

# Aging Attitudes Moderate the Effect of Subjective Age on Psychological Well-Being: Evidence From a 10-Year Longitudinal Study

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Older subjective age is often associated with lower psychological well-being among middle-aged and older adults. We hypothesize that attitudes toward aging moderate this relationship; specifically, feeling older will predict lower well-being among those with less favorable attitudes toward aging but not those with more favorable aging attitudes. We tested this with longitudinal data from the National Survey of Midlife Development in the United States–II assessing subjective age and psychological well-being over 10 years. As hypothesized older subjective age predicted lower life satisfaction and higher negative affect when aging attitudes were less favorable but not when aging attitudes were more favorable. Implications and future research directions are discussed.

*Keywords:* subjective age, self-perception, well-being, aging attitudes, ageism

When he was 70, Jouhandeau scolded himself: “For half a century I have persisted in being 20 years of age. The time has come to relinquish this unjust claim.” But this “relinquishing” is not so easy.

—*Simone de Beauvoir (1972, p. 290)*

As was the case with Jouhandeau, many middle-aged and older adults report feeling younger than their chronological age (Kaufman & Elder, 2002; Montepare, 2009; Montepare & Lachman, 1989). After the age of 40, North Americans maintain a subjective age that is, on average, 20% younger than their chronological age (Rubin & Berntsen, 2006). De Beauvoir (1972) suggested that relinquishing a youthful identity is not easy. And, indeed, research has confirmed that feeling relatively old in middle-age and older adulthood is associated with a number of negative outcomes. To be specific, those who report feeling relatively old experience lower positive and higher negative affect (Westerhof & Barrett, 2005), lower life satisfaction (Teuscher, 2009; Westerhof & Barrett, 2005), lower self-esteem (Barak & Stern, 1986; Montepare, 1996), lower self-efficacy (Boehmer, 2007), lower meaning-focused coping (Boehmer, 2007), higher pessimism about aging (Schafer & Shippee, 2010), and higher work strain (Barnes-Farrell, Rumery, & Sody, 2002) than those who feel younger relative to their chronological age.

However is feeling relatively old necessarily associated with reduced well-being? We hypothesize that feeling older is not an inherently negative experience. Rather, we suggest that it is only when a person applies relatively unfavorable aging attitudes to the

experience of feeling older that they will be at risk of experiencing negative outcomes. In contemporary North American culture popular representations present a largely unflattering impression of the aging process. In particular, older people are stereotyped as being incompetent across many functional domains (Cuddy, Norton, & Fiske, 2005; Richeson, & Shelton, 2006). These unflattering cultural representations of the aging process affect some middle-aged and older adults' attitudes toward aging (Levy & Banaji, 2002). We hypothesize that to the extent people hold less favorable attitudes toward aging they will be at risk for experiencing reduced psychological well-being when they feel older because when they feel older they will be inclined to apply these aging attitudes to themselves.

The age a person feels may be an important phenomenological variable that determines whether people take into account their aging attitudes when evaluating their own lives. People who feel relatively old should be more likely to take into account their aging attitudes when evaluating their lives than people who feel relatively young because the former feel closer to the age group to which those attitudes are relevant. To the extent that people have less favorable attitudes toward aging they should be at risk for experiencing reduced psychological well-being when they feel relatively old because people's attitudes and beliefs tend to have self-fulfilling consequences (Jones, 1977; Levy, Slade, & Kasl, 2002; Merton, 1948; Miller, Brickman, & Bolen, 1975). However, to the extent that people have more favorable attitudes toward aging they should not be at risk for negative psychological outcomes when they feel relatively old.

Several lines of evidence support the hypothesis that feeling older is only a risk factor for negative outcomes when a person holds less favorable attitudes toward aging. Indirect evidence comes from comparisons of subjective age in cultures that differ in their attitudes toward aging. If feeling older has negative self-evaluative implications only when a person has less favorable attitudes toward aging, then subjective age should predict lower well-being in cultures in which aging attitudes are less favorable but not in cultures in which aging attitudes are more favorable.

