Self-Esteem Development From Young Adulthood to Old Age: A Cohort-Sequential Longitudinal Study

Ulrich Orth
University of Basel

Kali H. Trzesniewski
University of Western Ontario

Richard W. Robins
University of California, Davis

The authors examined the development of self-esteem from young adulthood to old age. Data came from the Americans' Changing Lives study, which includes 4 assessments across a 16-year period of a nationally representative sample of 3,617 individuals aged 25 years to 104 years. Latent growth curve analyses indicated that self-esteem follows a quadratic trajectory across the adult life span, increasing during young and middle adulthood, reaching a peak at about age 60 years, and then declining in old age. No cohort differences in the self-esteem trajectory were found. Women had lower self-esteem than did men in young adulthood, but their trajectories converged in old age. Whites and Blacks had similar trajectories in young and middle adulthood, but the self-esteem of Blacks declined more sharply in old age than did the self-esteem of Whites. More educated individuals had higher self-esteem than did less educated individuals, but their trajectories were similar. Moreover, the results suggested that changes in socioeconomic status and physical health account for the decline in self-esteem that occurs in old age.

Keywords: self-esteem, age differences, adult development, life span

Researchers have long debated whether self-esteem shows normative age changes. In an influential review of the literature, Wylie (1979) concluded that self-esteem does not show systematic increases or decreases at any point in the life span. Although researchers subsequently questioned Wylie's conclusion (e.g., Demo, 1992; McCarthy & Hoge, 1982; O'Malley & Bachman, 1983; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002; Twenge & Campbell, 2001), the debates surrounding this issue have not led to any agreement about the normative development of self-esteem. One reason for the lack of consensus is the paucity of studies conducted on samples beyond adolescence (Trzesniewski, Donnellan, & Robins, 2003).

The present research addresses this gap in the literature by examining age-related changes in self-esteem from young adulthood to old age. Knowledge about the life course trajectory of self-esteem is useful because it can help build overarching theories of personality development (cf. B. W. Roberts, Wood, & Caspi, 2008; Robins, Fraley, Roberts, & Trzesniewski, 2001). In addition, understanding the normative self-esteem trajectory may inform interventions that are designed to promote self-esteem in critical developmental stages, such as young adulthood and old age. Self-esteem is a target of interventions because it prospectively predicts better physical health, less criminal behavior, lower levels of depression, and greater achievement and economic wealth (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009; Trzesniewski et al., 2006). In addition to describing the normative self-esteem trajectory, the present research examines the influence of moderators that may explain individual variability in the way self-esteem changes with age.

Theoretical Perspectives

There are a number of theoretical reasons to expect that self-esteem might show systematic developmental changes from young adulthood to old age. Although self-esteem is unlikely to show large normative changes over time, change can occur in response to important transitions or major life events (e.g., Trzesniewski, Robins, Roberts, & Caspi, 2004). Such developmental turning points (Pickles & Rutter, 1991) can modify or redirect life trajectories by altering behavior, affect, cognition, or context. When

Ulrich Orth, Department of Psychology, University of Basel, Basel, Switzerland; Kali H. Trzesniewski, Department of Psychology, University of Western Ontario, London, Ontario, Canada; Richard W. Robins, Department of Psychology, University of California, Davis.

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Correspondence concerning this article should be addressed to Ulrich Orth, Department of Psychology, University of Basel, Birmannsgasse 8, 4055 Basel, Switzerland. E-mail: ulrich.orth@unibas.ch

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these transition points are age-dependent and normative, they can produce mean-level change in a population. For example, the transition to adolescence entails a drop in self-esteem (e.g., Harter, 1998; Robins et al., 2002), presumably because of conflicting role demands, rapid maturational changes, and increasingly complex peer and romantic relationships that characterize this transition. Another transition is from midlife to old age, which involves high levels of instability, resulting from changes in roles (empty nest, retirement, obsolete work skills), relationships (spousal death, decreased social support), and physical functioning (declining health, memory loss, reduced mobility), as well as a drop in socioeconomic status (Baltes & Mayer, 1999). These changes are likely to contribute to a normative decline in self-esteem.

In contrast, midlife is a time of highly stable work, family, and romantic relationships, characterized by peaks in achievement, mastery, and control over self and environment (Erikson, 1968; Levinson, 1978). Over the course of adulthood, individuals increasingly occupy positions of power and status, which might promote feelings of self-esteem (e.g., Dannefer, 1984; Gove, Ortega, & Style, 1989; Helson, Mitchell, & Moane, 1984). Crocker and Wolfe (2001) argued that healthy adult development involves learning to look inward for sources of positive self-esteem, rather than requiring constant external reinforcement. Consistent with this reasoning, personality changes that occur during adulthood tend to reflect movement toward higher levels of maturity and adjustment, as indicated by increases in traits such as emotional stability, conscientiousness, and agreeableness (B. W. Roberts, Walton, & Viechtbauer, 2006; Terracciano, McCrae, Brant, & Costa, 2005). Thus, there are strong theoretical reasons to expect self-esteem to rise over the course of adulthood and to decline in old age.

Although we predict that self-esteem will drop in old age, several theories of aging suggest an alternative hypothesis: Older individuals may maintain their self-esteem and well-being because they are buffered against the adverse effects of various life transitions by a host of coping processes (Baltes & Mayer, 1999; Brandtstädter & Greve, 1994; Carstensen, Isaacowitz, & Charles, 1999). In the present research, we test these competing views about whether self-esteem drops in old age.

Previous Research on Self-Esteem Development

Previous studies have generally shown small, gradual increases in self-esteem across adulthood. Several cross-sectional studies have shown that young adults have lower self-esteem than do middle-aged adults (Galambos, Barker, & Krahn, 2006; Gove et al., 1989; Jaquish & Ripple, 1981; Lall, Jain, & Johnson, 1996). Two longitudinal studies have also shown increases in self-esteem from age 43 years to age 52 years (Helson & Wink, 1992) and from the college years to the 40s (R. E. Roberts & Bengtson, 1996).

The handful of studies that have examined age differences in self-esteem during old age have produced somewhat conflicting findings. Several cross-sectional studies showed that middle-aged adults had higher self-esteem than did older adults (Jaquish & Ripple, 1981; Ranzjin, Keeves, Luszcz, & Feather, 1998; Tiggemann & Lynch, 2001; Ward, 1977). In contrast, Gove et al. (1989) found that their oldest cohort (age 75 and older) had the highest level of self-esteem, and several studies have failed to show any significant age differences (Erdwins, Mellinger, & Tyer, 1981; Ryff, 1989; Trimakas & Nicholay, 1974). Only two longitudinal studies have examined self-esteem in old age; one reported no change over a 2-year period for individuals aged 58 years to 64 years (Reitzes, Mutran, & Fernandez, 1996), and the other reported a decline from age 65 years to age 75 years (Coleman, Ivani-Chalian, & Robinson, 1993). Reflecting this lack of consistency, reviews of the literature do not agree about whether self-esteem increases, decreases, or remains stable in old age (Bengtson, Reedy, & Gordon, 1985; Brandtstädter & Greve, 1994; Demo, 1992).

In three cross-sectional studies, researchers examined age differences across nearly the entire life span. McMullin and Cairney (2004) used data from a national probability sample of Canadian residents ranging in age from 12 years to 90 years. The analyses showed that a quadratic model captured age differences in self-esteem better than did a linear model. The results suggested that self-esteem declined with increasing age and that the decline was steepest in old age. Using data collected via the Internet on a large sample of individuals aged 9 years to 90 years, Robins et al. (2002) found that self-esteem levels were high in the youngest age group, declined over the course of childhood and adolescence, rose gradually throughout adulthood, and then declined sharply beginning in the mid-60s. Pullmann, Allik, and Realo (2009) examined data from multiple samples spanning adolescence to old age. The results varied across samples, with two showing increases in self-esteem, one showing decreases, and one showing no change.

