A life-span perspective on life satisfaction

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Abstract: The German population is ageing due to decreasing birth rates and increasing life expectancy. To sustain the German pension system, legal retirement age is increased step by step to 67 years. This raises questions about how to enable and motivate older individuals to work that long. Hence, it is important to understand whether they represent a homogeneous group that can be addressed through specific measures and instruments. Life-span theory points to systematic changes as well as increased heterogeneity with age. For example, work motivation does not generally decline with age but becomes increasingly task-specific, depending on changing life goals and individual adaptation processes in adult development. In this empirical study we analyse age heterogeneity with regard to current life satisfaction and life satisfaction domains (measured as satisfaction with work, income, family and health) that represent personal utilities individuals strive for. For our analysis we use data collected as part of a representative German longitudinal data study (SOEP1). We find increasing heterogeneity in current life satisfaction, satisfaction with work, family life, and health with age. Thus, common mean level analyses on age effects yield only limited informative value. The heterogeneity of older adults should be taken into account when motivating and developing older workers.

Keywords: Life satisfaction, heterogeneity, life-span, older workers, ageing

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[1] The data used in this publication was kindly provided to us by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin. The German Socio-Economic Panel is a representative longitudinal study of private households..

1   Introduction

The changing demographics of Germany and other mature societies involve increased life expectancy, lower fertility rates and a negative net migration. Germany's steadily ageing working-age population group (Birg, 2005; Börsch-Supan & Wilke, 2009) is expected to decrease by 6.5 million until the year 2025 (Bundesagentur für Arbeit[2], 2011). In order to stabilize the main pillar of the German pension system, the pay-as-you go-pension system, pension entry age is increased step-by-step to 67 years, effectively prolonging working life (Bundesministerium des Innern[3], 2011). For Germany, a representative poll in 2008 showed almost half of older working individuals aged between 55 to under 65 can well or rather well envision working past retirement age (Büsch, Dorbritz, Heien, & Micheel, 2010) and most also have the cognitive and physical abilities to do so (see Baltes, Lindenberger, & Staudinger, 2006; Tesch-Römer, Heribert, & Wurm, 2006).

Empirical studies have shown the importance of organisational factors on the process of retirement but also personal factors, with evidence that older workers motivated to work past retirement age can be broadly separated into two groups. Those who need to work longer for financial reasons and those who take pleasure in their work and want to stay longer (see McNair, 2006). In the latter case, key engagement factors in the organisational context are the experience of recognition at work as well as management and team support (Saba & Guerin, 2005; also Van Dam, van der Vorst, & van der Heijden, 2009). Life-span theories point to fundamental shifts in goal engagement in later life (see Heckhausen, Wrosch, & Schulz, 2010), emphasizing the increasing importance of short-term goals and emotional well being over long-term goals such as career-building (Stamov Rossnagel & Hertel, 2010). These changing life goals reflect the developmental tasks of the respective life phase of an individual (Nurmi, 1992) and may determine work and motivation to participate in continuing education over a life-course. Analysing age-related changes in satisfaction with life and life domains such as work, family life or income can yield information on goal engagement and disengagement. While mean-level analyses yield important information on normal ageing trajectories they are limited in capturing variability within and between cohorts that can be observed in many areas of research. Increasingly, life's developmental phases such as raising children or entering retirement fall into wider age spans,

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[2]   German Federal Labour Market Authority.
[3]   German Federal Ministry of the Interior.

hence, individuals within age groups may well lead very different lives. As a consequence, organizations need to think beyond mere age-compensatory measures (i.e. for cognitive and physical functioning) for their older workforce and appreciate the heterogeneity of their older workers.

Our paper will first provide a short background on observations of age instabilities and life satisfaction research. With regard to central theories of regulation across the life-span we shall then postulate our hypotheses and expected findings. Thirdly, we conduct analyses to test our hypotheses and discuss results with regard to previous findings on the subject. The paper closes with a conclusion, delineating implications for organisations and policy-makers and outlining directions for further research.

2   Age instabilities

Studies from various disciplines suggest that as people age, they become more heterogeneous, so looking only at measures of central tendency may hide the actual differences (see meta-analysis by Nelson & Dannefer, 1992). This decrease in inter-individual stability can be seen as a natural development as older individuals will have led different lives that made them adapt their behaviour and attitudes. The variation between individuals (inter-individual stability) can be distinguished from the changes within an individual that may also occur over time (intra-individual stability). In their meta-analysis of empirical studies on age changes in human behaviour and performance, Bornstein and Smircana (1982) note the general focus on mean behaviour over time and the lack of studies that analyse the variances of these findings. Their analysis of 23 studies yields "larger intersubject variances for older subjects in nine different studies, smaller variances in six cases, and mixed results in the remaining eight instances." (Bornstein & Smircana, 1982, p. 260).

Neuropsychological research on cognitive functioning shows intellectual abilities to generally decline with age but also to have increased test-score heterogeneity (Ardila, 2007; Schaie, 1994). In the field of gerontology, studies show socioeconomic differences in health to grow with increasing age, only lessening again in very old age (House, Lantz, & Herd, 2005). Not surprisingly, growing disparities in health and other personal characteristics also mirror the cumulative effects of individuals' different material and personal resources in their lifetime (Dannefer, 2003; Hertzman, Frank, & Evans, 1994).

This growing apart is also reflected in consumer research in terms of needs, lifestyle and consumption (Moschis, Lee, & Mathur, 1997; Sherman & Schiffman, 1991; Sudbury & Simcock, 2009). Although a number of studies show the elderly consumer segment to be heterogeneous, these segmentations usually present a snapshot of a particular moment and do not follow the development of individuals as they age and when or why they grow apart. However, it seems that at some point in a person's life, chronological age ceases to be a good predictor of behaviour, though it seems to be uncertain when exactly or why. One approach to this problem involves replacing chronological age with cognitive age as a segmentation criterium (Barak & Schiffman, 1981; Wilkes, 1992) or using the individual's life phase as a predictor of behaviour. Additionally, social sciences also highlight the impact of social environment and processes on social, psychological, and also physical changes in individual life patterns. Thus, regular sorting and allocation processes lead to differentiation between and within cohorts. Other explanations for increased inter-individual heterogeneity involve an increased fanning out or accentuation of individual characteristics (Dannefer, 1987).

For motivating and training an ageing workforce, it is necessary to identify common changes that occur with age as well as appreciate older worker's increased variability in work-relevant variables. This heterogeneity is, e.g., reflected in Ilmarinen's Workability Index (Ilmarinen, 2007). Apart from growing health disparities, older workers' formal education has been some decades in the past and they have had quite different (e.g., developmental) experiences in the meantime (Hansson, Robson, & Limas, 2001). Indeed, worker's life or career phases need not be related to age at all, as becomes apparent in increasingly diverse work and life biographies. Furthermore, motivators, contents and settings of work and training need to be re-evaluated as well. Gegenfurtner and Vauras (2012) show that with increasing age, individuals prefer personally meaningful and socially rewarding behaviours (also Mather & Carstensen, 2005). They also show increased interest in activities that produce positive affect (Kanfer & Ackerman, 2004). However, older individuals still pursuing career goals do exhibit strong achievement motivation that is otherwise more typical for younger adults (Greller, 2006). These findings add insight to goal engagement and disengagement over individuals' life-span that have a significant effect on (work) motivation and hint at a greater variety of factors underlying, e.g., work or training motivation at older ages.