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Consistent with this hypothesis, cross-cultural research finds that older subjective age is associated with greater negative affect in the United States, which has a relatively youth-oriented culture, but not in Germany, which has a less youth-oriented culture (Westerhof & Barrett, 2005; Westerhof, Barrett, & Steverink, 2003).

More direct evidence that aging attitudes moderate the effects of subjective age on well-being comes from a recent cross-sectional study that found that subjective age interacted with aging attitudes to predict well-being in a midlife sample of Swiss adults (Teuscher, 2009). To be specific, having a subjective age that was younger than one's chronological age was more strongly associated with life satisfaction among participants who had negative aging attitudes than among participants who had positive aging attitudes. These results are consistent with the idea that older subjective age and negative aging attitudes may influence people to feel worse about their lives. However, given that this was a cross-sectional study the direction of these relationships is necessarily ambiguous.

Evidence that the interaction between subjective age and aging attitudes may play a causal role in influencing a person's psychological well-being was found in a recent study in which subjective age was experimentally varied between participants and crossed with a separate manipulation of aging attitudes (Eibach, Mock, & Courtney, 2010, Study 2). In that study middle-aged and older adults were experimentally induced to feel older by having them experience visual disfluency while reading materials printed in a subtly degraded font. Visual disfluency is an experience that people tend to associate with aging (Whitbourne, & Collins, 1998) and, consequently, participants who were induced to experience visual disfluency reported feeling older than control participants. Participants were also primed with either negative or positive aging attitudes by varying the content of scrambled sentences that participants had to solve, an attitude priming procedure that was adapted from Bargh, Chen, and Burrows (1996). In the negative aging attitudes condition the scrambled sentences contained negative age-stereotypic words (e.g., *feeble*). In the positive aging attitudes condition the scrambled sentences contained positive age-stereotypic words (e.g., *wise*). After completing the subjective age and aging attitudes primes participants completed a self-evaluation measure (sample item: "Compared to how you usually feel how satisfied with yourself do you feel right now?"). Participants who were induced to feel older and who were primed with negative aging attitudes reported more negative self-evaluations than participants who were induced to feel older but who were primed with positive aging attitudes. Control participants who were not induced to feel older reported relatively positive self-evaluations regardless of the valence of the primed aging attitudes.

This experimental evidence shows that subjective age can vary independently of aging attitudes and that experimentally induced variations in subjective age and aging attitudes can interact to influence a person's well-being in middle-age and older adulthood. However, to further test the hypothesis that older subjective age only lowers psychological well-being when a person's aging attitudes are less favorable it is important to use longitudinal data to examine whether naturally occurring variation in subjective age and aging attitudes similarly interact to predict change in psychological well-being over time. The National Survey of Midlife Development in the United States (MIDUS), a 10-year longitudi-

nal study of a national sample of American adults, contains data on subjective age and psychological well-being at more than one time point. In the present study we use these data to test whether the interaction of subjective age and aging attitudes predicts life satisfaction and negative and positive feelings 10 years later controlling for baseline measures of life satisfaction and feelings. To be more specific, we predict that when aging attitudes are less favorable, older subjective age will predict significantly lower life satisfaction and positive affect and higher negative affect, but when aging attitudes are more favorable the relation between older subjective age and these measures of life satisfaction and affect will be reduced or eliminated. As far as we know this is the first longitudinal study to test whether the interaction of subjective age and aging attitudes predicts psychological well-being.