Together, these studies provide a rough map of the changes in self-esteem that might occur during early, middle, and later adulthood. However, most of these studies were based on small, homogeneous samples, and their findings may not generalize to more diverse populations. Moreover, most previous studies used cross-sectional designs or examined longitudinal changes across relatively short time spans. Analyses of age differences with cross-sectional data are useful because they provide a reasonable starting point for speculating about the developmental trajectory and may raise interesting hypotheses that can be tested in subsequent studies. However, cross-sectional studies do not allow disentangling aging and cohort effects (Baltes, Cornelius, & Nesselroade, 1979). For example, the extant cross-sectional studies of self-esteem suggest that individuals in midlife have higher self-esteem than do individuals in young adulthood. This age difference may reflect intraindividual change from young adulthood to midlife (i.e., an aging effect), but it is also possible that the older participants had higher self-esteem all along due to specific historical conditions during their childhood and adolescence (i.e., a cohort effect). In the present research, we address this methodological shortcoming of cross-sectional studies by using longitudinal, cohort-sequential data to examine self-esteem from early adulthood through old age.

Moderators of Self-Esteem Development

In addition to charting the basic trajectory of self-esteem, with the present research we seek to advance knowledge about self-esteem development by examining a set of moderators that might explain individual differences in self-esteem trajectories. Little is known about the specific conditions that promote self-esteem in adulthood and old age. It is plausible that factors in addition to chronological age, such as key social roles and events, define and

shape one's position in the life course and thereby determine the way the personality and the self develop (Caspi & Roberts, 2001; B. W. Roberts et al., 2008). When these factors are not age dependent (e.g., relationship satisfaction) or are nonnormative (e.g., stressful life events), they will differentially impact people's life trajectories and produce individual differences in intraindividual change. We examine the moderating effects of demographic variables, relationship variables, health experiences, and life events.

Demographic Variables

Previous research suggested that gender moderates the trajectory of self-esteem across the life span. Specifically, the available data suggest that the gender difference is largest in adolescence and young adulthood but that the average trajectories of men and women converge in old age (Kling, Hyde, Showers, & Buswell, 1999; Robins et al., 2002).

Previous research also suggests that ethnicity moderates the self-esteem trajectory. Specifically, the available data suggest that Blacks have higher self-esteem than do Whites at younger ages, but that the trajectories cross at some point in adulthood, with Blacks having a significantly steeper decline in self-esteem in old age than do Whites (Gray-Little & Hafdahl, 2000; Robins et al., 2002; Twenge & Crocker, 2002).

Another possible influence on self-esteem development is socioeconomic status (SES), which is typically measured by indicators such as education, income, and occupational prestige. SES might influence self-esteem because social status and wealth influence the individual's perception of his or her relational value (Leary & Baumeister, 2000). A meta-analysis showed that SES accounts for small but significant differences in self-esteem, with $d = .21$ in young adulthood, $d = .25$ at midlife, and $d = .17$ in old age (Twenge & Campbell, 2002). A similar pattern emerged in the study by Robins et al. (2002), who found that the SES effect on self-esteem was small in young adulthood ($d = .14$), largest in the 30s ($d = .31$) and small again in the 50s ($d = .14$) and 60s ($d = .06$).

Relationship Variables

Previous research strongly suggests that interpersonal relationships have an important influence on self-esteem development (Felson, 1989; Harter, 1999; Leary & Baumeister, 2000). For example, according to Murray, Holmes, and Griffin's (2000) dependency model, feelings about the self are regulated by individuals' perceptions of their partners' feelings about them. Thus, a satisfying and supportive marriage or close relationship should promote self-esteem. Several longitudinal studies have supported this idea. For example, Andrews and Brown (1995) found that women who reported a positive change in the closeness of their relationship increased in self-esteem over a 7-year period. Elliott (1996) found that being married predicted increasing self-esteem during early adulthood. In the present research, we therefore examine the effects of relationship satisfaction and marital status on the self-esteem trajectory.

For similar reasons, supportive relationships with friends and relatives might also influence self-esteem development. Receiving support from peers has been linked to increasing self-esteem during early adolescence (Fenzel, 2000; Wade, Thompson, Tashakkori, & Valente, 1989). Kinnunen, Feldt, Kinnunen, and Pulkkinen (2008) reported prospective effects of social support on self-esteem over a 6-year period in adulthood. In contrast, Keefe and Berndt (1996) and Seidman, Allen, Aber, Mitchell, and Feinman (1994) failed to find a relation between social support and self-esteem change during early adolescence. Overall, these studies suggested that supportive social relationships might contribute to higher levels of self-esteem, but the findings are not entirely consistent. Thus, the present research also examines social support from friends and relatives as a moderator of self-esteem development.

Health Experiences

Previous research suggested that physical health might influence the trajectory of self-esteem. For example, Benyamini, Leventhal, and Leventhal (2004) found that self-rated health was cross-sectionally related to self-esteem among older adults. Reitzes and Mutran (2006) found that functional health had longitudinal effects on self-esteem, controlling for prior self-esteem, in a sample of adults. Despite these suggestive results, there is a paucity of research examining the long-term consequences of health experiences for self-esteem development.

Life Events

Only in a few studies have the effects of life events on self-esteem been examined, and their results are inconsistent. One study found that stressful life events predicted subsequent decreases in self-esteem (Joiner, Katz, & Lew, 1999), but other studies did not find significant effects of stressful life events on self-esteem (Murrell, Meeks, & Walker, 1991; Orth, Robins, & Meier, 2009). Thus, more data are needed to evaluate the hypothesis that experiencing stressful life events is related to declining levels of self-esteem.

The Present Research

The first goal in the present research was to test whether self-esteem development can be captured by linear growth models or whether curvilinear growth models yield a better fit to the data. Our second goal was to test whether a single trajectory can be modeled for all cohorts or whether there are significant cohort differences in the trajectory. Our third goal was to test for moderators of the self-esteem trajectory. Specifically, we tested the effects of gender, ethnicity, education, income, employment status, relationship satisfaction, marital status, social support, health experiences, and stressful life events on the overall level and shape of the self-esteem trajectory.

This research extends previous studies on self-esteem development in several ways. First, the cohort-sequential longitudinal study design significantly improves the validity of conclusions about the life course trajectory of self-esteem because it can show that observed changes across age groups are due to intraindividual change and not cohort effects. Second, the study uses data from a national probability sample. Third, the study includes four waves of data which provide more precise estimates of the average self-esteem trajectory and the interindividual variability of the

trajectory than do the two-wave studies that are much more common in the literature. Fourth, researchers in previous studies of self-esteem development have rarely examined moderators of self-esteem change, particularly during midlife and old age.

Method

The data come from the Americans' Changing Lives (ACL) study, which is a national four-wave panel survey of individuals aged 25 years to 104 years who live in the contiguous United States (House, 1986). Data were collected with a multistage stratified area probability sample with an oversampling of Blacks and those 60 years of age and over.[1] Participants were assessed in 1986, 1989, 1994, and 2002.

Participants

The sample consisted of 3,617 individuals (62% female). Mean age of participants at Wave 1 was 54.0 years ($SD = 17.6$). Across Waves 1 to 4, the participants' age ranged from 25 years (at Wave 1) to 104 (at Wave 3); however, because very few participants were older than 100 years at any wave, figures in this article will show expected trajectories from age 25 years to age 100 years. Sixty-four percent of participants were White, 33% were Black, 1% were American Indian, 1% were Hispanic, and 1% were Asian.

