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Life satisfaction trajectories of elderly women living in Switzerland. An age-period-cohort analysis

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Abstract

Old age is a priori a vulnerable stage of the life course. Quality of life can be expected to decline in older age due to loss, isolation, declining cognitive and physical abilities. The purpose of this study was to investigate the distribution, prevalence and trajectory of Life Satisfaction (LS) as a measure of quality of life among Swiss elderly women. We also assessed the impact of different social determinants on life satisfaction within the age categories of the 'young old' and the 'old old' across different cohorts. Using the Swiss Household Panel (SHP) survey data, analyses of LS distribution and trajectories were conducted for 1,402 women aged 65 to 84 years. About 50 per cent of elderly women in Switzerland were very satisfied with their lives. The mean LS score and the prevalence of satisfied women were lower in more recent cohorts of identical ages. However their life satisfaction remained more stable over ageing than was the case in former cohorts. High education, satisfaction with income, social support, living with a partner and good self-perceived health were all positive and significant predictors of life satisfaction. Longitudinal analyses allowed to disentangle the ageing process net of cohort and period effects and to assess the influence of both social determinants and within-individual psychological traits on the self-evaluation of LS.

Keywords

Life satisfaction, elderly, women, longitudinal analyses, Switzerland

Introduction

While one intuitively expects quality of life to decline in older age due to diminishing social resources, declining cognitive and physical abilities, previous empirical studies reported a relative stability of quality of life over old age (Kunzmann, Little and Smith 2000; Gwozdz and Sousa-Poza 2010; Von dem Knesebeck *et al.* 2007). Some attribute this stability to psychosocial adjustment mechanisms: over the process of ageing individuals would use social and temporal comparisons to interpret and cope with their progressively declining situation. Others emphasize the importance of social resources expected to influence life course trajectories differently as successive cohorts grow old. Assessing these different perspectives requires disentangling age, cohort and period effects. In this paper, we examine the distribution and trajectories of life satisfaction among elderly women living in Switzerland, comparing specific age groups and cohorts.

Literature review

Quality of life among the elderly

Old age is a priori a vulnerable stage of the life course: over that period, individuals are potentially more exposed to loss, isolation, declining cognitive and physical abilities than younger age groups (Netuveli and Blane 2008; Grundy 2006; Kunzmann, Little and Smith 2000). Along this 'paradigm of decline', that used to predominate in gerontological research (Higgs *et al.* 2003), theories of 'disengagement' and 'structured dependency' emphasized the marginalization from society of retired people (Baltes & Lang 1997; Blane *et al.* 2004). In this perspective, ageing is negative and old age is seen as a problem (Walker 2005). Quality of life of the elderly is therefore expected to be low and measuring it of little interest.

Recent perspectives developed more positive images of ageing, as a response to increased longevity and the changing characteristics of the elderly. The distinction between a third age ('young old') and a fourth age ('old old') is emblematic of this shift (Blane *et al.* 2004; Baltes and Smith 2003). Emphasizing the benefits of economic, social and cultural transformations on the 'young old', notions of positive or successful ageing developed (Von dem Knesebeck *et al.* 2007; Hambleton, Keeling and McKenzie 2009). This led to an increasing interest for the elderly quality of life (Zaninotto, Falaschetti and Sacker 2009).

Indeed, empirical research suggests that there is no age-related decline in quality of life among the elderly (Kunzmann, Little and Smith 2000; Gwozdz and Sousa-Poza 2010; Von dem Knesebeck *et al.* 2007). The relative continuity of quality of life over old age has been associated with the 'satisfaction paradox' (Walker 2005) or 'response shift' (Wilhelmson *et al.* 2005) which highlights the adaptation mechanisms used by individuals to review their own standards and values as their individual situation evolves. Psychosocial adjustment mechanisms, based on social and temporal comparisons, would allow individuals to cope with a progressively declining situation (Henchoz, Cavalli and Girardin 2008).

Traditionally, quality of life among the elderly was narrowly associated with health-related measures and assessed by professionals (Walker 2005; Hambleton, Keeling and McKenzie 2009). However, it has been shown that quality of life measures are often inconsistent with objective parameters (Allison, Locker and Feine 1997), for example declining life satisfaction was associated with low levels of self-assessed health but not with objective health measures (Gwozdz and Sousa-Poza 2010). Furthermore, while ageing is encompassing a biological process of progressive

decline, socio-economic factors are also expected to play an important role in quality of life trajectories. A range of quality of life determinants, including social participation, family and social support, activities, psychosocial circumstances and socio-economic circumstances (Wilhelmson *et al.* 2005; Grundy 2006; Netuveli *et al.* 2006; Zaninotto, Falaschetti and Sacker 2009; Walker 2005; von dem Knesebeck *et al.* 2007), has been shown to affect life satisfaction.

Even though older women are disadvantaged compared to older men in several respects (lower socio-economic resources, worse health status, widowhood,...), the former report only slightly lower levels of well-being compared to the latter (Gaymu and Springer 2010; Pinqart and Sorenson 2001). This led to the assumption 'that wellbeing models do not apply in the same way to older men and women, and that gender-specific models are needed' (Gaymu & Springer 2010: 1154). It has been suggested that their quality of life evaluations are influenced by specific dimensions, in particular social relationships would have a more significant impact on women's well-being (Bourque *et al.* 2005).

While social policy has recently highlighted the importance of elderly well-being, the complexity and limitations of the concept itself are rarely discussed. Criticizing the emphasis on individual and objective measures, Barnes, Taylor and Ward (2013) suggest that it is important to take into account people's interpretations of well-being and their strategies to 'be well', considering how these interpretations and strategies are influenced by social circumstances and relationships, which provide specific resources patterns. These elements suggest that, based on specific expectations and contexts, individuals might report on life satisfaction in quite contrasted ways.

Quality of life dynamics

Research has often considered elderly people as an homogeneous category, foremost defined by its age (Kahn & Rower 1987; Walker 2005). Old age has typically been seen as a distinct phase of the life course disconnected from previous life stages. However, when they turn old people convey with them the social positioning they experienced throughout their life. A life course perspective takes into account 'the changing contexts of lives and their consequences for human development and ageing.' (Elder and Kirkpatrick Johnson 2003: 52). This perspective combines individual choices over time but also the social influences and constraints that shape their opportunities (Elder and Kirkpatrick Johnson 2003; Walker 2005). Consequently, the quality of life dynamics should be observed at two different levels (Allison, Locker and Feine 1997): as 'within-subject change', it refers to the evolution of the individual's quality of life over his/her life course; as 'between-subject difference', it considers differences among social groups, but also among different birth cohorts who are born and age in specific social contexts. Such an approach allows taking into account changing expectations, at the social and individual levels. In his analysis of the living conditions of successive cohorts, Chauvel (1998) emphasizes how much members of the cohort born just after 1945 benefited from a very positive socio-economic context in their young age and as they entered the workforce in the late 1960s. By contrast, those belonging to previous cohorts, born in the period covering both wars clearly had less favorable trajectories. These contrasted experiences are likely to affect their expectations in regards to old age, more specifically the rather low expectations of former cohorts' members could lead them to rate their lives as better than those belonging to more recent cohorts (Bowling 2004, cited by Walker 2005).

Social trajectories of men and women who are now over 65 have been clearly differentiated. The environment in which they grew up defined specific opportunities in their adult life, with men endorsing the traditional role of breadwinners and women dedicating themselves to the family and domestic work (Bourque *et al.* 2005). Such gender differences in socialization and adult life patterns are likely to produce distinct expectations in regard to well-being in later life (Della Giusta, Jewell and Kambhampati 2011). Adopting a life course perspective thus confirms the importance of considering men and women's experiences separately.

The Swiss context

Comparatively to other countries, the Swiss population benefits from good social conditions and a high life expectancy. In 2013, Switzerland came out first in the ranking of the World Economic Forum Human Capital Index, with high scores on the four pillars of the index (health, wellness, workforce and employment) (World Economic Forum 2013). The OECD Better Life Index confirms the high level of well-being in Switzerland, showing the highest life satisfaction score among OECD countries (on a scale 0-10, 7.8 versus 6.6 on average in OECD countries)ⁱ. However social inequalities do exist in that context and indicators suggest that they tend to be increasing (Levy 2010). In regard to the Esping-Andersen typology of welfare systems, the Swiss can be considered as a mix of the conservative model (focused on the protection of work, generous regimes in terms of old age, unemployment and disability, a model which includes France and Germany) and the liberal model (emphasizing the role of the private sector while limiting its help to the most poor people, like it is the case in the United Kingdom and the United States) (Bertozzi, Bonoli and Gay-des-Combes 2008). The cohorts aged now over 65 have all

experienced during most of their adult lives the benefits associated with the economic boom of the three decades following 1945. A recent analysis concluded that the financial situation of the elderly in Switzerland is fairly good, even though their income is lower than the one of the working population (Wanner and Gabadinho 2008). Furthermore, retired people benefit from important levels of wealth (higher than among those younger than 65). However, there also exist some groups of poor elderly, especially those receiving only the national retirement pension and having no professional pension.

