

University of Groningen

Healthy aging in context

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Djundeva, M. (2016). *Healthy aging in context: Family, welfare state and the life course*. University of Groningen.

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6. Conclusion

6.1 Contribution of this book

Health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO). This definition of health puts an emphasis on social health conceptualized as “people’s capacity to fulfil their potential and obligations, the ability to manage their life with some degree of independence despite a medical condition, and the ability to participate in social activities” (Huber et al., 2011). Personal relationships, especially those with kin are key predictors of quality of life and health at all life stages. This book adds to the scholarship on how family relationships of individuals studied in a social context contribute to the overall health inequality in later life. The approach taken in the four empirical studies is grounded in theoretical developments in the life course scholarship of sociology, demography, and epidemiology.

6.1.1 Life course epidemiology and the study of family

The study of health inequality in this book has been based on a few major ideas that complement each other facilitating the understanding of pathways in which health differences between individuals emerge and, more importantly, persist in later life. A life course approach in studying health has gained traction in epidemiology with the recognition that diseases and chronic conditions in old age usually have long latency periods, sometimes starting already in utero (Barker, 1995). Instead of following changes in individuals’ health over time this book borrows from life course epidemiology the concept of disease development to conceptualize how family status over the life course develops. Life course epidemiology seeks to discover links between exposures and outcomes, explicitly taking into consideration the importance of time (duration), and timing in disease development (Ben-Shlomo & Kuh, 2002). In parallel, family status in this book is conceptualized through aspects of partnerships and fertility that serve as *exposures* with focus on the timing and changes in quality and quantity of partnership and fertility over time.

6.1.2 Application of cumulative advantage theories

In addition, building on a life course approach to the study of socioeconomic inequalities in health from sociology, the focus on family is a tribute to the social and psychological risks, which have their own natural histories that unfold over time. Similarly to research done on the links between social position and health, in the chapters of this book health has been identified as a capital that builds or depletes depending on the experiences with partners and children, experiences which are presented as individual characteristics. Further, the importance of early exposure regarding health and SES for both *family status* over the life course and *health in later life* has been fully acknowledged. Theories of accumulation of disadvantages (i.e. cumulative adversity

theory, chains of risk and the pathway model) have been adopted in a twofold way. First, by treating family status jointly with early-life conditions and life style factors (i.e. smoking and exercise) as the building blocks in a cumulative exposure framework. Second, and departing from other studies, is the approach to conceptualize and measure family events and relations over the life course as accumulating experiences that present a quality on their own when they are studied over time, opposed to being studied as isolated transitions in time (i.e. last divorce, time of marriage).

6.1.3 Theoretical underpinnings of sequence analyses

This approach has enabled the use of partnership trajectories, a holistic concept that is derived to a compact measure via sequence analysis, next to number of transitions and timing of partnership and fertility events. The use of sequence analysis and optimal matching (OM) in social science has been subject to criticism as being too descriptive and atheoretical, and focusing on events over causes (e.g. Wu, 2000). Further, it has been criticized for being problematic when used for repeated events because OM algorithms do not distinguish between similarities at the beginning and the end of the sequences. In the chapters utilizing this technique (the second and third) I have departed from the use of OM, and instead a less computationally sophisticated approach is used that emphasizes the importance of the length of sequences, type of events and the direction in which events appear in the sequence. I argue that this break from canon in the use of sequence analyses without OM has the potential to successfully overcome some of the criticism by yielding important benefits. First is transparency, as different sequences grouped together are visible for scrutiny; second, the ability to match trajectories with an accumulation hypothesis about the importance of number and type of negative events (i.e. divorce, bereavement), and third, the successful resolution of the problem of directionality.

