Julia Klein

Essays on the Interrelation Between Sickness Allowance, Disability, and Mortality in Finland

National and Ethnolinguistic Perspectives

Åbo Akademi University

Julia Klein

Born in Berlin, German Democratic Republic, 1985

Previous studies and degrees

Bachelor of Arts in Social Sciences, University of Rostock, Germany, 2008

Master of Science in Demography, University of Rostock, Germany, 2012

Portrait picture: Foto Airaksinen Oy

Cover picture: Julia Klein

Essays on the Interrelation Between Sickness Allowance, Disability, and Mortality in Finland

National and Ethnolinguistic Perspectives

Julia Klein

Social Policy
Faculty of Education and Welfare Studies
Åbo Akademi University
Vasa, Finland, 2022

Supervised by

Professor Jan Saarela, PhD.
Faculty of Education and Welfare Studies
Åbo Akademi University, Finland

Reviewed by

Ylva Brännström Almquist, PhD.
Department of Public Health Sciences
Stockholm University, Sweden

Ossi Rahkonen, PhD.
Faculty of Medicine
University of Helsinki, Finland

Opponent

Ylva Brännström Almquist, PhD.
Department of Public Health Sciences
Stockholm University, Sweden

ISBN 978-952-12-4152-9 (print)
ISBN 978-952-12-4153-6 (digital)
Painosalama, Turku, Finland

Förord

Hur skriver man ett förord till sin doktorsavhandling som helt oförväntat plötsligt blir färdig? I många, långa år har jag älskat och hatat att jobba på den och när det var särskild svår försökt föreställa mig hur det kommer kännas att äntligen bli klar. Under flera års tid har jag skrivit förordet i mina tankar, och nu sitter jag här och har ändå bara ett stycke (som kommer senare i texten). Nu när det verkligen är dags finner jag mig själv sittande vid skrivbordet, stirrande ut genom fönstret en mörk, snöig kväll i en liten stad som ingen i Tyskland har hörts tala om förut, och funderar på den långa vägen och den långa raden av slumpmässiga händelser som gör att jag sitter här och stirrar. Kanske är det det som jag vill berätta om i förordet, om alla slumpmässiga händelser som har gjort att jag sitter här i det här hörnet av Finland där man pratar svenska, och vems ”fel” det är att det blev som det blev.

Det var en vanlig dag på hösten år 2001 när den här avhandlingen tog sin första början. Jag gick i tionde klass och en novemberdag var jag på vägen någonstans. Jag gick upp för trapporna till närtåget på stationen Karlshorst i Berlin, då tanken slog mig. Tanken att det vore kul att ha det där tillägget ”Dr.” framför mitt namn, som blir en officiell del av namnen i Tyskland, och att jag borde väl doktorera för att det skulle hända. När jag kom upp till perrongen kändes det avgjort under en tid där inget kändes avgjort.

En lång rad slumpmässiga händelser senare hände det att jag började studera i Rostock. Som nybliven student stod demografiföreläsning med professor Reiner Dinkel på schemat. Jag hade ingen aning vad demografi ens var, men snart blev det mina favorittimmar under veckan. Det som var så speciellt med professor Dinkels föreläsningar var att de inte alls kändes som undervisning, utan som sagostunden hos en old school-gubbe. Några år senare satt jag på en lika spännande, fast helt annorlunda föreläsning av professor Marc Luy, som visade hur antaganden, variabler och matematiska modeller plötsligt berättar saker om verkligheten, i nutid och i dåtid, och hur man med enkla enkäter kommer fram till professor Dinkels sagor. Dessa två professorer i Rostock väckte mitt intresse för demografi, särskild den där delen där folk blir gamla, sjuka och dör, och därför anser jag dem vara mina akademiska förfäder.

I sommarn efter jag blev klar med kandidatavhandlingen var jag uttråkad. Av en slump anmälde jag mig till en språkkurs i svenska. Det var Uta Mehl och senare Helen Johansson-Holze som gjorde det så pass roligt att jag fortsatte och plötsligt insåg att jag pratade flytande svenska. Därför beslöt jag mig för att bli utbytesstudent i Umeå för att studera på svenska där.

Våren 2011 upplevde jag min första vårvinter i Umeå. Jag blev genast förtjust i livet uppe i Norden. Min kärlek till livet här uppe blev ännu större när jag tog färjan och anlände till Vasa för första gången, tidigt på morgonen i juni 2011. Resan förde mig vidare till Helsingfors och Tallinn och var kort sagt en av de bästa tiderna i mitt liv. Efter den där upplevelsen var det dags att åka hem igen och skriva en magisteruppsats, men jag kunde inte glömma Norden. Det första som jag gjorde efter att jag var klar med studierna var därför att skaffa

sommarjobb i Tallinn. Mitt uppdrag var att se till att våra backpackare först blev tillräckligt fulla, och sedan föra dem fulla tillbaka till sina sängar. Men snart blev det ganska tråkigt. Istället kom den där gamla drömmen om att doktorera, som aldrig verkligen hade lämnat mig, tillbaka med full fart. Som ödet ville det finns det en demografienhet på universitetet i Tallinn. Enheten har inte bara en underbar utsikt över havet, utan där jobbar också Luule Sakkeus, som blev något av min akademiska mor, eftersom hon under min tid som praktikant där gav mig självförtroendet att bege mig ut i den stora akademiska världen och söka min lycka som doktorand. Tillsammans med Liili Abuladze och Leen Rahnu skrev jag en artikel, som tyvärr aldrig publicerades, men vi presenterade forskningen på PAA:s konferens i New Orleans våren 2013. Det var i konferensens program där jag råkade läsa namnen av en viss Jan Saarela från Åbo Akademi och beslöt mig för att tala med honom. Det gjorde jag – på svenska mitt i det amerikanska *bayou*.

Från det där slumpmässiga mötet tog det bara några korta månader tills jag blev antagen som doktorand vid Åbo Akademi i Vasa och Jan hade blivit min *Doktorvater* – inget mindre ord används för doktorandens handledare på tyska. September 2013 anlände jag till Vasa med bara en ryggsäck och en väska och började vägen mot den här boken, en väg som har varit allt annat än kort, enkel eller rak. Att skriva kappan, sammanfattningen av allt som jag ha forskat i, väcker så många minnen från långa timmar där jag jobbade på två kontinenter, i fyra länder, på flygplatser, på tåg, på kaféer, vid köksbord, på soffor, på golvet, i sängen och ibland även vid skrivbord och/eller på Åbo Akademi, på dagen, på kvällen, på natten. (Och detta är det stycke som jag har förberett i fyra år.)

Jag vill tacka alla som gick den här vägen med mig. Främst Jan Saarela, som alltid knuffade mig framåt och aldrig tvivlade på mig även när jag själv gjorde det. Fjalar Finnäs, som tyvärr inte kunde förbli min bihandledare. Annika Lindberg, som hjälpte till med mina första möbler till min tomma lägenhet. Camilla Härtull och Elisabeth Hästbacka, som välkomnade mig och förklarade livet i Finland för mig. Kaarina Reini, min medförfattare och ÅA-rumskompis, som tålmodigt förklarade sjukdagpenningens finesser minst hundra gånger för mig. Och resten av gänget på B6, Mikael, Fredrica, Marina, Josefin, Sarah, Marja, Emily och Jordan, som jag inte fick tillbringa så mycket tid med som jag skulle ha velat, först på grund av mitt resande och senare en liten pandemi. Barbro Furustrand, som litade på mig när jag inte gjorde det. Och slutligen mitt björngäng här hemma, *Pappabär* Topi som visade mig att det är okej, helt generellt, och att det är också okej att ta en paus ibland i det speciella, och som är den bästa *social distancing partner* som jag hade kunnat önska mig, och slutligen vår *Babybär* som inte ännu gör så mycket förutom att göra mig lycklig, och som gav mamma kraften att avsluta sin doktorsavhandling.

Vasa, 21.2.2022
Julia Klein

Abstract

Disability pension is an important pillar of the modern welfare state. As it is almost always a permanent state, it is important to understand risk factors preceding it, as well as the consequences which disability receipt has for its recipients. Much research has already been conducted in this area: Sickness allowance receipt has been found to be a major risk factor for transitioning into disability pension, and disability pension receipt is linked to a heightened mortality risk, both in working ages and during retirement. However, the aspect of time has so far not been considered sufficiently. Finland has ideal conditions for in-detail analyses for the matter at hand, as it has a reliable population registry which allows for large-scale longitudinal research. The first two research questions, which this thesis seeks to answer, are: 1) How does the association of sickness allowance and disability pension change over the course of 22 years? and 2) Does the negative association of disability pension with mortality extend into the early retirement ages also in Finland? For research in this area, Finland offers an interesting additional angle. About five percent of the population has Swedish as their mother tongue, and, unlike most ethnic minorities, the Swedish-speaking Finns are not marginalized. Instead, they are in a largely comparable position as the Finnish-speaking majority population, yet the Swedish-speaking Finns show health advantages for all three indicators of interest, i.e. sickness allowance, disability pension, and mortality. The second set of research questions this thesis seeks to answer are concerned with whether the observable ethnolinguistic differences in health outcomes also extend to the transition from one indicator of ill health to an indicator of more severe ill health: 3) Are there ethnolinguistic differences in the association of sickness allowance and disability pension? And 4) Are there ethnolinguistic differences in the association of disability pension and mortality in the early years of retirement?

The four research questions are answered by utilizing a sample from the Finnish population register, which encompass five percent of the Finnish-speaking population and 20 percent of the Swedish-speaking population and cover the years 1987–2011. The risk for receiving disability pension according to previous sickness allowance receipt in ages 16–60 is analysed for the years 1989–2010. The risk for dying in ages 65–70 is analysed according to labour market status in ages 50–64 for the years 1987–2011. The method of analysis for all research questions is Survival Analysis.

The results show that the risk for receiving disability pension is highly dependent on previous sickness allowance receipt, and the association remains strong even after two decades. The length of sickness allowance receipt is an important factor within the first decade, as those who received sickness allowance for longer than two months face a much higher risk than those who received sickness allowance for a shorter period. However, after about ten years, the risk of both groups converges. By and large, this association is the same for Finnish- and Swedish-speaking Finns, as well as for men and women.

Concerning the association of labour market status with mortality in the early years of retirement, previous disability pensioners are the only ones who face a higher risk for retirement mortality. This association is the same for Finnish- and Swedish-speaking Finns, as well as for men and women.

In conclusion, there is considerable variation over time in the association of sickness allowance and disability pension, and the firmly established gradient according to length of sickness absence weakens over time. Disability pension receipt is linked to a heightened mortality risk, and the situation in Finland is similar to what is found in other Western countries. The absence of ethnolinguistic differences in either of the associations discussed above, despite marked differences for being in either state, shows the ethnolinguistic differences for being in either state of ill health are likely to be related to the culture associated with speaking the respective language and that the Finnish welfare system does an adequate job in equalising the adverse outcomes when ill health has had an onset.