Research questions and hypotheses

In this paper, we examine (1) the distribution of life satisfaction (LS) among elderly women living in Switzerland and the dynamics of their LS trajectories on age across cohorts and periods; (2) the influence of social determinants on LS distribution and LS trajectories.

Confirming international observations, a recent Swiss report showed that in both the community-dwelling population and in institutions, elderly men are slightly more satisfied with life than elderly women (Zimmerman-Sloutskis, Moreau-Gruet and Zimmermann 2012). Knowing that men and women had differentiated life course experiences that are likely to influence both their quality of life and its determinants in older age, we consider necessary to analyse men and women separately. Rather than providing a gender analysis, comparing men and women, we choose here to focus on women only in order to document how their life satisfaction trajectories relate to specific determinants.

Life satisfaction dynamics

From a life course perspective, the study of life satisfaction must combine factors of change over time, at both the individual and social levels (Elder and Kirkpatrick Johnson 2003). Differences observed in the comparison of age groups might not be solely attributable to individual ageing, but rather to differences across cohorts, associated with changing social conditions. Studies on quality of life are usually based on cross-sectional surveys, which do not allow differentiating these effects (Zaninotto, Falaschetti and Sacker 2009). To disentangle age, period and cohort effects, we compare here two age categories – the ‘young old’ (65-74 years) and the ‘old old’ (75-84 years) – and within each of these, two successive cohorts while controlling for period (calendar year).

In terms of life satisfaction distribution, we hypothesize that, within an identical age category, more recent cohorts of elderly women, who benefited more from the post-war economic boom and transformations of values, have higher expectations in regards to the retirement period, and especially over the third age part of the life course. As a consequence, their satisfaction with life should be comparatively lower than that observed among women of identical age belonging to former cohorts.

We also analyze LS trajectories in a longitudinal perspective, looking at its evolution at the individual level over a 10-year period. In that respect, we hypothesize that LS should decrease progressively as women get older and encounter more difficult situations, in relationship to health and social integration in particular. We expect life satisfaction to decline faster among the older old due to poorer health. Besides, we assume that more recent cohorts have accumulated more resources to cope with

changes in their individual situation and therefore they should present more stable evaluations of life satisfaction than members of former cohorts.

Determinants of life satisfaction

We expect higher education and socio-economic resources, better social integration (social support, living with a partner), and better health to be associated with higher life satisfaction. Differences can be expected across the two observed age categories, i.e. 65-74 and 75-84 years old, older women being more isolated and having less available resources should report lower life satisfaction. We also examine how these determinants affect life satisfaction trajectories, hypothesizing that economically and socially advantaged women remain more satisfied with life over time than disadvantaged women.

Method and analysis

Sample selection

The analysis was conducted with the data of the Swiss Household Panel. This longitudinal data collection started in 1999 with the aim to observe social change, in particular the dynamics of living conditions within the Swiss population (www.swisspanel.ch) (Zimmermann and Budowski 2003; Zimmermann and Tillmann 2004). Based on an initial random sample of private households living in Switzerland, all household members, aged 14 and over, are interviewed each year through a CATI (Computer Assisted Telephone Interviewing) procedure. The initial sample was composed of 5,074 households and 12,931 individuals. In 2004, a complementary sample of 2,538 households and 6,569 individuals has been added. The total number of individuals enrolled between 1999 and 2010 is 15,507 (82,146 observations).

Since life satisfaction has not been recorded in the first SHP wave (1999), we included observations from the waves 2000 to 2010. We selected a subsample of 1,402 women aged 65 to 84 years (mean age=69.8 \pm 5.5), generating 6,387 observations. The exclusion of those women older than 85 years is motivated by their limited number in the SHP (4% of those over 65) which includes only people living at home. In Switzerland, people over 85 years represent 6.5% of the population over 65, among them 27.9 per cent are in institutions (nursing homes) (Höpflinger, Bayer-Oglesby and Zumbrunn 2011).

Out of the 1,402 selected women, 579 entered the survey between ages 54 and 64 years, that is before the age of interest here, but they were included in the analysis when they turned 65. The average participation was 6.6 \pm 3.1 waves. Data have been weighted by yearly transversal weights to represent the general population of elderly women at each calendar year.

Table 1 presents the number of observations (n=6,387) in the form of an age, period and cohort table (APC table) with cohorts in rows, ages in columns and periods (year of observation by survey) along diagonals. The three ten year cohorts are highlighted by corresponding shaded patterns and the two age categories of the 'young old' (65-74 years) and the 'old old' (75-84 years) in different fonts (normal and italic). The middle cohort (1926-1935) followed over the full observed age range (65-84) has been divided into two age categories: the 65-74 age range is compared with the more recent cohort (born 1936-1945) and the 75-84 age range with the former one (born 1916-1925). This means that some people were observed twice, once in the 65-74 years age category and once, as they got older, in the 75-84 years category. Respondents followed for a longer period over a larger age span may introduce a

selection bias, since healthier and more educated individuals are better compliers in the SHP survey (Zimmermann 2008). To assess this bias, we compared the mean life satisfaction score and the proportion of satisfied women of those of the 1926-1935 cohort aged 75-84 years at the end of their trajectory (n=313) and who had entered the study before the age of 75 years, with the new comers who entered the study after the age of 75 years (n=78). Since the differences was not significant, we considered that taking together ages 75-84 years of cohort 1926-1935, whether subjects were followed longer or only since the age of 75, did not represent a selection bias.

< insert table 1 about here >

Outcome (dependent variable)

The degree of life satisfaction (LS) in general was considered here as a proxy-measure for quality of life. The question was “In general, how satisfied are you with your life if 0 means ‘not at all satisfied’ and 10 means ‘completely satisfied’”? LS was analyzed either on a continuous scale or grouped into a binary dummy variable defining high satisfaction as ‘1’ for score values 9 to 10 and fair or poor satisfaction as ‘0’ for scores 0 to 8. Distribution and prevalence of life satisfaction were reported. SL trajectories were estimated as the individual mean scores over one year of age.

Selected covariates (explanatory variables)

The following social determinants were selected: education and satisfaction with income (socio-economic resources); social support and living with a partner (social integration), self-perceived health. These indicators are all self-reported. Birth year was used to define cohort affiliation. Birth year (B) and age (A) implicitly define the

calendar wave of the study, namely the period (P) ($P=B+A$) (Table 1). The educational level was reported as the highest education achieved. Compulsory or vocational levels were considered in the analyses as *lower* education, while maturity and high school or apprenticeship and vocational high or academic as *higher* education. Satisfaction with the household income was reported on a 0-10 score where 0 means completely unsatisfied and 10 satisfied. Satisfied was considered as a score of 8-10 and unsatisfied associated with lower values. Satisfaction with household income was considered as a better measure than income itself: first, data on household income was not available for about 10% of participants; second, income itself provides only a rough evaluation of the economic situation during retirement since it does not include the wealth accumulated over life time. Social support was reported on a 0-10 scale with five psychological support items and five practical support items from partner, relatives, neighbors, friends or colleagues. A mean individual social support score was computed at each period and dichotomized into 5.5-10 for high social support and 0-5.4 for low social support. Self-perceived health was reported as an ordinal five categories scale and dichotomized into excellent and very good (good) versus fair, moderate or poor (poor). Most covariates are time-variant (self-perceived health, social support, satisfaction with income, living with a partner). We considered all the above time-variant covariates as exogenous, namely that each one of them influences later LS score but that LS score does not influence future covariates. Birth year and the highest education level achieved are time-invariant. Period and age are time-variant but fixed by the study design. Age was chosen as a metric for time because our main interest was the ageing process. Two age categories were defined, 65-74 and 75-84 years, and centered to 65 or 75 years respectively to get interpretable satisfaction scores at the intercept.