6.1.4 The role of welfare regimes in health differentials

Last, in the chapters presented here health differences between groups have been studied minding the differences in institutional arrangements and social policies targeting families and public health. Working with typologies of the welfare regime perspective adopted to describe the institutional constrains and privileges available to citizens across Europe (Esping-Andersen, 1990, 2008), the studies presented here have utilized the welfare regime literature in political economy and sociology in a threefold way: to describe differences in income transfers, social services and housing between countries, to describe differences in family formation between countries or to empirically test for differences in health outcomes between countries belonging to different regimes. Acknowledging the variations in historical development of the differences in partnership and fertility formation is essential to understanding health differentials in old age.

6.1.5 Gender differences in health

In all chapters, gender differences in health are prominent. Chapter 5 explicitly tests the gender differences in the relationship between a family process and health, and the results show that there is greater difference in mental health for men with regards to the quantum of support compared to women. The results in Chapter 3 are stratified by gender, and across countries (Germany and England), and we observe more cardiovascular reactivity to life course partnership characteristics (number of partnership transitions and age at first partnership) for men than for women. Lastly, differences in the results for men and women in Chapter 2 reveal that men with chronic childhood illness compared to men without any childhood illness are more likely to be in a never married or to be in a complex partnership group consisting of multiple subsequent marriages (2+), whereas women with a chronic childhood illness are more likely to be in any of the non-standard partnership groups compared to a stably married trajectory group.

6.2 Contribution of empirical chapters

Several major findings from the studies summarized in Table 6.1 on page 132 go hand in hand with already established evidence on the relationship between family status and health, but also there are main contributions of each chapter worth mentioning. Each chapter carries distinct contributions that distinguish the studies in this book from previous research in both theoretical and methodological terms.

6.2.1 A life course approach to the relationship between childhood health and partnership trajectories

In this chapter an interdisciplinary approach is adopted to combine theoretical reasoning which links theories of cumulative adversity with advanced methods prominently featured in demographic and sociological research, such as sequence analyses and multilevel logistic regression models. Information from early childhood health and socioeconomic status is used to capture life course processes important for later partnership formation. The chapter addresses selection into partnership over the life course by asking if healthy individuals are more likely to get married and have stability in partnership over their life course than their unhealthy counterparts. By going beyond first partnership transition or investigating partnership transitions in mid-life, the chapter addresses selection into partnership and adds to the literature in two ways. One is going beyond investigating marriage to find out that cohabitation, as well as a complexity of multiple serial marital and cohabitation relationships over the life course, are associated with childhood health. The second one is that it enables the use of a compact measure of a life course partnership that proves useful for further investigation of later-life health.

6.2.2 Partnership trajectories and cardiovascular health in late life

In this study, the theoretical framework that puts family processes essential for late-life health is tested by using objective measures of cardiovascular health. In addition, the principle of selection into late-life health on early-life characteristics is applied by including information on childhood health and SES (similar to the principle of life course epidemiology that studies the development of chronic diseases from early to late age). By including anthropomorphic measures and biomarkers, the study contributes to research by offering evidence that links measures of cardiovascular health to life course partnership characteristics (age at first partnership transition, number of partnership transitions and partnership trajectories). A conservative approach including life style factors shows that there is an association between non-reported measures observed in old age and life course partnership.

6.2.3 Age at first birth and late-life self-rated health

This chapter goes beyond investigating socioeconomic position in later life to study the self-rated health of women to find out in what way the start of fertility history can influence later life health. Using a structural equation framework to empirically test associations between age at first birth and education, the study attempts to discern to what extent differences between countries can be explained due to differences in educational opportunities in welfare regimes. A complex statistical model is used to account for several important associations: a) the association of early-life conditions and the likelihood of becoming a parent, b) the association of age at first birth and education, c) the association between age at first birth and education to late-life health. By modelling these associations using explicit assumptions in a general structural equation model, the study contributes to the literature on health inequality in four ways. First, by linking theoretical hypotheses of latency period to late-life outcomes; second, by testing alternative scenarios stemming from theories of accumulated adversity; and third, by addressing the complexity of a non-linear relationship between age at first birth and subsequent health. Last, separate country analyses make it possible to discern differences between welfare regimes and speculate about the possible drivers behind them.

