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The Nature and Correlates of Self-Esteem Trajectories in Late Life

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Jenny Wagner

Humboldt-University, Berlin, Germany

Denis Gerstorf

Humboldt-University, Berlin, Germany and

German Institute for Economic Research (DIW), Berlin, Germany

Christiane Hoppmann

University of British Columbia, Vancouver, Canada

Mary A. Luszcz

Flinders University, Adelaide, Australia

Address correspondence to Jenny Wagner, Humboldt-University of Berlin, Psychological Research Methods, Unter den Linden 6, 10099 Berlin, Germany, phone: +49 30 20939432, fax: +49 30-20939351, email: jenny.wagner@hu-berlin.de

Abstract

Is it possible to maintain a positive perspective on the self into very old age? Empirical research so far is rather inconclusive with some studies reporting substantial self-esteem declines late in life, whereas others report relative stability into old age. In this report, we examine long-term change trajectories in self-esteem in old age and very old age and link them to key correlates in the health, cognitive, self-regulatory, and social domains. To do so, we estimate growth curve models over chronological age and time-to-death using 18-year longitudinal data from the Australian Longitudinal Study of Ageing (N = 1,215; age 65–103 at first occasion; M = 78.8 years, SD = 5.9, 45% women). Results revealed that self-esteem was, on average, fairly stable with minor declines only emerging in advanced ages and at the very end of life. Examining the vast between-person differences revealed that lower cognitive abilities and lower perceived control independently related to lower self-esteem. Also, lower cognitive abilities were associated with steeper age-related and mortality-related self-esteem decrements. In our discussion, we consider a variety of challenges that potentially shape self-esteem late in life and highlight the need for more mechanism-oriented research to better understand the pathways underlying stability and change in self-esteem.

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Keywords: self-esteem trajectories, age-related and mortality-related, adulthood, longitudinal data

The Nature and Correlates of Self-Esteem Trajectories in Late Life

One major theme of personality and lifespan research has long been whether and how key aspects of the self are preserved when people are faced with major challenges of late life (Baltes & Carstensen, 1996; Brandtstädter & Greve, 1994; Cross & Markus, 1991; Freund & Smith, 1999; Orth, Trzesniewski, & Robins, 2010; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002; Troll & Skaff, 1997). One important indicator of the self is self-esteem, which revolves around a general evaluation and appraisal of one's worth (Leary & Baumeister, 2000; Orth et al., 2011). Self-regulation theories emphasize the adaptive capacities of the self-system, (Brandtstädter & Renner, 1990; Brickman & Campbell, 1971; Charles & Carstensen, 2010). However, empirical findings on self-esteem in old age are rather inconclusive with some studies reporting sizeable declines (Orth et al., 2010; Shaw, Liang, & Krause, 2010), whereas others report relative stability into old age (Huang, 2010; Marsh, Martin, & Jackson, 2010). Our study moves several steps beyond extant research by focusing on a phase of life, namely very old age, during which self-regulatory mechanisms that usually keep the self stable may reach their limits (Baltes & Smith, 2003). Specifically, we examine self-esteem trajectories over a broad age range of 35 years across old and very old ages (65 to 103 years) and investigate whether and how self-esteem changes in the last years of life. We also explore some of the factors that may contribute to the between-person heterogeneity that is often observed in self-esteem trajectories (Erol & Orth, 2011). Going this route helps us better understand how variables in the health, cognitive, self-regulatory, and social domains shape self-esteem late in life. To do so, we apply latent growth curve models to 18-year longitudinal data obtained from 1215 participants who had deceased from the Australian Longitudinal Study of Ageing.

Stability or Change in Self-Esteem in Old Age

It has long been proposed that people have an inherent need to feel good about themselves (James, 1890/1950). Accordingly, self-esteem is considered a fundamental human concern (Bushman, Moeller, & Crocker, 2011; Sheldon, Elliot, Kim, & Kasser, 2001) and has become one of the most investigated constructs in psychological research (Leary, 1999). Despite this long and rich history of research, there is little established knowledge about the normative trajectories of change that self-esteem exhibits in old age. In particular, studies converge in reporting that average levels of self-esteem are relatively stable or even increase until people reach retirement age, whereas studies report highly divergent results for post-retirement ages. For example, Orth and colleagues (2010) reported from one of the few longitudinal studies that population-level differences in self-esteem between ages 60 and 97 amounted to $d = -.68$ (see also Shaw, et al., 2010). The cross-sectional study of Robins and colleagues (Robins et al., 2002) also found average levels of self-esteem to decline in late adulthood, but the amount of declines was shallower ($d = -.08$ in the 60s to the 70s and $d = -.29$ in the 70s to 80s). In contrast, other studies have reported that self-esteem remains fairly robust even in old age (Huang, 2010; Marsh et al., 2010; Pullmann, Allik, & Realo, 2009; Wagner, Lang, Neyer, & Wagner, 2012). For example, the meta-analyses of Huang (2010) reported that average differences between ages 50 and 60 years were $d = -.07$ and average differences for ages 60 and older were minimal as well ($d = .07$). We note that the relatively scarcity of longitudinal data and of observations obtained from people in their 80s and 90s precludes drawing more conclusive inferences about how self-esteem develops in old and especially very old age (see also Huang, 2010; Trzesniewski, Donnellan, & Robins, 2003).

Why would self-esteem be stable across old age or why would it change? To begin with, theories of self-regulation have long highlighted that adaptive capacities are robust well into late life (Brandtstädter & Renner, 1990; Brickman & Campbell, 1971; Charles & Carstensen, 2010). For example, people may come to terms with losses and unattainable goals by adjusting their aspiration levels or by disengaging from initially important goals, and

thereby maintain a coherent sense of themselves (see Heckhausen & Schulz, 1995). Indeed, several lines of empirical work have provided convincing support of adaptive aging (e.g., possible selves: Smith & Freund, 2002; emotion regulation: Carstensen, Fung, & Charles, 2003; social integration: Wrzus, Köckeritz, Wagner, & Neyer, 2012). It thus appears reasonable to assume that people adjust, on average, reasonably well to the changes imposed by transitions into retirement (e.g., fewer financial possibilities, loss of social roles, obsolete occupational expertise and skills; see Orth et al., 2010). Although these processes appear to be highly efficient throughout adulthood and old age, it is possible that the nature of change often imposed by advanced old age challenge self-regulatory capacity to the point where it reaches its limits (Baltes & Smith, 2003; Gerstorf & Ram, 2009, 2012). First of all, people are increasingly at risk of being confronted with transitions or critical life events that are outside of their control, particularly those that are almost normative for very old people such as declining health (e.g., disability) or social losses (e.g., bereavement). These challenges may simply become too frequent or too severe in advanced old age, thereby making adjustment more and more difficult. Secondly, the self-regulation system itself may become increasingly compromised, and capabilities that have worked highly efficiently across adulthood to recover from perturbations are getting more and more fragile, for example due to cognitive limitations.

Self-Esteem Trajectories at the End of Life

Reaching back to seminal work in the 1960s and 1970s (Kleemeier, 1962; Palmore & Cleveland, 1976; Riegel & Riegel, 1972; Siegler, 1975), it has long been established that late-life changes are often not only influenced by age-related factors, but also by factors related to approaching death. In particular, the terminal decline concept suggests that progressive mechanisms leading towards death fundamentally shape the course and nature of changes that often accompany the last years and months of life. Empirical studies examining how mortality-related processes unfold have described and extracted systematic within-person

changes in individuals' behavior and experience along a time-to-death time axis (for an alternative approach, see Ghisletta et al., 2006). Evidence for precipitous proximate-to-death declines that are often considerably steeper than the typical age-related effects has primarily accumulated in cognitive ability domains (for overviews, see Bäckman & MacDonald, 2006; Berg, 1996; Small & Bäckman, 1999). However, there is an increasing body of research showing that many aspects of well-being also show steep end-of-life declines (Berg et al., 2011; Diehr et al., 2002; Gerstorf, Ram, et al., 2008, 2010; Mroczek & Spiro, 2005; Palgi et al., 2010). There is even initial evidence to suggest that terminal decline is a highly pervasive phenomenon that affects many different domains, including those often considered relatively stable across old and very old age (Gerstorf, Ram, et al., 2012).

It is an open question whether people manage to maintain a reasonably positive view of the self until the very last phase of life. Based on the above considerations, one may expect self-esteem to exhibit late-life deterioration as well. The overarching question is whether self-protective processes are still resilient enough to help people adjust to the likely losses they are faced with or whether the pervasive nature of end-of-life decrements pushes individuals' adaptive capacities to their limits. The initial evidence suggests that some domains (particularly in the sensory, cognitive, and health areas) are more prone to mortality-related change than other domains (particularly in the self-regulation and social areas; Gerstorf, Ram, et al., 2012). For example, linear mortality-related declines amounted to an average of 1.6 *SD* units in the last 10 years for the cognitive marker (the Digit Letter test) and 0.9 *SD* units for the self-regulatory marker (perceived control). These preliminary reports from other, partly related domains (e.g., perceived control: Erol & Orth, 2011) suggest that the last years of life may be accompanied by accelerated deteriorations in self-esteem, but that the overall effect size of those changes is probably smaller relative to the effects observed in other domains.

Correlates of Late-Life Self-Esteem Trajectories

Extant research on factors contributing to between-person differences in self-esteem has revealed that feedback from peers (Leary, et al., 1995; Leary & Baumeister, 2000) and relationship with parents (Ojanen & Perry, 2007, Harter, 2006) as well as achievements (Marsh & Craven, 2006; Trautwein, Lüdtke, Köller, & Baumert, 2006) along with athletic competences and physical appearance (Harter, 1993, 2006) are all crucial correlates of self-esteem in the first half of life. For example, Harter (2006) illustrated that adolescents' transition from elementary school to junior high school is often accompanied by considerable changes in self-esteem and that such shifts are mostly due to a change in how successful adolescents are in important domains of life. However, less is known about the sources and correlates of self-esteem in old age.