Data were available for 3,617 individuals at Wave 1, for 2,867 individuals at Wave 2, for 2,562 individuals at Wave 3, and for 1,787 individuals at Wave 4. A substantial proportion of the attrition was due to deceased study members rather than nonresponse; 1,184 (33%) study members died by the fourth assessment. Ninety-two percent of nondeceased study members participated in at least two assessments, 84% participated in at least three assessments, and 66% participated in all four assessments. Compared with those who participated in at least two assessments (excluding deceased study members), nonparticipants were significantly more likely to be younger (Ms = 42.0 vs. 47.3; $d = -.35$), to be Black (49% vs. 30%), to have lower levels of education (Ms = 11.7 vs. 12.3 years; $d = -.20$), to report less social support by friends and relatives at Wave 1 (Ms = 3.75 vs. 3.94; $d = -.21$), and to report less income at Wave 1 (Ms = $21,742 vs. $27,931 per year; $d = -.27$). These differences were generally small, and no attrition effects were found for the other study variables, including self-esteem. Thus, nonrepresentativeness due to attrition was not a serious concern in the present study.

Measures

Self-esteem. The ACL includes a three-item version of the Rosenberg Self-Esteem Scale (RSE, Rosenberg, 1965): "I take a positive attitude toward myself," "At times I think I am no good at all," (reverse-scored) and "All in all, I am inclined to feel that I am a failure" (reverse-scored). Responses were measured on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*), with $M = 3.48$ ($SD = 0.58$) averaged across the four waves. The alpha reliability was .57 for Wave 1, .60 for Wave 2, .58 for Wave 3, and .58 for Wave 4. As would be expected, these reliabilities are lower than is typically found for the full 10-item RSE (Robins, Hendin, & Trzesniewski, 2001). However, in a pilot sample of college students ($N = 359$), the three-item ACL scale correlated from .92 to .95 with the 10-item RSE across four waves (for a description of the sample, see Orth, Robins, & Roberts, 2008, Study 2). In addition, an item response analysis showed that two of the three items used in the ACL study are among the three most discriminating of the 10 RSE items (Gray-Little, Williams, & Hancock, 1997). Gray-Little et al. (1997) concluded that "the RSE Scale could be shortened without compromising the measurement of global self-esteem" (p. 450, see also Robins, Hendin, et al., 2001).

Education. The ACL includes an 18-point measure of education ranging from 0 to 17 (corresponding to 0 years of education to 17 years and more), with $M = 11.5$, $SD = 3.5$, and range = 0 to 17. Given that education was measured at Wave 1 only and that for most participants the score on this measure was likely fixed across all waves (because participants were 25 years and older), we treated this variable as a time-invariant covariate. In the analyses, we contrasted participants with a low level of education (0 to 12 years; 66%) versus a high level of education (13 years or more; 34%).

Income. The ACL provides an 11-point measure of income, based on the exact income of participants and their spouses. Categories ranged from 1 (less than $5,000) to 11 ($100,000 or more). Income was assessed at all four waves and was thus analyzed as a time-varying covariate (TVC). The scale had a mean of 5.38 ($SD = 2.80$) averaged across the four waves.

Employment status. We used a dichotomous variable contrasting employed and nonemployed participants. At Waves 1, 2, 3, and 4, 52%, 51%, 47%, and 49%, respectively, of the participants were employed.

Relationship satisfaction. Relationship satisfaction was assessed with four items. All items were rated on a 5-point scale. The first two items, "How much does your (husband/wife/partner) make you feel loved and cared for?" and "How much is (he/she) willing to listen when you need to talk about your worries or problems?" were rated from 1 (*not at all*) to 5 (*a great deal*). The third item, "Taking all things together, how satisfied are you with your (marriage/relationship)?" was rated from 1 (*completely unsatisfied*) to 5 (*completely satisfied*), and the fourth item, "Taking everything into consideration, how often do you feel bothered or upset by your (marriage/relationship)?" was rated from 1 (*almost always*) to 5 (*never*). The scale had a mean of 4.18 ($SD = 0.74$) averaged across the four waves, and the alpha reliability was .79 for Wave 1, .82 for Wave 2, .85 for Wave 3, and .83 for Wave 4.

Marital status. We used a dichotomous variable contrasting married and nonmarried participants.[2] At each wave, 55% of the participants were married.

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[1] We used sampling weights to determine whether the results hold when the oversampling of Blacks is accounted for in the analyses (Asparouhov, 2005). As reported in the Results section, the overall trajectory is different for Blacks than for Whites. However, the basic results (e.g., the shape of the curve, test of cohort differences, and the effects of time-invariant and TVCs) were virtually identical when we used sampling weights. In the remainder of the article, we therefore report the results of analyses without using sampling weights.

[2] In the analyses, we also tested for the effects of two other categories of marital status, specifically divorced and widowed. However, as was the case for married (see the Results section), these two categories did not influence the predicted self-esteem trajectory.

Social support by friends and relatives. The ACL includes two items that measure social support by friends and relatives: "On the whole, how much do your friends and other relatives make you feel loved and cared for?" and "How much are these friends and relatives willing to listen when you need to talk about your worries or problems?" Responses were measured on a 5-point scale ranging from 1 (*not at all*) to 5 (*a great deal*), with $M = 4.02$ ($SD = 0.89$) averaged across the four waves. The alpha reliability was .72 for Wave 1, .73 for Wave 2, .79 for Wave 3, and .77 for Wave 4.

Functional health. The ACL has a 4-point index of functional health, based on a set of questions concerning difficulties in daily living (e.g., difficulty bathing self, difficulty climbing stairs, and difficulty walking several blocks). The index ranges from 1 ("In bed/chair most or all day due to health/has a lot of difficulty or cannot bathe self") to 4 ("Does not have a lot of difficulty doing heavy work around the house such as shoveling snow or washing walls because of health"). The index had a mean of 3.51 ($SD = 0.93$) averaged across the four waves.

Chronic health conditions. The ACL uses an index of nine chronic health conditions during the last 12 months, including hypertension, diabetes, lung diseases, heart attack or heart disease, major strokes, cancer, fractured or broken bones, arthritis or rheumatism, and urinary incontinence. Thus, the possible range of the index was from 0 to 9.[3] The index had a mean of 1.23 ($SD = 1.24$) averaged across the four waves.

Stressful life events. The ACL uses an index of nine stressful life events, including involuntary loss of job, being robbed or home burglarized, victimization by serious physical attack or assault, divorce, death of a spouse, death of a parent or stepparent, death of a child, death of a close relative or friend, and participant report of any additional stressful events that were not on the list. Thus, the possible range of the index was from 0 to 9. At Wave 1, participants reported whether these events occurred during the past 3 years. At Waves 2 to 4, participants reported whether the events occurred since the last assessment. The index had a mean of 1.02 ($SD = 0.91$) averaged across the four waves.

Procedure for the Statistical Analyses

The analyses were conducted with the Mplus 5.2 program (Muthén & Muthén, 2007). To deal with missing values, we used maximum likelihood estimation, which produces less biased and more reliable results compared with conventional methods of dealing with missing data, such as listwise or pairwise deletion (Allison, 2003; Schafer & Graham, 2002). Model fit was assessed with the Bayesian information criterion (BIC). For BIC, absolute values cannot be interpreted, but when comparing models, lower values indicate better model fit.

Results

Table 1 gives an overview of the demographic characteristics for the full sample and separately for six age groups that we created to test for cohort differences (note, however, that in all other analyses age was examined as a continuous variable, not as a categorical variable). The distribution of gender and ethnicity is relatively even across the age groups. The tests for the effect of ethnicity is necessarily constrained to the contrast between White participants and Black participants, due to low frequencies of American Indian, Hispanic, and Asian participants.