2.1   Life satisfaction

As most human beings try to be happy in life, life satisfaction can be assumed to be a widely shared goal of humanity. Generally, being satisfied with life means "having a favourable attitude toward one's life as a whole" (Haybron, 2007, p. 2), implying "a global evaluation by the person of his or her life" (Pavot, Diener, Colvin, & Sandvik, 1991, p. 150). Economically speaking, life satisfaction represents a personal utility that individuals strive for, thus organisations and policy-makers need to be aware of its dynamics and how their actions impact it (Fennell, 1991; Noll, 1999; Sirgy et al., 2006; Dolan, Layard, & Metcalfe, 2011). It is characteristic for this line of research that subjective rather than objective criteria of life quality are judged, so as to capture "true" personal satisfaction.

When comparing empirical and theoretical studies on life satisfaction there are almost as many life satisfaction measures as there are studies (Rain, Lane, & Steiner, 1991). Hence, the phenomenon of life satisfaction studies yielding different results for stability might be largely due to different components measured. However, according to the OECD's (2013) guidelines, measuring the higher-level concept of subjective well-being entails both a cognitive and an affective evaluation of life. The affective evaluation of life can include measurement of anger, worry or happiness. The cognitive evaluation of life is measured as life satisfaction and may include its specific sub-domains such as satisfaction with work, health or income. In our study we shall focus on measuring life satisfaction as a cognitive evaluation of life and specific domains, as implemented in our data source, the German socio-economic panel.

In surveys, respondents seem to evaluate stable and chronically accessible sources of information on life domains, that are repeatedly used each time the question is asked to come to an overall judgment on life satisfaction, as studies using source reports demonstrate (Schimmack, Oishi, Furr, & Funder, 2004). This bottom-up part of the judgment based on stable sources of information is thought to be responsible for the rather stable course of life satisfaction; variability may be added by situational and temporal factors such as mood (Veenhoven, 1998), interview situation or the occurrence of significant life events. A top-down effect in this judgment may result from the influence of relatively stable personality traits on the evaluation of the chroni-

cally accessible information used in the judgment – also assumed to represent a stable factor in life satisfaction evaluations, especially after age 50, when rank-order consistency of personality factors seems to peak (Lucas & Donnellan, 2007).

Empirically, life satisfaction does seem to be quite stable in the long run (Pavot & Diener, 1993), with few gender differences. Regarding the mean-level, older studies from the 1970s show a positive but small correlation of life satisfaction and age for the U.S. (Herzog & Rodgers, 1981). Other studies suggest an approximation of a U- (or rather S-) curve, with life satisfaction first decreasing, reaching its minimum around midlife, followed by an increase and then dropping sharply in the last few life years (see e.g., for the British and German population Baird, Lucas, & Donnellan, 2010; Wunder, Wiencierz, Schwarze, & Küchenhoff, 2013). Explanations for the midlife change include the reorganization of goals no longer attainable and coping skills with regard to goals not achieved so far (Blanchflower & Oswald, 2008). For the German population, SOEP data show mean life satisfaction to remain relatively stable until late life (Baird et al., 2010).

With regard to relative or rank stability, Erhardt, Saris, and Veenhoven (2000) find less than 30% of the original rank order in life satisfaction remains the same over time, implying that individual life satisfaction is only moderately stable and can change significantly and lastingly over time (similar Diener, Suh, Lucas, & Smith, 1999; Fujita & Diener, 2005). Events with a strong situational impact, significant lead or lag and sometimes lasting effects on life satisfaction include a change in income, birth of a child, marriage, divorce, widowhood, unemployment (especially for men: Clark, Diener, Georgelis, & Lucas, 2008), caring for disabled family members or becoming disabled (OECD, 2013). The impact of societal or global events is small, e.g., catastrophes such as Chernobyl hardly affected individual life satisfaction levels in Germany (Berger, 2008). Generally, life circumstances such as health, social contacts, good income, education, and being in a relationship, increase life satisfaction (see Dolan, Peasgood, & White, 2008; Sacks, Stevenson, & Wolfers, 2010).

A meta-analysis of well-being studies finds a strong influence of (rather hereditary) personality on life satisfaction (Steel, Schmidt, & Shultz, 2008). The influence of personality traits on life satisfaction is less well documented than on affective measures of well-being such as happiness, but point to cheerfulness (a facet of extraversion) and depression (a facet of neuroticism) as the strongest predictors of life satisfaction (Diener et al., 1999; Schimmack et al., 2004). As there is evidence that personality changes over the individual life-span – older persons show on

average less extraversion and neuroticism but rising levels of conscientiousness and agreeableness (Srivastava, John, Gosling, & Potter, 2003) – it can be assumed that this also accounts for changes in life satisfaction over the life-span.

Related to that, individual preferences and choices strongly and lastingly affect life satisfaction, too, adding further support for an only moderately stable life satisfaction (Headey, Muffels, & Wagner, 2010) – contrary to set-point theory, which posits life satisfaction to be stable in the medium and long run (always returning to an individual set-point). In that respect, significant choices are life goals and values, work-life-balance, social participation and a healthy lifestyle. These goals favourable to life satisfaction can be broadly categorized as non-zero-sum goals (no-one loses as I gain, e.g., social engagement) – as opposed to zero-sum goals such as career promotion or status (Headey, 2008). These insights lend support to authentic happiness theory, proposing that life satisfaction is closely connected the experience of purpose and engagement and the pursuit of altruistic goals (Seligman, Parks, & Steen, 2004). However, it is acknowledged that people do not pursue only one type of life goal throughout their lives. Rather, a succession of goals as people move through their life stages is the norm, as we will elaborate later.

2.2   Life satisfaction domains

The so-called life domain or additive approach explains life satisfaction judgments with the net outcome of satisfaction in life domains. Older empirical studies from the 1970s show a linear relationship between life satisfaction domains (except for health) and age (Herzog & Rodgers, 1981). But one could also argue for a negative relationship or compensation, e.g., higher work satisfaction can only be achieved at the cost of overall lower life satisfaction and vice versa. As Rice, Frone, and McFarlin (1992) note, with an additive model, "indicators of domain-specific quality of life are the only direct determinants of overall quality of life. The effects of any other variables on overall quality of life must be indirect (i.e. mediated by the quality of life in one or more domains)" (Rice et al., 1992, p. 156). Despite empirical support for this popular model its simplifying approach has also been questioned, as the ability to substitute losses in one domain with gains in another is likely to be subject to individual importance attached to the domains and decreasing marginal returns (Rojas, 2007).