Keywords: sickness allowance, disability pension, mortality, retirement pathways, retirement mortality, survival analysis, register data, Finland, Swedish-speaking Finns, ethnolinguistic differences

Sammanfattning

Sjukpension är en viktig pelare i den moderna välfärdsstatens omfattande skydd. Eftersom sjukpension nästan alltid är ett permanent tillstånd är det viktigt att förstå riskfaktorer som föregår den, samt vilka konsekvenser sjukpension har för mottagarna. Mycket forskning har redan bedrivits inom detta område: Mottagandet av sjukdagpenning har visat sig vara en stor riskfaktor för att bli sjukpensionär, och sjukpension är kopplad till en ökad dödlighetsrisk, både i arbetsför ålder och i pensionsålder. Tidsaspekten har dock hittills inte beaktats tillräckligt. Finland erbjuder idealiska förutsättningar för ingående analyser gällande dessa områden, eftersom befolkningsregistret möjliggör tillförlitlig, storskalig longitudinell forskning. De två första forskningsfrågorna som denna avhandling försöker besvara är: 1) Hur förändras sambandet mellan sjukdagpenning och sjukpension över en tid på 22 år? och 2) Omfattar det negativa sambandet mellan sjukpension och dödlighet in i den yngre pensionsåldern även i Finland? För forskning inom detta område erbjuder Finland ytterligare en intressant infallsvinkel. Cirka fem procent av befolkningen har svenska som modersmål, och till skillnad från de flesta etniska minoriteter är de svenskspråkiga finländarna inte marginaliserade. I stället har de en i stort sett jämförbar ställning med den finskspråkiga majoritetsbefolkningen, men uppvisar ändå fördelaktiga utfall för alla tre indikatorerna, dvs. sjukdagpenning, sjukpension och dödlighet. De två sista forskningsfrågorna handlar om huruvida de observerbara etnolingvistiska skillnaderna som finns för varje hälsoutfall även står att finna i övergången från en indikator på ohälsa till en indikator på svårare ohälsa: 3) Finns det etnolingvistiska skillnader i sambandet mellan sjukdagpenning och förtidspension? och 4) Finns det etnolingvistiska skillnader i sambandet mellan sjukpension och dödlighet under de första åren av pensionering?

De fyra forskningsfrågorna besvaras genom att använda data från det finländska befolkningsregistret och omfattar fem procent av den finskspråkiga befolkningen samt 20 procent av den svenskspråkiga befolkningen under åren 1987–2011. Risken för att bli sjukpensionär i åldrarna 16–60 analyseras enligt tidigare sjukdagpenningsmottagande för åren 1989–2010. Mortalitetsrisken i åldrarna 65–70 analyseras enligt arbetsmarknadsstatus i åldrarna 50–64 för åren 1987–2011. Analysmetoden för alla fyra forskningsfrågor är Survival Analysis.

Resultaten visar att risken för att bli sjukpensionär är starkt beroende av tidigare sjukdagpenningsmottagande och att sambandet är fortsatt starkt även efter två decennier. Längden på sjukdagpenningsmottagandet är en viktig faktor de första tio åren, eftersom de som fått sjukdagpenning längre än två månader löper en mycket högre risk än de som fått sjukdagpenning under en kortare tid. Efter cirka tio år utjämnas risken för båda grupperna. Risken är i stort sett densamma för finsk- och svenskspråkiga finländare, samt för män och kvinnor. När det gäller sambandet mellan arbetsmarknadsstatus och dödlighet under de första åren av pensioneringen är tidigare sjukpensionärer de enda

som visar en högre mortalitetsrisk. Sambandet är detsamma för finsk- och svenskspråkiga finländare, samt för män och kvinnor.

Sammanfattningsvis finns det stor variation över tid när det gäller sambandet mellan sjukdagpenning och sjukpension, och den väletablerade gradienten enligt sjukdagpenningsmottagandets längd försvagas över tid. Sjukpension är kopplad till en ökad dödlighetsrisk, och situationen i Finland liknar den som finns i andra västländer. Frånvaron av etnolingvistiska skillnader gällande båda ovan diskuterade undersökta samband, trots markanta skillnader i att befinna sig i någondera situationen, visar att språkgruppernas olika risker för ohälsa sannolikt är relaterade till den kultur som är förknippad med att tala respektive språk, och att det finländska välfärdssystemet gör ett adekvat jobb för att utjämna de negativa utfallen när ohälsa har börjat.

Nyckelord: sjukdagpenning, sjukpension, mortalitet, pensionsövergång, dödlighet efter pensionering, överlevnadsanalys, registerdata, Finland, svenskspråkiga finländare, språkgruppsskillnader

List of articles

Article 1:

Klein, J., Reini, K., Saarela, J. (2021): Sickness absence and disability pension in the very long term: a Finnish register-based study with 20 years of follow-up. Frontiers in Public Health. 9. 556648. DOI: https://doi.org/10.3389/fpubh.2021.556648

Article 2:

Klein, J., Saarela, J. (2019): Labour market status at ages 50–64 and all-cause mortality at ages 65-70: A longitudinal study from Finland. Finnish Yearbook of Population Research. 53. 51-73. DOI: https://doi.org/10.23979/fypr.70216

Article 3:

Klein, J., Reini, K., Saarela, J. (manuscript): Effects of sickness absence on disability pension in two ethnolinguistic groups: register-based evidence from Finland.

Article 4:

Klein, J., Saarela, J. (2019): Disability retirement and all-cause mortality in ages 65–70: A comparison of Finnish speakers and Swedish speakers in Finland. Finnish Journal of Social Research. 12. 38–54. DOI: https://doi.org/10.51815/fjsr.110787

Abbreviations used

DP	disability pension
HR	hazard ratio
KELA	Social Insurance Institution of Finland
PY	person years
SA	sickness allowance
SES	socioeconomic status

Table of contents

List of tables and figures

1. Introduction

1.1. Background

Disability pension (DP) is a pillar of the modern welfare state. Its aim is to maintain the welfare of working-aged adults whose health prevents them from participating in the labour market permanently or in the long term. DP is costly to society because, even though it is not by default a permanent state, returning to being active in the labour market is a rare event (Laaksonen & Gould, 2015; Saarela & Finnäs, 2002a). In an international comparison, Finland has a quite strict policy with about 20 percent of DP applications being rejected (Hytti, 2006) and the proportion of rejections rising in recent years (Perhoniemi, et al., 2020). Although the share of disability pensioners has decreased from ten to below seven percent of the population aged 25–64 in recent years (Finnish Institute for Health and Welfare, 2020), a sizeable share of the working-aged Finnish population is deemed to be permanently unfit to work.

The demographic trends in the past decades, involving increased longevity paired with low fertility, have led to a situation in which the number of working-aged persons is dwindling, while the number of old-age pensioners is rising (Sanderson & Scherbov, 2010). It is important to enhance the knowledge of determinants for DP, since it is one of the major factors of removing working-aged people from the pool of economically active persons. For that reason, the risk for DP has been researched from a variety of perspectives and considered a multitude of predictors. One of the main risk factors for future DP receipt is sickness allowance (SA). While DP in Finland is not conditional on previous SA receipt, the majority of DP recipients did receive SA at some point during the preceding ten years (Laaksonen, et al., 2016), and even short periods of SA receipt are associated with a heightened risk for DP (Salonen, et al., 2018).

The risk for DP, conditional on previous SA receipt, differs not only according to social, economic, and demographic characteristics but also by medical diagnosis. The diagnosis for the initial SA has a considerable impact on the subsequent DP risk (Kivimäki, et al., 2007), differing between the sexes and over the life course (Karlsson, et al., 2008). Differences between occupational classes have been explored and whether the impact of the diagnostic category for SA is the same in all occupational classes (Salonen, et al., 2018). The concordance of SA with DP diagnosis has been researched (Alexanderson, et al., 2005) and whether natives differ from foreign-born residents in this respect (Borg, et al., 2004).

Despite the already abundant research, two crucial aspects regarding the association of SA and DP are as of yet unknown. This thesis seeks to fill in these gaps. Broadly speaking, the aspect of time has hitherto been considered insufficiently in two different ways. Firstly, the long-term association of SA with DP receipt has not yet been widely analysed, since most studies have a time frame of ten years or less. Secondly, studies tend to examine the time under risk for DP in one single interval. Therefore, it is not known whether and how the risk

for DP may change as time following the first observed SA receipt passes. Although it appears that the risk for DP somewhat diminishes as time since SA receipt increases (Karlsson, et al., 2008; Kivimäki, et al., 2007), this has been researched by comparing two intervals of time under risk spanning five years each. To my knowledge, it has so far not been analysed 1) whether and how the DP risk changes on a year-by-year basis and 2) whether SA remains a significant risk factor over the course of two decades.

Shifting the focus from DP being the outcome to being the determinant, DP receipt is a major risk factor for a heightened mortality risk. The mortality risk of working-aged DP recipients is well-researched. Disability pensioners of all ages have a higher mortality risk, and this excess mortality is especially pronounced among young DP recipients (Wallmann, et al., 2006). It is known that DP mortality is negatively related to socioeconomic status (SES), particularly among blue-collar workers (Polvinen, et al., 2015). Those who receive full DP face a higher mortality risk compared to those on partial DP (Karlsson, et al., 2007). In terms of time trends, the overall excess mortality appears to be somewhat decreasing in more recent years (Björkenstam, et al., 2014).

Among the working-aged population, death is a rare event with over 90 percent of women and almost 90 percent of men reaching age 65 (Statistics Finland, 2020a). That means most DP recipients eventually reach retirement age. It is known that the negative impact of DP even reaches into older ages, i.e. it affects retirement mortality[1] as well. Comparing the mortality during retirement, (previous) disability pensioners are found to have higher mortality than all other (early) pension types (Brockmann, et al., 2009; Kalwij, et al., 2013). Nevertheless, few studies explicitly examine this relationship.

On the other hand, there is a huge body of research concerned with the relationship between health and retirement. Indeed, this question has been discussed for the past 70 years, often with the assumption that retirement would affect health for the worse. Even though little evidence for a negative impact of retirement has been found, a clear link between retirement and disability (pension) could already be established decades ago (see Minkler (1981) for an overview). The selective dropout of less healthy workers from the labour market into retirement in Finland was found as early as the 1960s–70s (Vinni & Hakama, 1980). Since then, the quality and quantity of data, as well as the methods of analysis, have improved greatly, yet the question of whether health/survival may be affected negatively by retirement is still being discussed. It appears that the relationship between health and retirement works in both directions, pushing unhealthy individuals out of the labour market (Oksanen & Virtanen, 2012), but also improving the health of those who transitioned into retirement (Coe & Zamarro, 2011; Hessel, 2016).

Also in Finland, the association of retirement and health is discussed frequently. The labour market attachment of Finnish women is and has been stronger than in most other countries, which results in both sexes having overall

[1] The terms "retirement mortality" and "mortality in ages 65+" are used interchangeably in this thesis.

similar trajectories into retirement (Riekhoff & Järnefelt, 2017). Poor self-rated health is a strong and reliable predictor of early retirement (Ilmakunnas & Ilmakunnas, 2018; Karpansalo, et al., 2004). But retirement is also linked to improved mental health, both among those who retire at the statutory age as well as those who retire before that (Oksanen, et al., 2011). Finns at age 50 spend an increasing amount of their remaining life expectancy working instead of being economically inactive (Leinonen, et al., 2018a). This might have somewhat weakened the relationship of poor health leading to retirement in recent years since the introduction of the flexible retirement window in 2005 (Leinonen, et al., 2016).