Life-Span Trajectory of Self-Esteem

Our first goal was to estimate the trajectory of self-esteem from young adulthood to old age. We examined life-span growth curve models that capture the development of self-esteem across the entire observed age range represented in the sample. Although each participant only provides data for, at most, four age points (covering a 16-year interval), the complete trajectory is constructed with information from all participants simultaneously. This approach is based on the assumption (which is tested below) that a common trajectory can be modeled across all ages and that this trajectory accurately represents the trajectory that would be found if data were available from a single cohort followed longitudinally across the full time span (e.g., Duncan, Duncan, & Strycker, 2006; Preacher, Wichman, MacCallum, & Briggs, 2008).

To account for the fact that the measurement was asynchronous across age (i.e., the data are organized by waves, but we were interested in another metric of time, specifically the individuals' age at each wave), we used individual slope loadings, following the recommendations by Bollen and Curran (2006), Mehta and West (2000), and Preacher et al. (2008). At each assessment, we computed each individual's exact age by subtracting the birth date from the interview date.

We estimated a linear, quadratic, and cubic model. Because the slope loadings are based on age rather than the four measurement occasions, it was possible to estimate relatively complex trajectories. For all models tested, it was possible to estimate the variances of the intercept and linear slope factor, but not—if applicable—the variances of the quadratic and cubic slope factors due to nonconvergence of the models. Therefore, variances of the quadratic and cubic slope factors were set to zero, which allowed for convergence of all models (thus, the quadratic and cubic slopes were fixed across individuals).[4] Figure 1 illustrates the life-span growth curve model, specified for quadratic growth (the models for linear only and cubic growth were specified similarly).

The quadratic model had the best fit to the data (the BIC values were 16,736.5 for the linear model, 16,637.2 for the quadratic model, and 16637.5 for the cubic model). Relative to the linear model, adding a quadratic term improved model fit; relative to the

[3] We did not compute coefficient alpha for the indexes of chronic health conditions and stressful life events. Coefficient alpha is not an appropriate measure of reliability for these scales because they are emergent not latent constructs, defined by an aggregation of relatively independent indicators (see K. Bollen & Lennox, 1991; Streiner, 2003).

[4] We tested whether centering age at 60 years (instead of using noncentered age) would allow for convergence of models that estimate the variance of the quadratic growth factor. However, only a subset of the models converged (specifically, the relatively simple basic models, but not the more complex, e.g., TVC models). We therefore decided to constrain the variance to zero throughout the study. Centering age at 60 had no effects on the shape of the trajectories, the coefficients of the covariates, and the BIC values. We therefore kept using noncentered age throughout the study. It should be noted that the multiple group models for time-invariant covariates (gender, ethnicity, education; see Figures 3 and 6) allow for group differences in the quadratic factor, so that some explanation of the quadratic factor is available.

Table 1
Demographic Characteristics of the Sample

		Gender		Ethnicity				
Age at Wave 1	*N*	Women	Men	White	Black	American Indian	Hispanic	Asian
25 to 34	697	386	311	429	228	12	18	10
35 to 44	604	366	238	364	210	11	10	9
45 to 54	391	222	169	225	152	6	5	3
55 to 64	657	412	245	432	209	9	4	3
65 to 74	753	514	239	527	216	5	4	1
75+	477	330	147	336	134	3	2	2
Full sample	3,579[a]	2,230	1,349	2,313	1,149	46	43	28

[a] Number of participants for whom information on age was available. Age is given in years.

quadratic model, adding a cubic term worsened model fit. Thus, in the remainder of the analyses we estimated a quadratic self-esteem trajectory.

Our second goal was to test for cohort differences in the trajectory of self-esteem. We created six birth cohort groups using age at Wave 1 (i.e., 25–34, 35–44, 45–54, 55–64, 65–74, and 75 years and older; the last cohort covered more than 10 years due to restrictions in sample size; see Table 1). Using a multiple group analysis, we tested whether a model in which coefficients are freely estimated yielded a better fit than did a model with cross-group equality constraints on the coefficients. The results showed that a model with constraints forcing the same trajectory across all of the cohorts fit better than did a model without the constraints, suggesting there are no cohort differences in the self-esteem trajectory (see Table 2).

Thus, the evidence suggests that modeling a single coherent trajectory across the observed age range is appropriate. As Table 3 shows, all of the coefficients in the basic quadratic model were significant, including the means of the intercept, linear slope, and quadratic slope, as well as the variances of the intercept and linear slope. Figure 2 shows the average, predicted trajectory of self-esteem for the full sample. Overall, self-esteem tended to increase during young and middle adulthood, reached a peak at about 60 years, and then declined in old age. There was about a one-half standard deviation increase ($d = .47$) from age 25 years to age 60 years, and about a two-third standard deviation decrease ($d = -.68$) from age 60 years to age 100 years.

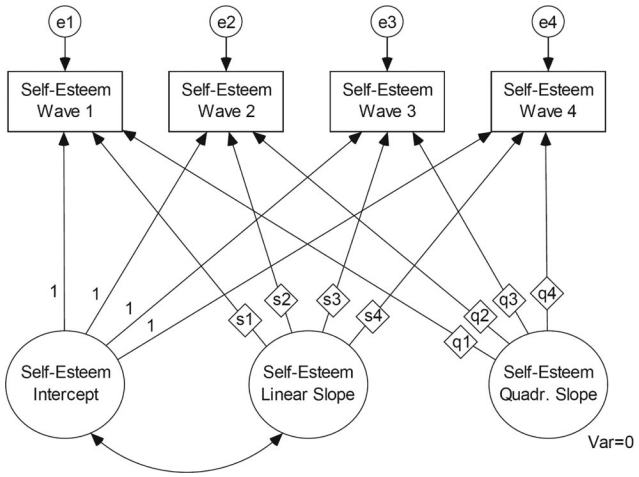

Figure 1. Growth curve model of quadratic change in self-esteem (the models for linear and cubic growth were specified accordingly). The model captures the development of self-esteem across the entire observed age range with individual slope loadings. Parameters with individually varying values are represented by diamonds (Mehta & West, 2000; Preacher et al., 2008). Linear slope loadings at Waves 1 to 4 are denoted as s1 to s4, and quadratic slope loadings are denoted as q1 to q4. Individual values for these loadings (i.e., the exact, unrounded age at assessments and the squared values, respectively) are included in the analysis through individual data vectors. The intercept loadings were set to 1 at each wave. Residual variances are denoted as e1 to e4. The variance (Var) of the quadratic (Quadr.) slope factor was set to zero to allow for convergence of the models.

Effects of Covariates on the Life-Span Trajectory of Self-Esteem

Our third goal was to test for moderators of the self-esteem trajectory. Different models are required to analyze time-invariant covariates versus TVCs, so we report the results separately for these two sets of variables.

Effects of time-invariant covariates. For all three time-invariant covariates (gender, ethnicity, education), model fit was improved when we allowed the coefficients to vary across groups (e.g., men vs. women; Table 2). To investigate these effects in more detail, we estimated four conditional growth curve models (see Table 3), one for each variable and one that examined all three variables simultaneously.[5]

With Model 1, we examined the effect of gender on the trajectory. The results indicated that gender significantly influenced the intercept and slope factor. Figure 3A shows the predicted trajectory for men and women.[6] As can be seen, female participants had

[5] We also tested for two-way and three-way interaction effects among gender, ethnicity, and education on the growth curve factors. However, no significant interaction effects emerged.

