Life-Span Development of Self-Esteem and its Effects on Important Life Outcomes

Ulrich Orth

University of Basel

Richard W. Robins and Keith F. Widaman

University of California, Davis

Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology, 102*, 1271-1288. http://dx.doi.org/10.1037/a0025558

Author Note

Ulrich Orth, Department of Psychology, University of Basel; Richard W. Robins and Keith F. Widaman, Department of Psychology, University of California, Davis.

This research was supported by Swiss National Science Foundation Grant PP00P1-123370 to Ulrich Orth.

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.

Abstract

We examined the life-span development of self-esteem and tested whether self-esteem influences the development of important life outcomes, including relationship satisfaction, job satisfaction, occupational status, salary, positive and negative affect, depression, and physical health. Data came from the Longitudinal Study of Generations. Analyses were based on 5 assessments across a 12-year period of a sample of 1,824 individuals aged 16 to 97 years. First, growth curve analyses indicated that self-esteem increases from adolescence to middle adulthood, reaches a peak at about age 50 years, and then decreases in old age. Second, cross-lagged regression analyses indicated that self-esteem is best modeled as a cause, rather than a consequence, of life outcomes. Third, growth curve analyses, with self-esteem as time-varying covariate, suggested that self-esteem has medium-sized effects on life-span trajectories of affect and depression, small to medium-sized effects on trajectories of relationship and job satisfaction, a very small effect on the trajectory of health, and no effect on the trajectory of occupational status. These findings replicated across four generations of participants—children, parents, grandparents, and their great-grandparents. Together, the results suggest that self-esteem has a significant prospective impact on real-world life experiences and that high and low self-esteem are not mere epiphenomena of success and failure in important life domains.

Keywords: self-esteem, life-span development, life outcomes

Life-Span Development of Self-Esteem and its Effects on Important Life Outcomes

There is an ongoing debate about whether individuals with high self-esteem have better prospects for their life than individuals with low self-esteem. Whereas some studies suggest that global self-esteem—a person's overall evaluation or appraisal of his or her worth—has no important influence on relationship success, economic welfare, and health (e.g., Baumeister, Campbell, Krueger, & Vohs, 2003; Boden, Fergusson, & Horwood, 2008; Krueger, Vohs, & Baumeister, 2008), other studies suggest that self-esteem has a significant impact on important life outcomes (e.g., Swann, Chang-Schneider, & McClarty, 2007, 2008; Trzesniewski et al., 2006). At present, the empirical evidence—which we review below—is still inconclusive with regard to which, if any, life domains are affected by self-esteem. Although previous research has identified numerous correlates of self-esteem, including a variety of relationship, work, and health factors, this research does not demonstrate that self-esteem actually predicts change in these correlates. For example, although self-esteem is concurrently correlated with career success (Judge & Bono, 2001), self-esteem might not predict increases in career success over time. Whether self-esteem is a cause or consequence (or both) of important life outcomes is a critical question because a causal effect of self-esteem implies that improving self-esteem would have a beneficial effect on the outcomes associated with self-esteem. Thus, if self-esteem has a causal effect, then this would suggest that the interventions aimed at increasing self-esteem are worthwhile and likely to contribute to positive life outcomes and reduce the risk for maladaptive outcomes (for a detailed discussion of this issue, see Baumeister et al., 2003). In contrast, if self-esteem is simply a consequence, or epiphenomenon (Seligman, 1993), of positive life outcomes, then efforts to boost self-esteem may produce little concrete benefit, either for the individual or society.

The present research addresses this gap in the literature by examining effects of self-esteem on life-span trajectories of relationship satisfaction, job satisfaction, occupational status, salary, affect, depression, and health, using data from a large longitudinal study of four generations of individuals aged 16 to 97 years. Currently, the field lacks a broad theoretical perspective that could provide a framework for the present research. By examining patterns of findings across developmental contexts (adolescence to old age) we hope to contribute to building a new, overarching theory of the causes and consequences of self-esteem across the life course.

In addition, we examined the life-span trajectory of self-esteem, so we can better understand how age-related changes in self-esteem correspond to age changes in life outcomes. The available evidence suggests that self-esteem follows a quadratic trajectory from adolescence to old age, increasing during young and middle adulthood, reaching a peak at about age 60, and declining in old age (Orth, Trzesniewski, & Robins, 2010). However, this trajectory has been documented in only one longitudinal data set (Orth et al., 2010; Shaw, Liang, & Krause, 2010). A meta-analysis of mean-level changes in self-esteem suggests that self-esteem increases in young adulthood and does not change after age 30 years; however, few longitudinal studies were available after age 30, possibly limiting the statistical power of analyses in midlife and old age (Huang, 2010). Thus, further research is needed to replicate the finding, particularly the old age decline, in other longitudinal samples.

Relations Between Self-Esteem and Life Outcomes

In this section, we review the available evidence on whether self-esteem influences relationship satisfaction, job satisfaction, occupational status, salary, affect, depression, and health, and conversely whether self-esteem is influenced by these variables. Because one goal of

the present research is to examine the influence of self-esteem on the life-span trajectories of the outcomes, we also briefly review research on age changes in each of the outcome variables.

Relationship Satisfaction

Cross-sectional studies suggest that self-esteem is positively correlated with relationship satisfaction (Shackelford, 2001; Voss, Markiewicz, & Doyle, 1999). This positive relation may arise because individuals with high self-esteem show more relationship-enhancing behaviors whereas individuals with low self-esteem show more dysfunctional, relationship-damaging behaviors. For example, individuals with low self-esteem are more sensitive to rejection and tend to withdraw and reduce interpersonal closeness following conflicts, thereby undermining satisfaction in close relationships (Murray, Holmes, & Griffin, 2000; Murray, Rose, Bellavia, Holmes, & Kusche, 2002). Conversely, relationship satisfaction may affect self-esteem. For example, satisfying relationships may increase the perceived relational value of oneself and thereby positively influence self-esteem (cf. Leary & Baumeister, 2000). Consistent with this possibility, Andrews and Brown (1995) found that women who reported becoming closer to their relationship partner increased in self-esteem over the following years.

Some studies have examined the life-span trajectory of relationship satisfaction. In a meta-analysis, age had a small positive effect on marital satisfaction (Karney & Bradbury, 1995). Consistent with this finding, Gorchoff, John, and Helson (2008) found that relationship satisfaction increased over an 18-year period in middle adulthood. In contrast, Umberson, Williams, Powers, Chen, and Campbell (2005) found that relationship satisfaction declined over an 8-year interval in all age groups from young adulthood to old age. The results by Gilford and Bengtson (1979) suggest that positive indicators of relationship satisfaction show a U-shaped relation with age, whereas negative indicators of relationship satisfaction decrease over the life

course. Other studies mapped relationship satisfaction on relationship duration (which is an imperfect, but useful, proxy for age). Some of these studies report a U-shaped curve for relationship satisfaction, specifically that relationship satisfaction decreases during the first years of a relationship but increases in later years (Anderson, Russell, & Schumm, 1983; Orbuch, House, Mero, & Webster, 1996), whereas other studies found that relationship satisfaction continuously decreases across time (e.g., VanLaningham, Johnson, & Amato, 2001) or remains stable in long-married couples (Vaillant & Vaillant, 1993). In sum, research published to date provides inconsistent evidence regarding how relationship satisfaction changes across the life span.

Job Satisfaction

Cross-sectional studies suggest that self-esteem is positively related to job satisfaction (Judge & Bono, 2001). The few available longitudinal studies suggest that self-esteem predicts changes in job satisfaction (Judge, Bono, & Locke, 2000; Judge & Hurst, 2008). However, there is a lack of longitudinal studies that controlled for the prior level of job satisfaction while testing for prospective effects of self-esteem on job satisfaction; moreover, there is a lack of longitudinal studies that tested for possible effects in the opposite direction, that is, whether job satisfaction predicts changes in self-esteem.

With regard to its life-span trajectory, most studies report that job satisfaction increases continuously across adulthood (Bernal, Snyder, & McDaniel, 1998; Hunt & Saul, 1975; Janson & Martin, 1982; Kalleberg & Loscocco, 1983; for meta-analyses, see Ng & Feldman, 2010, and Rhodes, 1983). For example, in a large national probability sample, Bernal, Snyder, and McDaniel (1998) found a small, but significant linear relation between age and job satisfaction, but no significant quadratic or cubic trends. However, some studies have found a U-shaped

relation between age and job satisfaction, with the lowest job satisfaction in middle adulthood (e.g., Clark, Oswald, & Warr, 1996; Hochwarter, Ferris, Perrewe, Witt, & Kiewitz, 2006; Warr, 1992). For example, Clark, Oswald, and Warr (1996) examined age differences in job satisfaction in a large cross-sectional sample and found a quadratic, U-shaped relation, even when controlling for multiple covariates such as gender, education, ethnicity, and health. To summarize, the available evidence diverges with regard to the trajectory from young to middle adulthood, but consistently suggests that job satisfaction increases in the second half of working life.

Occupational Status and Salary

Self-esteem is positively correlated with occupational status (Bachman & O'Malley, 1977; Kammeyer-Mueller, Judge, & Piccolo, 2008) and salary (Judge, Hurst, & Simon, 2009; Twenge & Campbell, 2002), which are key indicators of socioeconomic status. Occupational status and salary may influence the individual's perception of his or her relational value and thereby influence self-esteem (Leary & Baumeister, 2000). However, it is also plausible that high self-esteem helps the individual to attain higher education, to be more successful at the workplace, and consequently to gain higher occupational status and salary. At present, few longitudinal studies have examined prospective relations between self-esteem and occupational status or salary. Kammeyer-Mueller et al. (2008) found that self-esteem predicted occupational status controlling for prior level of occupational status, and Judge and Hurst (2008) found that positive self-evaluations predicted higher occupational status and salary from adolescence to middle adulthood and that the effect became stronger with increasing age. In the study by Judge et al. (2009), positive self-evaluations prospectively predicted higher income. Using a sample of young adults, Salmela-Aro and Nurmi (2007) found that self-esteem predicted positive career

outcomes 10 years later, e.g., whether participants were employed, had a permanent position, and a higher salary (previous levels of outcomes were not controlled for). However, we are not aware of previous studies that tested prospective effects between self-esteem and occupational status or salary in both directions (i.e., whether self-esteem predicts occupational status or salary, and vice versa) and simultaneously controlled for prior levels of the variables.

With regard to its life-span trajectory, empirical research supports the view that occupational status and salary increases from young adulthood into midlife and then remains high until retirement (Boyd, 2008; Elstad, 2004; Ganzeboom, De Graaf, Treiman, & de Leeuw, 1992; Hauser, Sheridan, & Warren, 1999; Helson & Soto, 2005; Judge & Hurst, 2008; Miech, Eaton, & Liang, 2003; Nam & Boyd, 2004). For example, in a large sample ranging in age from 18 to 72 years, occupational status strongly increased in young adulthood and reached a peak in midlife (Miech et al., 2003). Judge and Hurst (2008) examined a large sample of adolescents and young adults and found that occupational status and pay strongly increased over the next 25 years.

Affect

Measures of positive and negative affect show strong concurrent correlations with self-esteem (e.g., Aspinwall & Taylor, 1992; Joiner, 1995; Watson, Suls, & Haig, 2002). However, to our knowledge, no previous study has examined prospective relations between affect and self-esteem. Consequently, we do not know whether affect predicts self-esteem, self-esteem predicts affect, both affect and self-esteem predict the other, or neither affect nor self-esteem predicts the other.

With regard to its life-span trajectory, previous research suggests that positive affect remains relatively stable from young to middle adulthood (Carstensen, Pasupathi, Mayr, &

Nesselroade, 2000; Charles, Reynolds, & Gatz, 2001), possibly increasing in adulthood (Helson & Soto, 2005; E. M. Kessler & Staudinger, 2009; Löckenhoff, Costa, & Lane, 2008; Mroczek & Kolarz, 1998), and then slightly decreasing in old age (Charles et al., 2001; Kunzmann, Little, & Smith, 2000). In contrast, negative affect decreases from young to middle adulthood (Gross et al., 1997; Helson & Soto, 2005; E. M. Kessler & Staudinger, 2009; Löckenhoff et al., 2008; Mroczek & Kolarz, 1998), but the decrease levels off in old age (Carstensen et al., 2000; Charles et al., 2001; Kunzmann et al., 2000). Reviews and theoretical perspectives on the life-span development of affect have been provided by Charles (2010), Mroczek (2001), and Scheibe and Carstensen (2010).