Statistical analysis

LS score distribution is presented as a density function for all women aged 65-84 years between 2000 to 2010, for two age categories (65-74 and 75-84 years) and for three ten years cohorts (1936-1945, 1926-1935, 1916-1925). For cross-sectional cohort differences, we compared the prevalence (%) of satisfied individuals and the prevalence of determinants between successive cohorts of identical age categories. The association between LS and each binomial explanatory variable across the cohorts within two identical age categories was estimated in terms of odds ratios (OR) and its ninety five per cent confidence intervals (95% CI). All covariates were dichotomized into '1' for a positive value (high education, satisfaction with household income, high social support, living with a partner and good self-perceived health) and '0' for their corresponding unfavorable value. A high probability of satisfaction for a favorable predictor is expected to result in an odds ratio above 1. The generalized estimating equation (GEE) with conservative standard errors (SE) for inference, provided that individual observations are repeated over time, was used. The interpretation of the logistic marginal regression estimates represents the association between a change in the binary LS outcome and a change in the covariate at the population level. We used the SAS Proc Genmod procedure under the assumption of a constant within-subjects odds ratio (logor=exchangeable) for the variable "cohort" (time-invariant) but an independent correlation structure for all time-variant predictors (type=independent) (Diggle *et al.* 2002) (Table 2).

Patterns of LS trajectory as a continuous scale across cohorts of identical age were estimated using a) the multilevel mixed unconditional mean model with no covariates in level-1 model and a random intercept for assessing the amount of between

subjects variation, and b) the multilevel mixed growth model in which we added in level-1 the variable “age”, dummies for “cohorts” and “age by cohort” interaction. The unconditional multilevel mixed mean model was used to separate the amount of variability due to within- (level-1) or to between-subjects (level-2), and reported as the intra-class correlation coefficient (ρ). The mixed growth model assessed the intra-individual variability explained by ageing (within-variance) in each cohort and the inter-individual heterogeneity in the intercept and slope (Singer and Willett 2003).

We explored the effect of each covariate on the individual LS trajectory (slope) stratified by age and cohort categories. When the LS slope differed across the levels of the covariate, we tested the interaction term (age by covariate).

Finally we applied a hierarchical age-period-cohort (HAPC) mixed model with age, cohort as two dummies and all dichotomous covariates as fixed, and subjects and period as random. Adding period as random permitted to overcome the age, cohort and period exact linear dependency between the three and to assess unobserved within-subjects heterogeneity (Yang and Land 2008; Zheng, Yang and Land 2011). Covariates were added first one by one and then all together. Interactions between covariates and age were assessed and introduced to the full model if they were significant. Estimates indicate the effect of age (ageing) or one or all covariates on LS adjusted for the others.

We hypothesized that LS would vary as individuals get older (within-variance), but that individuals from different cohorts may experience different ageing patterns due to their life course experiences through different periods in a changing society (between variance). Along these hypotheses, we expect former cohorts (less educated and more exposed to cumulative social strains during childhood or early

adulthood) to have a higher intercept and a greater decline over age (individuals who are less demanding but less adaptive to harder situations when affected by declining health or social resources in older age). We also expect more recent cohorts to be less satisfied at baseline but probably more adaptive due to their higher education and social status, therefore to present a lower intercept and a flat LS trajectory over ageing.

All the statistical analyses were carried out using SAS software version 9.2.

Results

Life satisfaction levels and trajectories of life satisfaction

The life satisfaction score distribution is left skewed (-1.2) with a median at eight and an overall mean of 8.2 ± 1.6 , eight per cent of participants had a score below five. Among the 'young old' (65-74 years), the mean life satisfaction score does not significantly vary across cohorts (8.2 ± 1.6 , $p=0.61$). Among the 'old old' (75-84 years), women from the former cohort (born between 1916 and 1925) are slightly more satisfied (8.3 ± 1.7) than those belonging to the more recent cohort (1926-1935) (8.1 ± 1.7 , $p=0.10$) (Figure 1). Accordingly, the proportions of satisfied subjects are higher in former cohorts, significantly among the 75-84 years old (47.1% versus 41.5%, $p=0.001$), but not significantly in those aged 65-74 years (43.6% versus 41.4%, $p=0.4$) (Table 2). Overall, elderly women living in Switzerland are rather satisfied with their life.

< insert figure 1 about here >

< insert table 2 about here >

The unconditional mean model shows that, in both age categories, a great deal of the total variance (57%) is due to between-subjects variation (Table 3, Model 1). In the growth model with age centered at the youngest age in each age group (65 or 75 years), the estimate for age (adjusted for the mean period) is slightly negative, but not significant, within both age categories. The part of within-individual variance due to age is very small (about 1%) and not significant in both age categories (Table 3, Model 2). However, after introducing the dummies for cohort, recent cohorts are significantly less satisfied with life in both age categories. In both the 'young old' and the 'old old', LS scores are significantly lower for the more recent cohorts (1936-1945 versus 1926-1935 and 1926-1935 versus 1916-1925) by about -0.3 or -0.5 LS score units respectively. At the same time, earlier cohorts show a significant decline of LS with age (around -0.05 per year, $p < 0.001$) (Table 3, Model 3), indicating that the LS decline with age is cohort specific (Figure 2).

< insert table 3 about here >

< insert figure 2 about here >

Determinants of life satisfaction

Distributions of the selected determinants (Table 2) reflect the historical trend in educational attainment across cohorts, with the earliest one having the lowest proportion of higher educated women (54.2%) and the most recent one (1936-1945) having the highest proportion (69.1%). Regarding the living situation, the 'old old' women from the former cohort are the least likely to live with a spouse (28.9%), significantly less than those of the more recent cohort (36.4%). Among the 'young old', living with a spouse or partner is more prevalent, but again a significant difference exists between the two cohorts (50.6% of the 1926-1935 cohort versus

63.1% of the 1936-1945 cohort). Though the difference is not statistically significant, the satisfaction with income tends to be slightly higher among more recent cohorts; it remains at the same level for both age categories. Social support is significantly higher among women from more recent cohorts and older women (75-84 years) report clearly less support. Self-perceived health is slightly higher among more recent cohorts (not significant); older women (75-84 years) report poorer self-perceived health, but still almost two thirds of them consider themselves in good health at that age.

All covariates are positively associated with life satisfaction (Table 2, OR and 95%CI in parenthesis). High education, high social support, living together as a couple and good self-perceived health increase the probability of LS by about 50% to 100% and high satisfaction with income by about 300%. The absence of significant interactions between covariates and the cohort categories in both age categories indicates that the mean effect of covariates is stable across cohorts and age. These results suggest that it is important to adjust for the effect of covariates when assessing LS age trajectories across cohorts, but that it is not necessary to include interaction terms.

More recent cohorts are in general less satisfied with life than former cohorts of the same age, but they are more educated, more satisfied with their income, have higher social support and are living more often with a spouse, and are slightly healthier (Table 2). Among the 65-74, the unadjusted probability of life satisfaction is slightly higher for the former cohort (OR=1.1; 95%CI=0.9-1.4), when adjusted for covariates the odds ratio is higher and significant (OR=1.2; 1.0-1.4). Among the 75-84, this difference is higher and significant (OR=1.4, 95%CI=1.1-1.8 and aOR=1.6;

95%CI=1.2-2.1). The importance of the individual part explaining LS is also evident from the within-individual variance (56%) reported earlier out of the unconditional mean model.

Determinants of life satisfaction trajectories

Results regarding the influence of social determinants on life satisfaction trajectories are reported along three questions (Figure 3 and Table 4): 1) does the level of resources affect LS trajectories? (In the figures, comparison between solid and dashed trajectories); 2) are there differences between cohorts in the evolution of LS? (Comparison between black and grey trajectories); 3) are there difference across age categories in regards to the influence of determinants? (Comparison between the left and right patterns).

< insert table 4 about here >

< insert figure 3 about here >

(1) Regarding the level of resources, women having more of them systematically start with higher levels of life satisfaction than those with limited resources (to the exception of the women of the 75-84 age category, from the former cohort, living alone who had the highest LS in that age category). Over the process of ageing, the LS of women with positive resources tends to decline, but in a limited way, this is especially the case for those who maintain high social support, live with a partner and are in good health. Among women with limited resources, LS trajectories are more divergent: some experience a slight improvement in their LS over time, in particular those with lower education, less satisfied with their income or living alone. But others, for example some of those living alone or in poor health, experience particularly

sharp decline in their LS. Satisfaction with income generates most of the variation among the compared groups, while social support only has a limited influence.