6.2.4 Receiving instrumental support in late parent-child relationships and parental depression

The chapter asks in what ways intergenerational relations between adult children and parents are important for the mental health of parents. The contribution goes to lend support for the hypothesis that both quantity and quality of support matter for the health of old people, and not merely whether support is available. By using reported measures of the quantity of one type of support (instrumental, excluding emotional and financial), the study finds merit that the support-help relationship persists across welfare regimes, despite the differences in volume of support that exist over countries. Gender differences also moderate the relationship between support and depression, in line with previous research.

6.3 Summary of main findings

Table 6.1 provides a summary of the main findings of the empirical Chapters 2–5 by highlighting the most important results from each chapter together with the main conclusions of each study.

Table 6.1: Summary of main findings

Chapter 2	Chapter 3	Chapter 4	Chapter 5
<p>Most of the older Europeans follow traditional partnership trajectories consisting of one marriage and no later disruptions, and there is greater heterogeneity among the Northern European countries, and the more affluent.</p> <p>Poor childhood health is associated with individuals who have complex partnership trajectories consisting of multiple divorces or experiences of widowhood for both men and women. For women, poor childhood health is also associated with being never married or entering a cohabiting trajectory.</p> <p>The association between poor childhood health and a non-standard partnership trajectory pertains mostly to the younger cohorts born after World War II.</p>	<p>German respondents have lower average log of CRP, higher high HbA1c level, high systolic and high diastolic blood pressure than the English, whereas the English respondents on average have more often high total cholesterol.</p> <p>Women in divorced trajectories in Germany are less likely to have a high HbA1c, whereas men in Germany who had many partnership transitions are more likely to experience high diastolic BP.</p> <p>Results for England showed that age at first transition is related to total cholesterol for men, as those who had a first transition between 26 and 30 are more likely to have low total cholesterol.</p>	<p>In Austria, Sweden, Spain and Poland there is a persisting association between age at first birth and self-rated health (direct effects of AFB on health). In Germany, the Netherlands, Switzerland and the Czech Republic the direct effects of AFB on health are very small. The effects are direct mostly in the conservative regime countries (Austria, Germany, Netherlands, Switzerland) and the Eastern-European type countries (Czech Republic and Poland), but there is notable absence of direct effect of age at first birth on health in the Mediterranean countries, Denmark, and Belgium.</p> <p>In most countries there is an accumulation of risk or advantage as early-life health, AFB and education synergistically influence later-life health.</p>	<p>For parents who are severely physically impaired, those who receive at least some or a lot of instrumental support are less likely to be depressed than parents who receive no support. The volume of support plays a crucial role in the association between support and mental health.</p> <p>Receipt of instrumental support is stably related to depression across different European welfare regimes. For men even receiving sporadic support is enough to cause deterioration of mental health, whereas for women only frequent instrumental support is associated with higher depressive mood. Social interaction with children has no significant moderating effect.</p>

6.4 Methodological implications

In light of studies which show that relationship quality between ageing parents and adult children is essential for parental health, especially for mental health (Koropecjy-Cox, 2002; Zunzunegui et al., 2001; Merz, Consedine, Schulze & Schuengel, 2009; Merz, Schuengel & Schulze, 2009), the study in Chapter 5 adds to the literature by investigating the measured transfer of instrumental support instead of the perceived quality of the relationship with adult children, a more commonly investigated predictor. Similarly, in Chapters 2 and 3 partnership trajectories are investigated as factual histories of life course partnership, as opposed to perceived quality of marital relationships; and in both chapters the non-subjective measures of family events are related to measures of physical health. Chapter 4 uses a self-rated health as a health measure commonly used to study health inequality, a measure that is found highly predictive of mortality and morbidity that has high test-retest reliability in a number of studies (Idler & Benyamini, 1997).