Empirically, spillover hypothesis, i.e. the idea that domains influence each other and life satisfaction altogether, also reciprocally, implying a positive correlation, has seen the most sup-

port. This means any decrease in, e.g., work satisfaction can be offset by an increase in other life satisfaction domains, such as satisfaction with health, which is also strongly positively correlated to overall life satisfaction (Sirgy, Mentzer, Rahtz, & Meadow, 1991). Longitudinal data from the British Household Panel show domain satisfactions may have different trajectories than overall life satisfaction, and declines in some areas, e.g., health, can be offset by increases in other areas such as satisfaction with income, work, social life or amount of leisure time (see McAdams, Lucas, & Donnellan, 2014). Also, moderator variables have been discussed, such as personal importance of domains (disaggregation hypothesis, see Rice et al., 1992) but also cultural and economic conditions of the environment, e.g., financial satisfaction correlates more strongly with life satisfaction in poorer countries (Diener & Diener, 1993).

According to a meta-analysis by Cummins (1996), the most relevant life domains contributing to life satisfaction are economic condition, family circumstances, health, and work. Argyle (2001) analyses domains such as money, health, job and employment, social relationships, leisure, housing, and education.

In a meta analysis of studies on the relationship between work satisfaction and life satisfaction about half the studies analysed found work satisfaction to contribute significantly to beta weights in prediction of life satisfaction with correlations ranging from 0.04–0.58 with a median of 0.31 (Rain et al., 1991). Analysing German and British panel data, Wunder et al. (2013) show work satisfaction to be fairly stable over the life course with an upward movement 10 or 15 years before retirement. Satisfaction with household income is on the increase from around age 50, satisfaction with housing situation from around age 30 – these two domain satisfactions can be understood as indicators of a person's financial satisfaction and strongly contribute to the upward trend of general life satisfaction at middle age (the positive influence of income on life satisfaction judgments is also documented by Diener, Kahnemann, Arora, Harter, & Tov, 2009).

Health satisfaction in Germany declines on average with only a small interruption around age 60 (Wunder et al., 2013). Family satisfaction may be seen as a composite of both partnership satisfaction and family life including children and exhibits the strongest influence on general life satisfaction (Schulz, Gluske, & Lentsch, 1996). While longitudinal studies have shown marital satisfaction to decline with marriage duration, this pattern is not necessarily tied to the family life cycle (Vaillant & Vaillant, 1993; VanLaningham, Johnson, & Amato, 2001). The U-curve pattern found in a number of cross-sectional studies may be due to a cohort effect of older age cohorts being married at a time when long-lasting marriages were normal and less

was expected of them, leading to more contentment. The effect of children on marital and individual life satisfaction is more complex and may be slightly negative (McLanahan & Adams, 1989; Nelson, Kushlev, & Lyubomirsky, 2014).

Satisfaction with a particular life satisfaction domain can signify attainment of personal goals in that domain. For example, work satisfaction can be taken as a reflection of the extent career goal(s) have been met, such as holding a fulfilling job or having a desired position in an organisation (Easterlin, 2006). But it can also imply that one has come to terms with non-achievement in a particular domain of life or simply places more value on what has been achieved (contentment). As life satisfaction measures are typically cognitive assessments, cognitive development and its relation to emotion and personality development over the life-span need to be considered (see Lewis, 1995) but understanding the reasons for inter- and intra-individual variability is difficult as the life-span is long and involves many possible influencing events that may contribute to changes (see Baltes et al., 1998). Thus, in the following, we shall view life satisfaction in the context of the adult life-span approach.

3   Life-span development

Since roughly the 1970s life-courses of individuals have exhibited lesser degrees of standardization. This becomes apparent when important life events such as marriage, first or last child fall into increasingly wide age ranges (see Ravanera, Rajulton, & Burch, 2004). Originating from the discipline of developmental psychology, the life-span approach to individual adult development proposes that individual development and all adaptive processes over someone's life cover an entire life-span – from conception to very old age (see Baltes et al., 1998; Kanfer & Ackermann, 2004).

From this perspective, age effects on cognition, personality, and affect are not simply a decline but the result of patterns of losses, gains, reorganisation, and exchange that happen naturally over a lifetime. Losses mostly occur to fluid intelligence needed for, e.g., abstract thinking, memory and processing information (Schaie, 1994). As a consequence, older workers need to make more effort and invest more resources in their work. On the other hand, they gain on crystallized intelligence – educational knowledge, work experience and vocabulary (Ackerman, 1996). Apart from gains and losses, motives behind actions may be reorganised, meaning as people age, they may work for different reasons than in their youth. Furthermore, motives may

exchange priorities as personality changes. While on average the trait of openness to experience declines with age and conscientiousness increases, there is also an increase in generative motives and a preference for actions inducing positive affect and identity (also reflected in older individuals' consumption, see Schau, Gilly, & Wolfinbarger, 2009).

In their adaptation of the expectancy-value framework of motivation, Kanfer and Ackerman (2004) use these findings to show age-related changes in work motivation (for a discussion of motivational theories see Eccles & Whigfield, 2002). While individuals evaluate their chances of success if they engage in a particular action, they also bear in mind their effort and the outcome's value to them, before they are in fact motivated to act. With regard to work motivation, this implies that with age, motivation for tasks relying on mostly fluid intelligence decreases as chances of success decrease and required effort increases. At the same time, career outcomes lose their importance as goals priorities shift and motives for work change. Individuals take into account their time left in life and re-evaluate their goals.

Socioemotional selectivity theory (a life-span theory of motivation) posits that goal engagement and disengagement depend on the perceived time left. Two major processes are affected: the acquisition of knowledge and the regulation of emotional state. If the time-horizon is sufficiently long, an individual will be more motivated to increase knowledge, gather future-relevant information and pursue new experiences. If the perceived time horizon is shorter, quickly realisable goals, experiencing pleasant emotion, living in the present moment, and enjoying social contacts become more important (Carstensen, 2006).

In order to cope with functional, material or personal losses, ageing adults increasingly redirect their resources from growth towards maintenance or recovery, and later, management of loss (Baltes et al., 1998). By means of various strategies of coping and adaptation, individuals still achieve similar levels of life satisfaction while going through different developmental processes. Life-span theory predicts that resources will be invested in life domains that are especially relevant in the respective life phase and associated tasks. Accordingly, Ryff (1989) finds younger adults to draw their life satisfaction primarily from their career and accomplishments, whereas for older adults good health and the ability to accept change and their overall situation become more important to life satisfaction. Brandstädter and Rothermund define this assimilative behavior in their dual-process framework. To "avoid situations of entrapment and escalating commitments that may arise not only in personal life but also in broader organizational con-

texts" (Brandstädter & Rothermund, 2002, p.141), individuals may change their goals in order to come to terms with a given situation that cannot be changed or make an effort to change a situation in order to achieve one's goals.