Depression

Previous research suggests that low self-esteem is a risk, or vulnerability, factor for depression. That is, low self-esteem prospectively predicts depression, controlling for prior levels of depression (for a review see Orth, Robins, & Roberts, 2008). The effect of low self-esteem on depression holds across short time intervals (e.g., a few days; Metalsky, Joiner, Hardin, & Abramson, 1993; Ralph & Mineka, 1998; Roberts & Monroe, 1992) and across long intervals (e.g., years; Orth et al., 2008; Trzesniewski et al., 2006), for men and women, and across all age groups from adolescence to old age (Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009). In addition, most prior research has failed to support the opposite direction of the relation—that low self-esteem is a consequence, rather than a cause, of depression (Ormel, Oldehinkel, & Vollebergh, 2004; Orth et al., 2008; Orth, Robins, Trzesniewski et al., 2009; but see Shahar & Davidson, 2003; Shahar & Henrich, 2010).

With regard to its life-span trajectory, most studies have found that depression decreases from young adulthood to middle adulthood and then increases again in old age, with converging

evidence provided by both cross-sectional studies (Gatz & Hurwicz, 1990; R. C. Kessler, Foster, Webster, & House, 1992; Lewinsohn, Rohde, Seeley, & Fischer, 1991; Miech & Shanahan, 2000; Mirowsky & Ross, 1992; but see Blanchflower & Oswald, 2008) and longitudinal studies (Davey, Halverson, Zonderman, & Costa, 2004; Kasen, Cohen, Chen, & Castille, 2003; Mirowsky & Kim, 2007; Mirowsky & Reynolds, 2000; Rothermund & Brandtstädter, 2003; Wallace & O'Hara, 1992). For example, R. C. Kessler et al. (1992) examined two large nationally representative surveys, which included participants from young adulthood to old age, and found that age showed a U-shaped quadratic relation with depression, with the lowest depression levels at about age 50 years in both samples. In a longitudinal study of older adults ranging from age 60 to 96 years depression consistently increased with age (Davey et al., 2004).

Health

Individuals with high self-esteem tend to report better physical health (e.g., Benyamini, Leventhal, & Leventhal, 2004; Mäkikangas, Kinnunen, & Feldt, 2004). Individuals with high self-esteem may seek and receive more social support, experience less stress, and show more adaptive coping behaviors, thereby enhancing their health. However, it is also plausible that healthy individuals feel more independent and better able to contribute to their family and society, which in turn would bolster self-esteem. Available longitudinal data suggest that self-esteem prospectively predicts health outcomes. For example, Trzesniewski et al. (2006) found that low self-esteem in adolescence predicted more physical health problems at age 26 (see also Christie-Mizell, Ida, & Keith, 2010; Stinson et al., 2008). However, only one study has examined whether health predicts changes in self-esteem; Reitzes and Mutran (2006) found that self-esteem and functional health were reciprocally related across a two-year interval, controlling for prior levels in the constructs.

With regard to its life-span trajectory, most studies suggest that physical health stays relatively constant, or only declines slowly, from adolescence to the 40s or 50s and then worsens at an accelerating rate into old age. In longitudinal studies, many of which used national probability samples, researchers have examined the trajectories of self-rated health (e.g., Liang et al., 2005; McCullough & Laurenceau, 2005; Ross & Wu, 1996; Sacker, Worts, & McDonough, 2011), impairments of functional health such as being confined to bed or having difficulties to bath, dress, climb stairs, or do heavy housework (e.g., Chiu & Wray, 2010; J. Kim & Miech, 2009; Liang et al., 2003; Ross & Wu, 1996), physical symptoms (e.g., Aldwin, Spiro, Levenson, & Cupertino, 2001), and the number of health problems such as arthritis, hypertension, stroke, or cancer (e.g., House et al., 1994).

The Present Research

The goal of the present research was to examine the life-span development of self-esteem and its effects on important life outcomes. We used data from a large longitudinal study of individuals ranging in age from adolescence to old age. We examined the effects of self-esteem on the development of relationship satisfaction, job satisfaction, occupational status, salary, positive and negative affect, depression, and health. The cohort-sequential design, spanning four generations of the same families, allowed us to determine whether any observed changes were due to intraindividual change or cohort differences (Baltes, Cornelius, & Nesselroade, 1979).

In the first part of this study, we attempted to replicate previous research suggesting that self-esteem increases across adulthood and then decreases in old age (Orth et al., 2010). We tested which of several growth curve models (intercept-only, linear, quadratic, and cubic) yields the best fit to the data. We also used the unique design of the study to test whether the self-esteem trajectory varied across generations—children, parents, grandparents, and great-

grandparents. Finally, we examined whether the trajectory varied as a function of demographic variables (i.e., gender and education). In the second part of this study, we examined reciprocal prospective relations between self-esteem and life outcomes using cross-lagged regression analyses. We tested whether any observed relations held across generations and across the life span. Finally, in the third part of this study, we examined the influence of self-esteem on the life-span trajectories of the outcome variables, using growth curve models with self-esteem as a time-varying covariate (TVC). For each outcome variable, we also tested whether the trajectory varied across generations.

As described above, we used two types of models (i.e., cross-lagged regression models and growth curve models with a TVC) to examine the effects of self-esteem on life outcomes. Each type of model yields important information that is not provided by the other type of model. The cross-lagged model tests the direction of effects between constructs (which is not provided by the growth curve model with a TVC), because effects are prospectively tested and autoregressive effects are controlled for. Cross-lagged regression models are at present the most frequently used and recommended model to test whether data are consistent with causal hypotheses on the relation between constructs, when only non-experimental longitudinal data are available (Cole & Maxwell, 2003; Finkel, 1995; Little, Preacher, Selig, & Card, 2007). In contrast, growth curve analyses provide a way to model the developmental trajectory of a variable and to examine effects of other variables on the trajectory (which is not provided by cross-lagged models). For example, it is possible that the cross-lagged regression analysis shows that self-esteem predicts relative increases in an outcome variable, whereas the growth curve analysis shows that a strong negative developmental trend in the outcome outweighs any beneficial effects of self-esteem. Moreover, growth curve models with a TVC also demonstrate

whether the average trajectory of the outcome is altered when the TVC is controlled for, which cannot be examined using cross-lagged regression models (K. A. Bollen & Curran, 2006; Grimm, 2007; Preacher, Wichman, MacCallum, & Briggs, 2008).

The present study extends previous research in several ways. First, the study examines the development of self-esteem across a significantly broader age range (i.e., adolescence to old age) than in previous longitudinal studies, providing a more comprehensive picture of life-span development of self-esteem. Second, the study systematically tests for cross-lagged prospective effects between self-esteem and life outcomes, which helps to clarify the role of self-esteem as a potential cause or consequence of important outcomes. For most of the outcomes examined in this research (i.e., relationship satisfaction, job satisfaction, occupational status, salary, and positive and negative affect), no previous study has tested the reciprocal prospective effects in both directions, controlling for prior levels of both constructs. Third, the study examines the influence of self-esteem on the life-span trajectories of these outcome variables, allowing us to examine whether the trajectory of the life outcome is altered when self-esteem is held constant and to compare the size of the self-esteem effects to normative changes in the development of life outcomes. Fourth, the unique design of the study allowed us to test whether the observed effects replicated across four generations of the same families, providing important information about the generalizability of the findings across generational cohorts. If the results show that the hypothesized effects of self-esteem on life outcomes are not confined to specific cohorts but hold across generations, the findings have important implications for theory and research on the life-span consequences of self-esteem.

Method

The data come from the Longitudinal Study of Generations (LSG; Bengtson, 2009). In 1971, three-generation families were randomly drawn from a subscriber list of about 840,000 members of a health maintenance organization in Southern California. Since 1991, the study includes a fourth generation, i.e., the great-grandchildren in the same families. The members of the health maintenance organization included primarily White working-class and middle-class families, and very low and very high socioeconomic levels were not represented in the population. However, level of education among family members corresponded to national norms at the time the sample was drawn (Bengtson, Biblarz, & Roberts, 2002). Although the sample was originally recruited in Southern California, at recent waves more than half of the sample lived outside the region, in other states of the U.S., or abroad, due to residential mobility of participants (Bengtson et al., 2002).

Participants were assessed in 1971, 1985, 1988, 1991, 1994, 1997, and 2000. In 1971 and 1985, the LSG did not include the full self-esteem measure; the present study therefore examines data of the five waves from 1988 to 2000. We excluded any participant whose age was unknown or who did not provide data on self-esteem at any of the five waves.

Participants

The sample included 1,824 individuals (57% female). Table 1 gives an overview of the demographic characteristics for the full sample and separately for the four generations. The distribution of gender is relatively even across generations. The age range across waves was 14 to 102 years; however, because there was only one assessment below age 16 and two assessments above age 97, we restricted the analyses to the age range from 16 to 97 years. Ninety-four percent of participants were Caucasian, 3% were Hispanic, 1% African American,

1% Native American, and 1% were of other ethnicity. Due to the low frequencies of ethnicities other than Caucasian, we did not examine ethnic differences.

Data on study variables were available for 1,448 individuals in 1988, 1,463 individuals in 1991, 1,405 individuals in 1994, 1,281 individuals in 1997, and 1,227 individuals in 2000. To investigate the potential impact of attrition, we compared individuals who did and did not participate in the most recent wave of data collection (2000) on study variables assessed at the first wave (1988). Participants who dropped out were more likely to be older (*M*s = 52.1 vs. 43.6 years; $d = 0.48$), less likely to be female (53% vs. 60%), have lower levels of education (*M*s = 4.55 vs. 5.26; $d = -0.45$), and reported slightly lower self-esteem (*M*s = 3.45 vs. 3.51; $d = -0.13$), less positive affect (*M*s = 0.74 vs. 0.79; $d = -0.19$), less negative affect (*M*s = 0.31 vs. 0.35; $d = -0.13$), more depression (*M*s = 1.53 vs. 1.47; $d = 0.13$), and poorer physical health (*M*s = 2.97 vs. 3.18; $d = -0.28$); differences in relationship satisfaction, job satisfaction, occupational status, and salary were all nonsignificant. Although differences in demographic variables were of medium size, differences in self-esteem and the life outcome variables were small to nonsignificant. Thus, nonrepresentativeness due to attrition was not a serious concern in the present study.

Measures

Self-esteem. Self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965), the most commonly used and well-validated measure of self-esteem (Robins, Hendin, & Trzesniewski, 2001). At all waves, responses were measured using a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). However, in 1988 and 1991 the scale labels of the middle response categories (i.e., 2 = *somewhat disagree* and 3 = *somewhat agree*) differed slightly from the labels used in 1994, 1997, and 2000 (i.e., 2 = *disagree* and 3 = *agree*). Consequently, the raw RSE scores (e.g., the means of the RSE items) were not equivalent

across assessments with differing labels and could not be used for growth curve analyses. Therefore, we computed RSE factor scores by using confirmatory factor analysis with categorical indicators and equating by common items (these preparatory analyses are reported at the end of the Method section). The alpha reliability of the RSE was .86 in 1988, .83 in 1991, .86 in 1994, .86 in 1997, and .86 in 2000.

Relationship satisfaction. The LSG uses a 10-item relationship satisfaction scale (Gilford & Bengtson, 1979). Example items are "you calmly discuss something together," "you laugh together," "you disagree about something important" (reverse-scored), and "one of you becomes critical and belittling" (reverse-scored). Participants reported how frequently they experienced the situation when they were with their spouse or partner on a 5-point scale (1 = *hardly ever*; 2 = *sometimes*; 3 = *fairly often*; 4 = *quite frequently*; 5 = *almost always*), with M = 3.90 (SD = 0.70) averaged across the five waves. The alpha reliability was .87 in 1988, .89 in 1991, .87 in 1994, .89 in 1997, and .88 in 2000.

Job satisfaction. Job satisfaction was assessed using a single item: "How satisfied would you say you are with your main job?" Responses were measured on a 5-point scale (1 = *not at all satisfied*; 2 = *not too satisfied*; 3 = *somewhat satisfied*; 4 = *very satisfied*; 5 = *extremely satisfied*), with M = 3.63 (SD = 0.92) averaged across the five waves.

Occupational status. The LSG provides a measure of occupational status created from the Hauser-Warren Socioeconomic Index (Hauser & Warren, 1997), which is based on the average education level and income of persons in each occupation as reflected in the 1990 U.S. Census. The participants' score is based on information on his or her current or most recent occupation. Examples for occupational status scores are: 14.9 for farm workers, 29.8 for mining machine operators, 50.2 for librarians, 64.1 for teachers in secondary schools, and 77.1 for

dentists (for further information see Bengtson, 2009, Appendix C1). The measure ranged from 9.6 to 80.5 and had a mean of 43.5 (*SD* = 14.6) averaged across the five waves.