Observational data such as the Survey of Health and Retirement in Europe and the English Longitudinal Study of Ageing used in this book create challenges in estimating causal effects, and questions regarding identification and estimation of the effects still remain fairly poorly understood. A general approach to estimating the effect of the process or the phenomena of interest (also called treatment effects in the counterfactual inference and program evaluation literature) is to reach unconfoundedness. Estimating causal effects in the case of unconfoundedness, or also called exogeneity, ignorability, or selection on observables is one of the straightforward ways that social science research uses to feed advice to policy makers. In this book, a number of statistical methods and techniques are used — generalized linear models, logistic regression models, sequence analyses, general structural equation models, mediation and moderation analysis.

The statistical methods used inform on causality by including as much as possible all known and measured confounders (assumptions for confounders are made from previous empirical evidence and theoretically informed assumptions). The approach used in this book consists of sensitivity analyses, where the robustness of estimates to specific limited departures from unconfoundedness are investigated and their implications are reported in the appendixes or mentioned in sensitivity analyses after each chapter. All of the empirical studies in the book use different outcomes of interest: in Chapter 2 the outcome is a nominal (categorical) variable (partnership trajectory); in Chapter 3 a combination of continuous and nominal outcomes such as biomarkers and physiological measures is used; in Chapter 4 a continuous outcome of self-rated health, and in Chapter 5 a binary outcome of interest such as depressive mood.

Standard hypothesis testing is used in all chapters to test that the average effect of interest is zero. An advantage of the data is that the analyses in all chapters are done on fairly large sample sizes, therefore the assumption that the variables of interest are asymptotically normally distributed with zero asymptotic bias with standard confidence intervals (the point estimate plus or minus a constant times the standard error) is used

and not abused for hypotheses testing. This approach is fairly conservative as current trends in estimating effects use methods such as instrumental variable approach that must satisfy specific exogeneity and exclusion restrictions (Aranda, 2015), regression discontinuity design (Coe & Zamarro, 2008; Shaikh & Mueller, 2015; Hospido & Zamarro, 2015) and less the difference-in-differences method. In addition, in Chapters 2–4 due to lack of statistical power to focus on country-specific effects the strategy of splitting the sample in subsamples is adopted in order to test whether the effects are context specific. In this way, it is still possible to establish that there are subpopulations with average positive effects in cases where there is not sufficient information to obtain precise inferences for the average causal effect or association, namely in different cohorts in Chapter 2; and in different countries in Chapter 3. In Chapter 4 mediation analyses and conservative estimates of model-fit are used to account for direct and indirect effects on education on self-rated health. In Chapter 5, moderation analysis is used to investigate if there is an interaction between receiving support and country family regime (welfare regime) to show that differences between family regimes do not add to the association between receiving instrumental support and parental depression.

6.5 Policy implications

The implications of the studies in this book may be of importance for health interventions in older populations, productive working life of older adults, caregiving policies as well as work–life balance research. Public policies attempt to promote health by combining various approaches, including legislation, fiscal measures, taxation and organizational change (The Ottawa Charter for Health Promotion). Policies regulating childcare, parental leave, caregiving, as well as those regulating the boundaries of civil partnerships exert influence on the mating choices of individuals, the age when one gives birth of a child or how generations exchange time and money, as well as residential proximity between older and younger members of the family.

The findings presented in the book here can illuminate the importance on focusing on several issues that underline the relationship between family and health in Europe:

1. Investment in early childhood

The influence of childhood disadvantage on health has previously been explained by pathways of behavioural and materialist factors, however the social processes underlying exposure to these risk factors and the mechanism by which exposures lead to disease are still not properly understood. Results from Chapter 2, 3 and 4 corroborate the previous findings how early life is essential for health disparities in late life (Brandt et al., 2012; Brandt & Hank, 2014; Mazzonna, 2014; Shrira, 2012). Socioeconomic position in childhood, as well as health status, has an impact on late-life health measured with objective indicators such as biomarkers (Chapter 3) and subjective appraisal of health (Chapter 4). In addition, childhood conditions seem to be important not only for health in adulthood, but also for partnership over the life course (Chapter 2), as well as