(2) In regards to cohorts, LS trajectories of women belonging to former cohorts are above those of women from more recent cohorts, indicating higher levels of satisfaction. This is especially the case among older women having positive resources: in each age category the LS trajectories of both cohorts run in parallel in most cases. Among women with limited resources, former cohorts also start at higher level of LS but then experience a faster decline over ageing than those of more recent cohorts. Two specific elements can be further highlighted here. First, among the 'young old' (65-74 years old), the former cohort shows the fastest declining LS trajectories, especially among women with lower education, not satisfied with their income, having limited social support and living alone. Among the 'old old' (75-84 years old), members of the more recent cohort with limited resources systematically reported a slight improvement in their LS over ageing. This means that ageing is not inevitably linked to declining LS, even among those with limited resources.

(3) In regards to age categories, a greater heterogeneity of trajectories can be observed among the 'old old', in comparison to the 'young old' along the different determinants. This would suggest that among older women, the amount of available resources have a stronger impact on their life satisfaction evaluation. It should also be noted that in the 'old old', self-perceived health only has a limited impact on the LS, with stable trajectories for 3 of the 4 compared groups.

Finally, a HAPC model including age, and successively each covariate net of period effect was estimated (Table 5). It shows that all positive characteristics are significantly increasing the probability of being satisfied with life. However, the effect

of age adjusted for each covariate is not significant except for cohort. The adjustment for the different slopes across the two levels of covariates is cancelling out the differential age effect between them. It is important to report the interaction term between age and each covariate to better understand the specific effect of each group characteristics on LS trajectory. In the multivariate HAPC, all covariates remain significant, except age.

< insert table 5 about here >

< insert figure 4 about here >

After adjusting for all covariates, the difference between cohorts is larger, with the most recent cohort (1936-1945) even less satisfied than in the crude analysis. Most of the between-variance is due to subjects and cohort, period was of little interest. The within-subjects variance is large and significant suggesting a substantive contribution of individual traits that are beyond group characteristics like cohort, period and determinants (Table 5). The different curves in Figure 4 visually illustrate changes in levels of LS with progressive ageing in relationship with positive socio-economic resources (covariates). Though each resource appears to have a slightly different impact on LS with age, the overall trends are quite similar. Indeed LS slightly increases from 65 to 70 years, drops then to a somewhat lower stable level starting at age 75. Though elderly women who enjoy the most favorable resource position (all covariates) also show a significant drop in LS during early retirement age, they tend to experience a significantly better LS level after age 75 compared to women who are less well off. This model confirms the positive impact of these combined determinants. In the former cohorts, all the favorable conditions result in a considerable upwards adjustment in life satisfaction.

Discussion

Overall, about 50 per cent of elderly women in Switzerland are very satisfied with their lives. LS progressive decline over ageing is clearly affected by a cohort effect. In both the 'young old' and the 'old old', former cohorts are more satisfied with life than more recent cohorts. This could result from changing expectations over time, with women born later having experienced good living conditions during their adulthood and being more demanding in regards to their retirement (Bowling 2004, cited in Walker 2005). Another explanation relates to the fact that experiencing some adversity over the life course may reinforce resilience at later stages (Seery, Holman and Silver 2010). Alternatively, these differences might result from a reporting bias: compared to women of more recent cohorts, those of the former cohorts could be more reluctant to admit in a survey that their life satisfaction is low. Indeed our analyses show that LS trajectories are also affected by a cohort effect, with women of former cohorts experiencing a faster decline in LS than women of more recent cohorts. These patterns were observed for the 'young old' and the 'old old'.

Life satisfaction levels and trajectories are associated with social determinants, confirming previous research (Wilhelmson *et al.* 2005; Grundy 2006; Netuveli *et al.* 2006; von dem Knesebeck *et al.* 2007). High education, satisfaction with income, social support, living with a partner and good self-perceived health are all positive and significant predictors of LS (all OR>1, p<0.05) and these associations were similar across cohorts of similar ages (all interaction terms p>0.05). Satisfaction with income is the most important of the analyzed determinants. Positive resources further help maintain LS levels over time, which suggests that benefiting of more resources contributes to better coping with ageing. Women with limited resources

showed more diverse patterns, some experiencing a sharp decline and others being able to maintain a stable LS. These patterns confirm the heterogeneity of LS trajectories observed by Netuveli *et al.* (2006). The fact that women with limited resources and older women (75-84 years old) have more heterogeneous LS trajectories could indicate that in such circumstances some are better able to cope with ageing than others. The important part of variance attributed to within-subject changes suggests that within-individual characteristics like psychological adaptation, levels of aspirations and comparisons with peers, as well as other unobserved individual traits, are probably as relevant in LS evaluations. These differences might be particularly important among those having less social and economic resources, as well as among older ones.

Findings emphasize that there is a significant difference in life satisfaction between cohorts of identical ages, with earlier cohorts being more satisfied than more recent cohorts, though the later ones are indeed better off in terms of socio-economic status and health at identical ages. Therefore, analyses that do not adjust for those covariates positively influencing life satisfaction bias the association between LS and the cohort category towards the null. The higher satisfaction score among former cohorts should in fact be even higher than observed, had former cohorts enjoyed the same advantages as the more recent ones.

Living conditions have changed in the last decades, these changes have particularly affected baby boomers cohorts in general, women's life conditions in particular (Chauvel 1998). However our findings suggest that between-individual socio-economic resources may not be the only determinants of life satisfaction. Within-individual characteristics like psychological adaptation, levels of aspirations and

comparisons with peers, are probably as important in the level of life satisfaction. We observed that some elderly women are able to maintain their quality of life despite their limited resources

Limitations: The present study is limited to elderly women born between 1916 and 1945 who in the years 2000-2010 were anywhere from 65 to 84 years old. All three birth cohort groups (1916-1925, 1926-1935 and 1936-1945) might as children and young adults have experienced relatively hard economic conditions, but could enjoy during most of their adults life the economic upturn of the sixties and thereafter. The findings may not be applicable to the upcoming “baby boomers” generation just entering now the life stage of the “young old”. However, things being equal by else, this upcoming highly demanding cohort of elderly might experience lower levels of life satisfaction despite their enhanced capacity – better educated, higher income and increased relational resources - to cope with old age adversities. Our analyses included women only and therefore we cannot propose any interpretation in regards to the role of gender itself in the observed trends.

Conclusions

We assessed the role of age and cohort effects in regards to life satisfaction among elderly women living in Switzerland. Our results suggest that the elderly women born in the early 20th century (years 1916-1925) and consequently exposed during their early adult lives to the harsh social conditions of the years 1925 to 1945 cope less well with the ageing process. More recent and better educated cohorts, though generally more demanding and less satisfied with life, do indeed adapt better to the disadvantages of old age.

Most of the decline in life satisfaction in former cohorts occurs among the less educated, less satisfied with household income, getting less social support or living alone, and being unhealthy. Among more recent cohorts, less satisfied at baseline, life satisfaction remains fairly stable over ageing. The decline in LS on age is therefore underestimated by a cohort effect. However, results also indicated that within-subject changes are important, suggesting that individual characteristics – such as psychological adaptation – need to be taken into account.

In conclusion, new cohorts of elderly women tend to report lower levels of life satisfaction, which suggests that they are more demanding than their predecessors, even though their living conditions have significantly improved. While this trend could represent an increase in needs expressed by older people, it could also enhance their involvement in their own care planning. Therefore, these findings allow to anticipate new challenges but also opportunities in relation to provision of informal and formal care for the elderly.

Statement of ethical approval:

"SHP Data users and collaborators are to comply with the Swiss Regulations regarding data protection: in particular, users are to refrain from trying to identify a particular household or person and are strictly prohibited to use information for anything other than scientific research purposes. Published results shall not contain any information making it possible to identify any SHP household or interviewed person." (SHP data users contract)

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Declaration of contribution of authors

CBJ and DZ designed the research protocol together, analyses were conducted by DZ, CBJ reviewed the literature, the manuscript was written jointly by CBJ and DZ.

Statement of conflict of interest

none

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References

Allison, P.J., Locker, D. and Feine, J. S. 1997. Quality of life: a dynamic construct. *Social Science & Medicine*, **45**, 2, 221–230.

Baltes, M.M. and Lang, F. R. 1997. Everyday functioning and successful aging: the impact of resources. *Psychology and Aging*, **12**, 3, 433–443.

Baltes, P.B. and 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**, 2, 123–135.

Barnes, M., Taylor, D. and Ward, L. 2013. Being well enough in old age. *Critical Social Policy*, **33**, 3, 473.493.

Bertozzi, F., Bonoli, G. and Gay-des-Combes, B. 2008. *La Réforme de l'Etat Social en Suisse. Vieillesse, Emploi, Conflit Travail-Famille*. PPUR, Le savoir suisse, Lausanne.

Blane, D., Higgs, P., Hyde, M. and Wiggins, R. D. 2004. Life course influences on quality of life in early old age. *Social Science & Medicine*, **58**, 11, 2171–2179.

