.77
9.How a person is aging is pretty much set very early in life.		0.69
10.Aging is solely caused by genetic factors.		0.63

Note: EBA = essentialist beliefs about aging; (N)EBA = (non)essentialist beliefs about aging.

diploma/GED, associates degree, bachelor’s degree, master’s degree, and doctorate degree), and self-rated health (“In general, would you say your physical health is...” 0 = *poor* and 6 = *excellent*). In addition, to better understand associations with further constructs, we included life satisfaction (“How satisfied are you with your life currently, all things considered?” 0 = *totally unsatisfied* and 6 = *totally satisfied*), subjective age (“How young or old do you feel?” in years; computing a subjective age bias difference score: chronological age – subjective age), and subjective social status (1 = *lowest social status* to 10 = *highest social status*).

## Results Study 2

### Two Dimensions of Aging Mindsets: Fixed and Inevitable Versus Malleable and Modifiable

Fit indices showed a relatively poor model fit for the one-factorial model,  $\chi^2(35) = 1,413.36$ , comparative fit index (CFI) = 0.65, root-mean-square error of approximation (RMSEA) = 0.19 (0.18–0.20), standardized root mean square residual (SRMR) = 0.15, Akaike information criteria (AIC) = 38,377, Bayesian information criterion (BIC) = 38,526. However, the model fit improved significantly for the two-factorial model,  $\chi^2(34) = 283.79$ , CFI = 0.94, RMSEA = 0.08 (0.07–0.09), SRMR = 0.06, AIC = 37,249, BIC = 37,404. In comparison, the two-factor model had a significant better model fit,  $\Delta\chi^2 = 1,129.57$ ,  $\Delta df = 1$ ,  $p < .001$ . The standardized factor loadings are given in Table 4. As the factor loadings

**Table 4.** Means, Standard Deviations, and Bivariate Correlations for Variables, Study 2

	M	SD	1	2	3	4	5	6	7	8
1. Chronological age	45.08	15.76	—							
2. Sex	0.50	0.50	0.02	—						
3. Level of education	3.46	1.25	-0.18***	-0.04	—					
4. Subjective health	4.07	1.31	-0.15***	-0.02	0.22***	—				
5. Life satisfaction	4.00	1.44	0.04	-0.03	0.10***	0.58***	—			
6. Subjective social status	5.68	1.96	0.07*	-0.09**	0.16***	0.44***	0.44***	—		
7. Subjective age bias	4.81	9.91	0.44***	0.08**	-0.02	0.32***	0.24***	0.15***	—	
8. EBA	3.09	1.24	-0.11***	-0.15***	-0.04	0.21***	0.08**	0.05	-0.20***	—
9. (N)EBA	3.81	1.23	0.15***	0.07*	0.05	0.20***	0.26***	0.27***	0.27***	-0.27***

Note: EBA = essentialist beliefs about aging; (N)EBA = (non)essentialist beliefs about aging; N = 1,080; age range = 18–82 years; sex: 0 = male and 1 = female; level of education: 1 = none, 2 = high school diploma/GED, 3 = associates degree, 4 = bachelor’s degree, 5 = master’s degree, and 6 = doctorate degree; self-rated health: 0 = poor and 6 = excellent; subjective social status: 1 = lowest social status and 10 = highest social status; life satisfaction: 0 = totally unsatisfied and 6 = totally satisfied; subjective age bias = years felt younger.  
\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

in Table 4 indicate, estimates were all above 0.35, which is usually considered a satisfactory cutoff point for factor loadings (Tabachnick & Fidell, 2001). In the total sample, the correlation between the two factors was  $-0.27$ ,  $p < .001$ . Cronbach's  $\alpha$  was 0.79 for the EBA component (the United States: 0.83; Germany: 0.70) and 0.84 for the NEBA component (the United States: 0.86; Germany: 0.77). Thus, the standardized factor loadings together with the goodness-of-fit statistics suggested that a two-factor structure represented the data better than a one-factor solution. A paired  $t$  test showed that individuals held significantly stronger nonessentialist beliefs,  $M = 3.81$ ,  $SD = 1.21$ , when compared with essentialist beliefs about aging,  $M = 3.09$ ,  $SD = 1.24$ ,  $t(1,079) = -12.02$ ,  $p < .001$ .

### Measurement Invariance Across Age Groups

To determine measurement invariance across age groups, we divided the sample into three age groups: young adults (20–39 years;  $n = 471$ ), middle-aged adults (40–59 years;  $n = 367$ ), and older adults (65–82 years;  $n = 242$ ). We tested for (a) configural invariance (i.e., invariance of the number of factors and the pattern of factor–indicator relationships), (b) metric invariance (i.e., invariance of the factor loadings), and (c) scalar invariance (i.e., invariance of the intercepts). Our model comparisons confirmed measurement invariance across age groups. Even the strictest models, testing scalar invariance, showed acceptable model fits and comparisons to the less strict models did not result in reduced model fits (Supplementary Table S2). Thus, the findings from these analyses confirmed the same measurement model across age groups, making it possible to compare latent scale means in a meaningful way across this wide age range.