parenthood (Chapter 4). Although the cohorts studied in the chapters are older individuals who have experienced the turn of the century, the notion remains that healthier children from more affluent socioeconomic background remain healthier in late life, compared to those who had many childhood diseases or grew up in poverty; and they are also more likely to have a stable partnership (an uninterrupted union) over their lives (Chapter 2) and a timely transition to parenthood (Chapter 4). Investing in early childhood, especially in education, for disadvantaged children is probably the most effective strategy for reducing the social and the financial costs of bad health that arises in later life.

2. Linked lives — living in time and place

Results from Chapter 5 show that older parents benefit from receiving instrumental support from their non-coresident adult children when they actually need it (when parents are frail and have problems living independently). This assumes that older individuals are living in *time and place* (Elder, 1998; Djundeva, 2015). More precisely, a geographical proximity of adult children that fosters face-to-face contact and high quality personal relationships is needed to enable at least instrumental intergenerational transfers (Albertini et al., 2007; Attias-Donfut, Ogg & Wolff, 2005; Brandt & Deindl, 2013). Policy formulations might draw conclusion from the results in Chapter 5 and recent research on intergenerational relationships in Europe (Brandt et al., 2009; Brandt, 2013; Leopold & Raab, 2011) that family friendly policies can have a meaningful impact on health by enabling structural conditions for individuals to live in a near proximity of family members to support maintaining high quality relationships with kin.

3. Caregiving policies

The aim of a caregiving policy must be to make the healthier choice the easier choice for older adults and their families. This is of great importance for designing future caregiving policies. Current trends in providing care to a growing old age population in Europe are indicative of lack of personal carers and caregiver burden of family carers (Bonsang, 2009; Igel et al., 2010; Triantafillou et al., 2010). The results from Chapter 5 show that while family carers (as providers of instrumental support) can be somewhat effective, they should not be taken as *a carte blanche* to fully delegate care to family members of frail individuals.

6.6 Implications for future research: On data ethics in investigating public health

Changes pertaining to the use of mobile technologies, and smartphones in particular, the concern about privacy of storing and sharing data on individuals' health, as well as the lack of financial resources to compete with commercial market research are among the few factors that pose a challenge for collecting large scale data. Examples of the discontinuation of the Life Study cohort study in the UK, an ambitious, complex, and

Chapter 6

innovative study that aimed to track the development, health and wellbeing of around 80,000 UK babies and their parents (McKie, 2015); as well as the failure of the National Children's Study in the US (NCS) that aimed to assess how physical, chemical, biological and psychosocial factors affected 100,000 children from birth onwards (Reardon, 2014) expose the difficulty and the cost of conducting this type of research. Future efforts should concentrate on supporting and funding the existing surveys by enabling them to grow. Growth should be in line with the available resources and research interest by expanding the amount of data collected, enlarging the samples with new refresher samples, as well as modernizing and expanding the instruments included in the studies. Examples of existing surveys that hold potential to grow and to further the knowledge on the social aspects of health are the British cohort studies: The National Child Development Study of 1958, the 1970 British Cohort Study, the Millennium Cohort study (the 2000 cohort), the English Longitudinal Study of Ageing (ELSA); the Dutch LifeLines cohort study, and the Netherlands Kinship Panel Study (NKPS); the US Health, Retirement and Society (HRS) and the Survey of Health, Ageing and Retirement in Europe (SHARE). In addition, the US National Longitudinal Study of Adolescent to Adult Health (Add Health), a longitudinal study of a nationally representative sample of adolescents in grades 7–12 in the United States during the 1994–95 school year; as well as the UK Household Longitudinal Study Understanding Society (launched in 1991 as the UK's first socioeconomic household panel survey, previously known as the British Household Panel Study) that has a collection of data on health, biomarkers and genetics among other things, are also large surveys that embody the dreams and the hopes of scientists investigating health from a life course perspective.