Bourque, P., Gold, D., Bonneville, L. and Béland, F. 2005. Contextual effects on life satisfaction of older men and women. *Canadian Journal on Aging*, **24**, 1, 31–44.

Chauvel, L. 1998. *Le Destin des Générations. Structure Sociale et Cohortes en France au XXe siècle*. PUF, Paris.

Della Giusta, M., Jewell, S. L. and Kambhampati, U. S. 2011. Gender and life satisfaction in the UK. *Feminist Economics*, **17**, 3, 1–34.

Diggle, P., Heagerty, P., Liang, K.-Y. and Zeger, S. 2002. *Analysis of Longitudinal Data*. Oxford University Press, Oxford.

- Elder, G.H. and Kirkpatrick Johnson, M. 2003 The life course and aging: challenges, lessons, and new directions. In Settersten, R. A. (ed.) *Invitation to the Life Course: Towards New Understandings of Later Life*. Baywood Publishing co., Society and Aging Series, Amityville, New York, 49-61.
- Gaymu, J. and Springer, S. 2010. Living conditions and life satisfaction of older Europeans living alone: a gender and cross-country analysis. *Ageing & Society* **30**, 7, 1153–75.
- Grundy, E. 2006. Ageing and vulnerable elderly people: European perspectives. *Ageing & Society*, **26**, 1, 105–134.
- Gwozdz, W., Sousa-Poza, A. 2010. Ageing, health and life satisfaction of the oldest old: an analysis for Germany. *Social Indicators Research*, **97**, 3, 397–417.
- Hambleton, P., Keeling, S. and McKenzie, M. 2009 The jungle of quality of life: mapping measures and meanings for elders. *Australasian Journal on Ageing*, **28**, 1, 3–6.
- Henchoz, K., Cavalli, S. and Girardin, M. 2008. Health perception and health status in advanced old age: a paradox of association. *Journal of Aging Studies*, **22**, 3, 282–290.
- Higgs, P., Hyde, M., Wiggins, R. and Blane, D. 2003. Researching quality of life in early old age: the importance of the sociological dimension. *Social Policy & Administration*, **37**, 3, 239–252.

Höpflinger, F., Bayer-Oglesby, L. and Zumbrunn, A. 2011. *La Dépendance des Personnes Âgées et les Soins de Longue Durée. Scénarios Actualisés pour la Suisse*. Hans Huber, Berne.

Kahn, R. L. and Rowe, J. W. 1987. Human aging: usual and successful. *Science*, 237, July 10th, 143.

Kunzmann, U., Little, T. D., and Smith, J. 2000. Is age-related stability of subjective well-being a paradox? Cross-sectional and longitudinal evidence from the Berlin Aging Study. *Psychology and Aging* **15**, 3, 511–26.

Levy, R. (2010) *La Structure Sociale de la Suisse. Radiographie d'une Société*. PPUR, le savoir suisse, Lausanne.

Netuveli, G. and Blane, D. 2008. Quality of life in older ages. *British Medical Bulletin*, 85, 113–26.

Netuveli, G., Wiggins, R. D., Hildon, Z., Montgomery, S. M. and Blane, D. 2006. Quality of life at older ages: evidence from the English Longitudinal Study of Aging (wave 1). *Journal of Epidemiology and Community Health*, **60**, 4, 357–363.

Pinquart, M. and Sörensen, S. 2001. Gender differences in self-concept and psychological well-being in old age: a meta-analysis. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* **56**, 4, P195–P213.

Seery, M. D., Holman, A. E. and Silver, C. 2010. Whatever does not kill us: Cumulative lifetime adversity, vulnerability and resilience. *Journal of Personality and Social Psychology*, **99**, 6, 1025–41.

- Singer, J. D. and Willett, J. B. 2003. *Applied Longitudinal Data Analysis. Modeling change and Event Occurrence*. Oxford University Press, Oxford.
- Von dem Knesebeck, O., Wahrendorf, M., Hyde, M. and Siegrist, J. 2007. Socio-economic position and quality of life among older people in 10 European countries: results of the SHARE study. *Ageing & Society*, **27**, 2, 269–284.
- Walker, A. 2005. A European perspective on quality of life in old age. *European Journal of Ageing*, **2**, 1, 2–12.
- Wanner, P. and Gabadinho, A. 2008. *La Situation Économique des Actifs et des Retraités*. OFAS, Berne.
- Wilhelmson, K., Andersson, C., Waern, M. and Alleberck, P. 2005. Elderly people's perspectives on quality of life. *Ageing & Society*, **25**, 4, 585–600.
- World Economic Forum (2013) *The Human Capital Report*, WEF, Geneva.
- Yang, Y. and Land, K. C. 2008. Age-period-cohort analysis of repeated cross-section surveys. Fixed or random effects? *Sociology Methods and Research*, **36**, 3, 297-326.
- Zaninotto, P., Falaschetti, E. and Sacker, A. 2009. Age trajectories of quality of life among older adults: results from the English Longitudinal Study of Ageing. *Quality of Life Research*, **18**, 10, 1301–1309.
- Zheng, H., Yang, Y. and Land, K. C. 2011. Variance function regression in hierarchical age-period-cohort models: applications to the study of self-reported health. *American Sociological Review*, **76**, 6, 955-983.

Zimmermann, E. 2008. *Swiss Household Panel 2004-2007. Scientific Report 2007*.
Swiss Household Panel, Neuchâtel.

Zimmermann, E. and Budowski, M. 2003. The Swiss Household Panel Survey: A
Multidimensional Database for Monitoring Social Change. In Joye, D., Renschler, I.
and Hainard, G. (eds) *Social Change and Social Reporting*. UNESCO & SIDOS,
Neuchâtel.

Zimmermann, E. and Tillmann, R. 2004. *Vivre en Suisse 1999-2000 - Une année
dans la vie des ménages et familles en Suisse. Leben in der Schweiz 1999-2000 -
Ein Jahr im Leben der Schweizer Familien und Haushalte*. In Oris, M. (ed.)
Population, Family and Society. Peter Lang, Bern.

Zimmermann-Sloutskis, D., Moreau-Gruet, F. and Zimmermann, E. 2012.
*Comparaison de la qualité de vie des personnes âgées vivant à domicile ou en
institution*. Rapport 54. Swiss Health Observatory, Neuchâtel.

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Table 1: Age, period, cohort (APC) table matrix for the SHP 2000-2010 sub-sample of women aged 65-84 years. Birth years as rows, age as columns and periods in the diagonals (numbers in bold are the N's)

	65	N	66	n	67	n	68	N	69	n	70	n	71	n	72	n	73	N	74	n	75	n	76	n	77	n	78	n	79	n	80	n	81	n	82	n	83	n	84	n	n	total
1945	2010	67																																							67	
1944	2009	57	2010	55																																						112
1943	2008	55	2009	52	2010	56																																				163
1942	2007	63	2008	63	2009	65	2010	66																																	257	
1941	2006	56	2007	60	2008	57	2009	55	2010	57																															285	
1940	2005	36	2006	36	2007	37	2008	35	2009	36	2010	35																													215	
1939	2004	41	2005	36	2006	38	2007	36	2008	35	2009	36	2010	34																											256	
1938	2003	41	2004	56	2005	39	2006	50	2007	54	2008	56	2009	55	2010	57																									408	
1937	2002	45	2003	41	2004	56	2005	47	2006	45	2007	48	2008	45	2009	46	2010	46																							419	
1936	2001	34	2002	28	2003	27	2004	45	2005	33	2006	35	2007	33	2008	33	2009	34	2010	36																					338	
1935	2000	37	2001	35	2002	29	2003	26	2004	40	2005	31	2006	34	2007	36	2008	32	2009	31	2010	38																			369	
1934		2000	41	2001	38	2002	30	2003	27	2004	37	2005	31	2006	34	2007	37	2008	33	2009	35	2010	35																		378	
1933			2000	33	2001	30	2002	28	2003	23	2004	32	2005	25	2006	25	2007	26	2008	26	2009	25	2010	29																302		
1932				2000	30	2001	28	2002	24	2003	20	2004	42	2005	32	2006	28	2007	33	2008	32	2009	35	2010	35															339		
1931					2000	28	2001	26	2002	24	2003	20	2004	39	2005	34	2006	36	2007	32	2008	36	2009	34	2010	32														341		
1930						2000	29	2001	28	2002	22	2003	21	2004	31	2005	23	2006	26	2007	25	2008	24	2009	28	2010	29													286		
1929							2000	31	2001	31	2002	26	2003	24	2004	30	2005	24	2006	25	2007	23	2008	25	2009	26	2010	25												290		
1928								2000	38	2001	38	2002	28	2003	23	2004	30	2005	18	2006	19	2007	22	2008	19	2009	18	2010	20											273		
1927									2000	23	2001	23	2002	20	2003	19	2004	26	2005	24	2006	24	2007	23	2008	19	2009	18	2010	20										239		
1926										2000	25	2001	25	2002	17	2003	13	2004	23	2005	22	2006	21	2007	23	2008	21	2009	20	2010	20									230		
1925											2000	22	2001	21	2002	13	2003	15	2004	21	2005	13	2006	13	2007	12	2008	11	2009	12										153		
1924												2000	22	2001	23	2002	19	2003	17	2004	32	2005	26	2006	25	2007	24	2008	27										215			
1923													2000	19	2001	16	2002	12	2003	8	2004	18	2005	15	2006	16	2007	14											118			
1922														2000	26	2001	23	2002	19	2003	16	2004	23	2005	17	2006	15												139			
1921															2000	10	2001	11	2002	9	2003	8	2004	13	2005	11												62				
1920																2000	12	2001	7	2002	6	2003	4	2004	10													39				
1919																	2000	16	2001	14	2002	10	2003	10														50				
1918																		2000	11	2001	8	2002	6															25				
1917																																						12				
1916																																						7				
total	532		503		475		450		411		380		367		384		353		319		311		283		262		258		236		213		190		173		151		1366	387		