## Method

Data were drawn from the two waves of the MIDUS II (Brim et al., 1996; Ryff et al., 2006). Wave 1 data were collected by the MacArthur Midlife Research Network from 1994 to 1995, a national survey of over 7,000 Americans in adulthood that investigated behavioral, psychological, and social factors related to physical and mental health. Wave 1 consisted of a nationally representative multistage probability sample (main sample) of community-dwelling English speakers in the continental United States ( $n = 3,485$ ), and three additional groups including oversamples from five urban areas, a sample of siblings of main-sample respondents, and an additional twin sample. Participants completed a 30-min telephone interview and a self-administered questionnaire was mailed to them. Approximately 70% of Wave 1 participants took part in the Wave 2 survey collected by the Institute on Aging at the University of Wisconsin–Madison supported by the National Institute on Aging between 2004 and 2006. Many of the same behavioral, psychological, and social factors assessed at Wave 1 were also measured at Wave 2 (Ryff et al., 2006). Among the Wave 1 participants who did not take part in Wave 2 approximately two thirds could not be successfully contacted due to informant refusal, confirmed or unconfirmed mortality, or inability to be contacted and the remaining third of nonparticipants refused directly (Ryff et al., 2006). We analyzed only data from those who participated in the Wave 1 main sample who completed both the phone and mail-in surveys, participated in the Wave 2 survey, and had complete information for Wave 2 outcome variables. The potential impact of attrition on the analyses was examined with a series of analyses of variances (ANOVAs) comparing means of key study variables at baseline for those who remained in the study with those who did not, respectively, and there were no significant differences for subjective age:  $M = -9.55$ ,  $SD = 9.14$  versus  $M = -9.49$ ,  $SD = 10.22$ ,  $F(1, 1878) = 0.01$ , *ns*, aging attitudes:  $M = 1.43$ ,  $SD = 2.49$  versus  $M = 1.53$ ,  $SD = 2.63$ ,  $F(1, 1878) = 0.65$ , *ns*, life satisfaction:  $M = 7.81$ ,  $SD = 1.61$  versus  $M = 7.65$ ,  $SD = 1.80$ ,  $F(1, 1878) = 3.60$ , *ns*, positive affect:  $M = 3.39$ ,  $SD = 0.72$  versus  $M = 3.36$ ,  $SD = 0.78$ ,  $F(1, 1878) = 0.85$ , *ns*, or negative affect:  $M = 1.52$ ,  $SD = 0.61$  versus  $M = 1.57$ ,  $SD = 0.66$ ,  $F(1, 1878) = 2.57$ , *ns*. Furthermore, the overall multivariate analysis of variance (MANOVA) for this analysis was not statistically significant, Wilks's  $\lambda = .99$ ,  $F(5, 1874) = 1.21$ , *ns*. We also restricted analyses to participants age 40 and older because it is after age 40 that people tend to maintain a

subjective age that is on average about 20% younger than their chronological age (Rubin & Berntsen, 2006). Use of age 40 as a lower limit is also consistent with the minimum age used in prior cross-sectional studies of the association between subjective age and psychological well-being (Westerhof & Barrett, 2005; Westerhof et al., 2003), facilitating comparison of our results with these studies. These selection criteria yielded a sample size of 1,170.

### Subjective Age

The subjective age measure was constructed by finding the difference between participants' chronological age and responses to a question about the age they typically feel. The question eliciting the age participants typically feel was prefaced with a lead-in that introduced the idea that a person might feel a different age than their chronological age. Specifically the lead-in stated, "Many people feel older or younger than they actually are." Participants were then asked, "What age do you feel most of the time?" Participants then estimated how old they felt most of the time in years. They could list an age that was the same as, younger, or older than their chronological age. Subtracting actual age from felt age yielded values that were positive when participants felt older than their chronological age and values that were negative when participants felt younger than their chronological age, and zero when participants listed the same age as their chronological age. Responses 3.5 standard deviations above or below the mean for subjective age were deemed outliers leading to the exclusion of five participants from the analyses. Wave 1 and Wave 2 measures of subjective age were used in the present analyses.

### Favorability of Aging Attitudes

In two separate questions participants were asked to rate the overall lives of people in their late 20s and in their late 60s using 11-point scales ranging from 0 (*worst*) to 10 (*best*). Aging attitudes were calculated by subtracting the ratings of life for people in their 20s from the ratings of life for people in their 60s such that positive values indicated higher life quality ratings for those in their 60s compared to those in their 20s. This index provides us a measure of people's beliefs about the relative quality of life in older adulthood compared to younger adulthood. The variables used to construct this aging attitudes measure were only assessed at Wave 1.