Despite the broad body of literature on the relationship of health and retirement, the number of studies concerning factors which influence mortality during retirement is smaller (see Brown and McDaid (2013) for an overview). It is known that DP and (early) retirement are linked to pre-existing poor health and that DP is linked to generally raised mortality levels, but how these associations translate into retirement mortality is less well researched. Studies concerning the association of retirement mortality with the broad spectrum of labour market status in late working life are few and none of them have analysed the situation in Finland. This thesis seeks to fill this gap by relating the most common labour market statuses in late working life with mortality past the statutory retirement age. By doing so, this thesis seeks to explore whether Finland is similar to other European countries. In particular, this thesis is concerned with the issue of whether and how the relationship between labour market status and retirement mortality changes as statutory retirement age approaches, by not only examining the relationship close to retirement age, but also considering a sufficiently long time prior to that.

Even though association between SA and DP, as well as DP and mortality, has been widely explored, there have not been any large-scale studies concerning population subgroups other than those defined by socioeconomic, demographic, labour market, or medical criteria. One avenue that has yet to be examined is how ethnic and other minority groups fare. Generally speaking, minority groups tend to be in a worse socioeconomic and health situation compared to the majority population. One aspect of that phenomenon is that minorities in Western countries often have a recent migration background (Blom, et al., 2016). Mental wellbeing has been found to especially decrease among migrants, which can be caused by low integration within the receiving society (Hjellset & Ihlebæk, 2019) and a general lack of social support (du Plooy, et al., 2019). Those who move from a low- to a high income-country may experience a downturn in their SES which, in turn, is linked to decreased mental health (Das-Munshi, et al., 2012; Espinoza-Castro, et al., 2019). This downturn in wellbeing is not present among those who migrate from one high-income to another high-income country (Sand & Gruber, 2018), and neither does this particular group of migrants forego participation in preventive screening opportunities (Reynolds & Childers, 2019). Despite the absence of a migration background, also native ethnic minorities

often show worse health outcomes. The Roma population in Europe has both a lower socioeconomic position and a worse overall health position (Babinska, et al., 2013), while simultaneously displaying more unfavourable health behaviour, such as a higher smoking prevalence (Usera-Clavero, et al., 2019). Likewise, the indigenous populations of Australia, Canada, New Zealand, and the United States are in a disadvantaged health situation, which is characterized by higher cancer mortality (Moore, et al., 2015), likely due to lower participation in preventive screening, which in turn leads to cancers being detected in later stages (Vasilevska, et al., 2012). Furthermore, whether native or migrant, most minorities experience perceived discrimination. This has been shown to be linked to an overall worsened state of health (Paradies, et al., 2015), an increase in pain sensitivity (Bakhshaie, et al., 2019), and negative mental health outcomes (Hong, 2019; Kwon & Han, 2019), even though the perceived discrimination might be caused merely by communication barriers between physician and patient (Boutziona, et al., 2020).

In light of these findings, the absence of large-scale studies exploring differences between ethnic groups in the research concerning DP is not surprising, since the result would likely be a higher risk for DP due to the variety of unfavourable factors described above. However, Finland offers an interesting case. Not only does it have a population register which can be used for scientific purposes, it also has two population groups, both of whom are native and none of which is in a marginalized position. Both population groups can easily be distinguished by an indicator recording each individual's unique mother tongue in the official data. The Finnish-speaking majority and Swedish-speaking minority have equal constitutional rights and are equally well integrated into society. Despite their overall comparable position in society, there are observable health differences between the two groups, and they usually favour the Swedish-speaking minority. Among these differences are lower rates of SA and DP receipt (Reini & Saarela, 2017), as well as lower age-specific mortality rates in adult and older ages (Koskinen & Martelin, 2003; Saarela & Finnäs, 2006a). The two population groups are equally integrated into the same society and can, thus, be roughly viewed as providing a quasi-experimental situation. This leads to the unique possibility of not only being able to explore the associations between SA and DP and between DP and retirement mortality in detail, but also to explore the potential impact of unobservable factors beyond the scope of standard variables of SES.

1.2. Purpose and research questions

Both the negative impact of SA on DP as well as the impact of DP on working-age and retirement mortality are well-studied.

The literature concerning the association of SA and DP is mostly based on Nordic countries. Within this body of literature, studies concerning the DP risk of the whole population are less common (see Helgadóttir et al. (2019) and Kivimäki et al. (2007) for Sweden, or Salonen et al. (2018) for Finland), and none of those has a follow-up time exceeding ten years. Very few studies cover a time

frame longer than that, but these are based on small or highly selective samples. Alexanderson et al. (2005) and Borg et al. (2004) follow a sample of 213 Swedish residents for 11 years. To my knowledge, there are only two large-scale studies determining the risk for DP conditional on SA in the very long run. Wallmann et al. (2009) cover a time span of 16 years, but they use a rather small sample of only approximately 8,200 survey respondents. The study with the longest follow-up covers a period of 18 years in total and is based on all employees of the France's national gas and electric company whose employees hold a civil servant-like status and have good opportunities for career advancement within that company (Alexanderson, et al., 2012). The common feature of *all* previous studies is that they sum up the time under risk or, if variation over time is accounted for, bundle up the 10-year risk into two units spanning five years each (Karlsson, et al., 2008; Kivimäki, et al., 2007).

The gaps within research concerning the association of SA and DP are, thus, not in the big picture but rather in the details. Studies covering a time span of more than a decade are few, and all of the previous studies have combined the total time under risk as one interval or separated the time under risk for DP in few intervals spanning several years each. Thus far, no study has explored the risk for DP dependent on previous SA receipt over a course of two decades, and neither has the risk for DP been analysed on a year-by-year basis in order to investigate whether the risk changes as time since SA receipt increases. Therefore, the first research question to investigate in this thesis is:

1. *How does the risk for receiving DP, dependent on previous SA receipt, change on a year-to-year basis over the course of two decades among the working-aged population in Finland?*

The negative impact of DP receipt on survival is extensively studied as well. Among the working-aged population, research is strongly based on data from Nordic countries (see e.g. Björkenstam et al. (2014) for Sweden, Gjesdal et al. (2008) for Norway, or Polvinen et al. (2015) for Finland). Mortality in the retirement ages is studied in terms of survival dependent on retirement age or timing of retirement and based on a variety of data sources from across the Western World (see the effect of changes in retirement rules in Norwegian register data in Hernaes et al. (2013) or Rogne and Syse (2018), in Austrian register data in Kuhn et al. (2010), in the data of the Swedish army in Hallberg et al. (2014), or in panel survey data from in the USA in Coe and Lindeboom (2008)). The body of literature on mortality during retirement according to previous labour market status, with DP being one among others, is smaller. The data are based mainly in mainland Europe and utilize a variety of sources, such as population registers (see Kalwij et al. (2013) for the Netherlands or Quaade et al. (2002) for Denmark) or quasi-registers (see Kühntopf and Tivig (2012) using data from the public pension fund, or Brockmann et al. (2009) using data from one large health insurance provider, both for Germany). To my knowledge, the situation in Finland has so far not been mapped out in terms of how different labour market statuses relate to mortality during retirement, and neither is it

clear whether the negative association with DP might become diluted once other (early) retirement schemes become available. Hence, the second research question is:

2. *How do the most common labour market statuses in Finland in ages 50–64 relate to the mortality risk in ages 65–70? Analysing the labour market status on an age-to-age basis, the three following sub-questions are asked:*
   a) *Does the negative association with DP diminish once other routes of labour market exit routes become available?*
   b) *Are the associations between labour market status and mortality changing as retirement age approaches?*
   c) *Are the associations similar to the ones found in other European countries?*

To generalize, both associations, SA with DP and late working-age labour market status with retirement mortality, describe the risk for being in a state of severe ill health[2] dependent on a state of less severe ill health. The risk for ill health is not uniformly distributed within the population, and literature has identified reliable indicators for stratifying the risk within one population. These indicators usually stratify population by socioeconomic, demographic, or employment characteristics, as well as medical diagnoses. Subgroups defined by other criteria, such as ethnic affiliation, are usually missing in the European literature, but they are routinely included in studies from the United States (see e.g. ethnicity and health in LaVeist and Isaac (2013), ethnicity, SA receipt, and work absence due to influenza in Piper et al. (2017), ethnicity and disability trajectories in Warner and Brown (2011), or ethnic differences in mortality among the elderly population in Hummer et al. (2004)). However, the situation of black, Hispanic, or Asian minorities in the USA is hardly comparable to the situation in Finland because these minorities consist of both recent migrants and those who have been born and raised in the United States. Additionally, the orientation of the welfare state and, correspondingly, the coverage of the social security system are very different in the two countries. Focussing on only native minorities, both in the USA and Europe, the situation is somewhat comparable since these minorities tend to be in a marginalized situation in both regions. But at the same time, it provides no point of comparison for the Finnish case either, as the Swedish-speaking minority is not in a disadvantaged position. Literature on ethnic differences in transitioning into ill health from other European countries with more than one official language would provide a more suitable point of comparison. Yet, to my knowledge, no research in the two domains discussed above has been conducted in Belgium with its Dutch and French speaking population, Switzerland with its German, French, and Italian speaking population groups, or Italy with its German-speaking minority. Hence, the comparison of the Finnish-speaking majority with the Swedish-speaking minority cannot be related to international literature. At the same time, the situation within Finland has so far only been mapped out for each indicator of ill

[2] Death is viewed as an indicator for the ultimate ill health.

health separately, and the Swedish-speaking minority shows more favourable outcomes for all three indicators, i.e. SA, DP, and mortality. Therefore, the third and fourth research questions seek to answer whether the health advantage among the Swedish-speaking population also applies when it is conditional on another, but less severe health indicator of ill health:

3. *Are there ethnolinguistic differences in the risk of receiving DP according to previous SA receipt?*
4. *Are there ethnolinguistic differences in the mortality risk according to previous labour market status?*

The four research questions raised in this chapter will be investigated in this thesis by using large-scale and high-quality register-based samples. These data cover a period of 25 years, during which persons living in Finland can be followed. Since the number of Swedish speakers in Finland is fairly small, persons registered with Swedish as their mother tongue are oversampled.

1.3. Structure of the thesis

This dissertation consists of this introductory chapter (kappa) and four articles. The kappa discusses the four research questions raised in chapter 1.2 in the following manner: Chapter 2 presents the legal framework for SA, DP, and other retirement schemes in Finland. This is followed by a more detailed overview of the previous research concerning the association of SA and DP, DP and mortality in general, as well as a discussion how DP and other labour market statuses in late working life may be related to mortality during retirement in chapter 3. Chapter 4 presents the Finnish- and Swedish-speaking population in Finland as ethnolinguistic groups, observable differences between them in all areas of life, possible mechanisms behind these differences, as well as how these differences may interact with the progression from one state of ill health to a state of more severe state. In Chapter 5, the data and methods of all four articles are presented, and Chapter 6 provides a short summary of the findings of each article. Chapter 7 discusses the conclusions which can be drawn regarding the four research questions, according to the results of the articles and previous findings. Finally, Chapter 8 provides concluding remarks in terms of policy implications, strengths and limitations, as well as an outlook on future research. The kappa is followed by the four articles this thesis is based on.