Given that (N)EBA can be measured invariantly across groups confirming the robust latent structure of the construct, we were also interested in potential mean differences between groups. We found significant mean differences based on the factor scores between young, middle-aged, and older adults such that younger adults reported significantly higher levels of essentialist beliefs,  $M = 3.30$ ,  $SD = 1.20$ , when compared with middle-aged,  $M = 2.89$ ,  $SD = 1.23$ , and older adults,  $M = 3.00$ ,  $SD = 1.24$ ;  $F(2, 1079) = 12.48$ ,  $p < .001$ ,  $\eta^2 = 0.02$ . In addition, older adults reported significantly higher levels of nonessentialist beliefs,  $M = 4.13$ ,  $SD = 1.12$ , when compared with middle-aged,  $M = 3.83$ ,  $SD = 1.23$ , and younger adults,  $M = 3.63$ ,  $SD = 1.22$ ;  $F(2, 1079) = 14.15$ ,  $p < .001$ ,  $\eta^2 = 0.03$ .

### Measurement Invariance for Men and Women

Measurement (scalar) invariance of (N)EBA for men and women was also confirmed (Supplementary Table S2),

permitting valid mean comparisons between men and women. In addition, we found significant mean differences at the factor score level between men and women such that men reported significantly higher levels of essentialist beliefs,  $M = 3.27$ ,  $SD = 1.17$ , when compared with women,  $M = 2.91$ ,  $SD = 1.28$ ,  $t(1,078) = 4.86$ ,  $p < .001$ ,  $d = 0.29$ . In addition, women reported significantly higher levels of nonessentialist beliefs,  $M = 3.90$ ,  $SD = 1.24$ , when compared with men,  $M = 3.72$ ,  $SD = 1.18$ ,  $t(1,078) = -2.48$ ,  $p = .01$ ,  $d = 0.15$ .

### Measurement Invariance Across Cultures (the United States and Germany)

The test of measurement invariance of measuring (N)EBA across countries (the United States and Germany) also confirmed scalar invariance (Supplementary Table S2). We found that essentialist beliefs about aging were endorsed significantly more in Germany,  $M = 3.29$ ,  $SD = 1.03$ , when compared with the United States,  $M = 2.99$ ,  $SD = 1.32$ ,  $t(1,078) = -3.72$ ,  $p < .001$ ,  $d = 0.25$ . In addition, nonessentialist beliefs about aging were endorsed significantly stronger in Germany,  $M = 4.03$ ,  $SD = 1.04$ , when compared with the United States,  $M = 3.70$ ,  $SD = 1.28$ ,  $t(1,078) = -4.34$ ,  $p < .001$ ,  $d = 0.28$ . Although German participants had the tendency to score higher on both scales, the differences in essentialist and nonessentialist beliefs between German and U.S. participants appear both very similar and are indicative of medium effects ( $ds = 0.71$  and  $0.55$ , respectively).

### Associations With Other Variables and Constructs

We found significant associations between essentialist beliefs and (N)EBA with chronological age, sex, subjective health, life satisfaction, subjective social status, and subjective age bias (Table 4). A more fixed view of aging (i.e., essentialist beliefs about aging) was associated with being younger, being a man, feeling slightly satisfied with life, and feeling older than one's chronological age. By contrast, a more malleable view of aging (i.e., nonessentialist beliefs about aging) was associated with being older, being a woman, feeling healthier, more satisfied with life, having a higher social status, and feeling younger than one's chronological age.

### Discussion Study 2

Study 2 introduced an extended 10-item scale assessing (N)EBA and confirmed the proposed two-factor structure. Because both factors are negatively correlated, we suggest that to use the extended 10-item scale as a global factor or as two separate subfactors. In addition, the study provided evidence for the (scalar) invariance of the measure across age groups (young, middle-aged, and older adults), sex groups (men and women), and cultures (the United

States and Germany). Thus, (N)EBA can be measured invariantly across groups confirming the latent structure of the construct.

The present findings are consistent with previous research showing that (N)EBA are related to several constructs including perceived control ( $r = -0.39, p < .01$ ), future time perspective ( $r = -0.28, p < .001$ ), openness to experience ( $r = -0.25, p < .001$ ), age stereotypes ( $r = -0.23, p < .05$ ), subjective age ( $r = -0.46, p < .001$ ), implicit theories of personality ( $r = -0.26, p < .001$ ), self-rated health ( $r = -0.24, p < .01$ ), and subjective social status ( $r = -0.25, p < .001$ ; Weiss, 2018; Weiss et al., 2016, 2019). According to these findings, a more malleable view of aging is associated with more positive outcomes across adulthood. Consistently, results of the present study show that a more malleable view of aging was linked to a perceived higher standing in the social hierarchy, better self-rated health, higher life satisfaction, and a younger subjective age. In addition, results show that older (when compared with younger) individuals and women (when compared with men) are more likely to endorse a malleable and reject a fixed view of aging. In contrast to a fixed view of aging, a more malleable view suggests that aging-related changes are not inevitable and instead manageable, which seems to be beneficial for health, life satisfaction, social standing, and feeling younger rather than older. This is in line with previous findings demonstrating that individuals who held a more malleable view of aging felt less threatened and less helpless when confronted with aging-related losses (Weiss et al., 2016). In addition, older adults with a more fixed view of aging were more susceptible to the detrimental impact of negative age stereotypes on their memory performance and physiological reactivity (Weiss, 2018).