[6] The trajectories shown in Figure 3 are based on estimates for the multiple group models rather than the conditional models because the multiple group models yield more precise descriptions of the trajectories in different groups.

Table 2
Model Fit of Multiple-Group Growth Curve Models of Self-Esteem

Model	No cross-group constraints	Cross-group constraints
Cohorts (6 age groups)	16,758.9	16,668.9[a]
Gender (male vs. female)	16,641.4[a]	16,643.0
Ethnicity (White vs. Black)	16,033.4[a]	16,101.5
Education (low vs. high)	16,340.0[a]	16,624.2

Note. Values in the table are Bayesian information criterion (BIC); lower values indicate better model fit.
[a] Model selected.

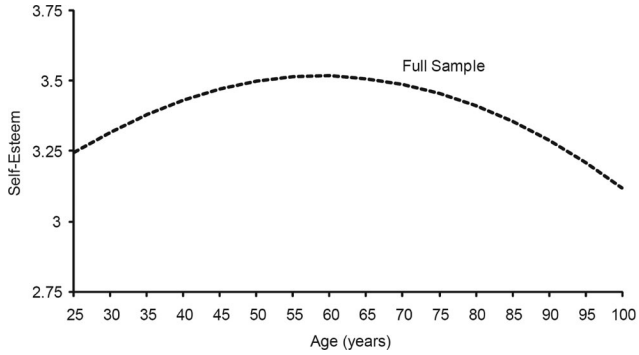

Figure 2. Average predicted trajectory of self-esteem for the full sample.

lower self-esteem at age 25 years but showed greater growth than did male participants. The self-esteem difference between male participants and female participants at age 25 years corresponded to $d = .26$, whereas the self-esteem difference at age 100 years was $d = -.01$.

With Model 2, we examined the effects of ethnicity on the trajectory. The results indicated that ethnicity (i.e., the contrast between White participants and Black participants) significantly influenced the slope factor but not the intercept. Figure 3B shows the predicted trajectory for Whites and Blacks. As can be seen, the self-esteem of Whites and Blacks differed only a little at age 25 years ($d = .12$). However, Black participants declined more sharply than White participants from about age 60 years; thus by age 100 years, there was a substantial difference in self-esteem between White participants and Black participants ($d = .85$).

With Model 3, we examined the effect of education on the trajectory. The results indicated that education predicted the intercept but not the slope of the curve (see Figure 3C). At all ages, participants with higher levels of education had higher self-esteem: the self-esteem difference between participants with low education and participants with high education at age 25 years, 60 years, and 100 years corresponded to $d = .34$, $d = .38$, and $d = .22$.

With Model 4, we examined the effects of all three variables simultaneously. The results were relatively similar to Models 1 through 3, except that the effect of ethnicity on the intercept, which was nonsignificant in Model 2, became significant in Model 4, and the effect of gender on the slope, which was significant in Model 1, became nonsignificant in Model 4; however, the regression coefficients were not strongly altered when the moderators were analyzed simultaneously. Thus, gender, ethnicity, and education are relatively independent moderators of the self-esteem trajectory.

Effects of TVCs. Figure 4 shows the generic model that was used for the analyses of TVCs. In this model, self-esteem at specific measurement occasions is explained simultaneously by growth curve factors and a repeatedly measured TVC, so the growth curve describes the predicted trajectory when the TVC is held constant (K. A. Bollen & Curran, 2006; Preacher et al., 2008). TVCs were centered in all analyses.

To test whether controlling for a TVC affected the self-esteem trajectory, we compared the fit of two models. In the first model, the growth curve parameters were fixed to the values from the basic model (see Table 3). Thus, with the first model it is assumed that the trajectory is unaltered by controlling for the TVC. In the second model, the growth curve parameters were freely estimated, allowing the trajectory to deviate from the basic model.

As Table 4 shows, four of the TVCs influenced the self-esteem trajectory: the two SES indicators (income, employment status) and the two health variables (functional health, chronic health conditions). To examine the effects in more detail, we plotted the predicted self-esteem trajectories controlling for the TVCs, relative to the basic model (Figure 5A to 5H). The graphs show that controlling for SES indicators and health experiences reduces the predicted self-esteem decline in old age, whereas in young adulthood the trajectory starts at lower values.

Table 3
Unstandardized Estimates for Growth Curve Models of Self-Esteem

Estimates	Basic model	Conditional models 1	2	3	4
Means and variances of growth curve factors[a]					
Means					
Intercept	2.70*	2.81*	2.67*	2.55*	2.59*
Linear slope	2.79*	2.70*	2.86*	2.91*	2.96*
Quadratic slope	−2.36*	−2.38*	−2.36*	−2.37*	−2.39*
Variances[b]					
Intercept	0.43*	0.42*	0.42*	0.42*	0.40*
Linear slope	0.89*	0.86*	0.82*	0.93*	0.85*
Regression coefficients of covariates of growth curve factors					
Predicting intercept					
Gender[c]		−0.21*			−0.16*
Ethnicity[d]			0.12		0.17*
Education[e]				0.24*	0.25*
Predicting linear slope					
Gender[c]		0.20*			0.15
Ethnicity[d]			−0.31*		−0.33*
Education[e]				−0.05	−0.08

Note. For the analyses, the age variable was rescaled by the factor 10^{-2} to avoid numerically small estimates related to slope factors and to yield a greater precision of these estimates. Thus, the original age scaling can be recovered by multiplying the means and regression coefficients of the linear slope by 10^{-2}, and the variance of the linear slope and the means of the quadratic slope by 10^{-4}. The means, variances, and regression coefficients of the intercept were not affected by the rescaling of the age variable.
[a] In the conditional models, means are intercepts and variances are residual variances. [b] The variance of the quadratic slope factor was set to 0 (see text for explanations). [c] 0 = male, 1 = female. [d] 0 = White, 1 = Black. [e] 0 = low, 1 = high.
* $p < .05$.

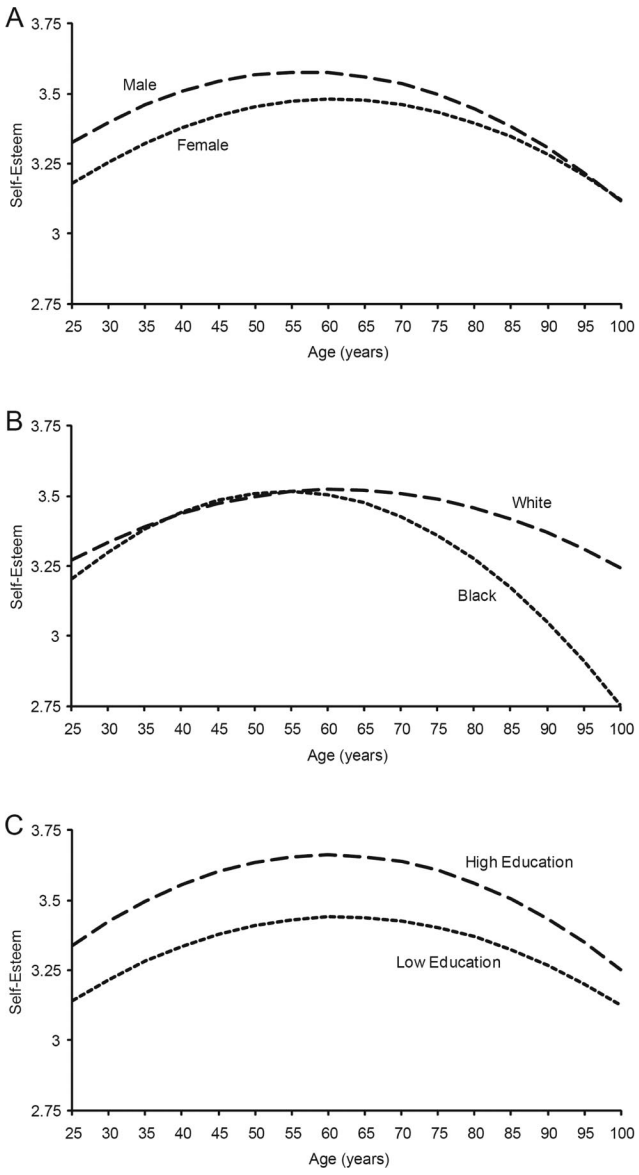

Figure 3. Average predicted trajectory of self-esteem for (A) male and female participants, (B) White and Black participants, and (C) participants with high and low education.