The four research questions are analysed in four articles. Article 1 is titled "Sickness absence and disability pension in the very long term: a Finnish register-based study with 20 years of follow-up". It analyses the risk of receiving DP and compares those who have not (yet) received SA with those who have received SA up to twenty years earlier. Article 2 is titled "Labour market status at ages 50–64 and all-cause mortality at ages 65–70: A longitudinal study from Finland". It analyses the association of the most common labour market statuses in late working life with mortality shortly thereafter for the whole of Finland. Article 3 bears the title "Effects of sickness absence on disability pension in two ethnolinguistic groups: register-based evidence from Finland". It analyses the

same association as Article 1, i.e. the risk for DP conditional on previous SA receipt, but additionally divides the data set by ethnolinguistic affiliation. Article 4 is titled "Disability Retirement and All-cause Mortality in Ages 65–70: A Comparison of Finnish speakers and Swedish speakers in Finland". It analyses the same association as Article 2, i.e. mortality in ages 65–70 conditional on labour market status in ages 50–64, but additionally accounts for potential ethnolinguistic differences and uses fewer labour market statuses. A more detailed overview of the four articles is provided in Table 1.

All articles are based on the same data and observation period. The central scheme of all four articles is DP. Articles 1 and 3 analyse DP as an outcome, with SA being the predictor, among the working-aged population. Article 1 analyses the situation in the whole of Finland on a year-by-year basis, whereas Article 3 analyses and explicitly compares the risk of the Finnish-speaking population with that of the Swedish-speaking population. Articles 2 and 4 analyse how labour market status in late working life and mortality during retirement are related, with a special focus on DP and its negative association with mortality. Article 2 analyses the situation in the whole of Finland, while Article 4 additionally considers ethnolinguistic affiliation. The four articles overlap in the two following ways: Articles 1 and 3 examine the same association and so do Articles 2 and 4. Articles 1 and 2 both have a national perspective, i.e. the situation in the whole of Finland is scrutinized, whereas Articles 3 and 4 both have an ethnolinguistic perspective, i.e. differences between Finnish and Swedish speakers are explicitly studied. Figure 1 shows schematically how the four articles are interrelated.

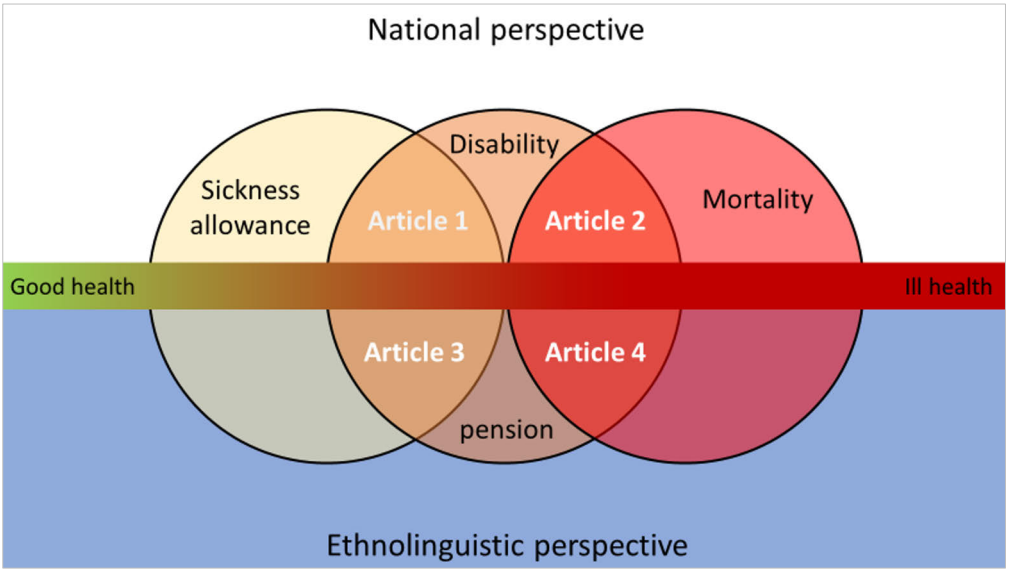

Figure 1. *Schematic presentation of the interrelation between Articles 1, 2, 3, and 4.*

Table 1. *Overview of the content of Articles 1, 2, 3, and 4.*

	Title	Aim	Data Method Risk	Focus Study population	Main results
Article 1	Sickness absence and disability pension in the very long term: a Finnish register-based study with 20 years of follow-up.	To study the risk for DP receipt dependent on previous SA receipt over the course of two decades on a year-by-year basis	Register data Survival Analysis Receiving DP in ages 16–60	Finland Finnish population	The risk for DP is high in the first year after SA receipt but remains considerably raised and rather stable for 20 years to come.
Article 2	Labour market status at ages 50–64 and all-cause mortality at ages 65–70: A longitudinal study from Finland	To study the association of labour market status in the late working ages with mortality in ages 65–70	Register data Survival Analysis Death in ages 65–70	Finland Finnish population	When SES is controlled for, only DP recipients have a heightened mortality risk. The risk rises the closer to age 65 DP was observed.
Article 3	Effects of sickness absence on disability pension in two ethnolinguistic groups: register-based evidence from Finland	To study whether the risk for DP receipt differs between the Finnish- and Swedish-speaking population, dependent on previous SA receipt over the course of 15 years on a year-by-year basis	Register data Survival Analysis Receiving DP in ages 16–60	Ethnolinguistic differences Finnish- vs. Swedish-speaking population	There are no ethnolinguistic differences in the risk of becoming disability pensioner conditional on previous SA receipt.
Article 4	Disability Retirement and All-cause Mortality in Ages 65–70: A Comparison of Finnish speakers and Swedish speakers in Finland	To study whether the association of DP in the late working ages with mortality in ages 65–70 differs between the Finnish- and Swedish-speaking population	Register data Survival Analysis Death in ages 65–70	Ethnolinguistic differences Finnish- vs. Swedish-speaking population	There are no ethnolinguistic differences in the heightened mortality risk of previous disability pensioners.

2. The Finnish framework for sickness allowance, disability pension, and other retirement schemes

This chapter gives a brief overview of the legal framework for SA, DP, and other retirement schemes in Finland. Even though other retirement schemes are not the primary focus of this thesis, their discussion is necessary as they have the potential to act as competing risks to DP in the late working ages. The presentation of the retirement schemes in this chapter encompasses eligibility criteria, an overview of the changes which have occurred over time, as well as a rough account of the numbers of persons in each state.

2.1. Sickness allowance

SA in Finland encompasses all permanent residents of the country who are insured in the Social Insurance Institution of Finland (KELA). The coverage of population groups eligible for SA is comprehensive and includes employees, self-employed persons, full-time students, and the unemployed in ages 16–67 whose health temporarily prevents them from participating in the labour market (Toivonen, 2012).

Statutory SA was first introduced in 1963. From the beginning, it contained earnings-related daily benefits and a minimum allowance for persons with income below a certain threshold. Since then, the legislation was reformed multiple times. During the 1970s, SA became somewhat of a flat rate benefit. A reform in 1982 laid the foundations for the system which is still in place today, with adjustments mainly concerning the replacement rates of the earnings-related benefit. SA is a taxable benefit with no upper limit to the amount paid out, but the replacement rates vary for different levels of income. When these thresholds were first introduced, the income replacement rates were 80, 50, and 30 percent after a waiting period of seven consecutive working days. As a reaction to the economic crisis in the 1990s, the replacement rate for the lowest income bracket was lowered first to 70 in 1992, then to 66 percent, and the waiting period extended to ten working days. In 1995, the replacement rate went up again to 70 percent. The same reform cut the minimum benefits for those without any or with low earnings and replaced it with a means-tested benefit. This was reversed in 2001 (Kangas, et al., 2013; Toivonen, 2012). The income thresholds are continuously adjusted to the cost-of-living index and, hence, change every year. As a rough approximation, the 70 percent replacement rate for the lowest income bracket is oriented towards the median income (Böckerman, et al., 2018). Since 2017, for the portion of yearly income which exceeds the threshold of about 30,000€, the replacement rate is 20 percent (KELA, 2020a). In order to increase the cooperation between individual, employer, and occupational health care services among long-term sick listed employees, the so-called “30-60-90 rule” was implemented in 2012: After 30 calendar days of sickness absence, the employer has to notify the occupational health care service provider regarding the prolonged sickness of their employee. Additionally, the physician issuing the sickness certificate has to include

suggestions on how alterations to the employee's working environment may increase the chances of successful return to work or what rehabilitation options might serve the same goal. Within 60 calendar days of sickness absence, the employer is to send request for compensation SA they have paid to the employee to KELA. In order for SA receipt to exceed 90 working days, KELA requires an assessment by an occupational physician about the remaining work ability (Halonen, et al., 2016; KELA, 2020a).

Today, KELA's SA is paid after a waiting period of ten consecutive working days, during which employers continue to pay wages, and requires a certificate of work inability issued by a physician (Toivonen, 2012). SA is paid for a maximum of 300 working days for the same illness within a period of two years. If work inability continues, DP may be applied for (KELA, 2020b).

In 2007, partial SA was introduced for full-time employees and self-employed people in ages 16–67 who were returning to work on a part time basis. When the benefit was first introduced, it was only available to those who had already received SA for at least 60 days. Partial SA could then be claimed for 12 to 72 working days in a two-year period. In 2010, the rules were relaxed, and eligibility for the benefit started right after the waiting period of ten working days. Since 2014, the benefit can be claimed for a minimum of 12 and a maximum of 120 working days within a two-year period, during which the employee cuts their working hours by 40 to 60 percent with a corresponding reduction in wages paid. In addition to the reduced wage, a person on part time sick leave receives 50 percent of the amount they would receive as full SA (Kausto, et al., 2010; KELA, 2020a). Partial SA is not widely used.

The overall prevalence of SA was as high as about 12 percent of persons of the same age in ages 16–67 in 1990 and dropped sharply after that. A rough average since then is about nine percent. The SA prevalence among men is about one percentage point below that average, among women it is about one percentage point above. The prevalence of part time sick leave has been steadily rising since its introduction, but even in 2019, KELA reports that only 7.7 percent of all SA recipients received this benefit (KELA, 2021).

2.2. Disability pension

DP is open to all permanent residents of Finland in ages 16–64 who are insured with KELA and have resided in the country for at least three years. DP can be applied for if an illness, injury, or defect prevents a person from earning a reasonable living (KELA, 2019a).