As life courses have become less standardized in the past decades (Brückner & Mayer, 2005; Ravanera et al., 2004; Widmer & Ritschard, 2009) and individuals exhibit increased variability with age both physically and mentally, we hypothesise that,

H1: *Heterogeneity in life satisfaction increases with age.*

We expect work satisfaction to exhibit more intracohort heterogeneity with age. Drawing on our theoretical framework, with increasing age and decreasing time left individuals either realize their career goals or have to acknowledge failure. This may lead to a greater spectrum of work satisfaction evaluation. Additionally, we expect differences between individuals to become larger as work biographies and employment patterns have become more diverse in the past decades. This leads us to hypothesise,

H1a: *Heterogeneity in work satisfaction increases with age.*

While household income satisfaction may contribute less to current life satisfaction with age, as in line with life-span theory, affective and social goals become more important than status-driven and materialistic goals it is still likely to be an assessment formed on the basis of actual household income. Thus, we expect heterogeneity to increase with age, as household income and standard of living increasingly depend on influences of previous life phases (Schütze, 2012), mirroring the growing apart of individuals with regard to work and family trajectories during the last decades, even though standards of living have generally improved (Easterlin, 2000). We expect that,

H1b: *Heterogeneity in household income satisfaction increases with age.*

Family satisfaction is predicted to follow a similar pattern. We expect levels of satisfaction with family to become more heterogeneous with age as individuals deal in different ways with the degree of realization of their family and partnership goals. We posit,

H1c: *Heterogeneity in family satisfaction increases with age.*

Objective health status becomes more varied with age so we expect satisfaction with health to exhibit a higher level of heterogeneity with increasing age. We thus hypothesise,

H1d: *Heterogeneity in health satisfaction increases with age.*

4 Empirical analysis

Our empirical analysis is based on data collected as part of the longitudinal German Socio-Economic Panel (SOEP), that is fully described elsewhere (TNS Infratest Sozialforschung, 2014).

4.1 Data set and collection

The German SOEP is a long running representative panel with refreshment samples under academic direction of the DIW Berlin (Deutsches Institut für Wirtschaftsforschung[4]) that conducts interviews in private German households on an annual basis. To gather the data, the fieldwork organisation TNS Infratest Sozialforschung approaches almost 11,000 households and more than 20,000 individuals annually and samples data on household composition, occupational biographies, employment, earnings, health and satisfaction indicators. In 1984, the panel started with 6,000 questionnaires, accomplishing its 31st wave in 2014. Topics in the annual questionnaire are wide-ranging and cover economics, sociology, political science, psychology and geography, using both objective as well as subjective indicators. Core questions include demography, qualification, labour market and occupational dynamics, income, housing, health, basic orientations (such as values and preferences) as well a satisfaction with life and related life domains. In 1990, with the German reunification, Eastern Germans have been included in the panel and more additions (e.g., immigrants, high income samples) were added over the course of the years. With regard to methodology, a mix of standardized instruments is used to obtain data.

For our analysis we limit the sample to working German adults between the ages of 25–66, excluding younger individuals whose personalities may still be subject to change and also older persons past retirement age.

Life satisfaction measures. Since the first wave in 1984 and as the last question in the survey, SOEP annually measures our dependent variable (DV) life satisfaction asking (with slight variations), "How satisfied are you with your life, all things considered?" on a 0–10 ("completely dissatisfied" to "completely satisfied") Likert-type scale, which has achieved sufficient validity also in other surveys (see Diener et al, 1999; Lucas & Donnellan, 2007).

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[4] German Institute for Economic Research.

Life satisfaction domains. Since 2007, SOEP measures domain satisfaction on an annual basis. Respondents are asked "how satisfied are you today with the following areas of your life?", then given about ten items on a 0–10 ("completely dissatisfied" to "completely satisfied") Likert-type scale. In the SOEP survey, domain satisfaction scales are embedded in the first block of questions since the second wave in 1985. Domains always covered health, work (if working), household activities (if active in household), household income and habitation. Alternatingly, domains such as living area, public transport, childcare (if preschool children live in the household), school and vocational education, leisure time (amount and activities), standard of living, family life, sleep and personal income are included in the survey. For our purposes we only analyse satisfactions with work, household income, health, and family, which also represent the most commonly covered life satisfaction domains of other international surveys.

Measure of heterogeneity. As we are interested in the heterogeneity in the various satisfaction items we compute a normalized Shannon Entropy Index (Shannon, 1948) for each satisfaction item, age group, and survey wave:

$$S = -100 \sum_{c=0}^{10} p_c \log_{11} p_c$$

where p_c denotes the relative frequency of answers in category c (0–10: "completely dissatisfied" to "completely satisfied") of the respective satisfaction item. The index varies between 0 (no heterogeneity, all answers are in the same category) and 100 (maximal heterogeneity, the answers are uniformly distributed over all categories). Shannon Entropy is a standard measure of heterogeneity and diversity (Masisi, Nelwamondo, & Marwala, 2008) in, e.g., ecology (De'ath 2012; Ricotta & Szeidl, 2006), and life course research (Widmer & Ritschard, 2009). It is particularly suitable for describing discrete distributions with small number of categories where measures like standard deviation would be of limited use as is the case for the 11-point Likert-type scales used in the SOEP.

To guarantee a sufficiently large number of respondents to compute the index scores for each age group and survey wave we need to define an age group to consist of two birth cohorts, i.e. all respondents born in, e.g., 1919 and 1920 are members of the same age group. The age associated with an age group is the average age of their members at the time they were interviewed. Accordingly, the thus constructed panel data set of satisfaction heterogeneity indices includes only every second year of the SOEP data to avoid that any respondent becomes a member of more than one age group.

4.2   Analysis and results

In the following, we report regression estimation results for a number of panel data models with our heterogeneity indices as dependent variables and age and age² as independent variables. An increase (decrease) in heterogeneity with age would be indicated by a significant positive (negative) estimated coefficient for age. In more complex models we also include the survey year and its interaction with age to test whether any age effects on heterogeneity are stable over time or whether they have changed during the time SOEP data is available.

While separate F-tests indicate that ordinary least squares models would not be appropriate, rather fixed effects or random effects regression models are needed to account for the heterogeneous intercepts (p<0.01), augmented Dickey Fuller tests (Dickey & Fuller, 1979) indicate that no panel time series has unit roots (p<0.01), i.e. they are all stationary.

Current Life Satisfaction. In a first model (see Table 1-1) we estimate a two-way fixed effects panel model with dummy variables for each (two-year) cohort and survey year. This fixed effects estimator explains (some of) the within-cohort variation in the data. The coefficients for both age and age² are statistically significant. Their signs indicate that heterogeneity in current life satisfaction increases with age at a decreasing rate, corroborating our hypothesis H1. The second fixed effects model where we substitute the survey year dummy variables for a continuous survey year variable[5] additionally shows that average heterogeneity over all cohorts decreases over time while the age gradient is increasing. Consequently, the observed substantial increase in heterogeneity in current life satisfaction with age seems to be partly driven by a decrease in heterogeneity in younger, more recent cohorts. Finally, since the Hausman test (Hausman, 1978) does not reject the consistency of the potentially more efficient random effects estimates that also use the between cohort variation we report the regression results of such a regression as well. This third model confirms the earlier results. Heterogeneity in current life satisfaction increases with age at a decreasing rate and is on average over all cohorts decreasing over the number of years while the age gradient is increasing.