We then examined a model with multiple TVCs, specifically the four TVCs which were found to be influential in the previous analyses. Figure 5I shows the predicted trajectory after controlling for all four TVCs: self-esteem increases from young adulthood into old age, peaks at about age 80 years, and declines only slightly from age 80 years to age 100 years. Thus, the analyses suggest that unfavorable changes in SES and health might be responsible for the self-esteem decline in old age or, conversely, that if elderly individuals maintained their health and wealth they would not show the normative trend of declining self-esteem.

Finally, we tested whether controlling for the TVCs reduces the effects of the time-invariant covariates gender, ethnicity, and education on the self-esteem trajectory. For example, it is possible that the Black and White self-esteem trajectories differ because Blacks and Whites differ in their SES and health. As in the previous analyses of time-invariant covariates, we used multiple group analyses to test whether model fit was improved when we allowed the coefficients to vary across groups (e.g., men and women). However, the present analyses also controlled for the effects of the four influential TVCs (i.e., income, employment status, functional health, and chronic health conditions). The results suggested that accounting for ethnicity and education improves model fit but that accounting for gender worsens model fit (see Table 5). Again, we plotted the predicted trajectories (see Figure 6). The pattern of group differences in the TVC-controlled models was similar to the group differences that resulted from the uncontrolled models (cf. Figure 3). For example, as in the uncontrolled models, Whites and Blacks had similar trajectories in young and middle adulthood, but self-esteem of Blacks declined much more sharply in old age. In sum, the results suggest that controlling for the effects of TVCs does not strongly alter the moderating effects of ethnicity and education on the life-span trajectory of self-esteem, whereas the moderating effect of gender on the self-esteem trajectory can be accounted for by gender differences in SES and health experiences.

Discussion

In the present research, we investigated the development of self-esteem from young adulthood to old age, using longitudinal data from a large, nationally representative sample from the United States. Latent growth curve analyses suggested that the average trajectory of self-esteem can be captured by a quadratic curve: Self-esteem increases during young and middle adulthood, reaches a peak at about age 60 years, and declines in old age. The magnitude of the increase in adulthood corresponds to a medium-sized effect ($d = .47$, age 25 years to age 60 years), and the magnitude of the decline in old age corresponds to a large effect ($d = -.68$, age 60 years to age 100 years).

We also found significant individual differences in both the intercept and the slope of the self-esteem trajectory. We therefore examined moderators of the self-esteem trajectory. Women had lower self-esteem than did men in young adulthood, but the trajectories of the two sexes converged in old age. Whites and Blacks had similar trajectories in young and middle adulthood, but the self-esteem of Blacks declined much more sharply in old age than did the self-esteem of Whites. Education predominantly affected the intercept factor: High education predicted a self-esteem trajectory that was constantly higher than the trajectory predicted by low education.

In addition to these static moderators, we also examined dynamic moderators of the self-esteem trajectory, specifically SES, relationship variables, health experiences, and life events. SES (as indicated by income and employment status) significantly influenced the trajectory: the results suggested that the self-esteem decline in old age is partially accounted for by unfavorable changes in income and employment status. Likewise, the analyses suggested that health experiences (as indicated by functional health and chronic health conditions) influenced the trajectory and that unfavorable changes in physical health partially account for the self-esteem decline in old age. In contrast, controlling for relationship variables (i.e., relationship satisfaction, marital status, and social support) and stressful life events did not affect the

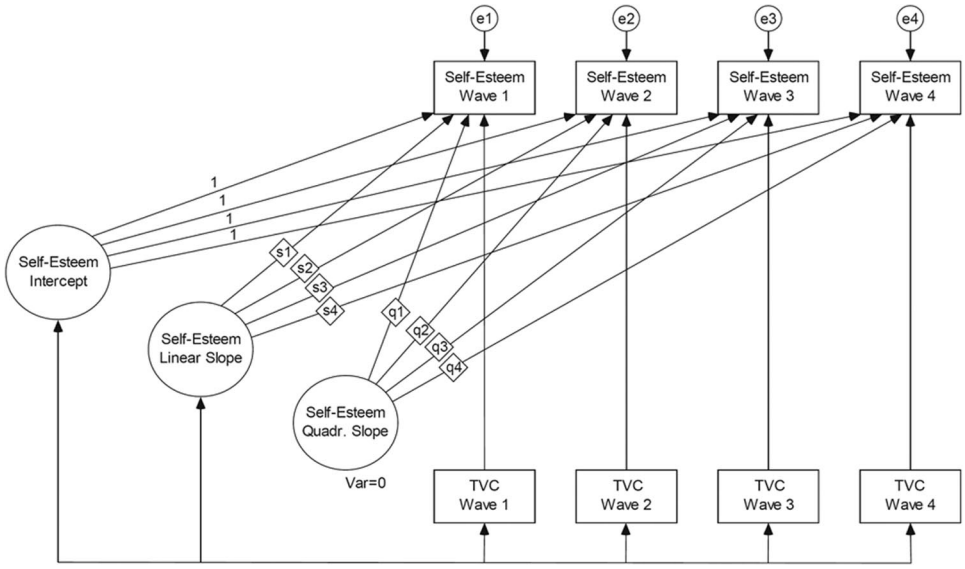

Figure 4. Growth curve model of self-esteem with time-varying covariates (TVCs). Parameters with individually varying values are represented by diamonds. Linear slope loadings at Waves 1 to 4 are denoted as s1 to s4 and quadratic slope loadings are denoted as q1 to q4. Individual values for these loadings (i.e., the exact, unrounded age at assessments and the squared values, respectively) are included in the analysis through individual data vectors. The intercept loadings were set to 1 at each wave. Residual variances are denoted as e1 to e4. The variance (Var) of the quadratic (Quadr.) slope factor was set to zero to allow for convergence of the models. The model includes covariances among intercept, linear slope, and TVCs at Waves 1 to 4.

life-span trajectory of self-esteem. Of note, the variance of the intercept and linear slope factor remained significant after controlling for static and dynamic moderators, which suggests the need to examine additional covariates in future research.

Implications of the Findings

As discussed in the introduction, previous research on self-esteem development suffered from significant methodological problems: Specifically, the studies either were cross-sectional or, if longitudinal, examined only one developmental stage (e.g., young adulthood). The findings of the present research confirm some, but not all, of the conclusions that can be drawn from this previous research. For example, the quadratic shape of the self-esteem trajectory across the adult life span could be anticipated by the cross-sectional studies of McMullin and Cairney (2004) and Robins et al. (2002), but not Pullmann et al. (2009). The present research also confirms previous cross-sectional findings concerning the effects of gender, ethnicity, and education on self-esteem (Gray-Little & Hafdahl, 2000; Kling et al., 1999; Robins et al., 2002; Twenge & Crocker, 2002). However, the present research provides for significantly stronger conclusions about the effects of these variables, due to the cohort-sequential longitudinal study design and the sample's broad age range from 25 years to 104 years.