Although insurances against work-related injuries have been in place for certain groups of employees since the late 19th century (Hannikainen, 2013), DP encompassing the whole population was first put in place in 1962 (Hakola, 2000). DP may be granted if work ability is decreased by at least 60 percent and the impairment is expected to last for at least a year. Currently, the criteria for evaluation of work-inability are less stringent for people ages 60 and above, and blind or immobile persons may be entitled to DP even though they are working (KELA, 2019a). Work-inability is assessed in context of job requirements of the

current/previous job an applicant holds/held, as well as age, profession, education, place of residence, but also with regard to re-employment and rehabilitation possibilities (KELA, 2017).

DP can be granted indefinitely, until it is converted into old-age pension when reaching age 65, or as rehabilitation subsidy for a fixed period of time (temporary DP), which may be converted into permanent DP if work inability continues (KELA, 2017). However, very few DP recipients return to the labour market, as most temporary DPs are converted into permanent DP eventually (Laaksonen & Gould, 2015; Saarela & Finnäs, 2002a).

DP is paid either by KELA or by a pension provider via occupational pension schemes as an earnings-related DP. The eligibility rules for earnings-related DP are similar to the rules for KELA's DP. The benefit can be granted as full DP, when work ability is decreased by at least 60 percent, or as partial DP, when work disability is decreased by at least 40 but less than 60 percent (Finnish Centre for Pensions, 2020a). Partial DP has been available since the 1970s as a means to keep people with only partially decreased work ability active in the labour market. It was not widely used and has only increased again in importance after individual early pension was abolished (see below). Also among partial DP recipients, most temporary DPs are converted into permanent disability benefits eventually (Gould, et al., 2008).

Individual early pension was first introduced in 1986 and phased out during the 2005-reform of the pension system (Hietaniemi & Ritola, 2007). It was a means for permanent labour market withdrawal of older employees with a long work history whose work ability was impaired. Like DP, it was dependent on health-testing but with less strict criteria than those for DP. The earliest age at which individual early pension could be claimed was initially 55. In 1995, it was raised to 58, and from 2000, the earliest eligible age was 60. Due to the objectively deteriorated state of health of the recipients, it is often classified as DP. Numbers for individual early age pension are not easily obtained, as they are often included in the numbers for DP (Hakola, 2000).

The overall prevalence of DP has declined in the last two decades, from about ten percent of the total population aged 25–64 in the mid-90s to somewhat less than nine percent during the 2000s. It has been decreasing again since around 2010 and falls short of seven percent as of 2019. The prevalence among men used to slightly exceed that among women but has been identical since 2015 (Finnish Institute for Health and Welfare, 2020). The share of partial DP recipients among all DP recipients was as low as 4.8 percent in 1996 and has been rising slowly to 8.3 percent in 2007 (Gould, et al., 2008). Among newly granted DPs in the earnings-related scheme, the share of partial DP rose from 20 percent in 2012 to about 30 percent from 2016 onwards (Finnish Centre for Pensions, 2022a). Out of all new DP recipients, about nine out of ten people receive their benefit from the earnings-related DP scheme and just one in ten from KELA's national DP scheme. Among the earnings-related disability pensioners, currently about one third has it granted due to mental and behavioural disorders, another third due to issues of the musculoskeletal system

and connective tissue, and the last third due to other conditions (Finnish Centre for Pensions, 2020b). Among the ten percent of KELA's national DP scheme, i.e. persons with a weak working history, the overwhelming majority of reason for being granted DP is due to mental and behavioural disorders. Issues of the musculoskeletal system and connective tissue only account for a small share of the DP decisions, and the importance of all other conditions with about 15 percent is rather limited (Finnish Centre for Pensions, 2020b; 2020c).

2.3. Other retirement schemes

Retirement pathways are not the primary focus of this thesis. Nevertheless, the main pathways to retirement are also presented in brief to give a comprehensive overview of the Finnish retirement system. The importance of these pathways lies in their possibility of acting as competing risks to DP, i.e. different retirement schemes may select the least healthy individuals out of working life without them becoming disability pensioner.

The first old-age pension in Finland came into effect in 1937 when the national pension scheme was introduced. At the age of 65, people could retire and would receive a flat rate pension. The system was radically overhauled in 1957 (Hannikainen, 2013), but national pension is available until today as part of the social security provided by KELA. The term "national pension" is somewhat of an umbrella term, as it encompasses DP, certain types of old-age pensions, and a guarantee pension which provides a minimal income to older Finnish citizens and residents with zero or very low earnings-related pensions (KELA, 2019b).

The first earnings-related pension for large groups of the population came into effect in 1962 for employees of the private sector, with a retirement age of 65, and in 1964 for public employees, who had a somewhat lower retirement age. The rules for retirement in the public and private sector were harmonized during the 1990s (Hannikainen, 2013; Hietaniemi & Ritola, 2007). The pension system was completely overhauled in 2005, and many early retirement options were phased out (Hietaniemi & Ritola, 2007). This reform was further amended in 2017 with a further tightening of early retirement options and further harmonization of retirement regulations between the different economic sectors (Tikanmäki, et al., 2019).

Within the earnings-related old-age pension scheme, one of the main features of the 2005-reform was the abolishing of the fixed retirement age of 65 in favour of a flexible retirement window spanning ages 63–68. Additionally, early old-age pension could now be drawn from age 62 but resulted in a permanent 0.6 percent penalty for every month retired before reaching age 63. Retiring past the retirement window resulted in a permanent 0.4 percent reward for each month retired past age 68. Another important feature of the 2005-reform was a change in the calculation of the final pension benefit. Up to 2005, the target for old-age pension was an income replacement of about 50 percent of the last income prior to retirement, and the calculation of the pensionable wage as well as the accrual rates had been changing over the years. From 2005, the idea of a target

replacement rate was abandoned, and all wages ever earned were taken into account, with the accrual rates increasing for wages earned after the age of 52. Since 2010, the increasing longevity of the population is taken into account by employing a life expectancy coefficient. It slightly reduces the amount of pensions for new retirees of the birth cohorts 1948 and later (Hietaniemi & Ritola, 2007), in order to keep the capital value of old-age pensions similar to the mortality rates observed in the years 2003–07 (Tikanmäki, et al., 2019).

The 2017-reform took the continuing gains in life expectancy even further into account. The flexible retirement window remains in effect, but the age limits are rising for each later birth cohort. The lowest age at which a person born before 1955 can retirement without penalty currently is 63, and this age limit rises by three months per year of birth for those born 1955–64. For those born 1965 and after, a birth cohort-specific target retirement age is calculated in a manner that allows the ratio between the computational working life, i.e. the amount of time between age 18 and the target retirement age, and the remaining life expectancy at the target retirement age to remain the same. The upper age of the flexible retirement window is replaced with an age at which the pension obligation ends, i.e. an age after which no new pension benefits can be accrued. This age is 68 for those born up to 1957, 69 for the birth cohorts 1958–61, and 70 for everyone born after that. Pension benefits are accrued at a rate of 1.5 percent of the gross annual earnings for all wages earned from age 17 (or from age 18 for earnings from self-employment) to the age at which the pension obligation ends (Tikanmäki, et al., 2019).

Starting from the 1970s, early retirement options were put into place. In 1971, unemployment pension was introduced in order to enable elderly, long-term unemployed persons to leave the labour market permanently before transitioning into regular old-age pension at the age of 65. The lowest age for claiming unemployment pension was initially 60. It was subsequently lowered to 58 (1978–80) and 55 (1980–86), before it was raised again to 60 (Hakola, 2000). This pension scheme was phased out in the 2005-reform, in favour of amended unemployment rules (Hietaniemi & Ritola, 2007).

In 1986, the routes for exiting the labour market were extended by two further early retirement schemes: individual early retirement, which has been phased out in the 2005-reform (described in chapter 2.2), and early old-age pension, which is currently being phased out. The latter enables people to retire before reaching the minimum/target retirement age, but a permanent penalty of 0.4 percent per month retired early is applied. The age limit was first set to age 60, later age 62, then raised to age 63, and it is currently age 64 for persons born in 1958–61. It is entirely abolished for birth cohorts whose target retirement age exceeds age 65 (Finnish Centre for Pensions, 2022b; Hietaniemi & Ritola, 2007).

The last addition to the retirement pathways was part-time pension. It was introduced in 1987 for the private sector and in 1989 for the public sector. It was abolished at the end of 2017 and replaced with a partial old-age pension arrangement. In order to draw part-time pension, an employee had to reduce their full-time work by 30–70 percent, and the part-time pension payment

corresponded to half of the income lost due to reduced working hours. The lowest available age has varied over the years. When part-time pension was first introduced, the lowest age was 58 for the public sector and 60 for the private sector. In 1994, it was set to 58 for everyone, lowered to 56 in 1998, raised again to 58 in 2003, then to 60 in 2011, and finally set to 61 in 2013 (Takala & Väänänen, 2016). This benefit was phased out in the 2017-reform and replaced with the possibility of drawing partial old-age pension. The lower age limit for this new pension scheme is 62 for persons born up to 1964, while those born after can draw it starting from three years prior to their cohort-specific target retirement age. Partial early old-age pension can be taken out as 25 or 50 percent of the old-age pension accrued so far, with an additional permanent deduction of 0.4 percent per month retired before the target retirement age or a 0.4 percent permanent increase per month retired after the target retirement age (Tikanmäki, et al., 2019).

Among the age-related retirement schemes in Finland, only individual early retirement has a clear link to a decreased health status. It is therefore often classified as DP. However, it is also possible that other retirement options would have a health-related component which might act as competing risks to DP for older workers with impaired health. Unemployment is known to be cause and consequence of deteriorated health (Schmitz, 2011; Virtanen, et al., 2013), and re-employment becomes increasingly unlikely as age increases (Baumann, 2016; OECD, 2016). As unemployment pension was only open to unemployed persons, it would be possible that this group is also negatively health selected. Part time pensioners might have chosen this scheme with its reduced working hours due to emerging health problems. Indeed, almost 30 percent of part time pensioners cited health-related reasons as the main reason for reducing their work hours. Another 15 percent stated family-related reasons, e.g. the obligation to care for relatives (Takala & Väänänen, 2016) which may be detrimental to one's own health (Adelman, et al., 2014). This applies mainly to women. Additionally, reasons unrelated to health might apply to choosing this option, such as helping a company meet its staff reduction goals (Coe & Lindeboom, 2008). However, it is also possible that the reduced workload could lead to an improvement of emerging health problems.

The prevalence of employed persons is negatively related to age. While about 80 percent of Finns at age 50 are employed, this number drops drastically after age 55. The share of people still working at age 60 was lowest in the mid-1990s, at below 30 percent, and has been increasing since then, surpassing 50 percent in the mid-2000s. As of 2018, two thirds of 60-year-olds are still employed. Even the share of people still working by age 65 has been rising. Reflecting the legislative changes concerning the retirement age, until 2005, less than five percent were still economically active at age 65 after which the figures rise slightly. By 2018, about 15 percent of the population aged 65 are still working. The figures for men and women are very similar (Statistics Finland, 2020b).

3. Previous Research

This chapter presents an overview of previous research on the relationship between SA and DP, as well as the relationship between DP and mortality during adulthood and retirement. Both presentations highlight the main risk factors and end with a summary of what may be the expected outcome for each association regarding in Finland as a whole, i.e. concerning research questions 1 and 2.