Some of these sources, such as the ones in the work domain, are no longer available after people have reached retirement ages. As a consequence, other factors may become increasingly important. These factors can be important sources of self-esteem but they can also represent risk factors as detailed below. In the current study, we assume that socio-demographic variables as well as variables in the health, cognitive, self-regulatory, and social domains are of key importance in determining self-esteem late in life.

To begin with, gender differences in self-esteem have long been reported from samples of young and middle-aged adults, typically with higher self-esteem among men relative to women (Kling, Hyde, Showers, & Buswell, 1999). However, there is evidence to suggest that these differences are considerably smaller in old age (Orth, et al., 2010; Robins, et al., 2002) or even non-existent (Huang, 2010), probably because late life is related to less strict social and role expectations (Freund, 2000). Education can be regarded as a general-purpose resource that links to a variety of factors ranging from finances to coping strategies that often help individuals achieve their goals and deal efficiently with changing living conditions. Consistent with this idea, people with higher educational achievements were repeatedly found to report higher self-esteem (Orth, et al., 2010; Shaw, et al., 2010). Finally,

studies of young adults have revealed that being single is related to lower self-esteem, particularly among men (Lehnart, et al., 2010; Neyer & Lehnart, 2007; Wagner, Lüdtke, Jonkmann, & Trautwein, in press). This is argued to be due to the normativity of establishing a first partnership in young adulthood. Given that living without a partner is much more common when people are in their 80s and 90s, we would however not expect considerable differences related to marital status anymore.

As a second set of crucial self-esteem correlates in late life, we examine variables in the health domain. Previous studies indicate that people who reported being in good health also reported higher self-esteem (Orth, et al., 2010; Reitzes & Mutran, 2006; Shaw, et al., 2010). To move towards a more comprehensive health assessment, we will make use of three indicators: a medical checklist reporting the current chronic medical conditions; functional limitations and disabilities, and self-rated health.

As a marker of cognitive abilities, we consider perceptual speed, which is highly reliable and sensitive to change throughout adulthood (Anstey, Hofer, & Luszcz, 2003; Gerstorf, Hoppmann, Anstey, & Luszcz, 2009), and, as a cognitive primitive, is conceptually closer to a resource than other cognitive abilities (Luszcz & Bryan, 1999).

As a fourth set of correlates, we draw from conceptual and empirical work highlighting the role of perceived control for successful aging (Heckhausen, et al., 2010; Infurna, Gerstorf, Robertson, Berg, & Zarit, 2010). Specifically, perceptions of and strivings for control appear to play a pivotal role in the context of active self-esteem recovery after loss or failure, for example through the use of self-protective strategies such as goal disengagement or downward comparison. Such control strategies are important throughout the life span, but may become particularly important with the increased risks of loss experiences in old age (see also Brandtstädter, 1999). Aspects of perceived control have indeed been linked with shaping self-esteem in early adulthood (Erol & Orth, 2011) and we examine such associations in a later phase of life.

A final correlate revolves around the social domain. For example, consistent with Sociometer theory, self-esteem often shows strong associations with social inclusion and positive social interactions (Denissen, Penke, Schmitt, & van Aken, 2008; Leary & Baumeister, 2000; Leary, Tambor, Terdal, & Downs, 1995). Because close social relationships constitute a relatively stable and important aspect of late-life functioning (Lang & Carstensen, 2002; Wrzus et al., 2012), we expect that the social domain continues to play a key role in shaping people's self-esteem. Taken together, a thorough investigation of the role of these factors promises to help identify some of the risk factors for, and protective living conditions against, self-esteem decline late in life.

The Present Study

In the current study, we examine whether and how self-esteem changes at the end of life and explore factors that contribute to between-person differences in such change. To do so, we apply growth models to long-term longitudinal data over chronological age and time-to-death metrics from 1,215 deceased participants in the ALSA. As an extension of studies examining how self-esteem changes when people are in their 60s and 70s, we expect self-esteem to show considerable decline when people are in their 80s and 90s and when they approach death. We also expect that variables in the health, cognitive, self-regulatory, and social domains will shape the course of self-esteem change late in life.

Method

Procedure

This report is based on the Australian Longitudinal Study of Aging (ALSA; Luszcz, 1998). The ALSA is a population-based psychobiosocial and behavioral study with participants from Adelaide, Australia. The first wave of data collection started in 1992 and 10 follow-up waves with varying study intervals have been conducted since. The study consists of an extensive personal interview including, among other things, psychosocial, behavioral, social, and contextual variables. Detailed information on study procedures and constructs can

be found in Andrews et al. (2002), Anstey et al. (2003), and Luszcz and colleagues (Luszcz, Bryan, & Kent, 1997).

Participants

At baseline in 1992, the ALSA sample comprised 2,087 participants, stratified by age and gender into four cohorts (70-74 years, 75.79 years, 80-84 years, and 85+ years; age: M = 78.16, SD = 6.69, range = 65 - 103) with those aged 85 years and older, as well as men, being oversampled. Information about mortality status of participants was updated in July 2011 from city registries, when 82.5% or n = 1,722 of the original participants were known to have died. With an interest in late-life changes, we included in our report all ALSA participants who (a) were deceased by July 2011 and (b) had contributed one or more waves of self-esteem data in the last 10 years of life, resulting in a sample of 1,215 old and very old adults, aged 65 through 103 years at baseline (M = 78.8, SD = 5.9, 55% men). About 54% left school by age 14 or younger. The majority of participants were married (66%).

Included in our study were all participants who provided valid data on key measures of our study (self-esteem, social participation). As a consequence, it was not possible to compare participants included in our report with those not included on these key measures. However, information for those not included was available on most other variables. Thus, selectivity analyses with all participants at T1 and those included in the current sample showed that included participants are more likely to be male (d = .20), have a higher education (d = .14), report more medical conditions (d = .19), and indicate lower internal control (d = .27). At the same time, the two groups did not differ from each other with respect to marital status, functional limitations and self-reported health, nor with respect to cognitive abilities and perceived loneliness. These analyses suggest that existing differences are small to marginal in effect size and thus may be indicative of only small selectivity effects.

For our analyses, we use six waves of longitudinal data spanning 18 years. As is common in research of old and very old individuals, sample attrition (primarily due to

mortality) was considerable. Specifically, the following numbers of individuals were selected at each measurement occasion: at baseline in 1992 (T1; n = 1,215), at T3 in 1994 (T3; n = 1,069), at T6 in 2000 (T6; n = 505), T7 in 2003 (T7; n = 257), at T9 in 2008 (T9; n = 52), and T11 in 2011 (T11; n = 18). Self-esteem was not assessed at T2, T4, T5, T8, and T10. On average, T3 took place 2.03 years (SD = 0.52) after T1, T6 7.99 years (SD = 0.41), T7 11.07 years (SD = 0.45), T9 15.38 years (SD = 0.82), and T11 17.78 years (SD = 0.43), respectively. Across the six waves, the 1,215 participants provided 2,435 observations (M = 2.00, SD = 1.07). More specifically, one data point on self-esteem was available for n = 472, two waves from n = 435, three from n = 173, four from n = 108, five from n = 20, and six from n = 7.[2] To quantify longitudinal selectivity, we used an effect-size metric that indicates the degree to which individuals of our selected sample who participated in three or more waves (n = 525) differed from those with fewer data points (for details, see Lindenberger, Singer, & Baltes, 2002). Total selectivity amounted to 0.17 SD units (where SD refers to that of the 2,087 ALSA sample) for self-esteem, –0.18 SD for chronological age, –0.90 SD for time-to-death, –0.13 SD for gender, 0.03 SD for education, 0.09 SD for marital status, -0.04 SD for comorbidities, –0.12 SD for functional limitations, 0.22 SD for self-rated health, 0.26 SD for perceptual speed, 0.26 SD for perceived control, 0.17 SD for social participation, and –0.07 SD for loneliness. This suggests that higher levels of self-esteem at T1, younger age, longer time-to-death, better health, preserved cognitive functioning, higher perceived control, more social participation, and less loneliness were associated with subsequently lower mortality and higher participation rates among survivors. Effects of sample selectivity were primarily due to mortality (e.g., self-esteem: 71% of the total effect of .17 SD units) rather than drop-out for other reasons. The statistical procedures used in our analyses handle this type of non-random attrition, however, we acknowledge that participants with the most longitudinal information represent a positively selected subset of the initial ALSA sample.

Measures

Self-esteem. The Bachman revision (1970) of Rosenberg's Self-Esteem Scale was used in the ALSA study. It comprised ten items ("I feel that I have a number of good qualities."), with four items being reverse-coded ("I think I am no good at all."). Participants were asked to indicate how often each statement was true on a five-point Likert-scale ranging from 1 ("almost always true") to 5 ("never true"). Prior to computing individual mean scores, the positive items were reverse-coded such that higher numbers indicate higher self-esteem. Reliability analyses showed satisfactory internal consistency across the entire study (Cronbach's $\alpha \geq .78$).

Correlates. Included in our models was information about participants' age, date of death, gender, marital status (married vs. not married), and education indicated by the age people left school (1 "never went to school", 2 "under fourteen years" to 7 "eighteen or more years"). We also examined resources in the health, cognitive, self-regulative, and social domain as correlates of late life changes in self-esteem (see Table 4 for descriptive statistics).

Health was based on three measures. *Medical conditions* were self-reports of the number of current chronic medical conditions from a comprehensive list of 61 (e.g., stroke, diabetes, arthritis). *Functional limitations* were measured by responses to two Rosow and Bresleau (1966) mobility items and to five Nagi (1976) disability items. If participants had any degree of difficulty with each of these seven items, they received a score of 1; these were summed, so that higher scores indicate more functional limitations. *Self-rated health* was based on a one-item measure that asked participants to rate their current overall health on a 5-point Likert-scale.

Cognitive correlates were assessed with the Digit Symbol Substitution subscale of the revised Wechsler Adult Intelligence Scale (Wechsler, 1981; for details, see Luszcz et al., 1997). As a parsimonious measure of psychomotor speed, participants were asked to substitute symbols corresponding to numbers from 1 to 9 as rapidly as possible into a

randomly ordered array of 93 digits. Symbols with corresponding numbers were present throughout the task. We included the number of correct substitutions in 90 seconds.