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[5]   We cannot include both since the survey year dummy variables are collinear with the continuous survey year variable.

Table 1-1: Current Life Satisfaction

Current Life Satisfaction

Variable	Model I Two-way fixed effects Coefficients (Std. error)	Model II One-way (individual) fixed effects Coefficients (Std. error)	Model III One-way random effects Coefficients (Std. error)		
Intercept			42.113 *** (3.375)		
Age	5.039 * (2.083)	5.692 ** (2.188)	1.278 *** (0.150)		
Age^2	−0.007 *** (0.002)	−0.015 *** (0.003)	−0.012 *** (0.002)		
Year		−5.000 * (2.145)	−0.726 *** (0.095)		
Age:year		0.016 *** (0.005)	0.0126*** (0.002)		
Random effects			**var**	**std. dev.**	**share**
Ideosyncratic			5.35	2.31	0.81
Individual			1.25	1.12	0.19
Statistics					
Unbalanced Panel	n=35, T=1–15, N=315				
Adjusted R^2	0.099	0.292	0.828		
F-statistic	17.638 on 2 and 264 DF	34.575 on 4 and 276 DF	412.086 on 4 and 310 DF		
Prob (F-statistic)	<0.001	<0.001	<0.001		
Hausman test		X^2 = 7.88, df = 4, p-value = 0.096			

*p<0.05, **p<0.01, ***p<0.001

Adjusted R^2 statistics for the fixed effects models do not include the variance explained by cohort and survey year dummy variables. Standard errors are robust to heteroskedasticity and correlation of arbitrary form within clusters (HC3 with clusters; see, e.g., MacKinnon & White, 1985).

Satisfaction with work. Similar to before we estimate first a two-way fixed effects panel model with dummy variables for each (two-year) cohort and survey year (see Table 1-2). Since the Hausman test indicates that random effects estimates would be inconsistent we do not report random effects regression results. In the first model, only the coefficient for age is statistically significant, it is positive and of substantial size. The second fixed effects model shows an additional statistically significant negative survey year effect. Age^2 and its interaction with the survey year are not significant. However, the second model itself is overall not statistically sig-

nificant (F-test, p>0.05). Therefore we can only rely on model I that would indicate an increase in the heterogeneity in work satisfaction with age, corroborating our hypothesis H1a. Still, the explained variance as indicated by the adjusted R^2 is rather small.

Table 1-2: Satisfaction with work and household income

Life Satisfaction Domains:

	Satisfaction with work		Satisfaction with household income	
Variable	Model I Two-way fixed effects	Model II One-way (individual) fixed effects	Model I Two-way fixed effects	Model II One-way (individual) fixed effects
	Coefficients (Std. error)	Coefficients (Std. error)	Coefficients (Std. error)	Coefficients (Std. error)
Age	4.615 * (1.837)	4.063 * (1.996)	3.103 (1.933)	3.843 (2.339)
Age²	−0.003 (0.002)	−0.000 (0.003)	−0.003 (0.002)	−0.006 (0.005)
Year		−3.821 * (1.899)		−3.570 (2.336)
Age:year		−0.006 (0.005)		0.005 (0.007)
Statistics				
Unbalanced Panel	n=35, T=1–15, N=315			
Adjusted R^2	0.032	0.029	0.015	0.057
F-statistic	5.276 on 2 and 264 DF	2.380 on 4 and 276 DF	2.377 on 2 and 264 DF	4.770 on 4 and 276 DF
Prob (F-statistic)	0.006	0.052	0.095	0.001
Hausman test		X^2 = 14.5, df = 4, p-value = 0.006		X^2 = 161, df = 4, p-value < 0.001

*p<0.05, **p<0.01, ***p<0.001

Adjusted R^2 statistics for the fixed effects models do not include the variance explained by cohort and survey year dummy variables. Standard errors are robust to heteroskedasticity and correlation of arbitrary form within clusters (HC3 with clusters; see, e.g., MacKinnon & White, 1985).

Satisfaction with household income. Again, we first estimate a two-way fixed effects panel model and then a one-way fixed effects panel that includes the survey year as a continuous variable instead of separate survey year dummy variables (see Table 1-2). The Hausman test indicates that random effects estimates would be inconsistent so we do not report random effects regression results. None of the estimated coefficients turn out to be statistically significant even

though signs and sizes correspond to the estimates for satisfaction with work. We therefore do not find statistically significant support of our hypothesis H1b of increasing heterogeneity of satisfaction with income with increasing age.

Table 1-3: Satisfaction with family

Life Satisfaction Domains: Satisfaction with family				
Variable	Model I Two-way fixed effects	Model II One-way (individual) fixed effects	Model III One-way random effects	Model IV One-way (individual) effect between model
	Coefficients (Std. error)	Coefficients (Std. error)	Coefficients (Std. error)	Coefficients (Std. error)
Intercept			59.634 *** (7.301)	56.491 *** (6.229)
Age	−2.146 (2.564)	−5.443 (5.253)	0.871 * (0.351)	1.114 ** (0.298)
Age²	0.002 (0.005)	0.056 (0.044)	−0.009 * (0.004)	−0.012 ** (0.003)
Year		4.597 (4.932)	−1.239 *** (0.358)	
Age:year		−0.108 (0.085)	0.022 * (0.008)	

Random effects			var	std.dev.	share		
Ideosyncratic			3.33	1.82	0.62		
Individual			2.04	1.43	0.38		

Statistics				
Unbalanced Panel	n=24, T=1–4, N=84			
Adjusted R²	0.007	0.105	0.698	0.352
F-statistic	0.287 on 2 and 55 DF	2.631 on 4 and 56 DF	56.316 on 4 and 79 DF	7.067 on 2 and 21 DF
Prob (F-statistic)	0.752	0.044	<0.001	0.005
Hausman test		X² = 6.35, df = 4, p-value = 0.175		

*p<0.05, **p<0.01, ***p<0.001

Adjusted R² statistics for the fixed effects models do not include the variance explained by cohort and survey year dummy variables. Standard errors for models I to III are robust to heteroskedasticity and correlation of arbitrary form within clusters (HC3 with clusters; see, e.g., MacKinnon & White, 1985).

Satisfaction with family life. As before we first estimate a two-way fixed effects panel model and then a one-way fixed effects panel that includes the survey year as a continuous variable (see Table 1-3). Since the Hausman test does not reject the consistency of the potentially more efficient random effects estimates we report the regression results of such a regression as

well. While none of the fixed effects estimates is statistically significant all random effects model coefficients are significant and of the opposite sign. This may indicate that the random effects estimates may be driven largely by a between cohort effect that is not visible in the fixed effects regression that capture the within cohort variation. Indeed, a between model (see model IV in Table 1-3) that uses the variation between cohorts and estimates the average effect over all years seems to confirm this. On average, older cohorts show more heterogeneity in their family satisfaction than younger cohorts. Average family satisfaction declines over all cohorts over the number of years while the differences between cohorts of different average age increases. In sum, while we cannot find direct support for increased heterogeneity with age, cohort effects corroborate our hypothesis H1c.