Salary. Salary was assessed with a 12-point measure, ranging from 1 (less than $10,000) to 12 ($110,000 or more). The mean was 4.07 (*SD* = 2.55) averaged across the five waves.

Positive and negative affect. Positive and negative affect were assessed with the Affect Balance Scale (Bradburn, 1969), with five items measuring positive affect and five items measuring negative affect. The validity of the scale has been repeatedly supported (Harding, 1982; K. A. Kim & Mueller, 2001). Example items are "particularly excited or interested in something" and "that things were really going your way" (positive affect), and "so restless that you couldn't sit long in a chair" and "bored" (negative affect). For each item, participants reported whether they ever felt that way during the past few weeks (0 = *no*; 1 = *yes*). For positive affect the mean was 0.76 (*SD* = 0.26), and for negative affect the mean was 0.32 (*SD* = 0.30), averaged across the five waves. In particular when items are dichotomous, coefficient alpha can underestimate the reliability of scales. We therefore used the method by Raykov, Dimitrov, and Asparouhov (2010) for estimating the reliability of scales with dichotomous items. The estimates were .84 in 1988, .87 in 1991, .84 in 1994, .87 in 1997, and .85 in 2000 for positive affect, and .69 in 1988, .69 in 1991, .72 in 1994, .71 in 1997, and .70 in 2000 for negative affect.

Depression. Depression was assessed with the 20-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a frequently used and well-validated measure for the assessment of depressive symptoms in non-clinical, sub-clinical, and clinical populations (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004). For each item, participants reported how frequently they experienced the symptom during the past week using a 4-point scale (0 = *rarely or none of the time*; 1 = *a little of the time*; 2 = a *moderate amount of the time*; 3

= *most or all of the time*). Because two of the CES-D items were used for equating the RSE across assessments (for further details see below), these items were excluded from the CES-D; thus, we used an 18-item CES-D for the analyses on depression. At each wave, the 18-item CES-D correlated .99 with the full 20-item CES-D. The 18-item CES-D had a mean of 1.52 (*SD* = 0.44) averaged across the five waves, and an alpha reliability of .88 in 1988, .91 in 1991, .90 in 1994, .90 in 1997, and .90 in 2000.

Health. Participants rated their health on a single item: "Compared to people of your own age, how would you rate your overall physical health at the present time?" Responses were measured on a 4-point scale (1 = *poor*; 2 = *fair*; 3 = *good*; 4 = *excellent*), with *M* = 3.07 (*SD* = 0.76) averaged across the five waves.

Health problems. Health problems were assessed with an index of 10 dichotomous items. The items were: heart problems/angina, high blood pressure, stroke, cancer, respiratory ailments, digestive problems, arthritis/rheumatism, diabetes, cataracts/glaucoma/retinal degeneration, and hearing impairment. The mean was 1.29 (*SD* = 1.55) averaged across the five waves. Because the distribution of health problems is positively skewed, with the largest frequency at zero problems, the variable was used in logarithmic metric.[1]

Education. The LSG includes an 8-point measure of education (1 = *8th grade or less*; 2 = *some high school, 9th-11th grade*; 3 = *high school or vocational school graduate*; 4 = *specialized technical, business, or other training after high school*; 5 = *some college, 1-3 years*; 6 = *college or university graduate*; 7 = *one or more academic years beyond college, including M.A.*; 8 = *post-graduate degree, Ph.D., M.D., J.D., etc.*). For most participants, due to their age, level of education was invariant across waves, so we used the highest degree that participants

reported across waves as a time-invariant covariate in our analyses. The mean was 5.04 (*SD* = 1.62), ranging from 1 to 8.

Statistical Analyses

Analyses were conducted using the Mplus 6.1 program (Muthén & Muthén, 2010). To deal with missing values, we employed full information maximum likelihood estimation to fit models directly to the raw data, 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; Widaman, 2006).

For confirmatory factor models and cross-lagged regression models, fit was assessed by the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root-mean-square error of approximation (RMSEA), based on the recommendations of Hu and Bentler (1999) and MacCallum and Austin (2000). Hu and Bentler (1999) suggest that good fit is indicated by values greater than or equal to .95 for CFI and TLI, and less than or equal to .06 for RMSEA. To test for differences in model fit, we used the test of small differences in fit recommended by MacCallum, Browne, and Cai (2006, Program C). For these tests, statistical power was high with values above .99 (MacCallum et al., 2006, Program D).

For growth curve models, CFI, TLI, and RMSEA were not available; therefore, the fit of these models was assessed using the Bayesian information criterion (BIC). For BIC, absolute values cannot be interpreted, but when comparing models, lower values indicate better model fit.

Equating the RSE Across Waves

In the LSG, the labels of the RSE response categories were altered in 1994 (as described above), which likely precludes measurement invariance of the RSE raw scores across waves. Measurement invariance is, however, a basic requirement for growth modeling because scores at

different waves are directly comparable only when measurement invariance holds (Edwards & Wirth, 2009; Widaman, Ferrer, & Conger, 2010). To resolve this problem, we used confirmatory factor analysis with categorical indicators (Wirth & Edwards, 2007) and equating by common items (Edwards & Wirth, 2009) to compute RSE factor scores. This procedure can establish measurement invariance because all observed scores, by using the common items as anchors, are mapped on the same latent scale.

To equate by common items, we needed items that were conceptually related to self-esteem and that were available at each wave in identical response format. Two CES-D items met these requirements. The items were "I felt that I was just as good as other people" (Item 4 of the CES-D) and "I thought my life had been a failure" (reverse-scored; Item 9 of the CES-D). The content of these items suggests that they are essentially measures of self-esteem. Thus, the self-esteem measurement models included 10 RSE items and two CES-D items; all items were available at each wave. For the RSE items, two different sets of labels for response categories were used (i.e., Set A in 1988 and 1991, and Set B in 1994, 1997, and 2000). For the CES-D items, an identical set of labels was used across waves (i.e., Set C). In a series of increasingly restricted measurement models we tested the measurement invariance of the CES-D items. If measurement invariance of the CES-D items holds, then the RSE items can be mapped on the same scale across waves. In addition, we also tested the measurement invariance of the RSE items for waves using the same set of labels (i.e., Set A and Set B). Although measurement invariance of the RSE items is not required for equating by the CES-D items, its presence would strengthen confidence in the measurement properties of the RSE.[2]

The measurement models included five correlated self-esteem factors (one factor per wave). In addition, the models included method factors that accounted for bias due to positive

and negative wording of the items (cf. Marsh, Scalas, & Nagengast, 2010). Both the positive and negative wording factors were correlated across waves, but positive wording factors were uncorrelated with negative wording factors, and all wording factors were uncorrelated with the self-esteem factors. Including these method factors strongly increased the fit of the models. Also, the measurement models included longitudinal correlations between the same items measured at different waves (Cole & Maxwell, 2003). Including these correlations controls for possible bias due to indicator-specific variance that is not captured by the self-esteem and wording factors. The indicators were analyzed as categorical variables, using the mean- and variance-adjusted weighted least square (WLSMV) estimator.

The first measurement model (i.e., Model 1) included configural invariance (Widaman et al., 2010) for both the CES-D and RSE items. The fit of this model was good (Table 2). Models 2 and 3 tested weak and strong invariance of the CES-D items by progressively constraining the loadings and thresholds, respectively, to be equal across waves. The fit of these models was as good as the fit of Model 1, supporting the conclusion that the CES-D items show measurement invariance and can be used for equating the RSE factor scores across waves.[3] Models 4 and 5 tested the measurement invariance of the RSE items for waves using the same set of labels (i.e., Set A and Set B), again by progressively constraining the loadings and thresholds, respectively, to be equal. The fit of these models was good (Table 2). Although the RMSEA values slightly worsened, the difference was small and the CFI and TLI values were unaltered. We concluded that, when using the same response format, the RSE items showed measurement invariance.[4] The RSE factor scores were computed in Model 6, which included only the RSE items and omitted the CES-D items. The loadings and thresholds of the RSE items were fixed to the parameter

estimates from Model 5. The participants' scores on the five latent self-esteem factors were saved and used as measures of self-esteem in the remainder of the analyses.

Results

Developmental Trajectory of Self-Esteem

We examined the trajectory of self-esteem from adolescence to old age, by using growth curve models that capture the development of self-esteem across the entire observed age range represented in the sample. Although each participant provided data for, at most, five age points (covering a 12-year interval), the complete life-span trajectory was constructed using 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 generations included in the sample (e.g., Duncan, Duncan, & Strycker, 2006; Preacher et al., 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 employed individual slope loadings, following the recommendations by Mehta and West (2000), Bollen and Curran (2006), and Preacher et al. (2008).

We estimated a model with an intercept only, and linear, quadratic, and cubic growth models (Preacher et al., 2008). Because the slope loadings are based on age rather than the five measurement occasions, it was possible to estimate relatively complex trajectories. Age was centered at 50 years. The cubic model had the best fit to the data (the BIC values were 13,483.5 for the model with an intercept only, 13,429.4 for the linear model, 13,037.0 for the quadratic model, and 12,906.6 for the cubic model). Therefore, in the remainder of the analyses, we estimated a cubic self-esteem trajectory. Next, we tested whether there are differences between generations in the trajectory. Using a multiple-group analysis, we tested whether a model in

which coefficients are freely estimated yielded a better fit than a model with cross-generation equality constraints on the coefficients.[5] In these models, the variance of the cubic growth factor had to be set to zero to allow for convergence of the models. The results showed that a model with constraints forcing the same trajectory across generations fit better than a model without the constraints, suggesting there are no generational differences in the self-esteem trajectory.

Thus, the evidence suggests that modeling a single coherent trajectory across the observed age range is appropriate. Figure 1A shows the average predicted trajectory of self-esteem for the full sample. Overall, self-esteem tended to increase during adolescence, young adulthood, and middle adulthood, reaching a peak at age 51, and then declined in old age. There was about a one-quarter standard deviation increase ($d = 0.29$) from age 16 to 51 and about a two-third standard deviation decrease ($d = -0.67$) from age 51 to 97 years. Although the trajectory shown in Figure 1A appears to be quadratic, it is in fact cubic. The cubic factor results in a lower increase in young adulthood and a stronger decrease in old age than would be explained by a quadratic trajectory. Although one of the turning points of the cubic trajectory is outside of the observed age range, the cubic factor is important to fit the trajectory more closely to the data (as indicated by the better model fit of the cubic trajectory).

Next, we estimated conditional growth curve models (Preacher et al., 2008) to examine the moderating effects of gender and education on the self-esteem trajectory. Gender was dummy-coded for these analyses, and education was converted to *z*-scores. For both gender and education, none of the effects on the intercept or on the linear, quadratic, and cubic growth factors were significant, except that education significantly predicted the intercept (the unstandardized regression coefficient was 0.17; no standardized estimate is available). We also examined the effects of gender and education simultaneously: the effects of gender remained

nonsignificant and the education effect on the intercept remained significant at 0.16. Figure 1B illustrates the education effect by plotting the predicted self-esteem trajectory for individuals with high (i.e., one standard-deviation unit above the mean) and low (i.e., one standard-deviation unit below the mean) levels of education. As can be seen, participants with higher levels of education had higher self-esteem at all ages: the self-esteem difference between participants with low vs. high education at age 16 corresponded to $d = 0.38$ and at age 97 to $d = 0.24$.

Cross-Lagged Effects of Self-Esteem and Life Outcomes

Before we examined the effects of self-esteem on the life-span trajectories of the outcome variables, we first tested whether self-esteem in fact predicts the outcome variables by using cross-lagged regression models. Figure 2 provides a generic illustration of these models (cf. Finkel, 1995). Each model tested the relations between self-esteem and one of the outcome variables.[6] The relations between variables were specified as cross-lagged effects, which indicate the prospective effect of one variable on the other (e.g., the effect of self-esteem in 1988 on relationship satisfaction in 1991), after controlling for their stability across time (e.g., the effect of relationship satisfaction in 1988 on relationship satisfaction in 1991). We accounted for variance due to specific measurement occasions by correlating the residual variances within waves (e.g., the residual of self-esteem in 1991 and the residual of relationship satisfaction in 1991; cf. Cole & Maxwell, 2003). The stability and cross-lagged coefficients were constrained to be equal across time. Although the fit values were slightly worse than the normative values specified by Hu and Bentler (1999), we judged the fit of the models to be overall satisfactory: The CFI values ranged from .93 to .97, the TLI values ranged from .92 to .96, and the RMSEA values ranged from .065 to .095. For all outcome variables, the equality constraints on the stability and cross-lagged coefficients did not significantly worsen model fit. Using multiple-

group models, we also tested for generational differences in the stability and cross-lagged coefficients. Importantly, models with cross-generation equality constraints did not fit significantly worse than models in which the coefficients were estimated freely.