Self-regulative correlates are based on a 12-item scale of perceived control from the Expectancy of Control subscale of the Desired Control Measure (Luszcz, 1997; adapted from Reid & Zeigler, 1981). This measure of perceived control asked respondents to indicate the extent of perceived control. Again, a 5-point Likert-scale was applied ranging from 1 "strongly agree" to 5 "strongly disagree". Estimates are based on a sum score of reversed-coded items such that higher scores on the scale illustrate more internal control, whereas lower scores illustrate more external control.

Social resources included two indicators: *Social participation* is based on four items of the Adelaide Activity Profile (Clark & Bond, 1995). The items assessed the frequency of four social-life aspects including active social participation (e.g., "having invited other people to one's home"). Based on a 4-point Likert-scale, higher scores related to more activity. To index *loneliness* we selected one item from the Center of Epidemiological Studies-Depression scale (Radloff, 1977). Participants were asked to indicate how often over the past week they felt lonely. Again, higher scores on a 4-point Likert-scale index higher loneliness.

Data Preparation and Statistical Procedure

All measures used were standardized to a *T* metric ($M = 50$, $SD = 10$) based on the original $N = 2{,}087$ ALSA sample as a reference group of old people. In addition, chronological age was noted for each available assessment as the number of years since birth. Likewise, time-to-death for each available assessment was noted as the number of years remaining in an individual's life.

Table 1 illustrates the layout of our data including descriptive statistics of self-esteem over chronological age and time-to-death. Two aspects are particularly noteworthy. First, we have a considerable number of observations obtained in very old age and in the last years of life. More precisely, the majority of assessments in ALSA were obtained from participants in

their 70s (n = 974, 40%) and 80s (n = 1,185. 49%). In a similar vein, data were primarily gathered in the last years of life (76% obtained in the last 10 years; 39% of which obtained in the last 5 years); thereby enabling us to thoroughly examine the typical changes that self-esteem exhibits during those last phases of life. Second, descriptive statistics suggest that self-esteem was relatively stable over both time metrics (e.g., ten years prior to death: M = 52.14 (SD = 9.02) vs. in the year of death: M = 53.94 (SD = 9.46)). In this context, the moderately sized correlation between age and time-to-death (r = .43, p < .001) suggests that older individuals tend to be closer to death, but also highlights that the two time metrics only partly overlap.

To address our research questions, we applied standard multilevel/latent growth modeling procedures (Raudenbush & Bryk, 2002; Ram & Grimm, 2007; Singer & Willet, 2003). In a first step, we fitted separate growth curve models of self-esteem change for chronological age (from 65 to 108 years) and for approaching death (from 21 to 0 years). These models took the following form

$$self\text{-}esteem_{ti} = \beta_{0i} + \beta_{1i}(time_{ti}) + \beta_{2i}(time^2_{ti}) + e_{ti},$$

where person i's self-esteem at time t, $self\text{-}esteem_{ti}$, is a combination of an individual-specific intercept parameter, β_{0i}, individual-specific linear and quadratic slope parameters, β_{1i} and β_{2i}, that illustrate the linear and quadratic rates of change per year over either chronological age or time-to-death, and a residual error, e_{ti}. At the individual level (or Level 2), the intercept, β_{0i}, and slope parameters, β_{1i} and β_{2i}, were then modeled as

$$\beta_{0i} = \gamma_{00} + u_{0i},$$

$$\beta_{1i} = \gamma_{10} + u_{1i}, \text{ and}$$

$$\beta_{2i} = \gamma_{20}$$

where γ_{10}, γ_{20} , and γ_{30} are sample means, and u_{0i}, u_{1i}, and u_{2i}, are individual deviations from those sample means. Individual deviations are expected to be multivariate normally

distributed, correlated with each other, and uncorrelated with residual errors, e_{ti}. We also tested deviations for the quadratic slope, u_{2i} and for the existence of cubic forms of change in either time metric. Both terms tested were not reliably different from zero and were thus not included in the final models.

To account for between-person differences in self-esteem trajectories across age and time-to-death, we included socio-demographic variables as well as characteristics of the health, cognitive, self-regulatory, and social domains at T1 into the model at Level 2. All correlates were grand-mean centered such that regression parameters indicated the average trajectory (across all individuals). The models were fit to the data using SAS (Proc Mixed; Little, Miliken, Stroup, & Wolfinger, 1996). The age time metric was centered at 85 years and time-to-death at two years prior to death. We chose age 85 as the centering point for age because it was close to the mean age across all observations (81.04 years). The dense observations at around this age provided for more robust description of the data relative to choosing other centering points (e.g., age 70 or age 90). In a similar vein, we chose two years prior to death as the centering anchor in the time-to-death models because of relatively dense observations at this point. Keeping the intercept relatively near to the time of death also means that terminal decline effects, if present, were very likely to have set in (e.g., Gerstorf et al., 2010; Sliwinski et al., 2006; Wilson Beck, Bienias, & Bennett, 2007; Wilson, Beckett, Bienias, Evans, & Bennett, 2007). Thus, the intercept means, intercept variances, intercept-slope covariance, as well as the effects of the correlates indicate effects at age 85 years and at two years prior to death, respectively.

Results

In a first step, we estimated an unconditional model of self-esteem to examine the distribution of between-person and within-person variation. These analyses revealed that the intraclass correlation was .54, suggesting that 54% of the total variation in self-esteem was between-person variation. Thus, at both levels of analyses—within individuals and between

individuals—substantial variation in self-esteem was observed. With the indication that there was indeed intraindividual variation to model, we proceeded to first compare age-related and mortality-related change trajectories of self-esteem and then compare the two time-metrics. Second, we examined the role of health, cognitive, self-regulatory, and social correlates in contributing to between-person differences in self-esteem trajectories.

Self-Esteem Late in Life: Age- and Mortality-Related Change Trajectories

Table 2 summarizes the results of the multi-level growth curve models over chronological age and time-to-death. In both instances, model 1 represents results of linear self-esteem change across the respective time metric and model 2 additionally includes the quadratic change trajectory of self-esteem. Based on the suggestions of Snijders and Bosker (1999), we used the residual variance proportion to calculate the proportional reduction in prediction error. The resulting coefficient is used as change in *pseudo* R^2 to compare models within and across time metrics. In a first step, this comparison illustrated that the additional inclusion of the quadratic slope explained more variance compared to the linear model. This was true for both the age-related and the mortality-related models. Despite the slight decrease in the illustrated fit index AIC, the quadratic age model indicated additional explained variance and a substantial quadratic effect. Also, from a theoretical point of view, relative stability in self-esteem is consistent with previous findings and expectations about self-evaluations in late life. We thus decided to focus on the quadratic age model and compare it with the quadratic distance-to-death model.

It appears as if self-esteem follows a nonlinear change trajectory late in life. In a second step, we compared models 2 across the two time metrics. The amount of variance accounted for was higher in the mortality-related model of self-esteem change at the end of life (.16; AIC = 17774) compared to the age-related model (.09; AIC = 17804). Such results concur with previous reports that time-to-death provides for a more efficient description of between-person differences in late-life change (Palgi, et al., 2010). In follow-up analyses, we

also included both age and mortality into one combined growth-curve model. Results revealed that only mortality-related effects remained reliably different from zero (and fairly unchanged to the reported simple model), whereas age-related effects did not. This supplementary analysis substantiates that with impending death, the mortality-related time metric provides insights into self-esteem change above and beyond an age-related consideration.

Considering the size of average change trajectories of self-esteem in late life suggests that rates of change are steeper with impending death relative to advancing age. Specifically, the age model showed no reliable linear change ($\gamma_{10} = 0.01$, $p > .05$) with only a small concave curvature ($\gamma_{20} = –0.01$, $p < .05$). In contrast, the mortality model exhibited relatively steeper linear declines ($\gamma_{10} = –0.30$, $p < .05$) and also a stronger concave curvature ($\gamma_{20} = –0.03$, $p < .05$). We note, however, that the overall effect size of late-life declines in self-esteem was rather minimal with the average linear mortality-related decrements not exceeding 0.3 *SD* units in the last 10 years (as compared with 1.6 *SD* units in the last 10 years for the Digit Letter test in the Gerstorf, Ram et al., 2012 study). Figure 1 illustrates this relative stability of late-life self-esteem over chronological age (left-hand Panel) and time-to-death (right-hand panel). At the same time, both figures indicate substantial between-person variability in self-esteem trajectories that will be explored in conditional models.

Correlates of Late-Life Self-Esteem Trajectories

In a second set of analyses, we examined the role of socio-demographic variables as well as proxies of health, cognition, self-regulation, and social resources as correlates of self-esteem change trajectories. Results are reported in Table 3. In general, findings revealed only a few associations between proxies and self-esteem intercept and late-life change over both age and time-to-death metrics. In this context, cognitive functioning and perceived control were identified as factors contributing to between-person difference in late-life self-esteem. Over chronological age, we found that better performance on the Digit Symbol test related to both higher self-esteem at age 85 and more positive age-related change in self-esteem ($\gamma_{07} =$

0.15, $p < .05$, $\gamma_{17} = 0.01$, $p < .05$, see Figure 2, left-hand Panel). In a similar vein, perceiving more internal control was associated with higher self-esteem ($\gamma_{08} = 0.40$, $p < .05$). However, the implications of perceived control for maintaining self-esteem decline with age ($\gamma_{18} = -0.01$, $p < .05$, see Figure 3, left-hand Panel). Random effects illustrate that there was still substantial within-person and between-person variation in age-related self-esteem trajectories, suggesting that the correlates included in our model account for only a fraction of between-person differences in self-esteem. As an effect size metric, we can calculate the reduction in variance in either level or slope with the inclusion of correlates. Our correlates accounted for in part substantial amounts of variability in self-esteem trajectories over chronological age (e.g., level: 39%). In addition, comparing AIC fit indices of models with (8013) and without (17804) covariates, a substantial fit increase is evident. Over time-to-death, we also found a moderating role of cognitive abilities, with better performance relating to higher self-esteem two years prior to death ($\gamma_{07} = 0.15$, $p < .05$) and less mortality-related declines ($\gamma_{17} = 0.02$, $p < .05$, see Figure 2, right-hand Panel). Perceiving more control over one's life was also associated with higher late-life self-esteem ($\gamma_{08} = 0.39$, $p < .05$, see Figure 3, right-hand Panel). Finally, people who reported more comorbidities at baseline tended to experience steeper self-esteem declines ($\gamma_{17} = –0.02$, $p = .052$). Again, the correlates examined accounted for a considerable share of between-person differences in self-esteem (e.g., level: 19%). Again, AIC comparisons illustrated a substantial fit increase ($AIC_{\text{no covariates}} = 17774$; $AIC_{\text{with covariates}} = 7989$).