### Well-Being

Life satisfaction at Wave 1 and Wave 2 was assessed with the question "Using a scale from 0 to 10 where 0 means 'the worst possible life overall' and 10 means 'the best possible life overall,' how would you rate your life overall these days?" (Cantril, 1965). To measure positive affect and negative affect at Wave 1 and Wave 2 participants were asked how often over the past 30 days they felt six characteristics related to good mood (e.g., cheerful, extremely happy) based on a 5-point scale ranging from 1 (*all of the time*) to 5 (*none of the time*); (Wave 1  $\alpha = .91$ ; Wave 2  $\alpha = .90$ ) and six characteristics related to bad mood (e.g., nervous, worthless; Wave 1  $\alpha = .86$ ; Wave 2  $\alpha = .84$ ) on the same 5-point scale (Bradburn, 1969; Mroczek & Kolarz, 1998; Watson, Clark,

& Tellegen, 1988). Responses were reverse-scored so that higher values indicate greater endorsement of the construct.

Wave 2 life satisfaction, positive affect, and negative affect were significantly correlated with each other. To be more specific, among the Wave 2 well-being measures we used, greater life satisfaction was associated with higher ratings of positive affect ( $r = .58, p < .001$ ) and lower ratings of negative affect ( $r = -.48, p < .001$ ) and greater positive affect was associated with lower negative affect ratings ( $r = -.60, p < .001$ ). However, in the well-being literature generally (Folkman & Moskowitz, 2000), and the subjective age literature specifically (Westerhof & Barrett, 2005; Westerhof et al., 2003), distinct components of well-being are often analyzed separately. Thus, to facilitate comparison of the results of our analyses with those of previous researchers, we report the effects on these well-being measures separately.

### Demographics

Demographic variables used in the present analyses were drawn from Wave 1. Age represents chronological age in years. Our study was modeled on the analyses of Westerhof and Barrett (2005). Their analyses included control variables of gender, socioeconomic status (SES), health, marital status, and employment status found to be associated with well-being (Diener, Suh, Lucas, & Smith, 1999) and subjective age (Barak & Stern, 1986) as well as a sum of chronic health conditions and self-rated health.

Gender was coded so that *female* = 1 and *male* = 0. The more detailed information on level of education in the MIDUS was recoded so that 1 = *did not graduate high school*, 2 = *graduated high school*, 3 = *some college*, 4 = *college graduate or greater educational attainment*. Household income was the sum of five possible sources of income: self, spouse, government assistance, Social Security, other sources. The education and income scores were transformed to *z* scores and the mean of the *z* scores was computed to form a single measure of SES (Westerhof & Barrett, 2005). Marital status was coded so that *currently married* = 1 and *all other conditions* = 0. Employed indicated that a participant was working for pay (*yes* = 1, *no* = 0). Chronic conditions were measured as the sum of 29 conditions experienced over the past 12 months including predominantly physical conditions (e.g., asthma, thyroid disease, high blood pressure) and some psychological and behavioral conditions (e.g., anxiety, alcohol or drug problems). Subjective health was measured with responses to the question "In general, would you say your physical health is *poor*, *fair*, *good*, *very good*, or *excellent*?" scored from 1 to 5 such that higher values corresponded to better subjective health.

### Analyses

Hierarchical regression models were used to examine the association of subjective age and aging attitudes with each outcome variable of life satisfaction, positive affect, and negative affect. The first step consisted of Wave 1 age, gender, SES, marital status, employment status, number of chronic conditions, self-rated health, and the Wave 1 equivalent of the dependent variable (Wave 1 criterion variable). In the second step, Wave 1 subjective age and Wave 2 subjective age and Wave 1 aging attitudes were added. Wave 2 aging attitudes could not be included in the analyses because this measure was not included in the Wave 2 survey. At

this step, significant findings for Wave 2 subjective age would suggest that change in subjective age leads to change in the outcome variable over time because a significant finding represents the residual effect of the predictor variable after controlling for earlier levels of the predictor and criterion variable (Cronbach, & Furby, 1970; Holahan & Moos, 1981). In the third step the subjective age by aging attitudes interaction was added. Significant interactions were probed with an online calculator used to determine the simple slopes for the association of the focal variable (subjective age) with the potential outcome variable (i.e., life satisfaction, positive affect, and negative affect) at high or low levels of the moderator, specifically, high favorability ( $M + 1 SD$ ) or low favorability ( $M - 1 SD$ ) of aging attitudes (Preacher, Curran, & Bauer, 2006). Continuous variables in the regression models (including the focal predictor and the moderating variable) were mean centered when generating the input for the online calculator used to interpret significant interactions.