The previous research concerning the association of SA and DP is based on studies from the Nordic countries, as most research on this topic is conducted in Scandinavia and Finland due to the need for high quality data which can almost only be provided by population registers. This has the additional benefit of largely comparable welfare systems between the countries. However, differences in the legislation do exist. E.g. DP is a regular early retirement route in Norway, in fact, it is the most common one (Hernaes, et al., 2013). Another example is Sweden where there is no explicit upper limit on the time SA can be received (Försäkringskassan, 2021; Hytti, 2006). These differences, however, are rather in the details, and as long as one keeps in mind that SA and DP are similar, yet not identical, indicators, the overall similarities allow for excellent cross-country comparisons between the Nordic countries.

On the other hand, the previous research concerning the association of DP and retirement mortality is based on studies from a broader geographical, mostly European, area and uses more diverse data sources. Therefore, the welfare system and rules for DP vary considerably between the countries in which studies have been conducted. However, this topic is not researched widely, especially not concerning the association of DP in the late working ages with mortality thereafter. Including only Nordic sources would not have yielded enough previous knowledge to build upon. The rules for DP, its prevalence among the working-aged population, and its association with ill health differ substantially between the European countries. Nevertheless, DP has clear link to decreased health across Western countries and is a reliable indicator for the prevalence of ill health (Börsch-Supan, et al., 2020). Therefore, while the effect size may vary between countries, the overall association and influencing factors can reliably be assumed to be valid in all of the included countries.

3.1. The association between sickness allowance and disability pension

SA is paid in case of temporary and short-term inability to work, and return to work is the expected outcome at the end of a sickness spell. This is, indeed, the case for the majority of SA recipients. Within three years of SA receipt, two thirds of Finns have been found to be working, but ten percent have become disability pensioners (Reini & Saarela, 2019). Extending the time frame to ten years, nine out of ten recipients were found to eventually return to employment in Norway, two thirds of them to stable full-time work, while one in ten receives DP (Madsen, 2020). From the perspective of SA recipients, return to work is the norm. However, about one in ten SA recipients eventually transitions into DP.

Shifting the perspective to DP recipients shows that the vast majority of them did receive at least some amount of SA at some point in the ten years prior to becoming disability pensioner. Even though the receipt of DP in Finland is not conditional on the receipt of SA, only three percent of disability pensioners did not receive any SA during the ten preceding years, and another six percent received very little SA during that time. By contrast, roughly 90 percent of new disability pensioners show a high number of SA days in the year prior to their DP decision. The group of DP recipients with few or no preceding SA days tends to be characterized by a fragmentary employment history, unemployment, and a higher frequency of musculoskeletal conditions (Laaksonen, et al., 2016).

Because DP is the outcome for a sizeable minority of SA recipients and most DP recipients did receive SA, SA receipt can be considered a major risk factor for future DP receipt. Among the employees of the French gas and electric company, those who had any sick leave are subject to a DP risk no less than twice as high as those who had none over the course of 17 years (Alexanderson, et al., 2012). The DP risk is highly dependent on the length of sickness absence (Helgadóttir, et al., 2019). In Sweden, the odds for receiving DP rises 16 percent per ten days of annual SA receipt (Wallmann, et al., 2009). In Finland, up to thirty days of SA receipt raises the DP hazard over the course of eight years by less than three times, whereas more than 180 days of SA receipt are associated with a hazard at least seven times as high as that of people who did not receive any SA (Salonen, et al., 2018). In Norway, the risk for DP was found to stabilize after having received SA for 280 days during a two-year period (Gjesdal & Bratberg, 2003). In Finland, the risk for full DP was found to be rising particularly after 150 days of SA receipt over a three-year period, whereas the risk for partial DP only rose notably when SA receipt exceeded 300 days (Kausto, et al., 2010). As time since SA receipt increases, the risk for DP appears to be decreasing. Kivimäki et al. (2007) find the hazard for DP within five years to be 4–9 times higher among SA recipients in Sweden, while the risk is only 3–5 times as high after six to ten years. However, Karlsson et al. (2008), who analyse a different data source from Sweden, find smaller risks and no such reduction over time.

There is a strong association between SA receipt and DP receipt net of all confounding variables, but socioeconomic and demographic variables do have a distinct modifying effect on this relationship. The strongest confounder is age. In Sweden, SA recipients below the age of 30 have a significantly lower risk of transitioning to DP than those aged 30–49 (Kivimäki, et al., 2007). Swedish SA recipients aged 50–59 have a more than ten times higher DP risk than those aged 16–29 (Karlsson, et al., 2008). The increase in the risk for DP was quantified by Wallmann et al. (2009) to more than double per ten years of age. A protective factor is high SES in the widest sense (Madsen, 2020), although its influence seems to weaken somewhat as time under risk for DP increases (Karlsson, et al., 2008). Among the aspects of SES, high education is a more specific protective factor (Wallmann, et al., 2009), with each additional year of education lowering the DP risk of SA recipients in Norway by about ten percent (Gjesdal & Bratberg, 2002). Also, having young children in the household has a protective effect

(Karlsson, et al., 2008), which amounts to a reduction in the odds for DP by 13 among Norwegian men and over 50 percent among women (Gjesdal & Bratberg, 2002). Job characteristics play an important role as well. While Swedish blue-collar workers have an overall higher risk for DP than white-collar workers, the DP risk following SA receipt within the same occupational class is smaller among blue-collar workers (Helgadóttir, et al., 2019). Using a more detailed classification, Salonen et al. (2018) find a gradient in the DP risk of Finns, ranging from those who work in upper non-manual jobs having the lowest risk to those outside of the labour market having the highest DP risk, although the differences are less pronounced among women. Lastly, sex is a variable which produces some differences in the impact of confounding variables, but its overall importance is rather small (Gjesdal & Bratberg, 2002).

One aspect of specific attention in the research concerning the relationship between SA and DP is the medical diagnosis for SA receipt, and how it relates to the risk for DP. In accordance with the diagnoses for being granted DP (see chapter 2.2.), studies find the most common diagnoses for SA receipt to be musculoskeletal disorders, mental disorders, and the group of "all other diagnoses". Most studies find that sick leave due to mental problems are associated with the highest DP risk. In Finland, Kausto et al. (2010) find a decreasing gradient from mental to musculoskeletal to all other diagnoses. In Sweden, Kivimäki et al. (2007) and Karlsson et al. (2008) find the same gradient. However, while Kivimäki et al. (2007) find the differences between the disease categories to decrease as time since SA increases, Karlsson et al. (2008) find the DP risk by SA diagnosis to be rather stable. In a French study, Alexanderson et al. (2012) find that sick leave on the grounds of mental problems is associated with the highest risks, but some other disease categories are associated with a higher risk for DP than musculoskeletal problems, while others had a lower risk. Another Swedish study finds the all-cause DP risk to be higher after SA due to problems of the musculoskeletal system than after SA receipt due to mental disorders (Helgadóttir, et al., 2019). The modifying effect of SA diagnosis appears to be related to age as well, because the frequency of SA diagnoses varies with age. Younger Swedes most often receive SA due to a mental diagnosis, whereas among older Swedes it is most often due to a musculoskeletal diagnosis (Karlsson, et al., 2008). Another modifying factor is sex. In both Sweden and Finland, most sick leave diagnoses are not related to the same risk for DP for men and women (Karlsson, et al., 2008; Kausto, et al., 2010). In Sweden and Norway, women have a higher incidence of sick leave due to problems of the musculoskeletal system than men and a higher subsequent risk for DP (Alexanderson, et al., 2005; Borg, et al., 2004; Gjesdal, et al., 2011). In Finland, women have a lower risk for DP due to all diagnostic groups for SA receipt (Salonen, et al., 2018). This holds true for both full and partial DP, the only exception are women who have a higher risk for full DP due to mental disorders (Kausto, et al., 2010). As shown above, research including medical diagnoses usually does so based on the diagnosis for SA receipt. But there appears to be a high overlap of diagnosis for the initial SA period and the eventual diagnosis for

DP, as among a small Swedish cohort of SA recipients due to musculoskeletal disorders, about three quarters were granted DP because of the same diagnosis (Alexanderson, et al., 2005).

In summary, even though most SA recipients do not become disability pensioners, the majority of DP recipients receives SA beforehand. Therefore, SA receipt can be considered a strong, independent risk factor for future DP receipt. Length of SA receipt is a main confounder, and it should be expected that even short periods of SA receipt are related to a marked increase in the risk for DP. The risk for DP is heavily moderated by SES, as well as age, but the sex differences are small. There seem to be some differences in prevalence of SA diagnoses and the effect size associated with them, however, when studying the association of all-cause SA and all-cause DP, the sex differences are smaller. It can be expected that SA receipt at least doubles the DP risk, but especially long periods of SA receipt may raise the DP several times more. The risk for DP is likely to decrease as time since SA receipt increases.

Relating the findings as discussed in this chapter to research question 1 gives rise to the expectation that the risk for DP decreases as time since SA receipt increases, and that there are only small differences between the sexes.

3.2. The association between disability pension and mortality

Among the working-aged population, the receipt of DP is preceded by ill health. This is reflected by different indicators. Swedes with a bad self-rated health have a heightened risk for sickness absence and hospital admission but also for becoming disability pensioner, as well as dying (Halford, et al., 2012). Norwegian SA recipients face a higher mortality risk when they receive DP between these two events (Gjesdal, et al., 2009a). Using survey data of economically active Finns, Polvinen et al. (2013) find that health behaviour and self-rated health are equally effective predictors for DP as the number of days for which SA is received. A more objective measure of ill health is hospital admission. According to register data, both DP receipt and hospitalization are independently related to an at least doubled hazard of dying within the following six years, and both factors appear to have a multiplicative effect (Olsson, et al., 2018). All studies above find the effect sizes to be largely comparable for men and women.

Analysing the relationship between DP and mortality, Swedes in the ages 16–64 have a mortality hazard within 15 years which is 1.7 times higher than that of those who do not receive DP (Björkenstam, et al., 2014). Another Swedish study using, at baseline, the same age range finds the hazard for mortality over 12 years among full time DP recipients to be three times higher than that of non-recipients. The risk among part time disability pensioners is only twice as high (Karlsson, et al., 2007). Comparing the mortality risk over the course of six years among Swedes and Norwegians, aged 30–59 at baseline, reveals that DP receipt among the former is associated with a hazard of dying about three times that of non-recipients and about four among the latter (Gjesdal, et al., 2009b). Finnish disability pensioners of the same age die about five times as frequently

(Polvinen, et al., 2015). The effect size for men and women in these studies is roughly similar.

DP receipt is associated with a markedly raised mortality risk. Nevertheless, the mortality risk among DP recipients is not uniformly distributed. The risk for DP among the Finnish general population is inversely related to SES according to a wide variety of indicators, with the gradient being somewhat steeper among men than women (Leinonen, et al., 2012). The mortality risk among disability pensioners, on the other hand, is not as clear-cut inversely related to SES. Using a sample from the general Finnish population and measuring SES as social class via job characteristics, Polvinen et al. (2015) find that disability pensioners of all social classes have distinctly raised mortality rates, but the socioeconomic gradient is much weaker than among DP non-recipients, and even mildly reversed among women.