Discussion

The objective of the current study was to examine the nature and correlates of self-esteem trajectories late in life and close to death. Applying multi-level growth curve models to long-term longitudinal data of now deceased participants in the ALSA revealed that tracking self-esteem change over time-to-death provides a better description of between-person differences in self-esteem change than does chronological age. Mortality-related

declines in self-esteem were also found to be steeper than age-related declines, but the overall effect size of these decrements was rather small suggesting that self-esteem is fairly stable at the end of life. We also examined the role of health, cognitive, self-regulative, and social characteristics as between-person difference correlates of late-life self-esteem trajectories. Overall, few effects were found, but cognitive functioning and perceived control consistently emerged as reliable self-esteem correlates. In our discussion, we consider a variety of challenges that potentially shape self-esteem late in life and highlight the need for more mechanism-oriented research to better understand the pathways underlying stability and change in self-esteem.

Relative Stability in Self-Esteem in Old Age and Close to Death

Previous research has repeatedly shown that mortality-related descriptions often provide a more accurate description of late-life changes in a variety of different domains, including indicators of cognitive abilities and well-being (Bäckman & MacDonald, 2006; Berg, 1996; Berg et al., 2011; Gerstorf, Ram, et al., 2008, 2012). Our results generally support these findings for self-esteem, a central facet of people s' self-regulation system. In particular, our mortality-related model accounted for a larger share of variance. Similarly, mortality-related effects remained reliably different from zero in a combined age/time-to-death model, whereas age effects did not. Thus, the way people evaluate themselves at the end of life appears to be more dependent on the closeness to death than the mere chronological age of a person. This finding contributes another perspective to the ongoing debate about chronological age being an insufficient time metric for understanding self-esteem development across the life span (Pullmann et al., 2009). Consistent with earlier studies, the amount of variance accounted for by age was relatively low (less than 10%). We note that the alternative time metric of time-to-death also only accounted for relatively small proportions of variance in self-esteem. Thus, to move towards better understanding of change trajectories of self-esteem, it appears promising to make use of more mechanism-oriented studies that

investigate the probable change-inducing nature of critical life events such as onset of disability (see Ram et al., 2010).

One central question of our study was to examine whether self-esteem is stable or declines at the end of life. Our findings suggest that self-esteem appears utterly robust with relatively small mean-level changes. Age-related and mortality-related models illustrated small negative curvature trajectories indicating that minor declines only emerge in advanced ages and at the very end of life. Based on 4 waves of longitudinal data covering up to 16 years, Orth and colleagues (2010; see also Shaw et al., 2010) found a similar shape of self-esteem change, but much stronger decrements late in life – starting already when people were 60 years of age. We can only speculate about possible reasons for these discrepancies. Differences in measurement scales, reliability of those scales, whether those scales tapped more negative aspects of self-esteem, study sampling and maintenance procedures, and the timing of observations preclude comparisons beyond the general pattern of findings. For example, self-esteem was measured with only three items in the Americans' Changing Lives study (cf., Orth et al., 2010; Shaw et al., 2010), with two of these items being negative, and only acceptable reliabilities (between .57 to .60); whereas the ALSA study included a ten item measure of self-esteem with four negative items and good reliabilities across all six waves ($\geq$.78). We also note that our study included more than 1,421 observations or 58% of our entire data base that were obtained after age 80, suggesting that parameter estimates of our models for these advanced ages should be reasonably robust. Leaving issues of positive sample selection aside, our findings suggest that the rate of late-life self-esteem deterioration may be rather minimal and less pronounced as compared with many other central domains of functioning. These results also are consistent with theoretical and empirical work highlighting the adaptive capabilities of the self well into late life (Brandtstädter, 2007; Freund & Smith, 1999). Despite the fact that gain/loss-ratios become increasingly negative (Baltes, 1987), individuals appear to maintain a positive view of the self.

Of note is also that over and above these average trends, we also found considerable between-person differences in self-esteem trajectories late in life. Some individuals appear to be rather negative and become increasingly so over time. Others in contrast are still very positive in their self-evaluative tendencies in late life, and some people reported stable or positive self-esteem trajectories even close to death. The big-picture question then is to identify and understand the conditions that enable people to maintain a positive view of the self into their last years.

Correlates of Late-Life Self-Esteem Trajectories

To explore the conditions and correlates that may contribute to self-esteem change, we selected four key domains of functioning late in life. The first domain involved several health-related characteristics. Despite substantial relations between self-esteem and disabilities as well as subjective health (cf. Table 4 in the appendix), the conjoint consideration with the three remaining domains evinced no reliable relation with either self-esteem intercept or slope. As a consequence, health conditions did not differentiate between individuals with more or less positive views of the self when between-person differences in cognitive, self-regulatory, and social indicators were taken into account. In our view, this finding is striking because proxies of pathologies generally relate to lower late-life functioning (Gerstorf et al., 2012). It appears as if the processes underlying self-esteem late in life are less prone to be shaped by health declines than typically expected. Thus, it may actually be possible to maintain a positive self-esteem even in the context of worsening health conditions. Of course, it is also possible that the measures used may not be sensitive enough to pick-up subtle, but important differences. However, in previous reports from the ALSA, poor health on one or more of the indices used herein has been linked successfully to lower self-perceptions of ageing (Sargent-Cox, Anstey & Luszcz, in press a & b), mortality (Caughey, et al., 2010; Giles, Glonek, Luszcz & Andrews, 2005), and fewer social activities (Hoppmann et al., 2008).

In contrast, our indicators of both the cognitive and the self-regulative domain showed considerable associations with self-esteem trajectories late in life. Specifically, age-related models evinced that preserved cognitive abilities and internal control related to higher self-esteem levels and, with respect to cognitive abilities at baseline, a more positive change trajectory of self-esteem at the end of life. Mortality-related models showed similar associations with level of self-esteem at two years prior to death, and being cognitively fitter at baseline was associated with less mortality-related decline in self-esteem. Previous studies associated cognitive abilities with functional limitations in the health domain of late life (Luszcz & Bryan, 1999; Infurna, Gerstorf, Ryan, & Smith, 2011). Our results now suggest that also self-evaluative processes interrelate with cognitive abilities and shape trajectories of self-esteem in late life. Previous experimental research with college students has shown depleted self-regulatory capacities in the light of self-esteem inconsistent feedback (Stinson et al., 2010). Thus, efforts to maintain self-esteem appeared to relate to cognitive abilities and cognitive resources already in young adulthood. With an increasing number of self-challenging situations in late life, the availability of higher cognitive abilities may form a basis to remain responsive and to maintain a positive view of the self.

Results regarding perceived control concur with and extend previous research illustrating the important role perceptions of and strivings for control often have across the entire life span (Heckhausen et al., 2010). For example, previous longitudinal research found that control shapes self-esteem trajectories in early adulthood (Erol & Orth, 2011). We have now shown similar associations late in life, with more favorable levels and change trajectories of self-esteem when people reported higher perceived internal control. Similarly, our mortality models suggest that perceived control is intertwined with maintaining self-esteem until very late in life. By using compensatory control strategies individuals may be able to cope with the losses of late life, and to protect or maintain their self-esteem.

We found no evidence for an association between self-esteem late in life and the social domain. Both social psychological (Baumeister & Leary, 1995) as well as developmental (Kahn & Antonucci, 1980) theories highlight the importance of social inclusion in late life. However, neither the amount of social inclusion nor perceptions of loneliness were reliable predictors of self-esteem at the end of life. We can only speculate about possible reasons. As a first possibility, the raw correlations indeed suggest that social domain characteristics relate to self-esteem (cf. Table 4). However, such associations appear not to be unique, but rather to be in part driven by some of the other domains included. For example, the onset of functional limitations may undermine social participation, which in turn cannot maintain its role as a key source for self-esteem. Second, socioemotional selectivity theory (Carstensen, 1992, Charles & Carstensen, 2010) posits that older adults concentrate social encounters on particularly close and emotionally meaningful relationships. Thus, including measures that tap into very close relationship partners such as spouses or children might evince associations with self-esteem (cf., Denissen et al., 2008 with respect to early adulthood). As a third possibility, the occurrence of social losses such as the death of the spouse or a close friend may level off the relation between the social domain and self-esteem because these sources of self-esteem are no longer available.

In sum, our analyses of old and very old adults in the ALSA sample revealed that cognitive and self-regulatory resources hold a significant role in shaping self-esteem in late life, whereas health conditions and social resources did not. Importantly, substantial within-person and between-person variability in self-esteem remained unexplained after including the correlates. It appears as if additional resources and developmental processes also relate to self-esteem at the end of life.

Limitations and Outlook

In the context of the strengths of extensive longitudinal data from a large population-based sample of adults late in life, we acknowledge several limitations of our study. First, all

constructs examined were based on self-report measures. For self-esteem, we believe that this is permissible because the subjective evaluation of the self represents one key component of the phenomenon of interest (Donnellan, Trzesniewski, Conger, & Conger, 2007; Robins et al., 1999). However, it would be informative to make use of more objective measures in the health domain or peer reports of social relationships. For example, subjective health measures may be blurred by individual tendencies of particularly positive or negative self-evaluation, and thus an objective measure may reveal additional insights. Second, irrespective of the longitudinal nature of our study we are not able to draw causal inferences about the role of the correlates as antecedents or consequences of self-esteem (for a discussion, see Foster, 2010). Late life is characterized by intertwined developmental challenges that may not have been captured in our study, but affect self-esteem. For example, spouses are known to mutually affect their developmental trajectories until late life (Hoppmann & Gerstorf, 2009). Thus, the quality of the partner relationship and the feedback people receive from a spouse may be particularly important in reduced social networks of late life. In addition, experimental designs would enable causal conclusions on the direction of effects, and thus, are one important road to travel in understanding the antecedents and consequences of self-esteem development. Third, by definition a study of late life is affected by selection processes both at the population and the sample level. We only included individuals deceased by mid 2011 and who provided data within the last ten years prior to death. With this procedure, we may exclude individuals with severe disabilities such as dementia who were not able to further participate. The replication of our findings using an independent sample is thus a next crucial step. In addition, one could think about the alternative ways of addressing this issue such as in a more prospective procedure that actually predicts the future occurrence or non-occurrence of events such as the timing of mortality. Finally, our design addressed self-esteem across six waves in a time frame of up to 18 years. It is possible that a more intense longitudinal assessment such as daily self-esteem measures across several weeks or assessments every two

months within the last two years of life may draw a completely different picture. Further research is clearly needed to understand specific self-evaluative processes throughout late life.