Satisfaction with health. As above we estimate first the two fixed effects panel models and then a random effects panel model since the Hausman test does not reject the consistency of its estimates (see Table 1-4). While the estimated age coefficients in the fixed effects panel models are not statistically significant[6] they are in the potentially more efficient random effects model. The random effects model reveals a similar pattern to the model for current life satisfaction. Heterogeneity in satisfaction with health increases with age at a decreasing rate. Further, average heterogeneity over all cohorts decreases with the number of years as indicated by the significant and negative coefficient for survey year. The estimated coefficient for the interaction effect between age and survey year, however, is not statistically significant and also very small, indicating the absence of a change in the age gradient over time. The positive and significant coefficient for age corroborates our hypothesis H1d: heterogeneity in satisfaction with health increases with age.

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[6] Age and age² are, of course, correlated, that will inflate their standard errors.

Table 1-4: Satisfaction with health

Life Satisfaction Domains: Satisfaction with health

Variable	Model I Two-way fixed effects Coefficients (Std. error)	Model II One-way (individual) fixed effects Coefficients (Std. error)	Model III One-way random effects Coefficients (Std. error)		
Intercept			43.494 *** (5.376)		
Age	2.539 (2.055)	3.062 (2.226)	1.562 *** (0.251)		
Age²	−0.011 *** (0.002)	−0.019 *** (0.005)	−0.015 *** (0.003)		
Year		−1.742 (2.194)	−0.367 ** (0.127)		
Age:year		0.014 * (0.007)	0.006 (0.003)		
Random effects			**var**	**std. dev.**	**share**
Ideosyncratic			8.45	2.91	0.82
Individual			1.90	1.38	0.18
Statistics					
Unbalanced Panel	n=35, T=1–15, N=315				
Adjusted R²	0.152	0.2	0.81		
F-statistic	29.233 on 2 and 264 DF	20.396 on 4 and 276 DF	359.981 on 4 and 310 DF		
Prob (F-statistic)	<0.001	<0.001	<0.001		
Hausman test		X² = 1.79, df = 4, p-value = 0.775			

*p<0.05, **p<0.01, ***p<0.001

Adjusted R² statistics for the fixed effects models do not include the variance explained by cohort and survey year dummy variables. Standard errors are robust to heteroskedasticity and correlation of arbitrary form within clusters (HC3 with clusters; see, e.g., MacKinnon & White, 1985).

5   Discussion and conclusion

Heeding the call for more longitudinal research on life satisfaction (Heckhausen, et al., 2010) our study provides empirical support for central life-span theories using data collected as part of a representative German longitudinal panel: We find increasing heterogeneity in current life satisfaction, satisfaction with work, family life, and health with age. It seems important that organisations acknowledge older workers' individuality as ageing processes might differ substantially – both physically and mentally. Hence, standardised instruments or processes "for older workers" may not prove fruitful. Evidence for the systematic variation in our sample's distribution in terms of life satisfaction questions the common practice to compare individuals on measures of central tendency.

Longitudinal data analyses need to be taken with caution. When working with longitudinal data, there might be the problem of selection bias, meaning that possibly more stable persons remain in the study while others drop out over the years leading to an underestimation of the hypothesised and observed increase in heterogeneity with age, so selectivity analyses might provide insight whether attrition results in less or more stability for the remaining sample. However, we avoid problems arising from cross-sectional analyses that are prone to suffer from cohort effects – where environmental contexts, education and other factors may vary strongly between age groups leading to wrong conclusions about observed effects. As always, self-reported data such as life satisfaction evaluations have their own caveats, as respondents may answer strategically or inconsistently (Bertrand & Mullainathan, 2001). Especially older cohorts have been found to give socially desirable answers, although this effect is stronger for topics such as satisfaction with family and general life where lack of satisfaction may be more sanctioned than for work, income, and health (Herzog & Rodgers, 1981).

When we computed our heterogeneity indices we have not made use of the survey sampling weights for each respondent available in the SOEP data. Not using this information is introducing extra noise to our heterogeneity indices. While this does not affect the consistency of our estimates it renders them less efficient. To improve the efficiency of estimates, future research could simultaneously estimate the expected heterogeneity within each cohort and survey year from all the available individual data and its changes with age and over time. Future research may further test central theories of regulation across the life-span by analysing shifts

in the relative importance of life satisfaction domains over the life course which may indicate changes in goal engagement and disengagement. In our theoretical framework, life satisfaction domains associated with zero-sum goals (e.g., work satisfaction, household income, standard of living) can be expected to contribute less to life satisfaction with age, while life satisfaction domains associated with non-zero-sum goals (e.g., health, family life, leisure time) should contribute more to life satisfaction with age. Also, while we searched for undifferentiated age effects, differentiating for social subgroups will provide more information on the impact of social processes and socio-demographic influences.

6   References

Ackerman, P. L. (1996). A theory of adult intellectual development: Process, personality, interests, and knowledge. *Intelligence, 22*(2), 227–257.

Ardila, A. (2007). Normal aging increases cognitive heterogeneity: Analysis of dispersion in WAIS-III scores across age. *Archives of Clinical Neuropsychology, 22(8),* 1003–1011.

Argyle, M. (2001). *The psychology of happiness*. London: Routledge.

Baird, B., Lucas, R., & Donnellan, M. B. (2010). Life Satisfaction Across the Lifespan: Findings from Two Nationally Representative Panel Studies. *Social Indicators Research, 99*(2), 183–203.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (1998). Life-span theory in developmental psychology. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 1029–1143). New York: Wiley.

Barak, B., & Schiffman, L. G. (1981). Cognitive Age: A Nonchronological Age Variable. *Advances in Consumer Research, 8(1)*, 602–606.

Bertrand, M., & Mullainathan, S. (2001). Do People Mean What They Say? Implications for Subjective Survey Data. *American Economic Review, 91*(2), 67–72.

Berger, E. M. (2008). A note on the high stability of happiness: the minimal effects of a nuclear catastrophe on life satisfaction. Discussion papers, (803). Berlin: DIW.

Birg, H. (2005). *Die ausgefallene Generation: was die Demographie über unsere Zukunft sagt*. Beck Verlag, München.

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science & Medicine, 66*(8), 1733–1749.

Börsch-Supan, A., & Wilke, C. (2009). Zur mittel- und langfristigen Entwicklung der Erwerbstätigkeit in Deutschland. *Zeitschrift für Arbeitsmarktforschung, 42*(1), 29–48.

Bornstein, R., & Smircana, M. T. (1982). The status of the empirical support of the hypothesis of increased variability in aging populations. *The Gerontologist, 22*(3), 258–260.

Brandtstädter J., & Rothermund, K. (2002). The Life-Course Dynamics of Goal Pursuit and Goal Adjustment: A Two-Process Framework. *Developmental Review, 22*(1), 117–150.