Table 2: Life satisfaction and social determinants: prevalence (%) of covariates by cohorts for the two age categories and odds ratios (OR) with 95% confidence intervals for the probability of being satisfied for each covariate using the GEE model with robust SE under the assumption of independent correlation structure (for time-variant covariates).

	Birth cohorts			p-value ¹
	1936-1945	1926-1935	1916-1925	
65-74 years old				
Satisfied ²	41.4	43.6		0.38
Higher education	69.1 1.1 (0.8-1.5)	62.2 1.6 (1.2-2.2)		0.007*
Satisfied with household income ⁵	63.3 2.9 (2.3-3.7)	59.5 3.4 (2.6-4.4)		0.29
High social support ⁴	44.3 1.4 (1.1-1.7)	29.8 1.1 (0.9-1.5)		<0.0001*
Living together with a spouse	63.1 1.6 (1.2-2.2)	50.6 1.4 (1.1-1.9)		<0.0001*
Good self-perceived health ⁵	77.3 1.8 (1.4-2.2)	75.0 1.9 (1.5-2.4)		0.19
75-84 years old				
Satisfied ²		41.5	47.1	0.01*
Higher education		61.2 1.4 (0.9-2.0)	54.2 1.5 (1.0-2.3)	0.05*
Satisfied with household income ⁵		63.6 3.6 (2.7-4.8)	59.7 2.9 (2.0-4.1)	0.41
High social support ⁴		23.1 1.3 (1.0-1.7)	17.9 1.2 (0.8-1.8)	0.0006*
Living together with a spouse		36.4 1.6 (1.1-2.2)	28.9 0.9 (0.6-1.3)	<0.0001*
Good self-perceived health ⁵		67.9 1.9 (1.5-2.5)	63.6 1.7 (1.2-2.4)	0.12

¹ p-value with conservative standard errors (SAS PROC GENMOD procedure)

² score 9-10 versus 0-8

³ score 8-10 versus 0-7

⁴ mean individual score 5.5-10 versus 0-5.4 of 10 items of social support

⁵ excellent and very good versus fair, poor and very poor

Table 3: Estimates from a mixed unconditional mean model, unconditional growth model and controlled for cohort model of life satisfaction, by age categories net of period effect

	Age 65-74 years			Age 75-84 years		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	Unconditional mean model	Unconditional growth model (+age centered)	+ cohort and cohort*age	Unconditional mean model	Unconditional growth model (+age centered)	+ cohort and cohort*age
Fixed effect						
Intercept	8.18 (0.05)***	8.24 (0.06)***	8.49 (0.13)***	8.17 (0.06)***	8.22 (0.08)***	8.56 (0.15)***
Age ¹		-0.02 (0.009) (ns)	-0.05 (0.02)***		-0.01 (0.01) (ns)	-0.04 (0.02)*
Recent cohort ²			-0.32 (0.14)*			-0.45 (0.18)**
Age*recent cohort ²			0.04 (0.02)*			0.04 (0.04)
Variance components						
Level-1 Within-subjects	1.24 (0.03)***	1.23 (0.03)***	1.23 (0.03)***	1.32 (0.05)***	1.32 (0.05)***	1.31 (0.05)***
Level-2 intercept in subjects	1.62 (0.09)***	1.62 (0.09)***	1.62 (0.09)***	1.76 (0.13)***	1.77 (0.14)***	1.76 (0.13)***
Level-2 intercept in period	0.01 (0.007)*	0.008 (0.006)	0.006 (0.004)	0	0	0
ρ	56.9% ³	0.07% ⁴	0.07% ⁵	57.4% ³	0.14% ⁴	0.4% ⁵
BIC	15026.9	15024.0	15018.3	8004.0	8002.9	7996.3

¹ Age centered to 65 years for age category 65-74 and to 75 years for age category 75-84
² For age 65-74 years recent cohort is 1936-1945 versus former cohort 1926-1935, and for age 75-84 years recent cohort is 1926-1935 versus former cohort 1916-1925
³ part of total variance due to between subjects and periods
⁴ part of variance due to age net of individual and period variances
⁵ part of variance due to age and cohort net of individual and period variances

Table 4: Estimates from mixed models of life satisfaction for age and covariates, by age and cohort categories net of period effect

Estimates of fixed effects	1936-1945 age 65-74 years	1926-1935 age 65-74 years	1926-1935 age 75-84 years	1916-1925 age 75-84 years	1916-1945 age 65-84 yrs (adjusted for birth year)
Intercept	8.21 (0.07)***	8.55 (0.13)**	8.12 (0.09)***	8.59 (0.17)***	8.10 (0.08)***
Age (Figure 2)	-0.02 (0.01)	-0.05 (0.02)***	-0.008 (0.02)	-0.05 (0.02)**	-0.04 (0.007)***
Education (Figure 3)					
Intercept	8.33 (0.08)***	8.66 (0.16)***	8.30 (0.11)***	8.99 (0.23)***	8.20 (0.08)***
High	0	0	0	0	0
Low	-0.40 (0.14)***	-0.26 (0.26)	-0.47 (0.18)***	-0.87 (0.33)***	-0.52 (0.11)***
High * age	-0.03 (0.02)	-0.04 (0.02)	-0.04 (0.02)	-0.07 (0.03)**	-0.04 (0.008)***
Low * age	0.01 (0.03)	-0.07 (0.03)	0.03 (0.03)	-0.02 (0.05)	-0.03 (0.008)***
p-value ¹	0.32	0.006*	0.23	0.06	<0.0001*
Satisfaction with household income (Figure 3)					
Intercept	8.56 (0.07)***	8.92 (0.15)***	8.60 (0.09)***	9.05 (0.19)***	8.39 (0.07)***
Satisfied	0	0	0	0	0
Unsatisfied	-0.94 (0.09)***	-0.88 (0.19)***	-1.27 (0.13)***	-1.12 (0.25)***	-0.90 (0.07)***
Satisfied * age	-0.04 (0.02)**	-0.05 (0.02)**	-0.04 (0.02)*	-0.06 (0.03)*	-0.03 (0.007)***
Unsatisfied * age	0.009 (0.02)	-0.07 (0.03)**	0.04 (0.03)	-0.03 (0.03)	-0.04 (0.008)***
p-value ¹	0.02*	0.005*	0.03*	0.06	<0.0001*
Social support (Figure 3)					
Intercept	8.34 (0.08)***	8.52 (0.19)***	8.29 (0.13)***	8.78 (0.32)***	8.17 (0.08)***
High	0	0	0	0	0
Low	-0.24 (0.09)**	0.01 (0.20)	-0.25 (0.14)	-0.22 (0.33)	-0.21 (0.07)***
High * age	-0.02 (0.02)	-0.02 (0.03)	-0.03 (0.02)	-0.06 (0.05)	-0.04 (0.009)***
Low * age	-0.02 (0.02)	-0.06 (0.02)**	0.005 (0.04)	-0.05 (0.03)*	-0.03 (0.007)***
p-value ¹	0.43	0.007	0.63	0.09	<0.0001
Living with a husband or as a couple (together) versus alone (Figure 3)					
Intercept	8.37 (0.07)***	8.73 (0.17)***	8.35 (0.13)***	8.30 (0.26)***	8.22 (0.08)***
Together	0	0	0	0	0
Alone	-0.49 (0.12)***	-0.47 (0.24)	-0.51 (0.12)***	0.50 (0.32)	-0.50 (0.09)***
Together * age	-0.01 (0.02)	-0.04 (0.02)	-0.01 (0.03)	-0.02 (0.04)	-0.04 (0.009)***
Alone * age	-0.009 (0.02)	-0.05 (0.02)*	0.008 (0.02)	-0.07 (0.03)**	-0.02 (0.008)**
p-value ¹	0.65	0.03*	0.87	0.04*	<0.0001*
Self-perceived health (Figure 3)					
Intercept	8.30 (0.06)***	8.69 (0.14)***	8.32 (0.09)***	8.68 (0.19)***	8.20 (0.07)***
Good	0	0	0	0	0
Poor	-0.40 (0.10)***	-0.82 (0.22)***	-0.71 (0.13)***	-0.27 (0.26)	-0.61 (0.07)***
Good * age	-0.007 (0.02)	-0.05 (0.02)**	-0.01 (0.02)	-0.03 (0.03)	-0.03 (0.007)***
Poor * age	-0.04 (0.02)	-0.02 (0.03)	0.02 (0.03)	-0.07 (0.04)*	-0.02 (0.009)***
p-value ¹	0.26	0.04*	0.62	0.09	<0.0001*