The longitudinal nature of our study enabled us to provide a first illustration of developmental trajectories of self-esteem at the end of life. Both, age and mortality-related models emphasized the relative stability of self-esteem until very old age. In conceptual terms, this finding of relative stability of self-esteem in late life is particularly informative for life span theoretical accounts. Most of these accounts propose that adaptive capabilities are typically well preserved into late life, suggesting that self-esteem is relatively stable. However, biological and cognitive degeneration is known to take a toll on adaptive capabilities, often leading to terminal decline in the last years of life across a large variety of bio-psycho-social characteristics (Bäckman & McDonald, 2006; Gerstorf, et al. 2012, Wilson et al., 2012). Our findings illustrate that self-esteem is probably one of the very few exceptions and a domain in which people may indeed be able to maintain functioning into the very last years of life.

At the same time, conclusions drawn from our conditional analyses – particularly with respect to interrelationships with resource characteristics – remain correlational. Our findings concur with previous studies that mortality-related models outperform age-related models at the end of life. One of the next steps would be to examine a possible sequence of developmental processes so as to differentiate conditions and consequences and underlying mechanisms of age-related and mortality-related self-esteem processes. For example, combining our findings on the adaptive abilities of the self and the role of cognitive and self-regulative resources with other lines of inquiry may be informative. First, Sociometer theory (Leary & Baumeister, 2000) suggests that self-esteem is a monitor of relational value and, thus, rather an outcome of social inclusion. Several studies in early adulthood were able to support such notions (Denissen et al., 2008; Leary et al., 1995). However, our study did not provide evidence for such effects. More mechanism-oriented studies may help to provide

some insights into such developmental processes in late life and close to death. For example, social networks are proposed to focus on emotionally meaningful relationships in late life (Carstensen, 1992; Kahn & Antonucci, 1980; for a meta-analytic overview see Wrzus et al., in press) and thus a more fine grained assessment of potential social relationships, such as the spouse, children, or a close friend, and their daily interactions and impact may help to understand relational feedback loops of late life. Also, our results highlight the relation between self-esteem and cognition in late life. Cognitive processes and mechanisms are known to thoroughly decline based on changes of neurobiological functioning (Baltes et al., 2006; Catell, 1971). Thus, more basic, mechanism-oriented assessments of cognitive functioning or experimental manipulations could help to integrate and advance our knowledge of possible causal directions, to better understand adaptive abilities that help to maintain positive self-views until late in life.

A second line of research could relate self-esteem to key constructs in other domains of functioning and, thus, help to understand its relationship and position in lifelong processes of successful development and aging. We would propose that self-esteem is embedded in a larger system of psychosocial functioning and relates in both direct and more indirect ways to broader constructs in the personality and affect domains. For example, there is reason to believe that higher self-esteem is associated with higher extraversion and higher well-being (Orth et al., 2011; Wagner et al., 2012). However, little is known about the temporal ordering of such associations (e.g., is self-esteem preceding and predicting extraversion or is it the other way around). It is only very recently that these questions have been addressed empirically. For example, in a series of publications, Orth and colleagues (Kuster, Orth, & Meier, 2012; Orth, Robins, & Roberts, 2008; Sowislo & Orth, 2012) have shown that low self-esteem is a unique predictor of later depression. Thus, further research is needed to understand the possible role of self-esteem for the onset of disability or mortality hazards. Such ideas may also speak to the potential of interventions. First, cognitive training might

have secondary effects by promoting self-esteem in late life (for effects on personality, see Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012). Second, by empowering older adults to maintain their self-esteem via increased perceived control, it may also be possible to affect other outcomes of successful aging.

In sum, our study revealed first insights into mortality-related compared to age-related trajectories of self-esteem. Despite the curvature decrease of self-esteem at the very end of life, self-evaluation remains fairly stable well into old and very old age. Importantly, our results highlight the pivotal role of cognitive and self-regulative abilities in this context, whereas neither health-related variables nor indicators of social embeddedness were associated with late-life self-esteem. Importantly, only a portion of intra-individual change as well as inter-individual differences were accounted for by the various domain indicators examined, emphasizing the need to further explore factors and processes that help us better understand developmental processes of late life functioning. One way to examine mechanisms that underlie individual differences in self-esteem late in life could be to focus on interpersonal transactions in close relationships: Does self-esteem interrelate between spouses in late life? Do partners boost each other up or drag one another down? We hope to be able to offer insight into these questions in the future. People appear to have an ability to adjust or prepare themselves quite well for the combination of late life challenges and inevitable losses. To understand the processes operating at the end of life and to be able to support struggling individuals is one major task of upcoming research.

References

Bachman, J. G. (1970). *Youth in transition II: The impact of family background and intelligence on tenth-grade boys*. Ann Arbor, MI: The Institute for Social Research.

Bäckman, L., & MacDonald, S. W. S. (2006). Death and cognition: Synthesis and outlook. *European Psychologist, 11*, 224-235. doi: 10.1027/1016-9040.11.3.224

Baltes, M. M., & Carstensen, L. L. (1996). The process of successful ageing. *Ageing and Society, 16*, 397-422. doi: 10.1017/S0144686X00003603

Baltes, M. M., & Lang, F. R. (1997). Everyday functioning and successful aging: The impact of resources. *Psychology and Aging, 12*, 433-443.

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology, 23*, 611-626.

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundation of developmental theory. *American Psychologist, 52*, 366-380. doi: 10.1037/0003-066x.52.4.366

Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences.* (pp. 1-34). New York, NY US: Cambridge University Press.

Baltes, P. B., & Smith, J. (2003). New frontiers in the future of aging: From successful aging of the young old to the dilemmas of the fourth age. *Gerontology, 49*, 123-135.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529. doi: 10.1037/0033-2909.117.3.497

Berg, A. I., Hassing, L. B., Thorvaldsson, V., & Johansson, B. (2011). Personality and personal control make a difference for life satisfaction in the oldest-old: Findings in a

longitudinal population-based study of individuals 80 and older. *European Journal of Ageing, 8*, 13-20. doi: 10.1007/s10433-011-0181-9

Berg, S. (1996). Aging, behavior and terminal decline. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging, (4th ed)* (pp. 323-337). San Diego, CA: Academic Press.

Birren, J. E., & Cunningham, W. R. (1985). Research on the psychology of aging: Principles, concepts, and theory. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging (2nd ed.)* (pp. 3-34). New York, NY, US: Van Nostrand Reinhold.

Brandstädter, J. (1999). Sources of resilience in the aging self: Toward integrating perspectives. In T. M. Hess & F. Blanchard-Fields (Eds.), *Social cognition and aging* (pp. 123-141). San Diego, CA: Academic Press.

Brandtstädter, J. (2007). *Das flexible Selbst*. München: Elsevier GmbH.

Brandtstädter, J., & Greve, W. (1994). The aging self: Stabilizing and protective processes. *Developmental Review, 14*, 52-80.

Brandtstädter, J., & Renner, G. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychology and Aging, 5*, 58-67.

Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. Appley (Ed.), *Adaptation-level theory* (pp. 287–305). New York, NY: Academic Press.

Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review, 14*, 155-195. doi: 10.1177/1088868309352321

Bushman, B. J., Moeller, S. J., & Crocker, J. (2011). Sweets, sex, or self□esteem? Comparing the value of self□esteem boosts with other pleasant rewards. *Journal of Personality, 79*, 993-1012. doi: 10.1111/j.1467-6494.2011.00712.x

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging, 7*, 331-338.

Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion, 27*, 103-123. doi: 10.1023/a:1024569803230

Cattell, R.B. (1971). *Abilities: Their structure, growth, and action.* Boston: Houghton Mifflin.

Caughey, G.E., Ramsay, E.N., Vitry, A.I., Gilbert, A.L., Luszcz, M.A., Ryan, P.J., & Roughhead, E.E. (2010). Comorbid chronic diseases, discordant impact on mortality in the elderly; a 14 year longitudinal population study. *Journal of Epidemiology and Community Health, 64,* 1036-1042. doi:10.1136/jech.2009.088260

Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology, 61*, 383-409. doi: doi:10.1146/annurev.psych.093008.100448

Clark, M. S., & Bond, M. J. (2000). The effect on lifestyle activities of caring for a person with dementia. *Psychology, Health & Medicine, 5*, 13-27.

Cross, S. & Markus, H. (1991). Possible selves across the life span. *Human Development, 34*, 230-255.

Denissen, J. J. A., Penke, L., Schmitt, D. P., & van Aken, M. A. G. (2008). Self-esteem reactions to social interactions: Evidence for sociometer mechanisms across days, people, and nations. *Journal of Personality and Social Psychology, 95*, 181-196.

Diehr, P., Williamsone, J., Burkee, G. L., & Psaty, B. M. (2002). The aging and dying processes and the health of older adults. *Journal of Clinical Epidemiology, 55*, 269-278.

Diener, E., & Diener, M. (1995). Cross-cultural correlates of life satisfaction and self-esteem. *Journal of Personality and Social Psychology, 68*, 653-663.