Table 3 reports the estimates for the stability and cross-lagged coefficients.[7] The cross-lagged effects showed a consistent picture: self-esteem prospectively predicted each of the outcome variables, whereas the outcome variables generally did not prospectively predict self-esteem. In all cases, the effect of self-esteem on the outcome variable was larger than the effect of the outcome variable on self-esteem. The results indicate that individuals with high self-esteem subsequently reported higher levels of relationship satisfaction, job satisfaction, occupational status, salary, positive affect, and health, and lower levels of negative affect, depression, and health problems. The multi-group analyses described above suggest that these effects held across all four generations. In sum, the results suggest that it is appropriate to examine the influence of self-esteem on life-span trajectories of the outcome variables, rather than vice versa.

Effect of Self-Esteem on Developmental Trajectories of Life Outcomes

To establish a baseline trajectory, we first modeled the basic trajectories of each outcome variable (i.e., without taking self-esteem into account).[8] As in the growth models for self-esteem, we employed individual slope loadings, based on age, to model the trajectory across the observed age range using information from all participants simultaneously. For each outcome, we estimated a model with an intercept only, and linear, quadratic, and cubic growth models. For the analyses, age was centered at 50 years and measures were converted to *z*-scores.[9] For salary and health problems, multi-group analyses indicated statistically significant generational differences in their trajectories and therefore it was not admissible to model a single life-span trajectory for

these outcomes. Consequently, we did not include these outcomes in the growth curve analyses with self-esteem as a TVC. For all other life outcomes, however, there were no significant generational differences in their trajectory. For job satisfaction and positive affect, the linear model had the best fit; for relationship satisfaction and negative affect, the quadratic model had the best fit; and for occupational status, depression, and health, the cubic model had the best fit.

We next examined the effect of self-esteem on the trajectories, by using growth curve models with a TVC (see K. A. Bollen & Curran, 2006; Preacher et al., 2008). Figure 3 shows a generic illustration of the models, for the case of quadratic growth in the outcome variable (the models for linear and cubic growth were specified accordingly). Again, the models included individual slope loadings based on age. At each measurement occasion, the outcome variable is explained simultaneously by growth curve factors and by repeatedly measured self-esteem (i.e., the TVC). Consequently, the models provide two types of information on the effects of self-esteem: The models estimate (a) the concurrent effect of self-esteem on the outcome while controlling for systematic growth in the outcome, and (b) the expected growth in the outcome when self-esteem is held constant (K. A. Bollen & Curran, 2006; Preacher et al., 2008).

Table 4 reports the results for the TVC models. To test whether controlling for self-esteem altered the trajectory of the outcome, we compared the fit of two models. In one model, the growth parameters were freely estimated, allowing the trajectory to deviate from the basic model for this variable. In the other model, the growth parameters were fixed to the values from the basic model, assuming that the trajectory is unaltered by controlling for self-esteem. For each outcome variable, we selected the model that better fit the data. The results indicated that controlling for self-esteem altered the trajectory of positive affect and depression, but did not alter trajectories of the other variables. For the models selected, we then examined the concurrent

TVC effects of self-esteem (Table 4, right-most column). All effects were in the expected direction. The strongest effect of self-esteem emerged for depression: A one-unit increase in self-esteem corresponded to a decrease of 0.52 units in the expected level of depression. Medium-sized effects emerged for positive and negative affect, small to medium-sized effects for relationship satisfaction and job satisfaction, and a very small effect for health. The effect of self-esteem on the trajectory of occupational status was nonsignificant and close to zero.

To examine the results in more detail, we plotted predicted trajectories (Figure 4). The figure shows the average trajectory for each outcome variable. If self-esteem had a significant concurrent TVC effect on the outcome variable—which was the case for all outcome variables except occupational status—the figure also includes trajectories for individuals with constantly high and constantly low self-esteem (corresponding to one standard-deviation unit above and below the mean, respectively). If controlling for self-esteem altered the expected growth curve of the outcome variable—which was the case for positive affect and depression—the figure also includes the controlled trajectory (which is the expected trajectory for an individual with a constantly average level of self-esteem).

Several findings shown in the graphs merit attention. First, the average trajectories of the outcome variables are consistent with the findings reported in the literature, with the exception of positive affect. In this study, positive affect decreased linearly from adolescence to old age (with the difference between age 16 and age 97 corresponding to a medium-sized effect, $d = -0.58$). As reviewed in the Introduction, previous research suggests that positive affect is relatively stable across adulthood and decreases slightly only in old age. As stated above, the trajectories of the other outcome variables converge with findings from previous studies. Relationship satisfaction showed a U-shaped trajectory, decreasing slightly until age 46 ($d = -0.23$) and then

increasing more strongly into old age (d = 0.68). Job satisfaction increased linearly across the observed age range (i.e., age 16 to age 70; d = 0.85). Occupational status increased strongly from age 16 to age 46 (d = 1.95) and then decreased slightly (d = −0.19). Negative affect decreased strongly from adolescence to middle adulthood and then leveled off in old age (with the difference between age 16 and age 97 corresponding to a very strong effect, d = −1.55). Depression decreased from adolescence to about age 60 and then increased again into old age (with the difference between age 16 and age 60 corresponding to a medium to strong effect, d = −0.60, and the increase between age 60 and age 97 corresponding to a strong effect, d = 0.83). Finally, health increased slightly from age 16 to age 46 (d = 0.09) and then decreased strongly at an accelerating rate into old age (d = −0.87).

Second, the graphs illustrate the size of the self-esteem effects on the level of the outcome trajectories (i.e., the concurrent TVC effects). As mentioned above, the largest effects emerged for positive affect, negative affect, and depression, as illustrated by the distance between trajectories for individuals with low versus high self-esteem. In contrast, for relationship satisfaction, job satisfaction, and health, the self-esteem effects on the level of the trajectories were smaller.

Third, for positive affect and depression, the graphs illustrate the effect of controlling for self-esteem on the expected trajectories (Figures 5D and 5F). Whereas the effect is very small for positive affect (e.g., at age 97 the difference between the uncontrolled and controlled trajectory corresponded to d = −0.03), the effect is larger for depression (at age 97 the difference corresponded to d = 0.29). For depression, controlling for self-esteem attenuated the decline from adolescence to middle adulthood and also attenuated the increase from middle adulthood to old age.

Discussion

In the present research, we used data from a large longitudinal study to investigate the life-span development of self-esteem and the prospective influence of self-esteem on life outcomes, including relationship satisfaction, job satisfaction, occupational status, salary, positive and negative affect, depression, and health. Several important findings emerged. First, we replicated the previously reported curvilinear trajectory of self-esteem (Orth et al., 2010); specifically, self-esteem increased from adolescence to middle adulthood, reached a peak at about age 50, and then decreased in old age. Second, self-esteem had significant cross-lagged effects on all of the life outcomes examined in the present research, but no reciprocal effects of life outcomes on self-esteem were found; this pattern is consistent with the hypothesis that self-esteem is a cause, rather than a consequence, of life outcomes (Swann et al., 2007; Trzesniewski et al., 2006). Third, growth curve analyses, with self-esteem as a TVC, suggested that self-esteem has medium-sized effects on the life-span trajectories of affect and depression, small to medium-sized effects on the trajectories of relationship and job satisfaction, a very small, but significant, effect on the trajectory of health, and no significant effect on the trajectory of occupational status. Moreover, for some of the outcome variables (specifically, positive affect and depression), self-esteem not only moderated the level, but also the slope of the trajectories. Below we discuss each of these findings in more detail.

Implications of the Findings

The present research replicates in an independent sample the curvilinear trajectory of self-esteem previously found in analyses of the Americans' Changing Lives study (Orth et al., 2010; Shaw et al., 2010). Although the present study suggests an earlier peak of the self-esteem trajectory (i.e., at about age 50 years) than in previous research (at about age 60 years, Orth et al.,

2010), the overall shape of the trajectory was similar. The repeated finding of a relatively strong decline of self-esteem in old age is of particular importance, given conflicting reviews of the literature (Bengtson, Reedy, & Gordon, 1985; Demo, 1992), conflicting results from studies focusing on old age (e.g., Coleman, Ivani-Chalian, & Robinson, 1993; Gove, Ortega, & Style, 1989; Ranzjin, Keeves, Luszcz, & Feather, 1998; Reitzes, Mutran, & Fernandez, 1996), and the negative impact of low self-esteem on a person's general well-being.

We also investigated possible moderators of the life-span trajectory of self-esteem. Consistent with previous research (Orth et al., 2010), educational attainment affected the overall level but not the shape of the trajectory; specifically, the self-esteem trajectory for more educated individuals was consistently higher than the trajectory for less educated individuals, but individuals at both high and low education levels tended to show a curvilinear trend. Surprisingly, gender did not affect the level or the trajectory of self-esteem; in contrast, previous research suggests that men tend to report higher self-esteem than women, at least in adolescence and adulthood, although the effect size is generally small (Kling, Hyde, Showers, & Buswell, 1999; Orth et al., 2010; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). Moreover, in the present study, no cohort differences in the trajectory of self-esteem were found, replicating findings from Erol and Orth (2011) and Orth et al. (2010). Thus, although the claim that there has been a generational increase in self-esteem levels—i.e., that more recent generations have higher self-esteem than previous generations—has intuitive appeal (Twenge & Campbell, 2001, 2008), the available evidence suggests that the average self-esteem trajectory has not changed across the generations born in the 20th century (Trzesniewski & Donnellan, 2010; Trzesniewski, Donnellan, & Robins, 2008). Finally, it is worth noting that the self-esteem measure used (i.e., the RSE factor scores) showed strong longitudinal measurement invariance. This result

strengthens confidence in the validity of the growth curve analyses given that measurement invariance is a fundamental, but rarely tested, assumption on which growth models are based (Edwards & Wirth, 2009; Widaman et al., 2010).

The present research also addressed the important question of whether self-esteem is better thought of as a cause or a consequence of life outcomes. We tested for reciprocal prospective relations between self-esteem and a set of life outcomes that are central to having a successful and fulfilling life, including measures of well-being (positive affect, negative affect, and depression), enjoying and succeeding in work, having a satisfying romantic relationship, and physical health. With regard to depression, we replicated previous studies showing that low self-esteem prospectively predicts depression, but that the effect of depression on low self-esteem is small or nonsignificant (Metalsky et al., 1993; Orth, Robins, & Meier, 2009; Orth, Robins, Trzesniewski et al., 2009; Roberts & Monroe, 1992). A similar pattern emerged for measures of dispositional positive and negative affect: self-esteem predicted increases in positive affect and decreases in negative affect, controlling for prior levels in the constructs, but positive affect did not predict subsequent self-esteem and negative affect had a statistically significant, but small, negative effect on self-esteem. In addition, we found that self-esteem was prospectively related to higher levels of relationship satisfaction, job satisfaction, occupational status, salary, and physical health, controlling for prior levels of these variables, but none of these life outcomes had reciprocal effects on self-esteem (or, if significant, the coefficients were small). Moreover, all results held across generations. Thus, regardless of whether one was born in the early 1900s or in the 1980s, self-esteem had significant benefits for people's experiences of love, work, and health, supporting hypotheses about the beneficial consequences of high self-esteem (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Swann et al., 2007; Trzesniewski et al., 2006; but

see Baumeister et al., 2003). In this context, it is worth noting that the subjective experience, or phenomenological state, of having high self-esteem and feeling positive about oneself is an intrinsically desirable end state, regardless of whether it causes the individual to get better grades, earn more money, live longer, engage in less crime, and other objective outcomes.

Finally, we investigated the influence of self-esteem on the life-span trajectories of life outcomes, given that the cross-lagged analyses suggested that self-esteem has prospective effects on the outcome variables but not vice versa. Whereas the cross-lagged analyses tested whether self-esteem predicts change in the rank-order position in life outcomes, the growth curve analyses tested whether self-esteem moderates the life-span trajectory of life outcomes. The results showed that self-esteem had small to medium-sized effects on the life-span trajectories of relationship satisfaction, job satisfaction, positive affect, negative affect, and depression, and a very small effect on the life-span trajectory of health. In contrast, self-esteem did not significantly predict the trajectory of a person's occupational status. As in the growth curve analyses of self-esteem, we tested for cohort differences in the life-span trajectories of the outcome variables. For all variables, results suggested that that any existing cohort differences were too small to preclude constructing a single overall trajectory from adolescence to old age. Although some may be surprised that we found no significant cohort differences for any of the outcome variables, research in other domains such as the Big Five personality traits likewise suggest that cohort differences are typically small or non-existent (Terracciano, McCrae, Brant, & Costa, 2005).