## Results

Descriptive statistics for all study variables are presented in Table 1. For subjective age at Wave 1, approximately 86% of participants felt younger than their chronological ages, 7% felt the same as their chronological ages, and 7% felt older than their chronological ages. At Wave 2, 83% felt younger than their chronological ages, approximately 10% felt the same as their chronological ages, and 7% felt older than their chronological ages. For aging attitudes, approximately 16% felt that quality of life was better for those in their 20s compared to those in their 60s, 20% felt that quality of life was the same whether people were in their 20s or 60s, and 64% rated quality of life for those in their 60s higher than those in their 20s. A paired sample  $t$  test also showed that subjective age changed from Wave 1 to Wave 2,  $t(1119) = 5.64, p < .001, d = .16$  (Dunlap, Cortina, Vaslow, & Burke,

1996), such that the gap between chronological age and subjective age increased over time, which is consistent with prior research (Rubin & Berntsen, 2006). Change in the criterion variables from Wave 1 to Wave 2 was assessed with paired sample  $t$  tests. Life satisfaction increased over time,  $t(1164) = -2.59, p < .05, d = .08$ , as did positive affect,  $t(1167) = -2.42, p < .05, d = .07$ . There was no significant difference between Wave 1 and Wave 2 negative affect scores,  $t(1167) = 0.63, p = .53, d = .02$ .

Regression analyses are presented in Table 2. The first set of analyses showed that older participants and female participants had greater life satisfaction. Being married and having higher ratings of subjective health were also associated with greater life satisfaction. In Step 2, Wave 2 subjective age predicted lower life satisfaction, suggesting that as people felt older relative to their actual age, life satisfaction decreased. More favorable aging attitudes were associated with higher life satisfaction. Calculation of the Relative Pratt Index (Thomas, Hughes, & Zumbo, 1998) showed that subjective age at Wave 2 and aging attitudes accounted for 9% and 5%, respectively of the proportion of  $R^2$  in Step 2 for life satisfaction analyses. Comparatively, Wave 1 life satisfaction in Step 2 (not shown) accounted for 61% of the  $R^2$ . In Step 3, the subjective age by aging attitudes interaction predicting life satisfaction was significant (Table 2, Step 3). Relative Pratt Index analyses showed that the interaction accounted for 2% of the  $R^2$  at Step 3. As illustrated in Figure 1, probing this significant two-way interaction (Preacher et al., 2006) indicated that when aging attitudes were more favorable (i.e., highly favorable aging attitudes at 1  $SD$  above the mean), there was no significant association of subjective age with life satisfaction ( $b < -0.009, ns$ ) but when aging attitudes were less favorable (less favorable aging attitudes at 1  $SD$  below the mean), increasing subjective age was associated with lower levels of life satisfaction ( $b = -0.025, p < .001$ ).

Analyses for positive affect showed that greater age and better perceived health were associated with greater positive affect (Table 2, Step 1). Wave 2 subjective age predicted decreased positive affect, suggesting that as people felt older relative to their actual age, positive affect decreased. The more favorable participants' aging attitudes were the higher their ratings of positive affect were (Table 2, Step 2). Relative Pratt Index analyses showed that subjective age at Wave 2 and aging attitudes accounted for 13% and 5%, respectively of the proportion of  $R^2$  in Model 2 for the positive affect analyses. Wave 1 positive affect in Step 2 (not shown) accounted for 70% of the  $R^2$ . In Step 3, the subjective age by aging attitudes interaction predicting positive affect was not statistically significant.