Erol, R. Y., & Orth, U. (2011). Self-esteem development from age 14 to 30 years: A longitudinal study. *Journal of Personality and Social Psychology, 101*, 607-619. doi: 10.1037/a0024299

Foster, E. M. (2010). Causal inference and developmental psychology. *Developmental Psychology, 46*, 1454-1480. doi: 10.1037/a0020204

Freund, A. M. (2000). Das Selbst im hohen Alter [The self in late life]. In W. Greve (Ed.), *Psychologie des Selbst* [Psychology of the self](pp. 115-131). Weinheim: Beltz.

Freund, A. M., & Smith, J. (1999). Content and function of the self-definition in old and very old age. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 54*, P55-PP67.

Gerstorf, D., Hoppmann, C.A., Anstey, K.J., & Luszcz, M.A. (2009). Dynamic links of cognitive functioning among married couples: Longitudinal evidence from The Australian Longitudinal study of Ageing. *Psychology and Aging, 24,* 296-309.

Gerstorf, D., Ram, N., Estabrook, R., Schupp, J., Wagner, G. G., & Lindenberger, U. (2008). Life satisfaction shows terminal decline in old age: Longitudinal evidence from the german socio-economic panel study (soep). *Developmental Psychology, 44*, 1148-1159.

Gerstorf, D., Ram, N., Lindenberger, U., & Smith, J. (2012). Age and time-to-death trajectories of change in indicators of cognitive, sensory, physical, health, social, and self-related functions. *Submitted for Publication*.

Gerstorf, D., Ram, N., Mayraz, G., Hidajat, M., Lindenberger, U., Wagner, G. G., et al. (2010). Late-life decline in well-being across adulthood in Germany, the United Kingdom, and the United States: Something is seriously wrong at the end of life. *Psychology and Aging, 25*, 477-485. doi: 10.1037/a0017543

Gerstorf, D., Ram, N., Röcke, C., Lindenberger, U., & Smith, J. (2008). Decline in life satisfaction in old age: Longitudinal evidence for links to time-to-death. *Psychology and Aging, 23*, 154-168.

Gerstorf, D., Smith, J., & Baltes, P. B. (2006). A systemic-wholistic approach to differential aging: Longitudinal findings from the berlin aging study. *Psychology and Aging, 21*, 645-663.

Ghisletta, P., McArdle, J. J., & Lindenberger, U. (2006). Longitudinal cognition-survival relations in old and very old age: 13-year data from the Berlin aging study. *European Psychologist, 11*, 204-223. doi: 10.1027/1016-9040.11.3.204

Giles, L.C., Glonek, G.F.V., Luszcz, M.A., & Andrews, G.R. (2005). Effect of social networks on 10 year survival in very old Australians: the Australian longitudinal study of ageing. *Journal of Epidemiology and Community Health, 59,* 574-579.

Harter, S. (2006). Developmental and individual difference perspectives on self-esteem. In D. K. Mroczek & T. D. Little (Eds.), *Handbook of personality development.* (pp. 311-334). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theorie of life-span development. *Psychological Review, 117*, 32-60.

Hoppmann, C., & Gerstorf, D. (2009). Spousal interrelations in old age—a mini-review. *Gerontology, 55*, 449-459. doi: 10.1159/000211948

Hoppmann, C. A., Gerstorf, D., & Luszcz, M. (2008). On the interplay between spousal social activity trajectories in the australian longitudinal study on aging in the context of cognitive, physical, and emotional resources. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 63B*, P41-P50.

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.

Infurna, F. J., Gerstorf, D., Robertson, S., Berg, S., & Zarit, S. H. (2010). The nature and cross-domain correlates of subjective age in the oldest old: Evidence from the OCTO study. *Psychology and Aging, 25*, 470-476. doi: 10.1037/a0017979

Infurna, F. J., Gerstorf, D., Ryan, L. H., & Smith, J. (2011). Dynamic links between memory and functional limitations in old age: Longitudinal evidence for age-based structural dynamics from the ahead study. *Psychology and Aging, 26*, 546-558. doi: 10.1037/a0023023

Jackson, J. J., Hill, P. L., Payne, B. R., Roberts, B. W., & Stine-Morrow, E. A. L. (2012). Can an old dog learn (and want to experience) new tricks? Cognitive training increases openness to experience in older adults. *Psychology and Aging, 27*, 286-292. doi: 10.1037/a0025918

James, W. (1890/1950). *The principles of psychology*. New York: Dover.

Kahn, R. L., & Antonucci, T. C. (1980). Convoys over the life course: Attachment, roles, and social support. In P. B. Baltes & O. Brim (Eds.), *Life-span development and behavior*. New York: Academic Press.

Kleemeier, R. W. (1962). Intellectual changes in the senium. *Proceedings of the Social Statistics Section of the American Statistical Association*, 290-295.

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.

Ko, K. J., Berg, C. A., Butner, J., Uchino, B. N., & Smith, T. W. (2007). Profiles of successful aging in middle-aged and older adult married couples. *Psychology and Aging, 22*, 705-718.

Kotter-Grühn, D., Kleinspehn-Ammerlahn, A., Gerstorf, D., & Smith, J. (2009). Self-perceptions of aging predict mortality and change with approaching death: 16-year longitudinal results from the berlin aging study. *Psychology and Aging, 24*, 654-667.

Kuster, F., Orth, U., & Meier, L. L. (2012). Rumination mediates the prospective effect of low self-esteem on depression. *Personality and Social Psychology Bulletin, 38*, 747-759. doi: 10.1177/0146167212437250

Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Aging, 17*, 125-139.

Leary, M. R. (1999). Making sense of self-esteem. *Current Directions in Psychological Science, 8*, 32-35.

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: Academic Press.

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology, 68*, 518-530. doi: 10.1037/0022-3514.68.3.518

Lehnart, J., Neyer, F. J., & Eccles, J. (2010). Long-term effects of social investment: The case of partnering in young adulthood. *Journal of Personality, 78*, 639-669. doi: 10.1111/j.1467-6494.2010.00629.x

Littell, R. C., Miliken, G. A., Stoup, W. W., & Wolfinger, R. D. (1996). *Sas system for mixed models*. Cary, NC: SAS Institute.

Luszcz, M. A. (1998). A longitudinal study of psychological changes in cognition and self in late life. *The Australian Developmental and Educational Psychologist, 15*, 39-61.

Luszcz, M. A., & Bryan, J. (1999). Toward understanding age-related memory loss in late adulthood. *Gerontology, 45*, 2-9.

Luszcz, M., Bryan, J., & Kent, P. (1997). Predicting memory performance of very old men and women: Contributions from age, depression, activity, cognitive ability and perceptual speed. *Psychology and Aging, 12*, 340-351.

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. doi: 10.1111/j.1745-6916.2006.00010.x

Marsh, H. W., Martin, A. J., & Jackson, S. (2010). Introducing a short version of the physical self description questionnaire: New strategies, short-form evaluative criteria, and applications of factor analyses. *Journal of Sport and Exercise Psychology, 32*, 438-482.

Mroczek, D. K., & Spiro, A., III. (2005). Change in life satisfaction during adulthood: Findings from the veterans affairs normative aging study. *Journal of Personality and Social Psychology, 88*, 189-202. doi: 10.1037/0022-3514.88.1.189

Nagi, S. Z. (1976). An epidemiology of disability among adults in the united states. *Milbank Memorial Fund Quarterly: Health and Society, 54*, 439-467.

Neyer, F. J., & Lehnart, J. (2007). Relationships matter in personality development: Evidence from an 8-year longitudinal study across young adulthood. *Journal of Personality, 75*, 535-568.

Ojanen, T., & Perry, D. G. (2007). Relational schemas and the developing self: Perceptions of mother and of self as joint predictors of early adolescents' self-esteem. *Developmental Psychology, 43*, 1474-1483. doi: 10.1037/0012-1649.43.6.1474

Orth, U., Robins, R. W., & Widaman, K. F. (2011). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, No Pagination Specified. doi: 10.1037/a0025558

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. doi: 10.1037/a0018769

Palgi, Y., Shrira, A., Ben-Ezra, M., Spalter, T., Shmotkin, D., & Kavé, G. (2010). Delineating terminal change in subjective well-being and subjective health. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 65B*, 61-64. doi: 10.1093/geronb/gbp095

Pullmann, H., Allik, J., & Realo, A. (2009). Global self-esteem across the life span: A cross-sectional comparison between representative and self-selected internet samples. *Experimental Aging Research, 35*, 20-44.

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

Ram, N., Gerstorf, D., Fauth, B., Zarit, S. H., & Malmberg, B. (2010). Aging, disablement, and dying: Using time-as-process and time-as-resources metrics to chart late-life change. *Research in Human Development, 7*, 27-44.

Ram, N., & Grimm, K. (2007). Using simple and complex growth models to articulate developmental change: Matching theory to method. *International Journal of Behavioral Development, 31*, 303-316. doi: 10.1177/0165025407077751

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models. Applications and data analysis methods.* Thousand Oaks: Sage Publications.

Reid, D. W., & Ziegler, M. (1981). The desired control measure and adjustment among the elderly. In H. Lefcourt (Ed.), *Research with the locus of control construct* New York: Academic Press.

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

Riegel, K. F., & Riegel, R. M. (1972). Development, drop, and death. *Developmental Psychology, 6*, 306-319. doi: 10.1037/h0032104

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132*, 1-25.

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.

Rosow, I., & Breslau, N. A. (1966). A guttman health scale for the aged. *Journal of Gerontology, 21*, 556-559.

Samanez-Larkin, G. R., Robertson, E. R., Mikels, J. A., Carstensen, L. L., & Gotlib, I. H. (2009). Selective attention to emotion in the aging brain. *Psychology and Aging, 24*, 519-529.

Sargent-Cox. K.A., Anstey, K.J. & Luszcz, M.A. (in press a). Change in health and self-perceptions of ageing over 16 years: The role of psychological resources. *Health Psychology*, PMID: 22429127

Sargent-Cox. K.A., Anstey, K.J. & Luszcz, M.A. (in press b). The relationship between change in self-perceptions of ageing and physical functioning in older adults. *Psychology and Aging.* doi: 10.1037a0027578

Scheier, M. F., Carver, C. S., & Bridges, M. W. (2001). Optimism, pessimism, and psychological well-being. In E. C. Chang (Ed.), *Optimism & pessimism: Implications for theory, research, and practice.* (pp. 189-216). Washington, DC US: American Psychological Association.