Büsch, V., Dorbritz, J., Heien, T., & Micheel, F. (2010). Weiterbeschäftigung im Rentenalter. Wünsche – Bedingungen – Möglichkeiten. *Materialien zur Bevölkerungswissenschaft*, 129. Wiesbaden: Bundesinstitut für Bevölkerungsforschung.

Bundesagentur für Arbeit (2011). Perspektive 2025 - Fachkräfte für Deutschland. Nuremberg. Retrieved May 26, 2014, from http://www.arbeitsagentur.de/Perspektive-2025.

Bundesministerium des Innern (2011). Demografiebericht der Bundesregierung. Retrieved May 26, 2014, from http://www.bmi.bund.de/SharedDocs/Downloads/DE/Broschueren/2012/demografiebericht.pdf?__blob=publicationFile.

Carstensen, L. L. (2006). The Influence of a Sense of Time on Human Development. *Science, 312(*5782), 1913–1915.

Clark, A. E., Diener, E., Georgellis, Y., & Lucas, R. E. (2008). Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis. *SOEP papers on Multidisciplinary Panel Data Research, 84*. Berlin: DIW.

Cummins, R. A. (1996). The domains of life satisfaction: An attempt to order chaos. *Social Indicators Research, 38*(2), 303–328.

Dannefer, D. (1987). Aging as Intracohort Differentiation: Accentuation, the Matthew Effect, and the Life Course. *Sociological Forum, 2*(2), 211–236.

Dannefer, D. (2003). Cumulative Advantage/Disadvantage and the Life Course: Cross-Fertilizing Age and Social Science Theory. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 58*(6), 327–337.

De'ath G. (2012). The multinomial diversity model: linking Shannon diversity to multiple predictors. *Ecology, 93*(10), 2286–2296.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association, 74*(366a), 427–431.

Diener, E, & Diener, M. (1993). Cross-cultural correlates of life satisfaction and self-esteem. *Journal of Personality and Social Psychology, 68*(4), 653–66.

Diener, E., Kahneman, D., Tov, W., & Arora, R. (2010). Income's association with judgments of life versus feelings. In E. Diener, D. Kahneman, & J. F., Helliwell (Eds.), *International differences in well-being* (pp. 3–15). Oxford, UK: Oxford University Press.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*(2), 276–302.

Dolan, P., Layard, R., & Metcalfe, R. (2011). Measuring subjective well-being for public policy. Office for National Statistics. Retrieved August 1, 2014, from http://eprints.lse.ac.uk/35420/1/measuring-subjective-wellbeing-for-public-policy.pdf.

Dolan P., Peasgood, T., & White, M. (2008), Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being, *Journal of Economic Psychology, 29*, 94–122.

Easterlin, R. A. (2000). The worldwide standard of living since 1800. *The Journal of Economic Perspectives, 14*(1), 7–26.

Easterlin, R. A. (2006). Life cycle happiness and its sources: Intersections of psychology, economics, and demography. *Journal of Economic Psychology, 27*(4), 463–482.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual review of psychology, 53*(1), 109–132.

Ehrhardt, J. J., Saris, W. E., & Veenhoven, R. (2000). Stability Of Life-Satisfaction Over Time. Analysis Of Change In Ranks In A National Population. *Journal of Happiness Studies, 1*(2), 177–205.

Fennell, G. (1991). Marketing And Quality Of Life: Micro And Macro Considerations. *Journal Of Business And Psychology, 6*(1), 121–131.

Frijters, P., Haisken-DeNew, J. P., & Shields, M. A. (2004). Money Does Matter! Evidence from Increasing Real Income and Life Satisfaction in East Germany Following Reunification. *American Economic Review, 94*(3), 730–740.

Fujita, F., & Diener, E. (2005). Life satisfaction setpoint: Stability and change. *Journal of Personality and Social Psychology, 88*(1), 158–164.

Gegenfurtner, A., & Vauras, M. (2012). Age-related differences in the relation between motivation to learn and transfer of training in adult continuing education. *Contemporary Educational Psychology, 37*(1), 33–46.

Glenn, N. (1998). The Course of Marital Success and Failure in Five American 10-Year Marriage Cohorts. *Journal of Marriage and the Family, 60*(3), 569–76.

Greller, M. M. (2006). Hours invested in professional development during late career as a function of career motivation and satisfaction. *Career Development International, 11*(6), 544–559.

Hansson, R. O., Robson, S. M., & Limas, M. J. (2001). Stress and coping among older workers. *Work: A Journal of Prevention, Assessment and Rehabilitation, 17*(3), 247–256.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society, 46*(6), 1251–1271.

Haybron, D. (2007). Life satisfaction, ethical reflection, and the science of happiness. *Journal of Happiness Studies, 8*(1), 99–138.

Headey, B. W. (2008). Life goals matter to happiness: A revision of set-point theory. *Social Indicators Research, 86*(2), 213–31.

Headey, B., Muffels, R., & Wagner, G. G., (2010). Choices Which Change Life Statisfaction - Revising SWB Theory to Account for Change. *SOEP papers on Multidisciplinary Panel Data Research*, 302. Berlin: DIW.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117*(1), 32–60.

Herzog, A. R., & Rodgers, W. L. (1981). Age and Satisfaction: Data from Several Large Surveys. *Research on Aging, 3*(2), 142–165.

House, J. S., Lantz, P. M., & Herd, P. (2005). Continuity and Change in the Social Stratification of Aging and Health Over the Life Course: Evidence From a Nationally Representative Longitudinal Study From 1986 to 2001/2002 (Americans' Changing Lives Study). *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 60*(Special Issue 2), 15–26.

Ilmarinen, J. (2007). The Work Ability Index (WAI). *Occupational Medicine (Lond)*, 57(2), 160.

Kanfer, R., & Ackerman, P. L. (2004). Aging, Adult Development and Work Motivation. *The Academy of Management, 29*(3), 440–458.

Lewis, M. D. (1995). Cognition-Emotion Feedback and the Self-Organization of Developmental Paths. *Human Development, 38*(2), 71–102.

Lucas, R. E., & Donnellan, M. B. (2007). How stable is happiness? Using the STARTS model to estimate the stability of life satisfaction. *Journal of Research in Personality, 41*(5), 1091–1098.

MacKinnon, J. G. & White, H. (1985). Some heteroskedasticity consistent covariance matrix estimators with improved finite sample properties. *Journal of Econometrics, 29*(3), 305–325.

Masisi, L., Nelwamondo, V., & Marwala, T. (2008). The use of entropy to measure structural diversity. In *Proceedings of the IEEE International Conference on Computational Cybernetics*, 41–45.

Mather, M., & Carstensen, L. L. (2005). Aging and motivated cognition: the positivity effect in attention and memory. *Trends in Cognitive Sciences, 9*(10), 496–502.

McAdams, K. K., Lucas, R. E., & Donnellan, M. B. (2012). The role of domain satisfaction in explaining the paradoxical association between life satisfaction and age. S*ocial indicators research, 109*(2), 295–303.

McLanahan, S., & Adams, J. (1989). The effects of children on adults' psychological well-being: 1957–1976. *Social Forces, 68*(1), 124–146.