¹p-value for the covariate and age interaction

Table 5: Estimates from HAPC mixed models of life satisfaction for age and covariates net of period effect

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Unconditional growth model (+age)	+cohort	+education	+satisfaction with income	+ social support	+ living together	+ health	all covariates
Intercept	8.25 (0.06)***	8.72 (0.16)***	8.39 (0.07)***	7.69 (0.07)***	8.35 (0.07)***	8.03 (0.08)***	7.83 (0.07)***	8.96 (0.17)***
Age ¹	-0.008 (0.005)	-0.03 (0.007)***	-0.005 (0.006)	-0.007 (0.005)	-0.005 (0.006)	-0.0000 (0.006)	-0.003 (0.005)	-0.01 (0.008)
1926-1935 ²		-0.32 (0.13)***						-0.36 (0.12)***
1936-1945		-0.49 (0.16)***						-0.55 (0.15)***
High education ³			0.44 (0.08)***					0.27 (0.07)***
Satisfied with income ³				0.89 (0.04)***				0.85 (0.04)***
High social support ³					0.19 (0.04)***			0.14 (0.04)***
Living with a partner ³						0.32 (0.07)***		0.23 (0.06)***
Good self-perceived health ³							0.53 (0.04)***	0.47 (0.04)***
Variance								
Within subjects	1.29 (0.03)***	1.29 (0.03)***	1.29 (0.03)***	1.25 (0.03)***	1.29 (0.03)***	1.28 (0.03)***	1.23 (0.03)***	1.24 (0.03)***
Between intercept for subjects	1.67 (0.08)***	1.68 (0.08)***	1.63 (0.08)***	1.25 (0.07)***	1.63 (0.08)***	1.49 (0.08)***	1.68 (0.12)***	1.07 (0.06)***
Between intercept for period	0.01 (0.006)*	0.003 (0.002)	0.007 (0.001)*	0.01 (0.007)*	0.01 (0.007)*	0.01 (0.006)*	0.007 (0.001)***	0.006 (0.004)
BIC	22855.7	22849.7	22818.1	22302.1	22837.2	22694.3	22669.6	22062.5

¹ Reference age centred to 65 years

² Reference former cohort 1916-1925

³ References low education, not satisfied with household income, low social support, living alone, poor self-perceived health

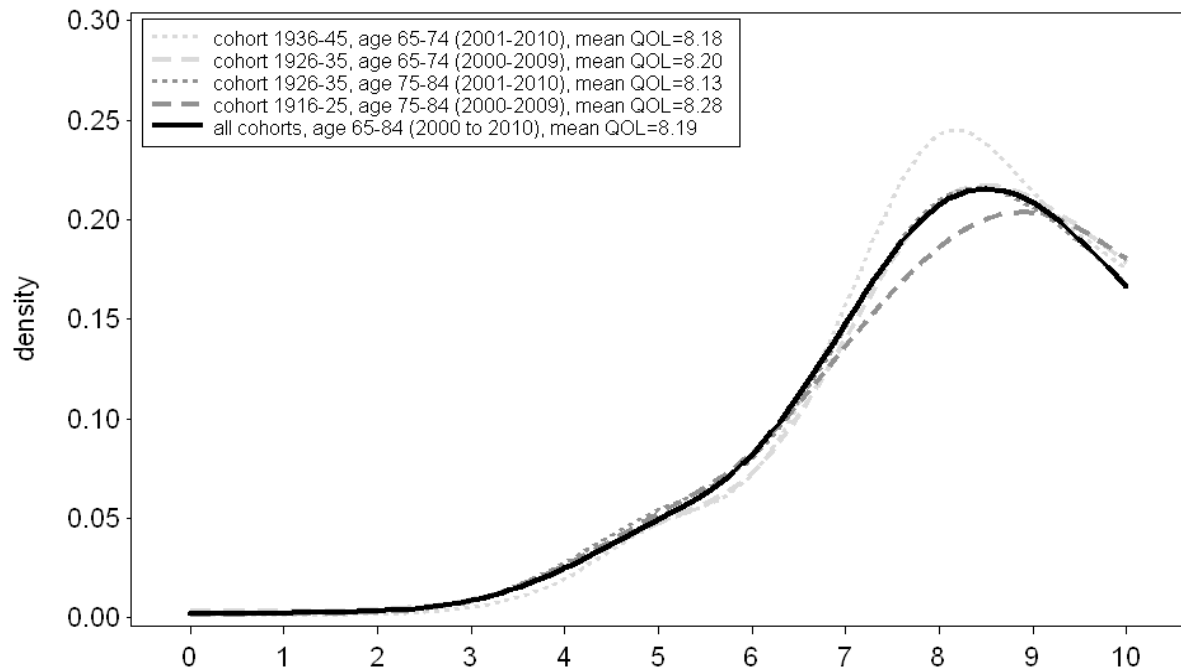
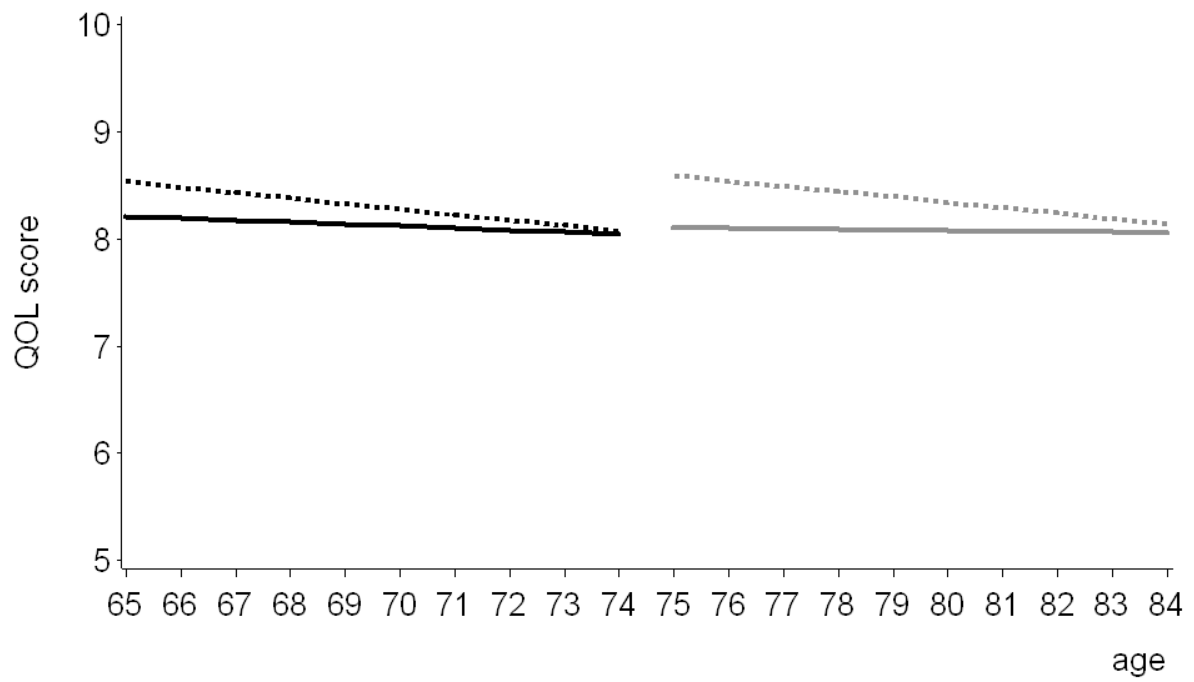
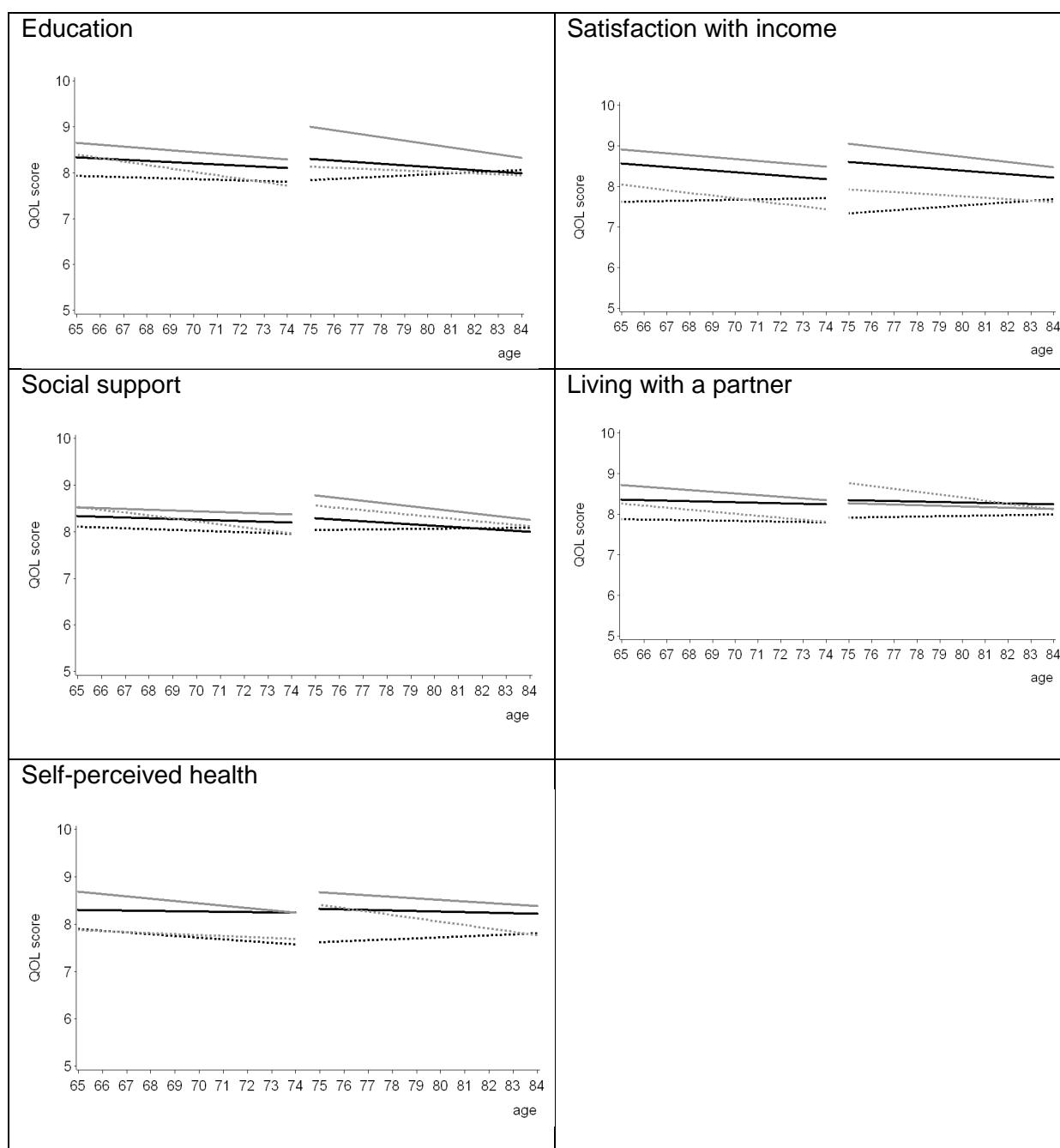