Our results allow us to compare the size of the self-esteem effects to the size of normative changes in the life outcomes across the life span. For example, the effect of self-esteem on the trajectory of relationship satisfaction was 0.23 (indicating that a one standard-deviation unit

increase in self-esteem predicted a 0.23 standard-deviation unit increase in relationship satisfaction). In comparison, relationship satisfaction decreased from age 16 to age 46 by 0.23 standard-deviation units and then increased into old age by 0.68 standard-deviation units. These data indicate that the self-esteem effect and the normative change from adolescence to midlife are of comparable size; for example, if an individual improves his or her rank in self-esteem by one standard-deviation unit (relative to other individuals in his age group), the resulting change in relationship satisfaction outweighs the expected normative loss from age 16 to age 46. In contrast, the average increase in relationship satisfaction from midlife to old age largely overrides the moderating effects of self-esteem. Another example is job satisfaction: the normative change from age 16 to age 70 corresponded to $d = 0.85$, whereas the self-esteem effect was 0.26; thus, although self-esteem can significantly moderate the trajectory of job satisfaction, it is unlikely that self-esteem would substantially alter the general trend of the job satisfaction trajectory.

Limitations and Future Directions

One limitation is that the sample, although large and economically diverse, is not representative of the population of the United States. Therefore, future research should test whether the results hold in other, ideally nationally representative, samples. Moreover, future research should examine the effects of self-esteem on the development of life outcomes in countries from more diverse cultural contexts, such as Asian and African cultures (cf. Arnett, 2008). For example, individuals from Asian and Western cultures show different self-construal styles and different tendencies toward self-enhancement (Heine, Lehman, Markus, & Kitayama, 1999; Markus & Kitayama, 1991), which may have important consequences for the size, and even direction, of self-esteem effects on trajectories of relationship, work, and health outcomes.

Therefore, whether studies with samples from other cultural contexts would yield the same results as the present study is presently unknown.

Although we found—in the second part of the study—prospective effects of self-esteem on life outcomes while controlling for prior levels of the constructs, the study design does not allow for strong conclusions regarding the causal influence of self-esteem. As in all passive observational designs, effects between variables may be caused by third variables that were not assessed (Finkel, 1995). For example, personality factors such as neuroticism might simultaneously affect both self-esteem and many of the outcome variables. Therefore, future research should test theoretically-relevant third-variable models that might account for the relations between self-esteem and life outcomes. Nevertheless, the prospective models (i.e., cross-lagged regression models) are useful because they can indicate whether the data are consistent with a causal model of the relation between the variables, by establishing the direction of the effects and ruling out some (but not all) alternative causal hypotheses. Further evidence on the causal status of the effects might also accrue from intervention studies. For example, if improvement of self-esteem through psychological intervention were followed by improvements in relationship satisfaction, success at the workplace, psychological well-being, and health, the causal status of self-esteem would be enhanced. Although we do not yet know whether interventions to improve self-esteem lead to improvements in the relationship, work, and health domains, meta-analytic reviews of self-esteem intervention programs have demonstrated that “it is possible to significantly improve children’s and adolescents’ levels of [self-esteem/self-concept] and to obtain concomitant positive changes in other areas of adjustment” (Haney & Durlak, 1998, p. 429; see also, Marsh & Craven, 2006; O'Mara, Marsh, Craven, & Debus, 2006).

Future research should include informant based measures and additional objective measures of life outcomes. This could be done, for example, in the relationship domain (e.g., partner ratings of relationship quality), the work domain (e.g., supervisor and peer ratings of job performance), and the health domain (e.g., measures of cardiovascular health, immune functioning, etc.). Typically, correlations between measures that are based on the same method (e.g., self-report) are artificially inflated by shared method variance. In the present context, however, shared method variance is unlikely to account for the cross-lagged effects because some of it has been statistically removed by controlling for concurrent relations and prior levels of each construct. Moreover, we included three objective measures of life outcomes (occupational status, salary, health problems), which showed the same pattern of results as the self-report measures. Self-esteem prospectively predicted the objective outcomes, whereas the prospective effects of the outcomes on self-esteem were generally nonsignificant. Although the self-esteem effects were small, they may accumulate to meaningful differences over the course of a person's life. Or, to frame it another way, although the effects might be relatively small for each individual person, the implications at the societal level could be quite large. For example, the effect of aspirin on heart disease is .02 (Meyer et al., 2001), yet doctors regularly prescribe aspirin when people have heart problems because the reduction in risk is meaningful at the societal level when millions of people are taking aspirin.

Future research should seek to identify the cognitive, emotional, behavioral, and social processes that mediate the effects of self-esteem on life outcomes. These processes will likely differ across life domains, although some general processes might account for effects in several life domains. For example, a possible behavioral pathway is that low self-esteem motivates social avoidance and withdrawal (e.g., Murray et al., 2000), thereby impeding social

reinforcement and social support (Ottenbreit & Dobson, 2004), which likely has negative impact on life domains such as relationships, work, and health. A possible intrapersonal pathway is that low self-esteem may increase the tendency to ruminate about negative aspects of the self (Cambron, Acitelli, & Pettit, 2009; Luyckx et al., 2008). Rumination, in turn, strengthens negative affect and depression (Mor & Winquist, 2002; Nolen-Hoeksema, 2000), which may have further detrimental consequences for job performance, relationship quality, and health.

Finally, in future research it would be interesting to examine the effects of self-esteem after controlling for narcissism. Although self-esteem is only moderately related to narcissism and self-enhancement, in particular when measured by the RSE (Ackerman et al., 2011; Brown & Zeigler-Hill, 2004; Kwan, John, Kenny, Bond, & Robins, 2004; Robins et al., 2001), it is possible that the effects of self-esteem on life outcomes are even stronger once narcissistic self-enhancement is controlled for. In addition, it would be interesting to test whether the effect of self-esteem on life outcomes is similar for implicit measures of self-esteem. However, although implicit measures are a promising avenue for self-esteem measurement, there is not yet sufficiently strong support for their validity (Buhrmester, Blanton, & Swann, 2011).

In summary, the present research contributes to our understanding of the life-span development of self-esteem and its possible consequences for important life outcomes. Our findings are consistent with the hypothesis that self-esteem has a significant prospective impact on real-world life experiences and that high and low self-esteem are not mere epiphenomena of success and failure in relevant life domains. An important task in future research is to further test whether self-esteem causally influences well-being and success in the domains of work, relationships, and health, for example, by examining the longterm effects of interventions aimed at increasing self-esteem.

References

Ackerman, R. A., Witt, E. A., Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., & Kashy, D. A. (2011). What does the Narcissistic Personality Inventory really measure? *Assessment, 18*, 67-87.

Aldwin, C. M., Spiro, A., Levenson, M. R., & Cupertino, A. P. (2001). Longitudinal findings from the Normative Aging Study: III. Personality, individual health trajectories, and mortality. *Psychology and Aging, 16*, 450-465.

Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology*, *112*, 545-557.

Anderson, S. A., Russell, C. S., & Schumm, W. R. (1983). Perceived marital quality and family life-cycle categories: A further analysis. *Journal of Marriage and the Family, 45*, 127-139.

Andrews, B., & Brown, G. W. (1995). Stability and change in low self-esteem: The role of psychosocial factors. *Psychological Medicine, 25*, 23-31.

Arnett, J. J. (2008). The neglected 95%: Why American psychology needs to become less American. *American Psychologist, 63*, 602-614.

Aspinwall, L. G., & Taylor, S. E. (1992). Modeling cognitive adaptation: A longitudinal investigation of the impact of individual differences and coping on college adjustment and performance. *Journal of Personality and Social Psychology, 63*, 989-1003.

Bachman, J. G., & O'Malley, P. M. (1977). Self-esteem in young men: A longitudinal analysis of the impact of educational and occupational attainment. *Journal of Personality and Social Psychology, 35*, 365-380.

Baltes, P. B., Cornelius, S. W., & Nesselroade, J. R. (1979). Cohort effects in developmental psychology. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 61-87). New York: Academic Press.

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*, 1-44.

Bengtson, V. L. (2009). *Longitudinal Study of Generations, 1971, 1985, 1988, 1991, 1994, 1997, 2000 [Data file and codebook]*. Ann Arbor, MI: Inter-University Consortium for Political and Social Research [Distributor].

Bengtson, V. L., Biblarz, T. J., & Roberts, R. E. L. (2002). *How families still matter: A longitudinal study of youth in two generations*. Cambridge, UK: Cambridge University Press.

Bengtson, V. L., Reedy, M. N., & Gordon, C. (1985). Aging and self-conceptions: Personality processes and social contexts. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (pp. 544-593). New York: Van Nostrand Reinhold.

Benyamini, Y., Leventhal, H., & Leventhal, E. A. (2004). Self-rated oral health as an independent predictor of self-rated general health, self-esteem and life satisfaction. *Social Science and Medicine, 59*, 1109-1116.

Bernal, D., Snyder, D., & McDaniel, M. (1998). The age and job satisfaction relationship: Does its shape and strength still evade us? *Journal of Gerontology: Psychological Sciences, 53B*, P287-P293.

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science and Medicine, 66*, 1733-1749.

Boden, J. M., Fergusson, D. M., & Horwood, L. J. (2008). Does adolescent self-esteem predict later life outcomes? A test of the causal role of self-esteem. *Development and Psychopathology, 20*, 319–339.

Bollen, K., & Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin, 110*, 305-314.

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Hoboken, NJ: Wiley.

Boyd, M. (2008). A socioeconomic scale for Canada: Measuring occupational status from the census. *Canadian Review of Sociology, 45*, 51-91.

Bradburn, N. M. (1969). *The structure of psychological well-being*. Chicago, IL: Aldine.

Brown, R. P., & Zeigler-Hill, V. (2004). Narcissism and the non-equivalence of self-esteem measures: A matter of dominance? *Journal of Research in Personality, 38*, 585-592.

Buhrmester, M. D., Blanton, H., & Swann, W. B. (2011). Implicit self-esteem: Nature, measurement, and a new way forward. *Journal of Personality and Social Psychology, 100*, 365-385.

Cambron, M. J., Acitelli, L. K., & Pettit, J. W. (2009). Explaining gender differences in depression: An interpersonal contingent self-esteem perspective. *Sex Roles, 61*, 751-761.

Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology, 79*, 644-655.

Charles, S. T. (2010). Strength and vulnerability integration: A model of emotional well-being across adulthood. *Psychological Bulletin, 136*, 1068-1091.

Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology, 80*, 136-151.

Chiu, C. J., & Wray, L. A. (2010). Physical disability trajectories in older Americans with and without diabetes: The role of age, gender, race or ethnicity, and education. *The Gerontologist, 51*, 51-63.

Christie-Mizell, C. A., Ida, A. K., & Keith, V. M. (2010). African Americans and physical health: The consequences of self-esteem and happiness. *Journal of Black Studies, 40*, 1189-1211.

Clark, A., Oswald, A., & Warr, P. (1996). Is job satisfaction U-shaped in age? *Journal of Occupational and Organizational Psychology, 69*, 57-81.

Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558-577.

Coleman, P. G., Ivani-Chalian, C., & Robinson, M. (1993). Self-esteem and its sources: Stability and change in later life. *Ageing and Society, 13*, 171-192.

Davey, A., Halverson, C. F., Zonderman, A. B., & Costa, P. T. (2004). Change in depressive symptoms in the Baltimore Longitudinal Study of Aging. *Journal of Gerontology: Psychological Sciences, 59B*, P270-P277.

Demo, D. H. (1992). The self-concept over time: Research issues and directions. *Annual Review of Sociology, 18*, 303-326.

Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychological Science, 16*, 328-335.

Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2006). *An introduction to latent variable growth curve modeling: Concepts, issues, and applications*. Mahwah, NJ: Erlbaum.

Eaton, W. W., Smith, C., Ybarra, M., Muntaner, C., & Tien, A. (2004). Center for Epidemiologic Studies Depression Scale: Review and revision (CESD and CESD-R). In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Volume 3 (Instruments for adults)* (pp. 363-377). Mahwah, NJ: Erlbaum.

Edwards, M. C., & Wirth, R. J. (2009). Measurement and the study of change. *Research in Human Development, 6,* 74-96.

Elstad, J. I. (2004). Health and status attainment: Effects of health on occupational achievement among employed Norwegian men. *Acta Sociologica, 47*, 127-140.

Erol, R. Y., & Orth, U. (2011). Self-esteem development from age 14 to 30 years: A longitudinal study. *Journal of Personality and Social Psychology.* Advance online publication.

Finkel, S. E. (1995). *Causal analysis with panel data*. Thousand Oaks, CA: Sage.

Ganzeboom, H. B. G., De Graaf, P. M., Treiman, D. J., & de Leeuw, J. (1992). A standard international socio-economic index of occupational status. *Social Science Research, 21*, 1-56.