Another distinguishing factor is whether DP is granted as full or partial benefit. Karlsson et al. (2007) find the elevated mortality risk in the total population of one Swedish county to be to be substantially lower among partial DP recipients than full disability pensioners. The same study finds that the gradient is more pronounced the earlier in life DP was awarded. There are no sex differences in the overall mortality risk of DP recipients. However, female disability pensioners have lower age-specific mortality risks in younger ages, while male DP recipients have slightly higher age-specific mortality risks from age 35 onwards.

In addition to that, the survival of disability pensioners differs substantially by medical diagnosis according to which DP was granted. These diagnoses are usually divided into the following three categories: musculoskeletal disorders, mental disorders, and grouping together "all others". Among DP recipients in the Norwegian resident population, aged 30–59 in the 1990s, the distribution between these categories was about 30 percent, 30 percent, and 40 percent (Gjesdal, et al., 2008). These proportions differ quite substantially between the Nordic countries, but also over time within one country. Among the Swedish population, aged 16–64 whose DP was granted in 1995, musculoskeletal conditions account for about half of the decision, mental conditions for about 20 percent, and "all others" for 30 percent. Comparing this situation to 2005, the share of musculoskeletal decreased to about one third, while the share of mental conditions increased to about one third, leaving another third for all other conditions (Björkenstam, et al., 2014). A comparable shift is also observable in Finland from the 1980s to the 2000s (Polvinen, et al., 2016). As of 2019, the distribution of causes leading to DP is 25 percent musculoskeletal diseases, 40 percent mental disorders, and 35 percent all others (Finnish Centre for Pensions, 2020c).

Not only does the distribution of the underlying conditions for DP vary between the Nordic countries, but the associated mortality risk does as well. Gjesdal et al. (2009b) compare the general population, aged 30–64, in Norway and Sweden with the exact same DP diagnosis categories. They find substantial differences in the mortality risk associated with the same DP diagnosis between

the two countries, and that men and women in one country show more similar risks according to the same diagnosis than the same sex in both countries. By comparison, Finland seems to have much higher risks associated with each DP diagnosis and almost identical effects for men and women, according to register data (Polvinen, et al., 2015). Even though the distribution of underlying causes for DP and their association with mortality differ, the order of magnitude for the three main diagnostic groups is similar in the three Nordic countries. All studies presented above find the least negative, if any, association with mortality relating to DP due to musculoskeletal diseases, a substantially higher association with DP due to mental disorders, and while DP due to "all others" shows a greater variation, it generally relates to a higher risk than musculoskeletal diseases.

There are distinct sex differences in the frequency of DP diagnoses. Women have a higher prevalence of musculoskeletal diseases in Finland, Norway, and Sweden. When it comes to mental disorders, they have a lower prevalence in Norway and Sweden, whereas in Finland the opposite is the case (Björkenstam, et al., 2014; Finnish Centre for Pensions, 2020c; Gjesdal, et al., 2008; 2009b; Polvinen, et al., 2016). The frequency of diagnoses also differs between social classes, as measured by job characteristics. In Finland, DP due to musculoskeletal disorders is most frequent among manual workers, whereas DP due to mental disorders is most common among upper non-manual workers (Polvinen, et al., 2016). However, within each disease category, the mortality risk shows the inverse relationship with SES stated above (Polvinen, et al., 2015).

In summary, DP receipt is a strong predictor for mortality among the working-aged population. The survival of disability pensioners is positively related to SES and whether DP is granted as full or partial benefit. Additionally, there are considerable differences in the diagnostic groups due to which DP is granted, the prevalence between the sexes, between countries, over time within the same country, as well as in the mortality risk associated with the diagnostic groups. However, the association of all-cause DP with mortality is rather similar for men and women, especially once SES is controlled for. The mortality hazard among working-aged DP recipients compared to non-recipients was found to vary between 1.7 and five, and the risk in Finland appears to be somewhat higher than in Norway and Sweden.

3.3. The association between labour market status and mortality in the late ages of labour market participation

As discussed in the previous chapter, DP receipt is linked to decreased health and increased mortality throughout working life. The risk for both becoming disability pensioner as well as for mortality rises as age increases. The age-specific death risk among disability pensioners, however, decreases as the age at which DP is granted rises. Transitioning into DP in ages 45–54 is associated with 4.1 times higher mortality hazard in the following 18 years, compared to those who do not transition, while transitioning in ages 55–64 is associated with a 2.5 times higher risk among men, according to Swedish data stemming from several surveys with linked register data. The respective figures among women are 2.7

and 2.1 (Wallmann, et al., 2006). Using data from one entire Swedish country, the mortality risk associated with becoming disability pensioner, as well as the difference between full and partial DP recipients, diminishes as age increases. Among men, full DP granted between ages 55–64 is linked to a 2.4 time increase in the mortality risk, partial DP to 1.7 times risk increase when compared to those who do not receive DP. The respective figures among women are 2.3 and 1.8 (Karlsson, et al., 2007). Even though these studies focus on the working-aged population, the follow-up among persons in ages 50+ stretches into the ages of statutory retirement[3]. This shows that the negative association of DP and survival does not stop at retirement. On the contrary, (former) disability pensioners have distinctly raised mortality also during retirement, i.e. past age 65. That is illustrated by Hult et al. (2010) who find the hazard for mortality in ages 65–72 among former Swedish male construction workers to be significantly higher among those who have received DP before reaching age 65.

One possible reason for the decreasing mortality risk the later in life DP was granted might be that other routes for labour market withdrawal start opening up above age 50. One potential competing risk could be unemployment, as there is evidence for a negative health selection into unemployment (Virtanen, et al., 2013). But unemployment is also a risk factor for becoming disability retired in itself (Laaksonen & Blomgren, 2020). However, the relationship of health and unemployment is hard to disentangle in terms of cause and consequence, since unemployment may cause health to deteriorate (Herbig, et al., 2013), and both processes are likely to reinforce each other (Olesen, et al., 2013). A raised mortality risk among the unemployed, therefore, is no surprise (Martikainen & Valkonen, 1996). Although unemployment is not automatically a permanent state, the chances for re-employment are decreasing as age increases because labour market participants above age 50 tend to be perceived as increasingly unemployable. This is partially due to the existence of schemes for older unemployed persons to retire early and other early retirement schemes (Stypińska & Nikander, 2018). These schemes were originally put into place to relieve pressure from the labour market, but they are also exploited by companies to meet staff reducing goals (Coe & Lindeboom, 2008).

The existence and widespread use of early retirement schemes leads to the question of whether and how these are related to health and, ultimately, also survival. In the British ELSA-panel survey, Behncke (2012) finds evidence for retirement itself causing health to deteriorate, especially for developing a cardiovascular condition or cancer. Using data of men from the comparable HRS-panel survey from the USA, Coe and Lindeboom (2008) set up a quasi-experiment and analyse the causal effect of early retirement windows, which are time-limited offers employers may grant and have to be unrelated to the employee's health status. While they find a correlation of worsening health status and entering into retirement, they do not find evidence for retirement

[3] Although different countries have different statutory retirement ages, the statutory retirement age is usually 65 or an age close to it. Therefore, the term "statutory retirement age" and "age 65" are used somewhat interchangeably.

causing health to deteriorate. Hernaes et al. (2013) use a similar set up based on Norwegian register data. They analyse the effect of additional early retirement options, which were open only to some selective men and women, and arrive at a similar conclusion. In summary, there is a correlation between deteriorated health status and early retirement, but retirement does not appear to be causal for a deterioration of health.

One aspect in the association of retirement and health seems to be the voluntariness of the retirement decision. Kuhn et al. (2010) use Austrian register data of older blue-collar workers and compare mortality in regions which did and did not have an additional early retirement scheme in place for a short while. They find that early retirement was not related to an increase in mortality among men and women who retired early voluntarily. Involuntary early retirement among men, on the other hand, was related to a slight increase in the mortality risk, especially due to cardiovascular conditions, likely due an increase in unhealthy habits, especially smoking. Exploiting a time-limited, additional early-retirement scheme among male members of the Swedish military, Hallberg et al. (2014) find that voluntary early retirement is linked to decreased hospitalization and mortality, i.e. a health preserving effect. Using data from one large German health insurance fund, a quasi-register, Brockmann et al. (2009) find evidence for both a negative health selection into early retirement, but also for a health preserving effect of being retired.

As for the question of whether the age at retirement may be linked to survival, this does not appear to be the case. Rogne and Syse (2018) analyse the effect which the lowering of the retirement age by three years in 1973 had on Norwegian men. According to register data, they find that the legislative change had no effect on mortality. Exploiting newer legislative changes in Norway, Hernaes et al. (2013) find no evidence for mortality being affected in either direction by retirement age either, for neither men nor women. A similar pattern can be found among the employees of the Shell-company, namely that age at retirement is not related to mortality in ages 65+ (Tsai, et al., 2005). Using data from the German retirement fund, which is a de-facto population register, Kühntopf and Tivig (2012) find that both men and women who retire before age 60 have an at least two year lower remaining life expectancy at age 65 than those who retire in ages 60–65. However, Brockmann et al. (2009) additionally distinguish between the retirees' status as early old-age retirement and DP, and they find that survival following retirement is similar among Germans who retire on old-age pension before age 61 and those who in ages 61–65. On the other hand, retiring due to DP at any time past age 50 is related to lower survival rates (Brockmann, et al., 2009). Lastly, Israeli survey data linked to the death registry reveal that neither the status of being retired nor the age of retirement are related mortality, only the presence of an illness is (Litwin, 2007).

Combining the evidence presented above leads to the conclusion that retirement itself is not related to health and survival, but that it is the healthiest individuals who tend to stay active in the labour market until statutory retirement age instead (Carlsson, et al., 2012; Kühntopf & Tivig, 2012). This

'Healthy Worker Selection Effect' has been known for a long time (Minkler, 1981; Vinni & Hakama, 1980) and can, therefore, be assumed to be independent of the more widespread early-retirement options in place today.

Having considered the competing risk for health-impaired older labour market participants to leave the labour market on retirement schemes other than DP, the evidence for this actually happening is rather thin. At the same time, the evidence for DP being the primary exit route for persons with a decreased state of health also in the presence of other labour market exit options is plenty: Swedish construction workers who have survived until age 65 have a significantly lower survival when they have been receiving DP, especially if the onset of DP was before age 60 (Hult, et al., 2010). According to register data from the Netherlands, the mortality risk in ages 65+ according to labour market status before that shows that persons who were continuously employed have the same mortality risk as those who were unemployed or retired early. Solely previous disability pensioners have a raised mortality risk; each year of DP receipt from age 58 onwards increases the probability of dying by 27 percent among men and 12 percent among women (Kalwij, et al., 2013). Quaade et al. (2002) use data of the entire Danish birth cohorts 1926–36 to analyse mortality in ages 60–70 by labour market status. They find that previous DP recipients to have a mortality hazard 4.1 times higher than that of employed men and 3.6 times among women. Other labour market statuses show a much lower excess mortality in comparison to employed persons. Early retirement raised the hazard by around 60 percent for both men and women, while all others had a mortality hazard slightly lower than that.