Analyses for negative affect showed largely the inverse of the relationships found for the other two measures of well-being. The older participants were, the lower the levels of negative affect were, but those who were married reported greater negative affect (Table 2, Step 1). Those who were employed had lower levels of negative affect, greater number of chronic conditions predicted greater negative affect, and greater subjective health predicted lower levels of negative affect (Table 2, Step 1). Increased subjective age predicted greater negative affect and the more favorable participants' aging attitudes were the lower their ratings of negative affect were (Table 2, Step 2). Relative Pratt Index analyses showed that Wave 2 subjective age and aging attitudes accounted for 7% and 1%, respectively of the proportion of  $R^2$  in

Table 1  
Means and Frequencies for Demographic, Subjective Age, Aging Attitudes, and Well-Being Variables

Variable	$M$ / $%$	$SD$
Demographics		
Age	53.71	9.08
Gender	52.90	—
Socioeconomic status	0.07	0.68
Marital status	73.33	—
Employment status	73.82	—
Chronic conditions	2.68	2.58
Subjective health	3.52	0.96
Subject Age and attitudes		
Subjective age W1	-9.78	8.33
Subjective age W2	-11.23	9.91
Aging Attitudes W1	1.42	2.47
Subjective well-being		
Life satisfaction W1	7.85	1.56
Life satisfaction W2	7.97	1.51
Positive affect W1	3.40	0.72
Positive affect W2	3.45	0.71
Negative affect W1	1.50	0.58
Negative affect W2	1.49	0.55

Note.  $N = 1,170$ . Demographic variables are for Wave 1 only. W1 = Wave 1; W2 = Wave 2.



Table 2

*Hierarchical Multiple-Regression Analyses Predicting Life Satisfaction, Positive Affect, and Negative Affect From Demographics, Subjective Age, Aging Attitudes, and the Subjective Age by Aging Attitudes Interaction*

Predictor variables	Criterion variable W2					
	Life satisfaction		Positive affect		Negative affect	
	R <sup>2</sup> change	β	R <sup>2</sup> change	β	R <sup>2</sup> change	β
Step 1	.25		.31		.34	
Age		.11***		.09**		-.09**
Gender		.07**		.04		.01
Socioeconomic Status		-.05		.03		-.07*
Marital status		.06*		-.04		.05*
Employment status		.04		.02		-.07*
Chronic conditions		-.05		-.05		.08**
Subjective Health		.10***		.09**		-.07*
Criterion variable W1		.40***		.49***		.48***
F value (for change)	F(8, 1054) = 42.73***		F(8, 1054) = 58.112***		F(8, 1053) = 66.20***	
Step 2	.02		.03		.01	
Subjective age W1		.02		.05		-.02
Subjective age W2		-.12***		-.18***		.11***
Aging attitudes W1		.10***		.10***		-.05*
F value (for change)	F(3, 1051) = 10.62***		F(3, 1051) = 18.59***		F(3, 1050) = 6.84***	
Step 3	.01		.00		.01	
Subjective Age W2 × Aging Attitudes W1		.06*		-.01		-.06*
F value (for change)	F(1, 1050) = 5.06*		F(1, 1050) = < 0.01		F(1, 1049) = 5.56*	

Note. W2 = Wave 2; W1 = Wave 1.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Model 2 for negative affect analyses and Wave 1 negative affect in Model 2 (not shown) accounted for 70% of the R<sup>2</sup>. Finally, the Wave 2 subjective age by aging attitudes interaction predicting negative affect was statistically significant (Table 2, Step 3). Probing of this interaction (see Figure 2) indicated that when aging attitudes were more favorable (i.e., 1 SD above the mean), there

was no significant association of subjective age with life satisfaction ( $b = 0.003$ ,  $ns$ ), but when aging attitudes were less favorable (1 SD below the mean) as people felt older relative to actual age negative affect increased ( $b = 0.009$ ,  $p < .001$ ). Relative Pratt Index analyses showed that the interaction accounted for 2% of the R<sup>2</sup> at Step 3.