Gatz, M., & Hurwicz, M. L. (1990). Are old people more depressed? Cross-sectional data on Center for Epidemiological Studies Depression Scale factors. *Psychology and Aging, 5*, 284-290.

Gilford, R., & Bengtson, V. (1979). Measuring marital satisfaction in three generations: Positive and negative dimensions. *Journal of Marriage and the Family, 41*, 387-398.

Gorchoff, S. M., John, O. P., & Helson, R. (2008). Contextualizing change in marital satisfaction during middle age: An 18-year longitudinal study. *Psychological Science, 19*, 1194-1200.

Gove, W. R., Ortega, S. T., & Style, C. B. (1989). The maturational and role perspectives on aging and self through the adult years: An empirical evaluation. *American Journal of Sociology, 94*, 1117-1145.

Grimm, K. J. (2007). Multivariate longitudinal methods for studying developmental relationships between depression and academic achievement. *International Journal of Behavioral Development, 31*, 328-339.

Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J., Skorpen, C. G., & Hsu, A. Y. C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging, 12*, 590-599.

Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and adolescents: A meta-analytic review. *Journal of Clinical Child Psychology, 27*, 423-433.

Harding, S. D. (1982). Psychological well-being in Great Britain: An evaluation of the Bradburn Affect Balance Scale. *Personality and Individual Differences, 3*, 167-175.

Hauser, R. M., Sheridan, J. T., & Warren, J. R. (1999). Socioeconomic achievements of siblings in the life course: New findings from the Wisconsin Longitudinal Study. *Research on Aging, 21*, 338-378.

Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology, 27*, 177-298.

Heine, S. J., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard? *Psychological Review, 106*, 766-794.

Helson, R., & Soto, C. J. (2005). Up and down in middle age: Monotonic and nonmonotonic changes in roles, status, and personality. *Journal of Personality and Social Psychology, 89*, 194-204.

Hochwarter, W. A., Ferris, G. R., Perrewe, P. L., Witt, L. A., & Kiewitz, C. (2006). A note on the nonlinearity of the age-job-satisfaction relationship. *Journal of Applied Social Psychology, 31*, 1223-1237.

House, J. S., Lepkowski, J. M., Kinney, A. M., Mero, R. P., Kessler, R. C., & Herzog, A. R. (1994). The social stratification of aging and health. *Journal of Health and Social Behavior, 35*, 213-234.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Huang, C. (2010). Mean-level change in self-esteem from childhood through adulthood: Meta-analysis of longitudinal studies. *Review of General Psychology, 14*, 251-260.

Hunt, J. W., & Saul, P. N. (1975). The relationship of age, tenure, and job satisfaction in males and females. *Academy of Management Journal, 18*, 690-702.

Janson, P., & Martin, J. K. (1982). Job satisfaction and age: A test of two views. *Social Forces, 60*, 1089-1102.

Joiner, T. E. (1995). The price of soliciting and receiving negative feedback: Self-verification theory as a vulnerability to depression theory. *Journal of Abnormal Psychology, 104*, 364-372.

Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology, 86*, 80-92.

Judge, T. A., Bono, J. E., & Locke, E. A. (2000). Personality and job satisfaction: The mediating role of job characteristics. *Journal of Applied Psychology, 85*, 237-249.

Judge, T. A., & Hurst, C. (2008). How the rich (and happy) get richer (and happier): Relationship of core self-evaluations to trajectories in attaining work success. *Journal of Applied Psychology, 93*, 849-863.

Judge, T. A., Hurst, C., & Simon, L. S. (2009). Does it pay to be smart, attractive, or confident (or all three)? Relationships among general mental ability, physical attractiveness, core self-evaluations, and income. *Journal of Applied Psychology, 94*, 742-755.

Kalleberg, A. L., & Loscocco, K. A. (1983). Aging, values, and rewards: Explaining age differences in job satisfaction. *American Sociological Review, 48*, 78-90.

Kammeyer-Mueller, J. D., Judge, T. A., & Piccolo, R. F. (2008). Self-esteem and extrinsic career success: Test of a dynamic model. *Applied Psychology: An International Review, 57*, 204-224.

Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, method, and research. *Psychological Bulletin, 118*, 3-34.

Kasen, S., Cohen, P., Chen, H., & Castille, D. (2003). Depression adult women: Age changes and cohort effects. *American Journal of Public Health, 93*, 2061-2066.

Kessler, E. M., & Staudinger, U. M. (2009). Affective experience in adulthood and old age: The role of affective arousal and perceived affect regulation. *Psychology and Aging, 24*, 349-362.

Kessler, R. C., Foster, C., Webster, P. S., & House, J. S. (1992). The relationship between age and depressive symptoms in two national surveys. *Psychology and Aging, 7*, 119-126.

Kim, J., & Miech, R. (2009). The Black-White difference in age trajectories of functional health over the life course. *Social Science and Medicine, 68*, 717-725.

Kim, K. A., & Mueller, D. J. (2001). To balance or not to balance: Confirmatory factor analysis of the Affect-Balance Scale. *Journal of Happiness Studies, 2*, 289-306.

Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin, 125*, 470-500.

Krueger, J. I., Vohs, K. D., & Baumeister, R. F. (2008). Is the allure of self-esteem a mirage after all? *American Psychologist, 63*, 64-65.

Kunzmann, U., Little, T. D., & Smith, J. (2000). Is age-related stability of subjective well-being a paradox? Cross-sectional and longitudinal evidence from the Berlin Aging Study. *Psychology and Aging, 15*, 511-526.

Kwan, V. S. Y., John, O. P., Kenny, D. A., Bond, M. H., & Robins, R. W. (2004). Reconceptualizing individual differences in self-enhancement bias: An interpersonal approach. *Psychological Review, 111*, 94-110.

Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 1-62). San Diego, CA: Academic Press.

Lewinsohn, P. M., Rohde, P., Seeley, J. R., & Fischer, S. A. (1991). Age and depression: Unique and shared effects. *Psychology and Aging, 6*, 247-260.

Liang, J., Shaw, B. A., Krause, N., Bennett, J. M., Kobayashi, E., Fukaya, T., et al. (2005). How does self-assessed health change with age? A study of older adults in Japan. *Journal of Gerontology: Social Sciences, 60B,* S224-S232.

Liang, J., Shaw, B. A., Krause, N. M., Bennett, J. M., Blaum, C., Kobayashi, E., et al. (2003). Changes in functional status among older adults in Japan: Successful and usual aging. *Psychology and Aging, 18,* 684-695.

Little, T. D., Preacher, K. J., Selig, J. P., & Card, N. A. (2007). New developments in latent variable panel analyses of longitudinal data. *International Journal of Behavioral Development, 31,* 357-365.

Löckenhoff, C. E., Costa, P. T., & Lane, R. D. (2008). Age differences in descriptions of emotional experiences in oneself and others. *Journal of Gerontology: Psychological Sciences, 63B,* P92-P99.

Luyckx, K., Schwartz, S. J., Berzonsky, M. D., Soenens, B., Vansteenkiste, M., Smits, I., et al. (2008). Capturing ruminative exploration: Extending the four-dimensional model of identity formation in late adolescence. *Journal of Research in Personality, 42,* 58-82.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51,* 201-226.

MacCallum, R. C., Browne, M. W., & Cai, L. (2006). Testing differences between nested covariance structure models: Power analysis and null hypotheses. *Psychological Methods, 11,* 19-35.

Mäkikangas, A., Kinnunen, U., & Feldt, T. (2004). Self-esteem, dispositional optimism, and health: Evidence from cross-lagged data on employees. *Journal of Research in Personality, 38,* 556-575.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*, 224-253.

Marsh, H. W., & Craven, R. G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective: Beyond seductive pleasure and unidimensional perspectives. *Perspectives on Psychological Science, 1*, 133-163.

Marsh, H. W., Scalas, L. F., & Nagengast, B. (2010). Longitudinal tests of competing factor structures for the Rosenberg Self-Esteem Scale: Traits, ephemeral artifacts, and stable response styles. *Psychological Assessment, 22*, 366-381.

McCullough, M. E., & Laurenceau, J. P. (2005). Religiousness and the trajectory of self-rated health across adulthood. *Personality and Social Psychology Bulletin, 31*, 560-573.

Mehta, P. D., & West, S. G. (2000). Putting the individual back into individual growth curves. *Psychological Methods, 5*, 23-43.

Metalsky, G. I., Joiner, T. E., Hardin, T. S., & Abramson, L. Y. (1993). Depressive reactions to failure in a naturalistic setting: A test of the hopelessness and self-esteem theories of depression. *Journal of Abnormal Psychology, 102*, 101-109.

Meyer, G. J., Finn, S. E., Eyde, L. D., Kay, G. G., Moreland, K. L., Dies, R. R., et al. (2001). Psychological testing and psychological assessment: A review of evidence and issues. *American Psychologist, 56*, 128-165.

Miech, R. A., Eaton, W., & Liang, K. Y. (2003). Occupational stratification over the life course: A comparison of occupational trajectories across race and gender during the 1980s and 1990s. *Work and Occupations, 30*, 440-473.

Miech, R. A., & Shanahan, M. J. (2000). Socioeconomic status and depression over the life course. *Journal of Health and Social Behavior, 41*, 162-176.

Mirowsky, J., & Kim, J. (2007). Graphing age trajectories: Vector graphs, synthetic and virtual cohort projections, and cross-sectional profiles of depression. *Sociological Methods and Research, 35*, 497-541.

Mirowsky, J., & Reynolds, J. R. (2000). Age, depression, and attrition in the National Survey of Families and Households. *Sociological Methods and Research, 28*, 476-504.

Mirowsky, J., & Ross, C. E. (1992). Age and depression. *Journal of Health and Social Behavior, 33*, 187-205.

Mor, N., & Winquist, J. (2002). Self-focused attention and negative affect: A meta-analysis. *Psychological Bulletin, 128*, 638-662.

Mroczek, D. K. (2001). Age and emotion in adulthood. *Current Directions in Psychological Science, 10*, 87-90.

Mroczek, D. K., & Kolarz, C. M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology, 75*, 1333-1349.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (2000). Self-esteem and the quest for felt security: How perceived regard regulates attachment processes. *Journal of Personality and Social Psychology, 78*, 478-498.

Murray, S. L., Rose, P., Bellavia, G. M., Holmes, J. G., & Kusche, A. G. (2002). When rejection stings: How self-esteem constrains relationship-enhancing processes. *Journal of Personality and Social Psychology, 83*, 556-573.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide: Sixth edition*. Los Angeles, CA: Muthén and Muthén.

Nam, C. B., & Boyd, M. (2004). Occupational status in 2000: Over a century of census-based measurement. *Population Research and Policy Review, 23*, 327-358.

Ng, T. W. H., & Feldman, D. C. (2010). The relationships of age with job attitudes: A meta-analysis. *Personnel Psychology, 63*, 677-718.

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology, 109*, 504-511.

O'Mara, A. J., Marsh, H. W., Craven, R. G., & Debus, R. L. (2006). Do self-concept interventions make a difference? A synergistic blend of construct validation and meta-analysis. *Educational Psychologist, 41*, 181-206.

Orbuch, T. L., House, J. S., Mero, R. P., & Webster, P. S. (1996). Marital quality over the life course. *Social Psychology Quarterly, 59*, 162-171.

Ormel, J., Oldehinkel, A. J., & Vollebergh, W. (2004). Vulnerability before, during, and after a major depressive episode. *Archives of General Psychiatry, 61*, 990-996.

Orth, U., Robins, R. W., & Meier, L. L. (2009). Disentangling the effects of low self-esteem and stressful events on depression: Findings from three longitudinal studies. *Journal of Personality and Social Psychology, 97*, 307-321.

Orth, U., Robins, R. W., & Roberts, B. W. (2008). Low self-esteem prospectively predicts depression in adolescence and young adulthood. *Journal of Personality and Social Psychology, 95*, 695-708.

Orth, U., Robins, R. W., Trzesniewski, K. H., Maes, J., & Schmitt, M. (2009). Low self-esteem is a risk factor for depressive symptoms from young adulthood to old age. *Journal of Abnormal Psychology, 118*, 472-478.

Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: A cohort-sequential longitudinal study. *Journal of Personality and Social Psychology, 98*, 645-658.

Ottenbreit, N. D., & Dobson, K. S. (2004). Avoidance and depression: The construction of the Cognitive-Behavioral Avoidance Scale. *Behaviour Research and Therapy, 42*, 293-313.

Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent growth curve modeling*. Los Angeles: Sage.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

Ralph, J. A., & Mineka, S. (1998). Attributional style and self-esteem: The prediction of emotional distress following a midterm exam. *Journal of Abnormal Psychology, 107*, 203-215.