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

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology, 80*, 325-339. doi: 10.1037/0022-3514.80.2.325

Singer, J. D., & Willet, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*: Oxford University Press, USA.

Sliwinski, M. J., Stawski, R. S., Hall, C. B., Katz, M., Verghese, J., & Lipton, R. (2006). Distinguishing preterminal and terminal cognitive decline. *European Psychologist, 11*, 172-181. doi: 10.1027/1016-9040.11.3.172

Smith, J., & Baltes, P. B. (1997). Profiles of psychological functioning in the old and oldest old. *Psychology and Aging, 12*, 458-472.

Smith, J., & Freund, A. M. (2002). The dynamics of possible selves in old age. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 57*, P492-PP500.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis. An introduction to basic and advanced multilevel modeling.* London: Sage Publications.

Sowislo, J. F., & Orth, U. (2012). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 95, 695-708. doi: 10.1037/a0028931

Stinson, D. A., Logel, C., Holmes, J. G., Wood, J. V., Forest, A. L., Gaucher, D., et al. (2010). The regulatory function of self-esteem: Testing the epistemic and acceptance signaling systems. *Journal of Personality and Social Psychology*. doi: 10.1037/a0020310

Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Self-esteem, academic self-concept, and achievement: How the learning environment moderates the dynamics of self-concept. *Journal of Personality and Social Psychology, 90*, 334-349. doi: 10.1037/0022-3514.90.2.334

Troll, L. E., & Skaff, M. M. (1997). Perceived continuity of the self in very old age. *Psychology and Aging, 12,*162-169.

Trzesniewski, K. H., Donnellan, M. B., & Robins, R. W. (2003). Stability of self-esteem across the life span. *Journal of Personality and Social Psychology, 84*, 205-220.

Wagner, J., Lang, F. R., Neyer, F. J., & Wagner, G. G. (2012). Self-esteem across across adulthood: The role of individual resources. *Submitted for Publication*.

Wagner, J., Lüdtke, O., Jonkmann, K., & Trautwein, U. (in press). Cherish yourself: Longitudinal patterns and conditions of self-esteem change in the transition to young adulthood. *Journal of Personality and Social Psychology*.

Wechsler, D. (1981). *Wechsler adult intelligence scale—revised manual*. New York: Psychological Corporation.

Wilson, R. S., Beck, T. L., Bienias, J. L., & Bennett, D. A. (2007). Terminal cognitive decline: Accelerated loss of cognition in the last years of life. *Psychosomatic Medicine, 69,* 131-137.

Wilson, R. S., Beckett, L. A., Bienias, J. L., Evans, D. A., & Bennett, D. A. (2003). Terminal decline in cognitive function. *Neurology, 60,* 1782-1787.

Wrzus, C., Köckeritz, M., Wagner, J., & Neyer, F. J. (2012). Social network change and life events across the lifespan: A meta-analysis. *Psychological Bulletin. Advance online publication*. doi: 10.1037/a0028601.

Table 1

Descriptive Statistics for Self-Esteem over Age and Time-to-death.

Self-esteem							
Age				Time-to-death			
	n	*M*	*SD*		*n*	*M*	*SD*
65	1	62.20	/	21	1	39.18	/
66	6	50.99	11.52	20	0	/	/
67	2	59.55	1.25	19	19	53.35	7.37
68	12	50.88	9.24	18	22	56.25	9.41
69	19	46.17	9.69	17	44	52.91	8.53
70	54	49.84	10.51	16	53	51.95	9.57
71	54	51.90	9.49	15	73	52.22	8.88
72	99	52.66	9.10	14	73	51.34	10.34
73	81	51.90	8.66	13	90	52.06	10.71
74	94	51.45	8.71	12	87	52.90	8.98
75	100	51.42	10.01	11	119	51.61	9.22
76	104	52.51	9.93	10	143	52.14	9.02
77	136	50.72	11.07	9	157	51.02	9.94
78	128	53.40	9.72	8	191	52.10	9.68
79	124	51.77	10.84	7	215	52.51	9.99
80	160	51.32	10.15	6	198	51.31	10.30
81	121	51.59	10.85	5	191	51.71	10.45
82	146	51.80	9.12	4	216	50.92	10.90
83	134	52.19	10.50	3	199	50.30	11.23
84	118	51.43	9.26	2	195	50.99	10.78
85	131	50.68	10.69	1	140	50.40	11.18
86	109	50.37	11.73	0	9	53.94	9.46
87	109	51.59	10.25				
88	84	52.22	10.89				
89	73	51.82	10.49				
90	56	52.13	10.32				
91	41	51.74	10.46				
92	43	49.09	12.49				
93	32	50.22	11.06				
94	23	52.64	7.31				
95	12	47.59	9.97				
96	11	57.21	6.62				
97	2	54.23	3.76				
98	6	57.78	8.80				
99	1	53.35	/				

(Table continues on next page)

	Self-esteem					
Age				Time-to-death		
	n	*M*	*SD*	*n*	*M*	*SD*
100	3	54.53	5.69			
101	1	65.75	/			
102	1	36.96	/			
103	1	49.81	/			
104	0	/	/			
105	1	51.58	/			
106	1	35.63	/			
107	0	/	/			
108	1	33.86	/			

Table 2

Multi-Level Growth Model Over Chronological Age and Time-to-death

	Self-esteem							
Effect	Age				Time-to-death			
	Model 1		Model 2		Model 1		Model 2	
Fixed effects								
Intercept	50.94*	(0.31)	51.13*	(0.32)	50.95*	(0.36)	50.33*	(0.41)
Linear slope	0.07*	(0.04)	0.01	(0.05)	0.05	(0.05)	-0.30*	(0.12)
Quadratic slope			-0.01*	(0.00)			-0.03*	(0.01)
Random effects								
Intercept	62.09*	(4.68)	62.09*	(4.67)	82.53*	(6.62)	81.58*	(6.54)
Linear slope	0.14*	(0.05)	0.14*	(0.05)	0.35*	(0.09)	0.36*	(0.09)
Int., linear slope	0.83*	(0.38)	0.82*	(0.38)	3.28*	(0.70)	3.12*	(0.70)
Residual	45.71*	(2.17)	45.23*	(2.13)	42.52*	(2.08)	41.68*	(2.05)
Goodness-of-fit								
AIC	17799		17804		17777		17774	
Explained variance								
R^2	.08		.09		.14		.16	

Note. Unstandardized estimates and standard errors (in parentheses) are presented. Age was centered at 85 years and time-to-death at 2 years. 1,215 participants provided 2,435 observations (M = 2.00, SD = 1.07). T-scores standardized to cross-sectional sample at Time 1 (N = 2,127, M = 50, SD = 10).

Table 3

Conditional Multi-Level Growth Model Over Chronological Age and Time-to-death

	Self-esteem							
Effect	Age				Time-to-death			
	Intercept		Linear slope		Intercept		Linear slope	
Fixed effects								
	50.11*	(0.78)	0.10	(0.11)	51.06*	(1.04)	0.18	(0.14)
Men	0.86	(0.95)	-0.00	(0.12)	0.32	(1.22)	-0.05	(0.15)
Education	0.05	(0.04)	-0.00	(0.00)	0.04	(0.04)	-0.00	(0.01)
Married	1.13	(0.94)	-0.01	(0.12)	1.05	(1.17)	-0.00	(0.16)
Health								
Comorbidities	-0.03	(0.05)	-0.01^{+}	(0.01)	-0.06	(0.06)	-0.02^{+}	(0.01)
Disabilities	-0.05	(0.04)	0.01	(0.01)	-0.05	(0.06)	0.01	(0.01)
Self-rated health	0.06	(0.05)	0.01	(0.01)	0.08	(0.06)	0.01	(0.01)
Cognitive								
Digit Symbol	0.15*	(0.05)	0.01*	(0.01)	0.15*	(0.06)	0.02*	(0.01)
Self-regulative								
Perceived control	0.40*	(0.04)	-0.01*	(0.01)	0.39*	(0.06)	-0.01	(0.01)
Social								
Social participation	0.03	(0.04)	0.01	(0.01)	0.00	(0.05)	0.00	(0.01)
Emotional loneliness	0.02	(0.04)	0.01	(0.01)	0.03	(0.05)	0.01	(0.01)
Random effects								
Variance	37.86*	(5.19)	0.23*	(0.08)	66.11*	(8.00)	0.51*	(0.12)
Covariance	0.86	(0.51)			4.19*	(0.91)		
Residual Variance	38.52*	(2.69)			34.59*	(2.39)		
Goodness-of-fit								
AIC	8013				7989			

Note. Unstandardized estimates and standard errors (in parentheses) are presented. T scores standardized to cross-sectional ALSA sample at Time 1 (N = 2,127, M = 50, SD = 10). Age was centered at 85 years and time-to-death at 2 years. N = 1,215 participants provided 2,435 observations (M = 2.00, SD = 1.07).