Results of Study 2 also showed that younger adults reported significantly higher levels of essentialist beliefs when compared with middle-aged and older adults. In addition, older adults reported significantly higher levels of nonessentialist beliefs when compared with middle-aged and younger adults. As young adults move into midlife and middle-aged adults move into later adulthood, they may accumulate unique and diverse aging experiences that may challenge their generalized beliefs about the predetermined course of development. Thus, as people grow older these experiences may change their mindsets about aging by increasing their nonessentialist beliefs and decreasing their essentialist beliefs about aging. In support for this argument, Rothermund and Brandstädter (2003) showed in an 8-year longitudinal study that people's aging self-views shaped their generalized beliefs about aging across midlife and later adulthood.

## General Discussion

With the present set of studies, we provide a more complete picture of (non)essentialist beliefs about the process of aging across the adult life span, by validating a brief and extended

scale to assess (N)EBA. Our findings revealed commonalities and differences between (N)EBA and measures assessing attitudes toward aging (AARC and ERA), subjective age, self-reported health, subjective social status, and life satisfaction. According to this, the validity of the scale was supported by evidence for both convergent and divergent validity. Therefore, (N)EBA can be distinguished from important concepts and capture a unique and distinct construct. In addition, our longitudinal study confirmed that the (N)EBA scale has good retest reliability. Moreover, the two-factor structure of the scale consisting of essentialism and nonessentialism that were negatively correlated could be confirmed for the extended version of the scale. Taken together, the findings of two studies provide support for the use of the 4-item brief and the 10-item extended version of the (N)EBA scale to assess individuals' beliefs about the process of aging. Thus, people view aging in (a) essentialist terms, as changes over time that are fixed and cannot be influenced, or (b) nonessentialist terms, as a flexible process that is malleable.

Modern theories of development suggest that nature and nurture never function independently or in isolation from each other. To the contrary, development is described as a result of multiplicative and interactive relations between genetic characteristics and experiential influences (Lerner, 1984). The present studies suggest that people maintain (N)EBA describing the aging process as either fixed (i.e., inherent, immutable, and inevitable) or malleable (i.e., modifiable, changeable, or flexible). Furthermore, people might hold (N)EBA independent of their personal beliefs whether they have the means to control their very own aging process. Thus, essentialist beliefs about aging represent the beliefs about the process of aging, whereas agency and control beliefs denote beliefs about oneself (Lachman, 2006; Skinner, 1996; Weiss et al., 2016). Although people may experience a loss of agency and control as they grow older, this does not necessarily affect their (N)EBA.

When studying views of aging, we believe it is important to consider essentialist beliefs about aging because these mindsets are closely related to age stereotypes and self-perceptions of aging but differ in important ways. Although people often view aging in general and their own aging to be associated with inevitable losses, they differ in their beliefs about aging as a fixed or a malleable process. Importantly, this distinction can add to our understanding of how age stereotypes affect aging individuals and their personal views of aging. For example, previous research has shown that age stereotype internalization or reactance is a function of (N)EBA (Weiss & Kornadt, 2018). Specifically, whereas negative age stereotypes impaired the cognitive performance of older adults holding essentialist beliefs about aging, those with a nonessentialist mindset showed better performance and less physiological reactivity (Weiss, 2018).

Although the present study provides a more detailed picture of (N)EBA, several limitations need to be noted. Our samples included mainly white participants with relatively high levels of education and good health, limiting

the generalizability of the results to the broader population. Thus, future studies need to examine (N)EBA in more diverse samples. Likewise, although our studies included samples from Germany and the United States, future research needs to establish these scales in different countries and cultures. For example, a promising path for future research is to examine how (non)essentialist beliefs might be shaped by the culture in terms of collectivism versus individualism or tightness and looseness (Gelfand et al., 2011). Furthermore, although we examined (N)EBA in a longitudinal study across 12 weeks, it would be interesting to investigate the stability and change of (N)EBA across several years in further longitudinal studies. Finally, although it goes beyond the data presented here, (N)EBA might have age-differential effects on how people deal with challenges in different periods of life (e.g., adolescence and old age) with regard to changing opportunities and constraints across the life span. Thus, future research may examine the antecedents and consequences of (N)EBA in more detail, for instance, how these mindsets may affect how people deal with aging-related changes and challenges.

## Conclusion

The present research helps to fill a gap in the aging attitude literature by introducing a reliable and valid measure assessing (non)essentialist beliefs about the process of aging. This research and the reported findings further tie in with the literature highlighting the multidimensional and complex nature of aging attitudes (Diehl et al., 2014).

## Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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## Conflict of Interest

None declared.

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The data, analytic scripts, and study materials used in the current study will be made available to other researchers upon request. This study was not preregistered.

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