Ranzjin, R., Keeves, J., Luszcz, M., & Feather, N. T. (1998). The role of self-perceived usefulness and competence in the self-esteem of elderly adults: Confirmatory factor analyses of the Bachman revision of Rosenberg's Self-Esteem Scale. *Journals of Gerontology: Psychological Sciences and Social Sciences, 53B*, P96-P104.

Raykov, T., Dimitrov, D. M., & Asparouhov, T. (2010). Evaluation of scale reliability with binary measures using latent variable modeling. *Structural Equation Modeling, 17*, 265-279.

Reitzes, D. C., & Mutran, E. J. (2006). Self and health: Factors that encourage self-esteem and functional health. *Journal of Gerontology: Social Sciences, 61B*, S44-S51.

Reitzes, D. C., Mutran, E. J., & Fernandez, M. E. (1996). Does retirement hurt well-being? Factors influencing self-esteem and depression among retirees and workers. *The Gerontologist, 36*, 649-656.

Rhodes, S. R. (1983). Age-related differences in work attitudes and behavior: A review and conceptual analysis. *Psychological Bulletin, 93*, 328-367.

Roberts, J. E., & Monroe, S. M. (1992). Vulnerable self-esteem and depressive symptoms: Prospective findings comparing three alternative conceptualizations. *Journal of Personality and Social Psychology, 62*, 804-812.

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*, 151-161.

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging, 17*, 423-434.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Ross, C. E., & Wu, C. L. (1996). Education, age, and the cumulative advantage in health. *Journal of Health and Social Behavior, 37*, 104-120.

Rothermund, K., & Brandtstädter, J. (2003). Depression in later life: cross-sequential patterns and possible determinants. *Psychology and Aging, 18*, 80-90.

Sacker, A., Worts, D., & McDonough, P. (2011). Social influences on trajectories of self-rated health: Evidence from Britain, Germany, Denmark and the USA. *Journal of Epidemiology and Community Health, 65*, 130-136.

Salmela-Aro, K., & Nurmi, J. E. (2007). Self-esteem during university studies predicts career characteristics 10 years later. *Journal of Vocational Behavior, 70,* 463-477.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7,* 147-177.

Scheibe, S., & Carstensen, L. L. (2010). Emotional aging: Recent findings and future trends. *Journal of Gerontology: Psychological Sciences, 65B,* 135-144.

Seligman, M. E. P. (1993). *What you can change and what you can't: The complete guide to successful self-improvement*. New York: Fawcett.

Shackelford, T. K. (2001). Self-esteem in marriage. *Personality and Individual Differences, 30,* 371-390.

Shahar, G., & Davidson, L. (2003). Depressive symptoms erode self-esteem in severe mental illness: A three-wave, cross-lagged study. *Journal of Consulting and Clinical Psychology, 71,* 890-900.

Shahar, G., & Henrich, C. C. (2010). Do depressive symptoms erode self-esteem in early adolescence? *Self and Identity, 9,* 403-415.

Shaw, B. A., Liang, J., & Krause, N. (2010). Age and race differences in the trajectory of self-esteem. *Psychology and Aging, 25,* 84-94.

Stinson, D. A., Logel, C., Zanna, M. P., Holmes, J. G., Cameron, J. J., Wood, J. V., et al. (2008). The cost of lower self-esteem: Testing a self- and social-bonds model of health. *Journal of Personality and Social Psychology, 94,* 412-428.

Streiner, D. L. (2003). Being inconsistent about consistency: When coefficient alpha does and doesn't matter. *Journal of Personality Assessment, 80,* 217-222.

Swann, W. B., Chang-Schneider, C., & McClarty, K. L. (2007). Do people's self-views matter? *American Psychologist, 62,* 84-94.

Swann, W. B., Chang-Schneider, C., & McClarty, K. L. (2008). Yes, cavalier attitudes can have pernicious consequences. *American Journal of Community Psychology, 63*, 65-66.

Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 20,* 493-506.

Trzesniewski, K. H., & Donnellan, M. B. (2010). Rethinking “Generation Me”: A study of cohort effects from 1976-2006. *Perspectives on Psychological Science, 5,* 58-75.

Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology, 42,* 381-390.

Trzesniewski, K. H., Donnellan, M. B., & Robins, R. W. (2008). Do today's young people really think they are so extraordinary? An examination of secular trends in narcissism and self-enhancement. *Psychological Science, 19,* 181-188.

Twenge, J. M., & Campbell, W. K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5*, 321-344.

Twenge, J. M., & Campbell, W. K. (2002). Self-esteem and socioeconomic status: A meta-analytic review. *Personality and Social Psychology Review, 6*, 59-71.

Twenge, J. M., & Campbell, W. K. (2008). Increases in positive self-views among high school students: Birth cohort changes in anticipated performance, self-satisfaction, self-liking, and self-competence. *Psychological Science, 19,* 1082-1086.

Umberson, D., Williams, K., Powers, D. A., Chen, M. D., & Campbell, A. M. (2005). As good as it gets? A life course perspective on marital quality. *Social Forces, 84,* 493-511.

Vaillant, C. O., & Vaillant, G. E. (1993). Is the U-curve of marital satisfaction an illusion? A 40-year study of marriage. *Journal of Marriage and the Family, 55*, 230-239.

VanLaningham, J., Johnson, D. R., & Amato, P. (2001). Marital happiness, marital duration, and the U-shaped curve: Evidence from a five-wave panel study. *Social Forces, 78,* 1313-1341.

Voss, K., Markiewicz, D., & Doyle, A. B. (1999). Friendship, marriage, and self-esteem. *Journal of Social and Personal Relationships, 16*, 103-122.

Wallace, J., & O'Hara, M. W. (1992). Increases in depressive symptomatology in the rural elderly: Results from a cross-sectional and longitudinal study. *Journal of Abnormal Psychology, 101*, 398-404.

Warr, P. (1992). Age and occupational well-being. *Psychology and Aging, 7*, 37-45.

Watson, D., Suls, J., & Haig, J. (2002). Global self-esteem in relation to structural models of personality and affectivity. *Journal of Personality and Social Psychology, 83*, 185-197.

Widaman, K. F. (2006). Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development, 71*, 42-64.

Widaman, K. F., Ferrer, E., & Conger, R. D. (2010). Factorial invariance within longitudinal structural equation models: Measuring the same construct across time. *Child Development Perspectives, 4*, 10-18.

Wirth, R. J., & Edwards, M. C. (2007). Item factor analysis: Current approaches and future directions. *Psychological Methods, 12*, 58-79.

Footnotes

[1] We did not compute coefficient alpha for the index of health problems. Coefficient alpha is not an appropriate measure of reliability for this scale because health problems are an emergent not latent construct, defined by an aggregation of relatively independent indicators (K. Bollen & Lennox, 1991; Streiner, 2003).

[2] Although the LSG assessments in 1971 and 1985 (i.e., the two waves which are not used in the present research) included some items of the RSE, we did not use these data for the following reasons. In 1971, the LSG used labels for the RSE response categories which differed from both sets of labels used in the assessments from 1988 to 2000, and, moreover, in 1971 the CES-D was not included, so that no common items were available to equate the RSE scores from 1971 with scores from any other waves. In 1985, only one RSE item was used, and so the reliability and validity of RSE factor scores for 1985 would have depended on a single item and likely would have been low. We therefore decided against using data from the 1971 and 1985 assessments of the LSG.

[3] Because the chi-square value for WLSMV cannot be used for model comparison, we did not formally test for differences in fit of the measurement models, but examined the fit indicators CFI, TLI, and RMSEA.

[4] We also tested the fit of a model that imposed measurement invariance of the RSE items across all five waves, disregarding the alteration in the labels of response categories. As expected, the fit of this model (with CFI = .90, TLI = .98, and RMSEA = .051) was clearly worse than the fit of the measurement invariance models that accounted for the alteration in the labels. This result confirms that the difference in response formats needs to be taken into account in the measurement models.

[5] In tests of differences between generations, participants from Generation 4 could not be included because for one of the waves no data were available (as reported in the Method section, this generation did not participate in the 1988 assessment). Moreover, in tests of generational differences for the variables job satisfaction, occupational status, and salary, participants from Generation 1 could not be included because the variables were not assessed for this generation (by reasons of study design).

[6] The cross-lagged regression analyses for self-esteem and depression are mostly redundant with analyses reported in a previous study, which used data from the 1988 to 1997 assessments of the LSG (Orth, Robins, Trzesniewski et al., 2009; Study 1). In the present article, we report the cross-lagged regression analyses for depression for reasons of completeness; however, the growth curve analyses of depression reported in the remainder of the article have not been published previously.

[7] The standardized coefficients were averaged across time intervals using Fisher's Z_r transformations. Although the coefficients were constrained to be equal across time intervals, the constraints were imposed on unstandardized coefficients (as typically recommended), which led to slight variation in the resulting standardized coefficients.

[8] A previous study examined growth in positive and negative affect using data from the LSG (Charles et al., 2001). However, the study did not include any analyses of self-esteem and, specifically, of the influence of self-esteem on the trajectories of positive and negative affect.

[9] For job satisfaction and occupational status, figures show predicted trajectories from age 16 to 70 because only a few observations were available outside of this range.

Table 1

Demographic Characteristics of the Sample

Sample	*N*	Female (proportion)	Mean age (and *SD*) in 1991[a]	Age range across waves
Generation 1	176	.64	83.0 (5.3)	61–97
Generation 2	601	.57	63.3 (5.2)	41–90
Generation 3	851	.56	39.2 (2.7)	19–68
Generation 4	196	.59	20.1 (4.0)	16–47
Full sample	1824	.57	49.3 (18.3)	16–97

Note. Age is reported in years. The age range is given for observations with data on study variables.

[a] Mean age is reported for 1991 (i.e., the second wave) because Generation 4 individuals were not part of the study in 1988 (i.e., the first wave).

Table 2

Fit of Self-Esteem Measurement Models with Categorical Indicators and Equating by Common Items

Model	CFI	TLI	RMSEA
Invariance of CES-D items (with configural invariance of RSE)			
1. Configural invariance	.94	.99	.034
2. Weak invariance	.95	.99	.033
3. Strong invariance	.95	.99	.033
Invariance of RSE (with strong invariance of CES-D items)			
4. Weak invariance	.95	.99	.035
5. Strong invariance	.95	.99	.036
Computation of RSE factor scores (with CES-D items excluded)			
6. Strong invariance[a]	.98	.99	.032

Note. In the LSG, the labels of the RSE response categories were altered in 1994. Therefore, in a series of measurement models, RSE factor scores were equated by using two CES-D items that are essentially measures of self-esteem and that were available at each wave in identical response format (see text for further explanation). Weak invariance = equality constraints on loadings; strong invariance = equality constraints on loadings and thresholds. For models with categorical indicators, confidence intervals of RMSEA are not available. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; CES-D = Center for Epidemiologic Studies Depression Scale; RSE = Rosenberg Self-Esteem Scale; LSG = Longitudinal Study of Generations.

[a] Parameters fixed to estimates of Model 5.

Table 3

Cross-Lagged and Stability Effects of Self-Esteem and Outcome Variables

Outcome variable (Y)	Cross-lagged effects		Stability effects	
	SE→Y	Y→SE	SE→SE	Y→Y
Relationship satisfaction	.05*	.01	.85*	.72*
Job satisfaction	.14*	−.01	.85*	.39*
Occupational status	.03*	.00	.85*	.76*
Salary	.03*	.01	.85*	.83*
Positive affect	.17*	.00	.85*	.43*
Negative affect	−.13*	.02*	.86*	.51*
Depression	−.20*	.02*	.86*	.46*
Health	.11*	.02*	.85*	.59*
Health problems	−.05*	−.02*	.85*	.71*

Note. The table shows standardized regression coefficients. SE = self-esteem.

* $p < .05$.

Table 4

Effect of Controlling for Self-Esteem on Life-Span Trajectories of Outcome Variables

	BIC		
Outcome variable	Model with growth parameters freely estimated	Model with growth parameters constrained to basic model	Self-esteem TVC effect
Relationship satisfaction	24212.2	**24171.5**	0.23*
Job satisfaction	22750.7	**22737.8**	0.26*
Occupational status	21940.3	**21881.0**	0.03
Positive affect	**29868.0**	29887.6	0.38*
Negative affect	29166.4	**29145.6**	−0.37*
Depression	**28707.1**	28765.5	−0.52*
Health	29344.2	**29292.1**	0.11*

Note. For BIC, lower values indicate better model fit. The TVC effects of self-esteem are unstandardized regression coefficients (standardized coefficients are not available). Values in bold indicate the best fitting model. BIC = Bayesian information criterion; TVC = time-varying covariate.