Table 4
Model Fit of Growth Curve Models of Self-Esteem With Time-Varying Covariates

TVCs controlled	Model with constrained growth curve parameters (fixed to basic model)	Model with free growth curve parameters
Models with single TVCs		
Income	61,581.9	61,578.8[a]
Employment status	26,958.2	26,922.2[a]
Relationship satisfaction	27,925.3[a]	27,964.0
Marital status	25,419.3[a]	25,457.8
Social support	42,274.3[a]	42,314.7
Functional health	42,260.6	42,253.9[a]
Chronic health conditions	46,826.1	46,798.7[a]
Stressful life events	44,658.7[a]	44,699.4
Model with multiple TVCs		
Income, employment status, functional health, and chronic health conditions	123,837.1	123,722.7[a]

Note. Values in the table are Bayesian information criterion; lower values indicate better model fit. TVC = time-varying covariate.
[a] Model selected.

The findings of the present research are broadly consistent with the literature on personality development. Self-esteem is most closely associated with the personality traits of emotional stability, extraversion, and conscientiousness (Robins, Hendin, et al., 2001; Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001; Watson, Suls, & Haig, 2002). On average, emotional stability increases from young adulthood to midlife and remains high into old age; conscientiousness increases throughout the adult life span or increases from young adulthood to midlife and then decreases during old age; and extraversion shows minimal change across the adult life span (Donnellan & Lucas, 2008; Lucas & Donnellan, 2009; B. W. Roberts et al., 2006; Srivastava, John, Gosling, & Potter, 2003; Terracciano et al., 2005). Thus, the self-esteem trajectory follows a curve similar to emotional stability and conscientiousness (at least from young adulthood to midlife). One question that

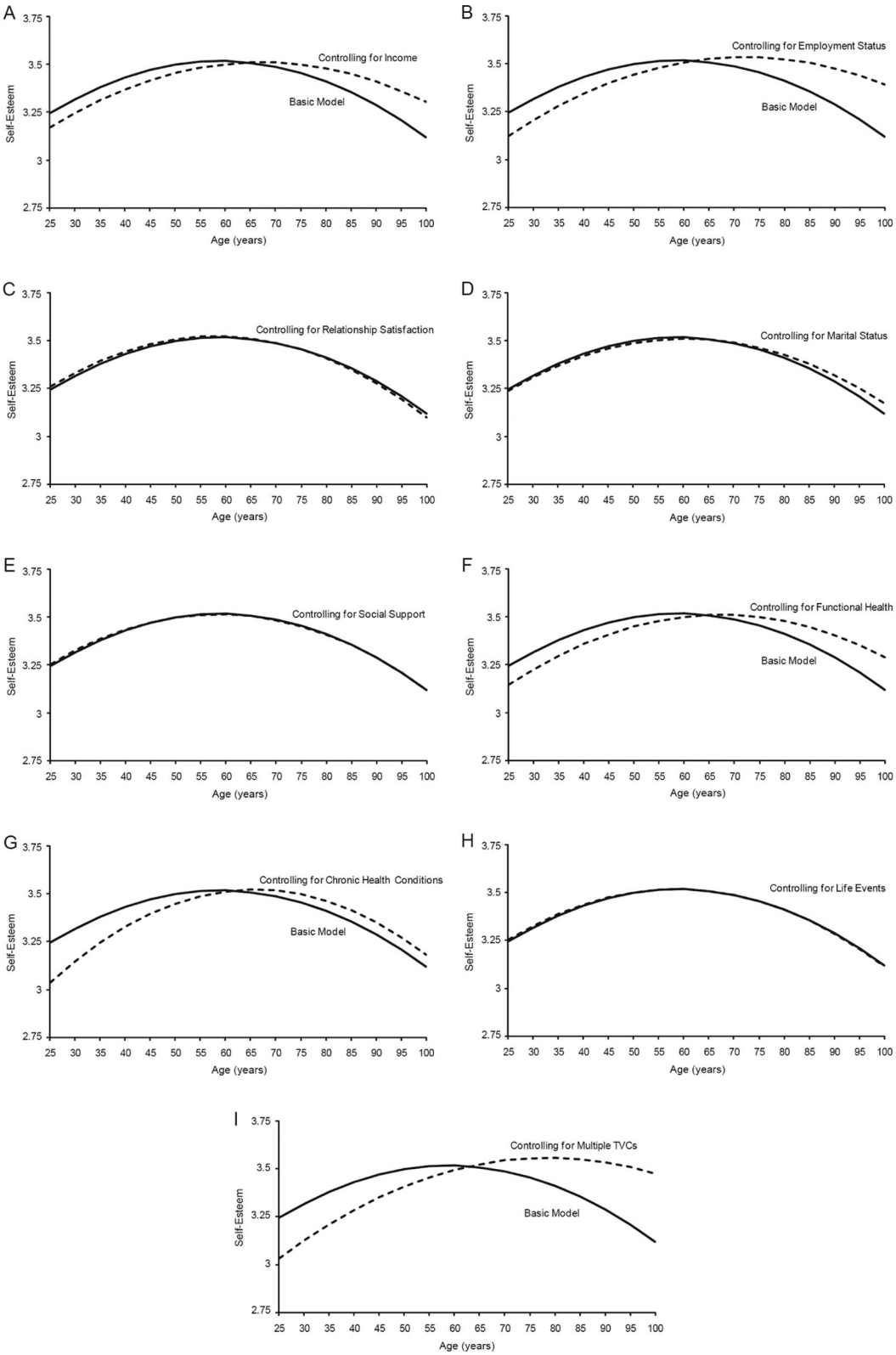

Figure 5. Average predicted trajectory of self-esteem, controlling for the effects of time-varying covariates (TVCs). Panels 5A to 5H show the predicted trajectories when controlling for single TVCs. Panel 5I shows the predicted trajectory controlling for multiple TVCs (i.e., income, employment status, functional health, and chronic health conditions). TVCs were centered.

Table 5
Model Fit of Multiple-Group Growth Curve Models of Self-Esteem With Time-Varying Covariates

Model	No cross-group constraints	Cross-group constraints
Gender (male vs. female)	124,491.9	124,465.1[a]
Ethnicity (White vs. Black)	120,607.1[a]	120,665.0
Education (low vs. high)	123,113.1[a]	123,279.9

Note. Values in the table are Bayesian information criterion; lower values indicate better model fit. All models controlled for the effects of income, employment status, functional health, and chronic health conditions.
[a] Model selected.

arises is whether the personality and self-esteem trajectories are independent of each other; that is, do people increase in self-esteem during adulthood because they increase in emotional stability and conscientiousness, and conversely, do they increase in emotional stability and conscientiousness because they increase in self-esteem? We know from previous research that low self-esteem prospectively influences depression, but not vice versa (Ormel, Oldehinkel, & Vollebergh, 2004; Orth et al., 2008; Orth, Robins, Trzesniewski, et al., 2009), which suggests that the self-esteem trajectory might be driving the emotional stability trajectory (depression is an important indicator of low emotional stability). However, if there is an association between self-esteem trajectories and conscientiousness trajectories, the causal relation seems likely to be in the opposite direction; that is, individuals who are increasing in conscientiousness will attain more success in life, which in turn may boost self-esteem. Future research should explore these possibilities.

The present research suggests that the largest mean-level changes in self-esteem, at least across the adult life span, occur in young adulthood (i.e., the largest increase) and old age (i.e., the largest decline). This finding might be related to the fact that the interindividual, or rank-order, stability in self-esteem is somewhat lower in these two developmental stages than in middle adulthood (Trzesniewski et al., 2003). Thus, at times when normative change in self-esteem is largest, change in the rank-order position of individuals—relative to their age group—likewise is largest, perhaps because both types of changes tend to occur during important life transitions when social roles and relationships are in rapid flux. The combined pattern of results for mean-level and rank-order change suggests that young adulthood and old age are critical periods in self-esteem development. Therefore, these developmental stages might be of particular importance for interventions aimed at improving self-esteem.