Figure 1: Life satisfaction score density distribution, by age categories (65-74 and 75-84 years) and birth cohorts. SHP 2000-2010, women 65-84 years



Age 65-74 years birth year 1936-1945 (recent) in solid black
 Age 65-74 years birth year 1926-1935 (former) in dashed black
 Age 75-84 years birth year 1926-1935 (recent) in solid grey
 Age 75-84 years birth year 1916-1925 (former) in dashed grey

**Figure 2: Life satisfaction trajectories on age by birth cohort.
 SHP 2000-2010, women 65-84 years**



Age 65-74 years birth year 1936-1945 favorable level of the determinant in solid black
 Age 65-74 years birth year 1936-1945 unfavorable level of the determinant in dashed black
 Age 65-74 years birth year 1926-1935 favorable level of the determinant in solid grey
 Age 65-74 years birth year 1926-1935 unfavorable level of the determinant dashed grey
 Age 75-84 years birth year 1926-1935 favorable level of the determinant in solid black
 Age 75-84 years birth year 1926-1935 unfavorable level of the determinant in dashed black
 Age 75-84 years birth year 1916-1925 favorable level of the determinant in solid grey
 Age 75-84 years birth year 1916-1925 unfavorable level of the determinant in dashed grey

Figure 3 : Life satisfaction trajectories on age, by age and birth cohort categories, for selected determinants. SHP 2000-2010, women 65-84 years

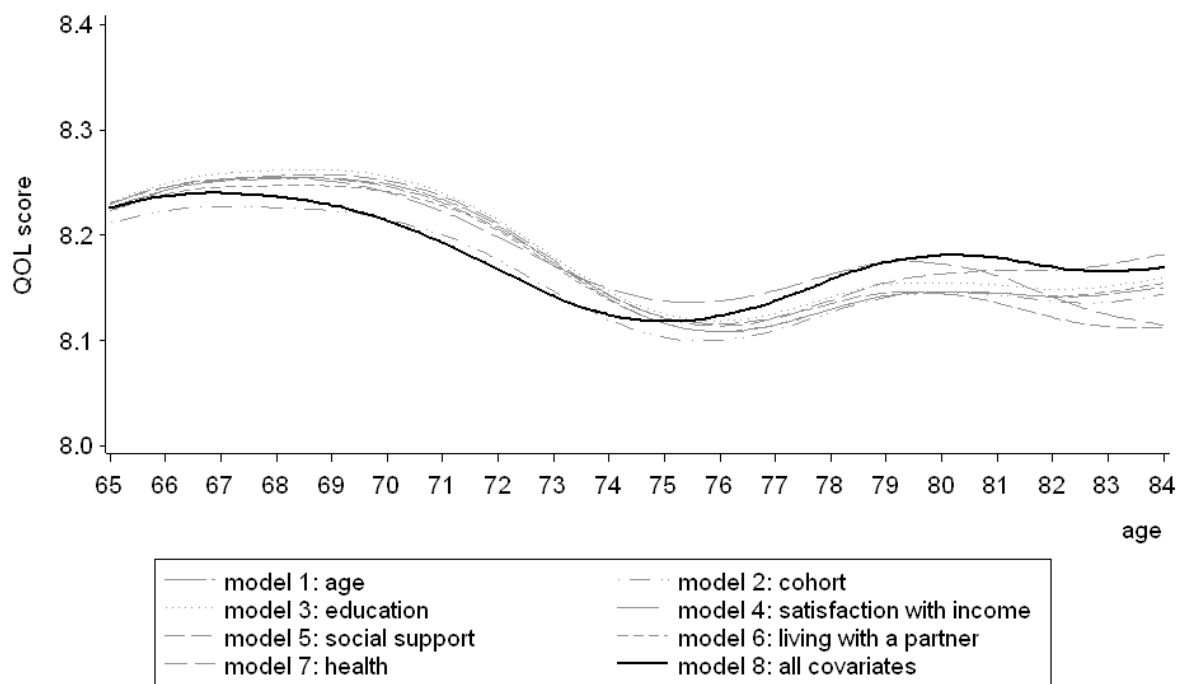


Figure 4: Estimates from HAPC mixed models of life satisfaction for age and covariates net of period effect, SHP 2000-2010, women 65-84 years

endnotes

ⁱ <http://www.oecdbetterlifeindex.org/topics/life-satisfaction/> [January 29th 2014]