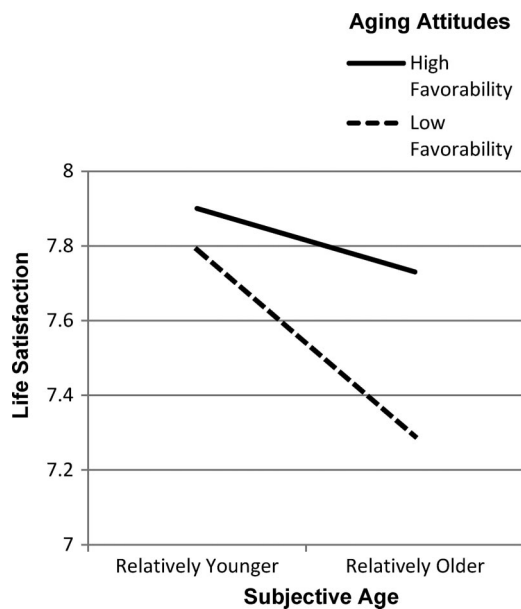


Figure 1. Association of subjective age with life satisfaction moderated by aging attitudes.

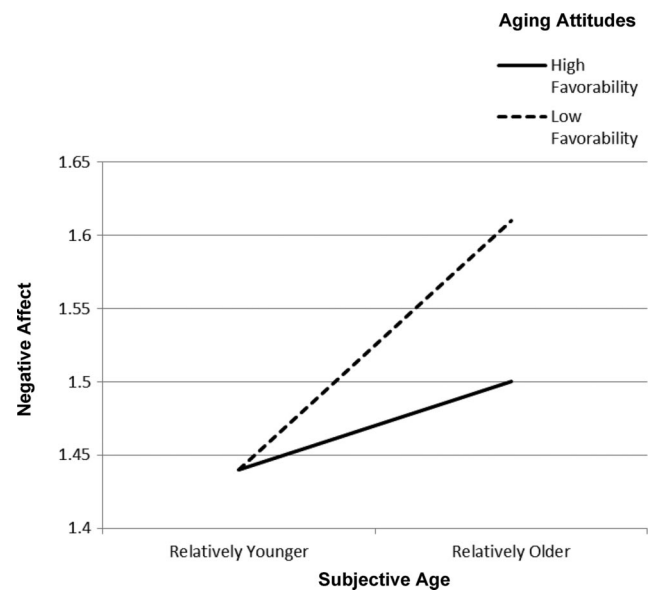


Figure 2. Association of subjective age with negative affect moderated by aging attitudes.

## Discussion

Does feeling older necessarily entail feeling worse? The data suggest it may not. Rather, the relationship between subjective age and well-being seems to depend on a person's attitudes toward aging. When aging attitudes are less favorable older subjective age predicts lower life satisfaction and increased negative affect. However, when aging attitudes are more favorable older subjective age is no longer associated with these measures of psychological well-being. These longitudinal survey results complement recent experimental findings showing that middle-aged and older adults who are induced to feel older evaluate themselves more negatively if negative aging attitudes are primed but not if positive aging attitudes are primed (Eibach et al., 2010). This convergence of longitudinal and experimental data helps strengthen the case that aging attitudes interact with subjective age to predict well-being. Although the experimental data provide more definitive evidence for causal relationships among these variables, the longitudinal data confirm that these findings are not just a hothouse laboratory effect because they show that the same patterns are found when naturally occurring relationships among these variables are examined.

Although aging attitudes moderated the effects of subjective age on life satisfaction and negative affect, the main effect of subjective age on positive affect was not moderated by aging attitudes. It is possible that the measure of aging attitudes that was available in the MIDUS was not sensitive enough to detect a moderation effect on positive affect and that a moderation effect on positive affect would be found if different measures of aging attitudes had been available. However, it is also possible that subjective age has a more direct effect on positive affect whereas its effects on life satisfaction and negative affect are more dependent on aging attitudes. Future research with more diverse and extensive measures of aging attitudes are needed to explore these possibilities.