Despite the decline in old age, average self-esteem scores never dropped below the midpoint of the response scale, suggesting that mean self-esteem levels remained relatively high in an absolute sense. However, it is important to note that at least in samples from Western cultures, self-esteem scores tend to be distributed predominantly in the middle to high range (cf. Heine, Lehman, Markus, & Kitayama, 1999; Robins et al., 2002). In other words, individuals who rate their self-esteem at the midpoint of the scale actually have low self-esteem relative to the population. Given that we used data from a large probability sample, the mean levels found in the present sample provide a useful reference point for determining whether participants at each developmental period had relatively low versus high self-esteem. However, because self-esteem was necessarily assessed with an arbitrary metric, there is no way to determine whether the participants in our study had low or high self-esteem in an absolute sense (Blanton & Jaccard, 2006).

Limitations and Future Directions

One limitation of the present research is that the ACL study did not follow participants across the full time span examined (i.e., age 25 to 104) but covered a 16-year interval only. We therefore used

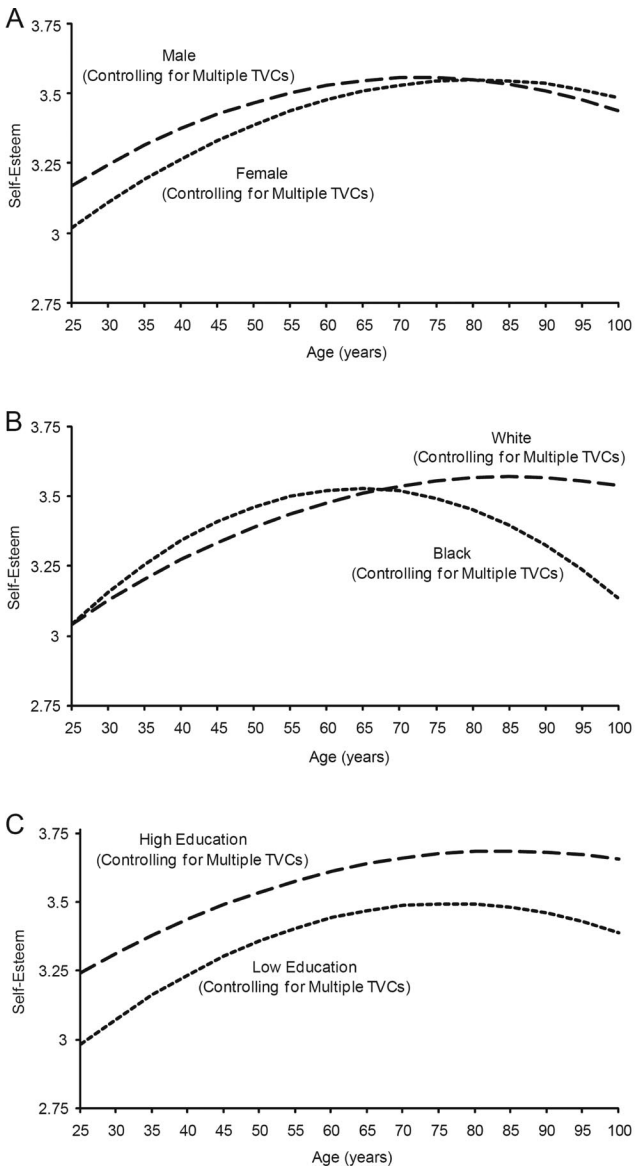

Figure 6. Average predicted trajectory of self-esteem, controlling for multiple time-varying covariates (TVCs; i.e., income, employment status, functional health, and chronic health conditions), for (A) male and female participants, (B) White and Black participants, and (C) participants with high and low education. TVCs were centered.

cohort-sequential methodology to estimate the complete trajectory from the available data. This procedure is only valid in the absence of cohort effects. In the present research, the results indicate that taking cohort differences into account does not improve, and in fact worsens, model fit, suggesting that any existing cohort differences were too small to preclude constructing a single overall trajectory across the adult life span. Similar findings have been reported by Terracciano et al. (2005) who found relatively small cohort effects in a cohort-sequential longitudinal study of the Big Five personality traits.

Another limitation is that the ACL data set includes only a three-item version of the RSE, resulting in Cronbach's alpha values that are lower than for the full 10-item RSE. However, as noted in the Method section, the three-item version captures almost all of the variance in the 10-item version, with part–whole correlations in the mid-.90s. We therefore believe that the self-esteem measure used in the present study allows for valid conclusions about the trajectory of self-esteem and its moderators. Nevertheless, future research should replicate the present analyses with the full 10-item RSE, as well as with other self-esteem scales.

The ACL data set did not allow us to examine self-esteem in childhood, adolescence, or young adulthood before age 25 years. Previous research suggests that self-esteem is high in childhood, drops during adolescence, and then increases in young adulthood (Robins et al., 2002). Thus, analyses of data sets including individuals from childhood to old age will presumably show a more complex trajectory than does the present research with individuals from age 25 years to age 104 years. In the present research, a quadratic function fit the data best; however, analyses across the full life span would likely require cubic or even more complex growth curves. Therefore, future research would benefit from the availability of data sets including participants from all stages of the life span.

The present sample included participants who are representative of the population of the United States. Although the findings are likely to generalize to other Western countries, future research should involve examination of self-esteem development in countries from more diverse cultural contexts, such as Asian and African cultures (cf. Arnett, 2008). For example, Japanese participants typically report lower self-esteem than do participants from North America (Heine et al., 1999). It is possible that Japanese samples would show an entirely different self-esteem trajectory than the one found in the present study or the same trajectory but at a lower level.

Another limitation is that the present research does not allow for conclusions regarding the causal influence of the examined moderators on self-esteem development. For example, although the time-invariant covariates moderated the self-esteem trajectories, it is possible that the effects were caused by third variables that were not assessed. Nevertheless, the findings suggested that the effects of gender, ethnicity, and education are relatively independent and hold when all three variables are analyzed simultaneously.

The results suggested that the moderating effects of ethnicity and education on the self-esteem trajectory were not explained by differing levels of SES and health experiences. For example, elderly Blacks showed a sharper decline in self-esteem than did elderly Whites, even when income, employment status, and health experiences were controlled for. Likewise, more educated individuals showed higher levels of self-esteem than did less educated individuals, even when income, employment status, and health experiences were controlled for. Thus, future research on self-esteem development should seek to identify mediators of these ethnic and educational differences. At present, we know of no relevant theories that can explain, for example, why Blacks and Whites showed different self-esteem trajectories, even after controlling for differences in SES and health experiences. In contrast, however, controlling for SES and health experiences rendered the difference between men and women nonsignificant, so differences in SES and health experiences are a possible explanation of the moderating effect of gender on self-esteem development.

In summary, the present research contributes to our understanding of self-esteem development by providing longitudinal evidence about the shape of the trajectory across the adult life span and by identifying moderators that account for interindividual differences in the trajectory. Ethnicity, education level, SES, and health were of particular importance in explaining the life-span trajectory of self-esteem. As reviewed in the introduction, previous research suggests that these factors might causally influence self-esteem and, thus, are potential sources of self-esteem. At the same time, previous research also suggests that self-esteem might influence economic welfare and physical health. Therefore, an important task in future research is to better understand the interplay between self-esteem development and important life outcomes across the life span.

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