* $p < .05$.

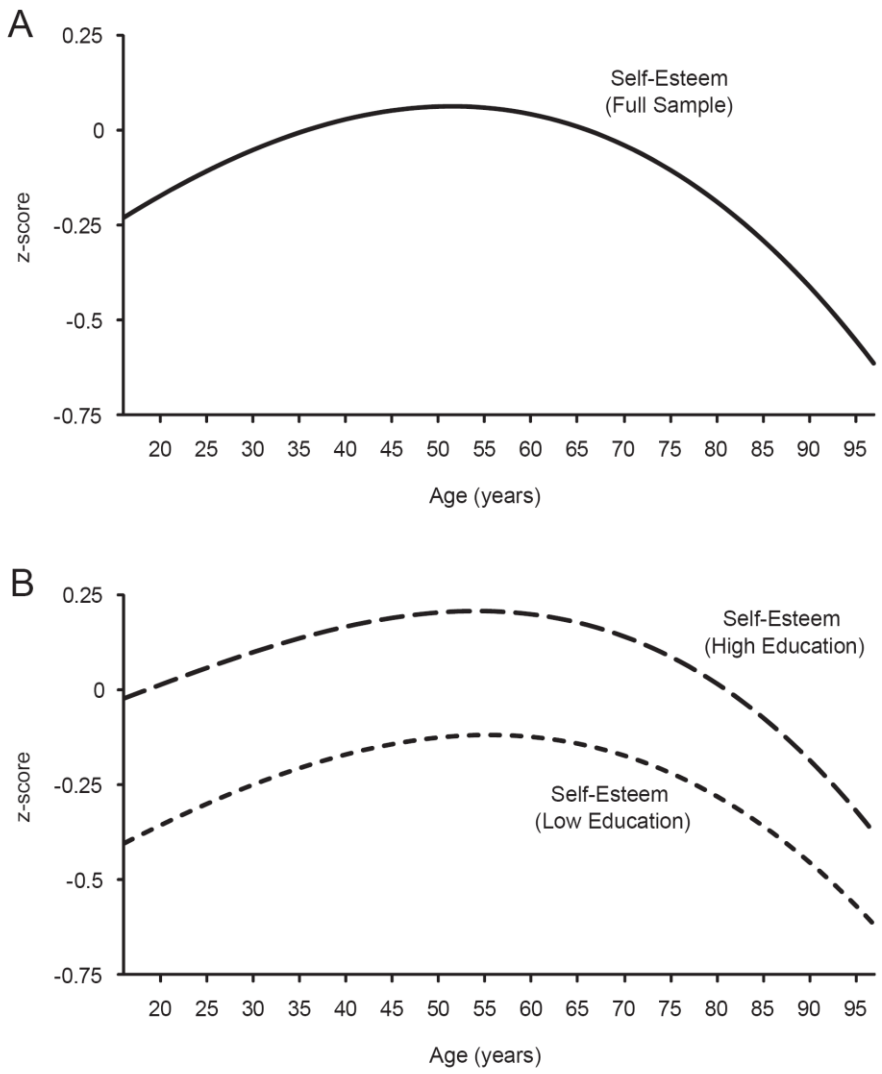

Figure 1. Average predicted trajectory of self-esteem for the full sample (Panel A) and for individuals with high (i.e., one standard-deviation unit above the mean) and low (i.e., one standard-deviation unit below the mean) levels of education (Panel B). Measures were converted to *z*-scores for the analysis.

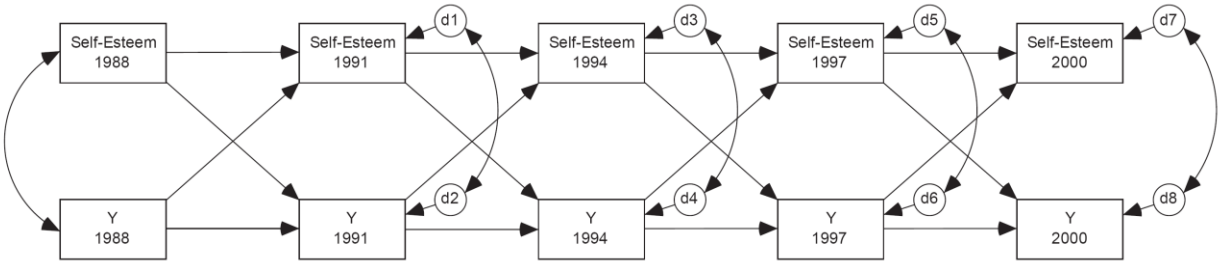

Figure 2. Cross-lagged regression model of the relations between self-esteem and an outcome variable (Y). The relations between factors are specified as cross-lagged effects, which indicate the prospective effect of one variable on the other (e.g., the effect of self-esteem in 1988 on Y in 1991), after controlling for their stability across time (e.g., the effect of Y in 1988 on Y in 1991). Residual variances (i.e., disturbances) are denoted as *d1*, *d2*, etc.

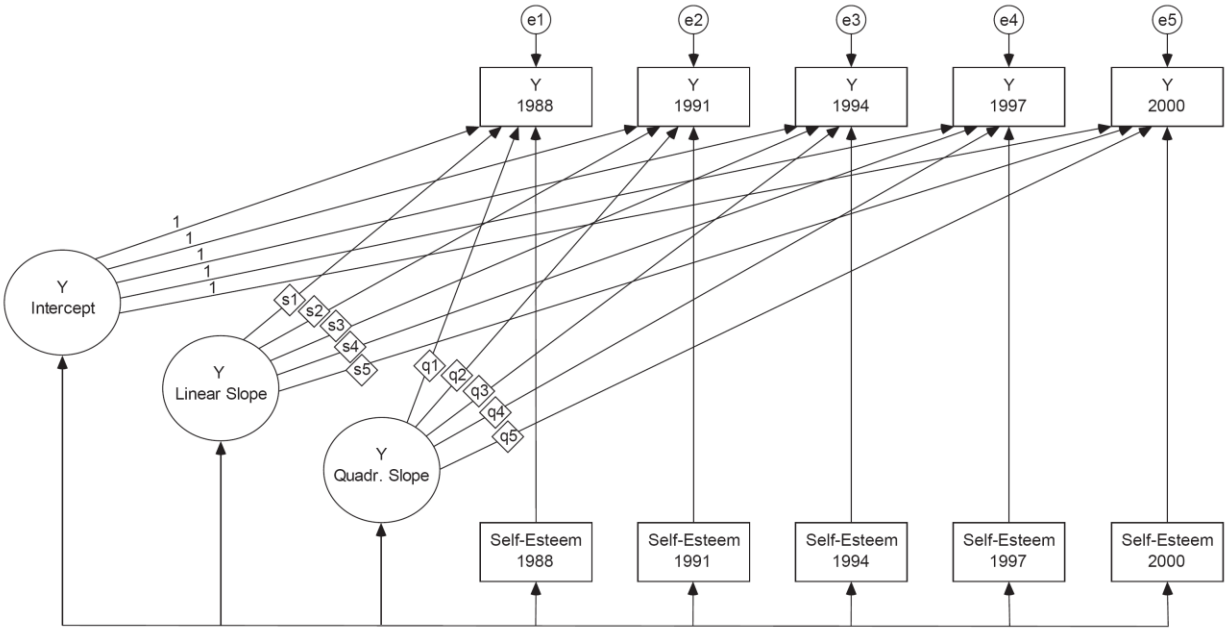

Figure 3. Growth curve model of an outcome variable (Y) with self-esteem as time-varying covariate, shown for quadratic growth (the models for linear and cubic growth were specified accordingly). The model captures the development of Y across the entire observed age range by using individual slope loadings. Parameters with individually-varying values are represented by diamonds (Mehta & West, 2000; Preacher et al., 2008). Linear slope loadings at assessments from 1988 to 2000 are denoted as *s1* to *s5* and quadratic slope loadings are denoted as *q1* to *q5*. Individual values for these loadings (i.e., age at assessments and the squared values, respectively; age was centered at 50 years) are included in the analysis through individual data vectors. The model includes covariances between growth factors and the self-esteem scores at assessments from 1988 to 2000.

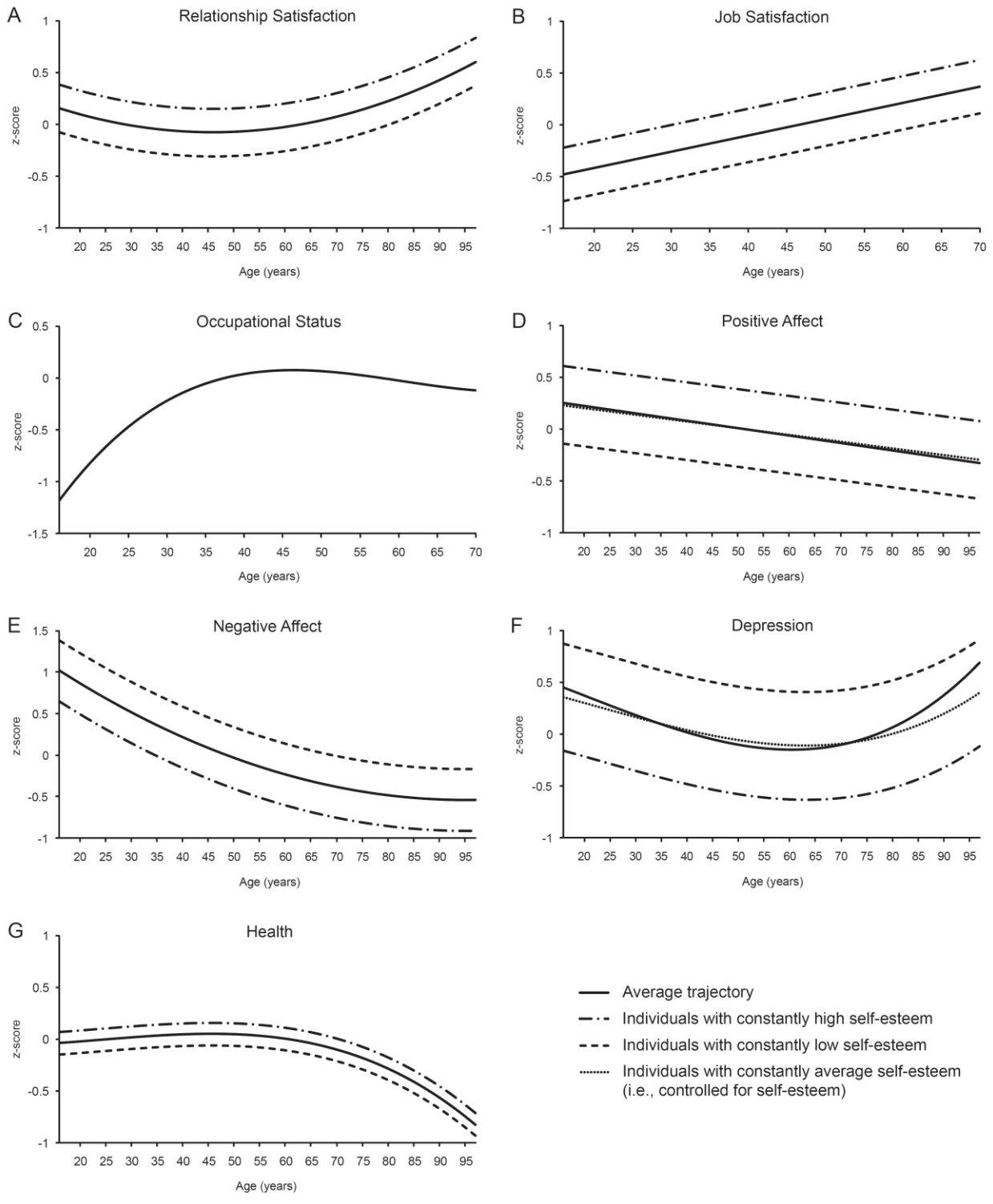

Figure 4. Predicted trajectories of outcome variables. The figure shows average trajectories (continuous lines), trajectories for individuals with constantly high self-esteem (long dash-dot

lines), trajectories for individuals with constantly low self-esteem (dashed lines), and—for positive affect (Panel D) and depression (Panel F) for which the trajectory was altered when self-esteem was included as time-varying covariate—trajectories for individuals with a constantly average level of self-esteem (dotted lines). High and low self-esteem corresponded to one standard-deviation unit above and below the mean, respectively. For job satisfaction and occupational status, the age range is restricted to 16 to 70 years because only few observations were available outside of this range. For occupational status, only the average trajectory is shown because self-esteem did not significantly predict the trajectory of this outcome variable. The measures were converted to *z*-scores for the analyses.