McNair, S. (2006). How different is the older labour market? Attitudes to work and retirement among older people in Britain. *Social Policy and Society, 5*(4), 485–494.

Moschis, G. P., Lee, E., & Mathur, A. (1997). Targeting the mature market: opportunities and challenges. *Journal of Consumer Marketing, 14*(4), 282–293.

Nelson, E. A., & Dannefer, D. (1992). Aged Heterogeneity: Fact or Fiction? The Fate of Diversity in Gerontological Research. *The Gerontologist, 32*(1),17–23.

Noll, H.-H. (1999). *Konzepte der Wohlfahrtsentwicklung: Lebensqualität und "neue" Wohlfahrtskonzepte*. EuReporting Working Paper No. 3. Mannheim: Centre for Survey Research and Methodology (ZUMA), Social Indicators Department.

Nurmi, J.-E. (1992). Age Differences in Adult Life Goals, Concerns, and Their Temporal Extension: A Life Course Approach to Future-oriented Motivation. *International Journal of Behavioral Development, 15*(4), 487–508.

OECD (2013), OECD Guidelines on Measuring Subjective Well-being, OECD Publishing. Retrieved July 15, 2014, from http://dx.doi.org/10.1787/9789264191655-en.

Pavot, W., & Diener, E. (1993). Review of the Satisfaction With Life Scale. *Psychological Assessment, 5*(2), 164–172.

Pavot, W., Diener, E., Colvin, C. R., & Sandvik, E. (1991). Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality assessment, 57*(1), 149–161.

Rain, J. S., Lane, I. M., & Steiner, D. D. (1991). A Current Look at the Job Satisfaction/Life Satisfaction Relationship: Review and Future Considerations. *Human Relations, 44*(3), 287–307.

Ravanera, Z. R., Rajulton, F., & Burch, T. K. (2004). Patterns of age variability in life course transitions. *The Canadian Journal of Sociology, 29*(4), 527–542.

Rice, R. W., Frone, M. R., & McFarlin, D. B. (1992). Work-nonwork conflict and the perceived quality of life. *Journal of Organizational Behavior, 13*(2), 155–168.

Ryff, C. D. (1989). Happiness Is Everything, or Is It? Explorations on the meaning of Psychological Well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081.

Rojas, M. (2007). Life Satisfaction and Satisfaction in Domains of Life: Is it a Simple or a Simplified Relationship? *Journal of Happiness Studies, 7*(4), 467–497.

Saba, T., & Guerin, G. (2005). Extending employment beyond retirement age: the case of health care managers in Quebec. *Public Personnel Management, 34*(2), 195–214.

Sacks, W. D., Stevenson, B., & Wolfers, J. (2010), Subjective Well-being, Income, Economic Development and Growth, *NBER Working Paper*, (16441).

Schaie, K. W. (1994). The course of adult intellectual development. *American Psychologist, 49*(4), 304–313.

Schau, H. J., Gilly, M. C., & Wolfinbarger, M. (2009). Consumer Identity Renaissance: The Resurgence of Identity-Inspired Consumption in Retirement. *Journal Of Consumer Research, 36*(2), 255–276.

Schimmack, U., Oishi, S., Furr, R. M., & Funder, D. C. (2004). Personality and Life Satisfaction: A Facet-Level Analysis. *Personality and Social Psychology Bulletin, 30*(8), 1062–1075.

Schütze, Y. (2012). Soziale Ungleichheit im Alter. In P. Graf Kielmansegg & H. Häfner (Eds.): *Alter und Altern* (pp. 115–123). Berlin, Heidelberg: Springer.

Schulz, W., Gluske, H., & Lentsch, A. (1996) Partnerzufriedenheit, Familienzufriedenheit und Lebensqualität. In M. Haller (Ed.): *Lebensformen und Lebensqualität 1986 bis 1993* (pp. 155–164). Wien: Verlag für Geschichte und Politik.

Seligman, M. E. P., Parks, A. C., & Steen, T. (2004). A balanced psychology and a full life. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 359*(1449), 1379–1381.

Shannon, C. E. (1948). A mathematical theory of communication. *The Bell System Technical Journal, 27*, 623–656.

Sherman, E., & Schiffman, L. (1991). Quality-of-life (QOL) assessment of older consumers: A retrospective review. *Journal of Business and Psychology, 6*(1), 107–119.

Sirgy, M. J., Mentzer, J., Rahtz, D., & Meadow, H. L. (1991). Satisfaction with Health Care Services Consumption and Life Satisfaction among the Elderly. *Journal of Macromarketing, 11*(1), 24–39.

Sirgy, M. J., Michalos, A. C., Ferriss, A. L., Easterlin, R., Patrick D., & Pavot W. (2006). The Quality-of Life (QOL) Research Movement: Past, Present, and Future. *Social Indicators Research, 76*(3), 343–466.

Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology, 84*(5), 1041–1053.

Stamov Rossnagel, C., & Hertel, G. (2010). Older workers' motivation: against the myth of general decline. *Management Decision, 48*(6), 894–906.

Staudinger, U. M. (1996). Psychologische Produktivität und Selbstentfaltung im Alter. In: M. M. Baltes & L. Montada (eds.), *Produktives Leben im Alter* (pp. 344–373). Frankfurt: Campus.

Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological bulletin, 134*(1), 138–161.

Sudbury, L., & Simcock, P. (2009). A multivariate segmentation model of senior consumers. *Journal of Consumer Marketing, 26*(4), 251–262.

Tesch-Römer, C., Heribert, E., & Wurm, S. (2006). *Altwerden in Deutschland. Sozialer Wandel und individuelle Entwicklung in der zweiten Lebenshälfte*. Wiesbaden: VS Verlag für Sozialwissenschaften.

TNS Infratest Sozialforschung (2014). SOEP 2013 – Erhebungsinstrumente 2013 (Welle 30) des Sozio-oekonomischen Panels: Personenfragebogen, Altstichproben. *SOEP Survey Papers 180: Series A*. Berlin: DIW/SOEP.

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*(1), 230–239.

Van Dam, K., van der Vorst, J., & van der Heijden, B. (2009). Employees' intentions to retire early: A case of planned behavior and anticipated work conditions. *Journal of Career Development, 35*(3), 265–289.

Van Laningham, 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, 79*(4), 1313–1341.

Veenhoven, R. (1998). Two State-Trait Discussions On Happiness. A reply to Stones et al. *Social Indicators Research, 43*(3), 211–225.

Widmer, E. D., & Ritschard, G. (2009). The de-standardization of the life course: Are men and women equal? *Advances in Life Course Research, 14*(1), 28–39.

Wilkes, R. E. (1992). A Structural Modeling Approach to the Measurement and Meaning of Cognitive Age. *The Journal of Consumer Research, 19*(2), 292–301.

Wunder, C., Wiencierz, A., Schwarze, J., & Küchenhoff, H. (2013). Well-Being over the Life Span: Semiparametric Evidence from British and German Longitudinal Data. *Review of Economics and Statistics, 95*(1), 154–167.