$^{+}$ $p \leq .064$, *$p < .05$

Table 4

Zero-Order Correlation and Descriptive Statistics of all Included Variables (Data in Long Format as used for the Multilevel Modeling Procedure)

	Self-esteem	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-.01												
2. Time-to-death	-.06**	.43**											
3. Men	.00	.01	.12**										
4. Education	.07**	.01	-.02	-.03									
5. Married	.06**	-.26**	-.04*	.10**	-.01								
6. Comorbidities	-.03	-.03	.06**	-.03	-.06**	-.01							
7. Disability	-.16**	.05*	.04	-.18**	-.01	-.11**	.32**						
8. Subjective health	.20**	.10**	-.14**	-.01	.11**	-.05*	-.36**	-.29**					
9. Digit symbol	.21**	-.24**	-.14**	-.10**	.17**	.11**	.03	-.08**	.14**				
10. Perceived control	.45**	-.02	-.09**	-.07**	.04	-.06**	-.04	-.17**	.25**	-.24**			
11. Social participation	.15**	-.05**	-.10**	-.17**	.07**	-.09**	-.03	-.05	.12**	.23**	-.32**		
12. Loneliness	-.13**	.08**	.02	-.03	-.01	-.35**	.13**	.11**	-.13**	-.10**	.17**	-.01	
M	51.58	81.04	-7.40	0.53	3.82	0.69	5.60	3.54	3.20	31.45	45.55	2.07	0.35
SD	10.18	6.41	4.42	0.50	0.69	0.47	2.90	1.38	1.06	10.35	5.31	0.64	0.72

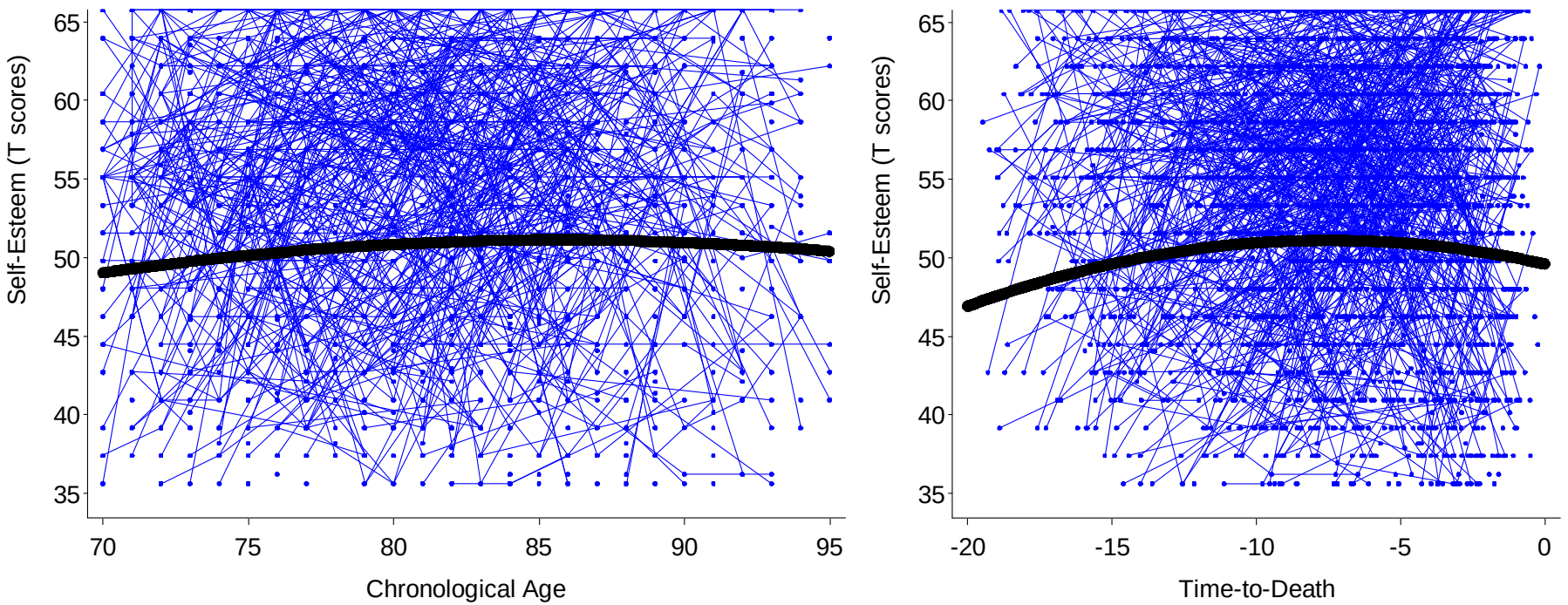

Figure 1. Average self-esteem change observed over (a) chronological age and (b) time-to-death in ALSA

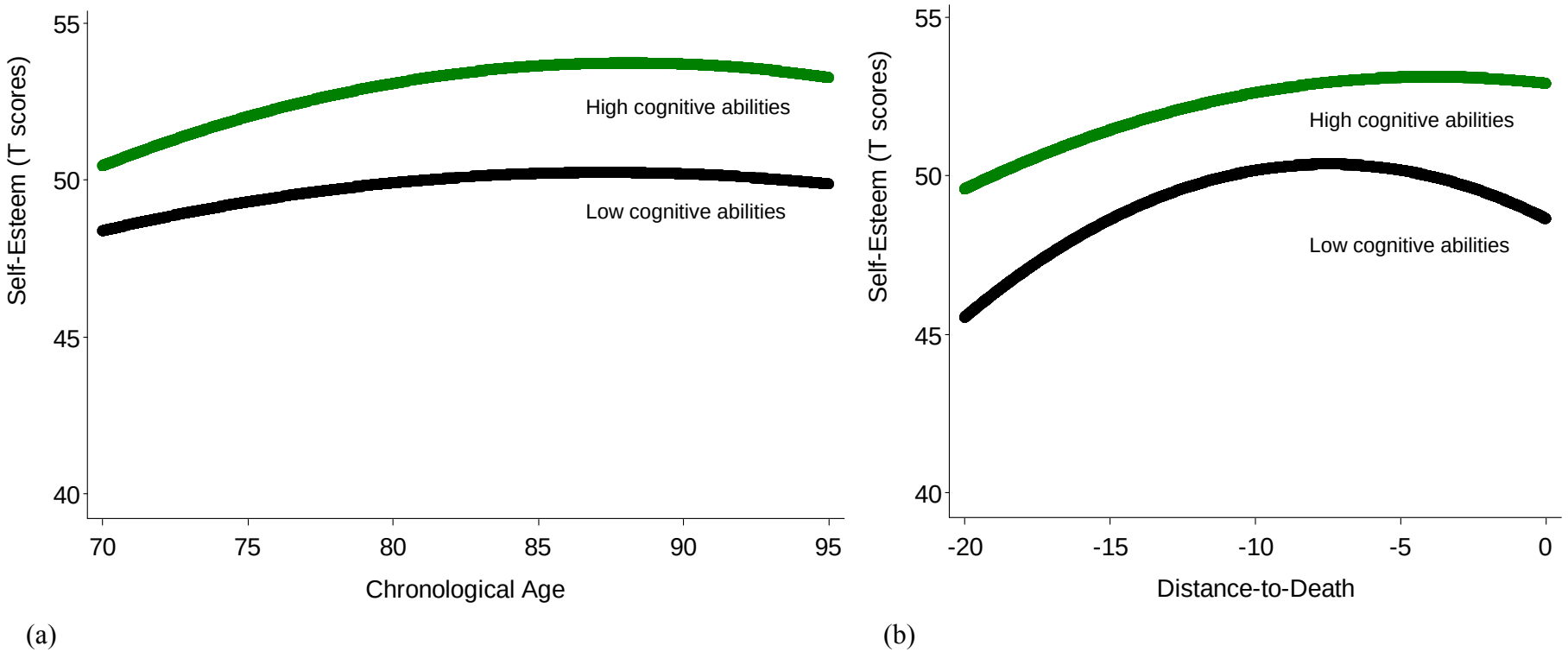

Figure 2. Self-esteem as a function of (a) chronological age or (b) time-to-death and cognitive abilities (mean-split) in ALSA

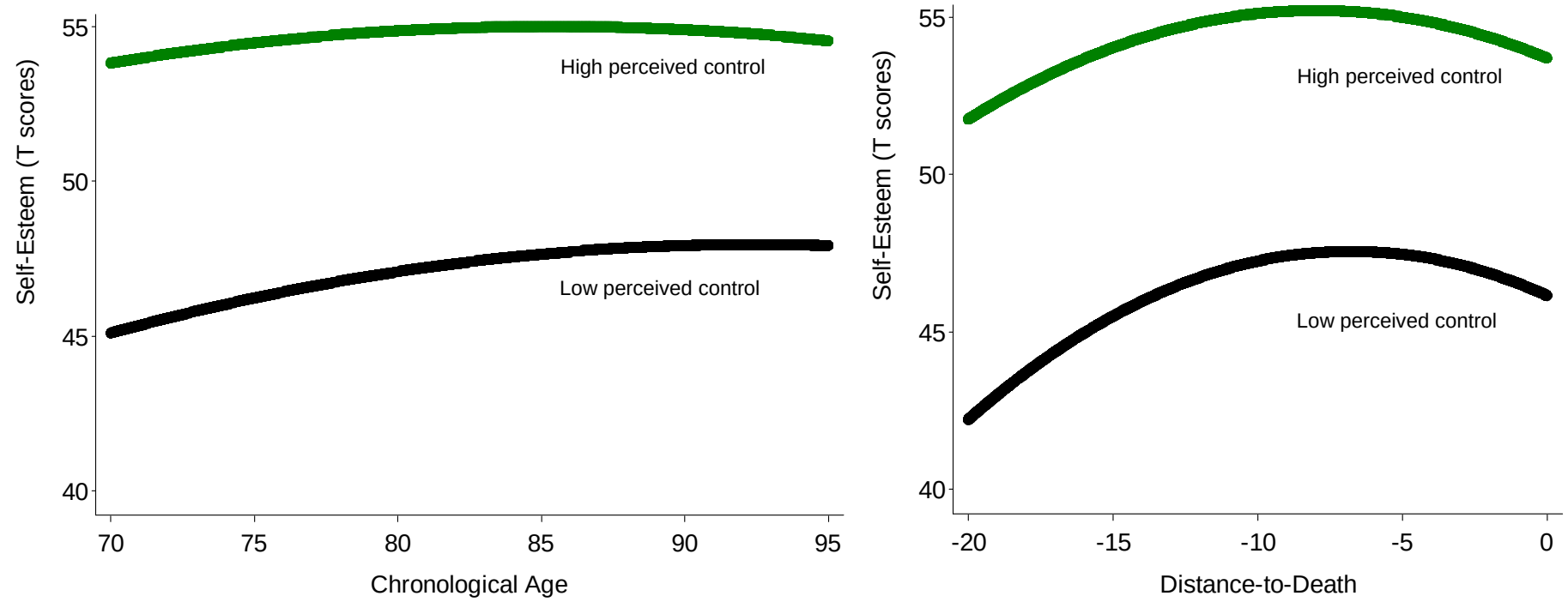

Figure 3. Self-esteem as a function of (a) chronological age or (b) time-to-death and perceived control (mean-split) in ALSA