It is noteworthy that more favorable aging attitudes eliminated but did not reverse the relationship between subjective age and measures of psychological well-being. This pattern is consistent with the findings in previous cross-sectional (Teuscher, 2009), cultural comparative (Westerhof & Barrett, 2005), and experimental (Eibach et al., 2010) research, which has found a reduction or elimination of the relationship between subjective age and well-being among participants who have more favorable aging attitudes. This pattern may reflect the fact that negative psychological states generally tend to have a stronger impact on psychological well-being than positive psychological states have (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Taylor, 1991).

The present findings contribute to the growing literature demonstrating negative effects that less favorable aging attitudes can have on older adults' well-being (Levy, 2003). Less favorable attitudes toward aging have been linked to several detrimental psychological and physical outcomes for older adults including reduced will to live (Levy, Ashman, & Dror, 1999–2000), greater cardiovascular stress (Levy, Hausdorff, Hencke, & Wei, 2000; Levy, Zonderman, Slade, & Ferrucci, 2009), impaired cognitive (Levy, 1996; Levy & Langer, 1994), perceptual (Levy, Slade, & Gill, 2006) and motor (Hausdorff, Levy, & Wei, 1999) functioning, and greater mortality (Levy, Slade, Kunkel, & Kasl, 2002). In future research it would be interesting to investigate whether subjective age interacts with aging attitudes to predict these psy-

chological and physical health outcomes. There is already some evidence linking older subjective age to mortality. To be more specific, subjective age was positively associated with mortality in a 13-year longitudinal study (Uotinen, Rantanen, & Suutama, 2005). It is possible that this relationship between subjective age and mortality is moderated by negative aging attitudes.

One potential limitation of the present study is its use of a somewhat leading question to assess participants' subjective age. To be more specific, the lead-in to the question that asked people to report their subjective age emphasized that a person might feel older or younger than their chronological age but it did not clearly state that a person might feel the same age as their chronological age. This aspect of the framing of the question may have increased participants' tendency to report a subjective age that was discrepant from their chronological age. Although this is a possibility, other research that assessed subjective age with a question that explicitly stated that people might feel the same age or older or younger than their actual age still found that most middle-aged and older adults reported feeling younger than their actual age (Rubin & Berntsen, 2006). So the tendency of most of the present study's participants to report a younger subjective age was probably not solely due to the particular wording of the question. However, in future studies that test the interactive effects of subjective age and aging attitudes predicting well-being, it will be important to assess subjective age with a more balanced question such as the measure used by Rubin and Berntsen (2006).

In future research it would also be useful to include more diverse measures of subjective age and aging beliefs and attitudes to test more nuanced predictions about their interactive effects on well-being. For instance, rather than measuring global subjective age, as was done in the present study, future research should attempt to separately measure subjective psychological age and subjective physical age (Montepare, 1996) to test whether these measures differentially interact with aging attitudes to predict well-being. Also, it will be important in future research to test whether not just explicit but also implicit beliefs and attitudes toward aging (Hummert, Garstka, O'Brien, Greenwald, & Mellott, 2002) interact with subjective age to predict well-being.

Future research on the relationship between subjective age and well-being would benefit from measuring these variables at more than two time points to more definitively test the causal relationships between subjective age and well-being. Also, given that cross-cultural research has found that the relationship between subjective age and well-being is stronger in North America than it is in other settings, it would be useful to examine the relationships between subjective age, aging attitudes, and well-being in longitudinal studies in other cultures. We hypothesize that older subjective age will be associated with reduced well-being among middle-aged and older adults who have less favorable aging attitudes not just in North America but also in other cultural settings. Consistent with this, a recent cross-sectional study with Swiss adults found that negative aging attitudes interacted with subjective age to predict lower well-being (Teuscher, 2009). However, longitudinal studies of subjective age outside North America will be needed to more definitively test this hypothesis.

In conclusion, the present findings emphasize the subjectivity of aging. Not only do people often feel differently than their chronological age, as previous research has established, but it also appears that the consequences of feeling older depend on a per-

son's subjective interpretations of aging. People who have relatively less favorable attitudes toward aging experience worse psychological outcomes to the extent that they feel older but people who have more favorable attitudes toward aging do not. Thus, although it is often said that a person is only as old as he or she feels it might also be said that feeling old is only as bad as people presume.

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