In conclusion, DP in the late working ages remains related to an impaired health status which, in turn, is related to decreased survival during retirement. Although other non-employed labour market statuses are also slightly biased towards ill health, their association with raised mortality is much weaker. Therefore, even as statutory retirement age approaches and other means of labour market withdrawal become available, the main route for labour market exit among older persons with impaired health remains DP. Hence, it can be concluded that the relationship of labour market status and mortality does not stop at the statutory retirement age, but former labour market status continues to affect mortality even after age 65.

Relating the findings as discussed in this chapter to research question 2 gives rise to the expectation that those who remain employed longest have the lowest retirement mortality risk, while the mortality of DP recipients is distinctly higher. All labour market groups, which are neither employed nor DP, can be expected to have a retirement mortality risk slightly higher than that of employed persons, but lower than that of disability pensioners. Because of the similar labour market attachment of men and women in Finland, no major sex differences are expected.

4. The Finnish- and Swedish-speaking population as ethnolinguistic groups in Finland

Finland is situated in the north of Europe, between Sweden and the Baltic Sea to the west and Russia to the east. Historically, these superpowers have shaped the fate of the politically much weaker Finland until it gained independence in 1917. Today, about 300,000 Finns have Swedish as their mother tongue. They are equally well integrated into society and do not face discrimination or noteworthy degree of socioeconomic differences. Despite this, there are distinct differences in health favouring the Swedish-speaking minority. This chapter provides an overview of the current situation of the Swedish-speaking Finns, starting with a brief overview outlining key facts of the Finnish history, with a strong emphasis on the position of the Swedish-speaking population as a native ethnic minority. This is followed by a summary of differences in observable characteristics, especially in health, between the two ethnolinguistic groups, after which possible reasons behind these differences are discussed. Lastly, it will be discussed how these differences might be related to research questions 3 and 4, namely how the association between SA and DP, as well as DP and mortality, may differ between Finnish- and Swedish-speaking Finns.

4.1. The Swedish-speaking population as an ethnolinguistic minority

The settlement history of Finland has been subject to much speculation because no written records exist for the time before Finland became part of the Kingdom of Sweden in the 13th century (McRae, 1999). However, genetic evidence increasingly points towards continuous, yet sparse inhabitation since the end of the last ice age when Finland became ice-free about 12,000 years ago (Palo, et al., 2009; Sundell, et al., 2014). The first Swedish-speaking people appear to have arrived and settled along the Western and Southern shoreline in the 13th century, and the settlement area has been remarkably stable (Allardt & Starck, 1981; McRae, 1999).

Politically, Finland became part of Sweden in the 13th century, and the language of administration was, thus, Swedish. Finnish was mainly the language spoken by the lower classes, but its use was never actively suppressed. When Finland became part of Russia in 1809, Swedish remained the sole official language of the country, but the use of Finnish in official purposes slowly and gradually increased. Finland gained independence in 1917, and in the Constitution, both Finnish and Swedish were listed as equal official national languages (Allardt & Starck, 1981; McRae, 1999). The Constitution continues to guarantee equal rights for speakers of both languages, not only in an individual's right to use either Finnish or Swedish language when dealing with authorities but for all cultural and societal needs as factual equal treatment (Ministry of Justice, 2021). This includes, among others, education in Swedish language, ranging from primary to tertiary level, as well as a wide media landscape

encompassing Swedish language radio, television, and newspapers (Allardt & Starck, 1981; McRae, 1999; Moring & Husband, 2007).

Even though the Swedish-speaking minority has a strong group identity, it is not a typical sub-national minority whose strong inner-group loyalty is often opposed to the loyalty to their country, and which are often-times not that well integrated into society (see below). The Swedish-speaking Finns, while having a strong inner-group loyalty, do not perceive this as an opposition to a strong loyalty with the country as a whole and are equally well integrated into society as their Finnish-speaking compatriots (see chapter 4.2.). Although perceptions as "bättre folk", i.e. as higher class and better off, have been and are persistent, these are more a means of group identification from the Finnish-speaking side, as well as self-identification from the Swedish-speaking community, than based in reality (Heikkilä, 2011). Overall, the presence of Swedish speakers has never been perceived as hostile and part of a colonialization effort because in the national identity, Finland has always been an equal partner in the Kingdom of Sweden. Contacts between the language groups in geographically close areas appear to have been frequent for all of history, and there has never been a law or even norm against linguistically mixed marriages. In fact, for as long as data has been available, a noticeable share of Swedish-speakers has been married to a Finnish-speaking counterpart (Allardt & Starck, 1981; McRae, 1999). In the 1950s, one third of Swedish-speaking men and one fifth of Swedish-speaking women were married to a Finnish-speaking partner. Since then, this figure has risen to currently somewhat less than half of all Swedish-speakers having a Finnish-speaking live-in partner and one third having a Finnish-speaking spouse (Saarela, 2021).

The Swedish-speaking population has always been a numerical minority. The earliest number estimates their share to have been somewhat below twenty percent in 1610 (Allardt & Starck, 1981). Since then, the share has steadily been declining, from 12.9 percent in 1900 to 8.6 percent in 1950, 5.6 percent in 2000, and the latest figure in 2019 being 5.2 percent, or about 288,000 persons (Saarela, 2021). One of the reasons behind this continual decline was a somewhat lower fertility which, paired with a slightly lower mortality, led to a somewhat older age structure compared to the Finnish-speaking population. Additionally, the Swedish-speaking population had and still has a higher propensity to move abroad, first to North America, and, especially in the 1950s and 1960s, to the at that time higher developed Sweden. Another reason can be found in linguistically mixed marriages, the proportion of which continues to be higher among men, and in which it used to be the norm that children would learn the language of the mother as their primary language (Allardt & Starck, 1981; Finnäs, 1986; McRae, 1999; Saarela, 2021). The latter trend appears to have been broken, and for the last two decades, the number of children with Swedish as their registered mother tongue exceeds the number of Swedish-speaking mothers. In the last decade, Swedish-speaking women have had a slightly higher fertility than their Finnish-speaking counterparts, yet the slow downward trend in the number of Swedish-speaking Finns has not stopped (Saarela, 2021).

Historically, the Swedish-speaking population has consisted of two groups who, for the longest time, did not have a sense of commonality simply due to their common mother tongue. One group was the numerically very small but powerful elite. This group included the administrative class as well as nobility. It was highly influential and largely urban-based. The other, far more numerous, group were farmers. Both groups started to develop a sense of cohesion as a reaction to the awakening Finnish nationalism and the increasing status of the Finnish language in the later 19th century (Allardt & Starck, 1981; McRae, 1999). Since then, the group of people merely defined by a common mother tongue has formed and continues to have a strong inner-group cohesion which Allard and Starck (1981) classify as a resource-strong minority fulfilling all the criteria for an ethnic group: The group of Swedish-speaking Finns has a self-identification as "Finland-Swedish", there is a common ancestry, there are specific forms of culture (most notably: a common language), and a rather high degree of ethnic organisation. Since the main factor of distinction form the majority population is language, the Swedish speakers are classified as an ethnolinguistic minority. Even though their numbers are slowly declining, the Swedish-speaking community is viewed as possessing a high degree of ethnolinguistic vitality in terms of demography, institutional support, and status (Moring & Husband, 2007), and it is as such not in danger of extinction.

The area where the Swedish-speaking population has lived historically and continues to live to the present day is geographically concentrated on the Western and Southern shoreline of the country, with a very low share of persons living outside of these areas and very low internal migration (Finnäs, 1986; Saarela, 2006).

Every Finnish citizen has their unique mother tongue recorded in the population registry at birth. According to this indicator, Swedish-speaking Finns can readily be identified by their own mother tongue (Saarela, 2021). Therefore, every municipality has an exact overview of its inhabitants' language composition. In order to account for different numbers and percentages of languages, all municipalities are either mono- or bilingual, and the status is determined every ten years. The current legal requirements for a bilingual community are that either eight percent or 3,000 inhabitants speak the respectively other mother tongue (as recorded in the population registry). A bilingual municipality loses its status and becomes unilingual when the number of minority language inhabitants falls below the threshold of 3,000 persons and the proportion below six percent. A municipality not fulfilling these minimum requirements may voluntarily declare itself bilingual (Finlex, 2021; Saarela, 2021), which all of the mainland monolingual Swedish municipalities have done in recent years. Since 2016, the only municipalities which are monolingual Swedish are in the Åland region (Kommunförbundet, 2021). The linguistic situation effective 2016-22 is presented in Figure 2.

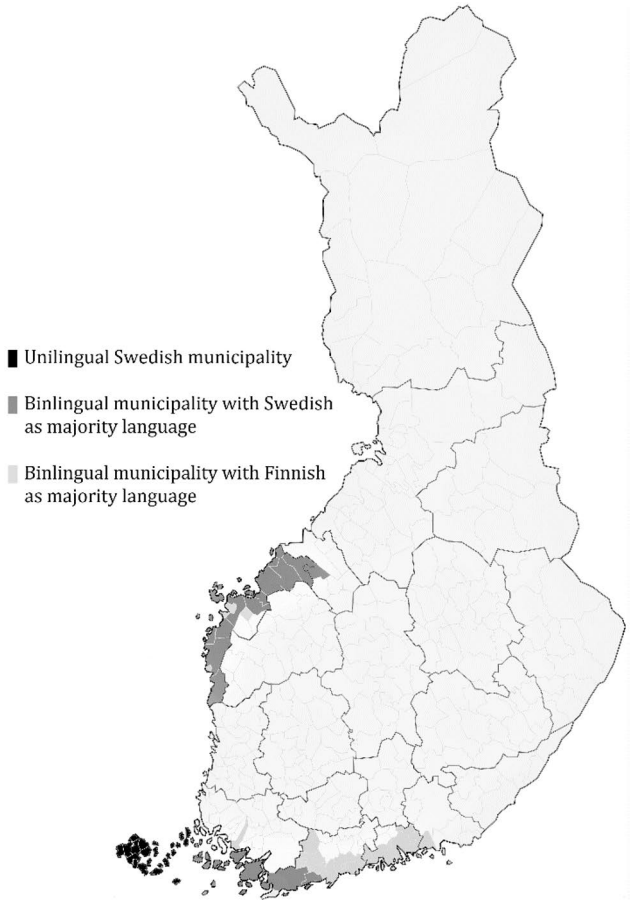

Figure 2. *Swedish speakers' main settlement area in Finland, according to current language status of municipalities.*
Source: (Wikimedia Commons, 2010; 2016).

4.2. Differences in health and other indicators between Finnish and Swedish speakers

The Finnish- and Swedish-speaking population are equal in the eyes of the law and are equally well integrated into society. Despite this, there are distinct differences in a variety of measurable outcomes, usually in favour of the Swedish-speaking population. This chapter aims at giving a comprehensive overview of these differences, starting with health, then turning to socioeconomic, and demographic indicators.

One of the most obvious differences between Finnish- and Swedish-speaking Finns is mortality. For as long as there has been data, the Swedish-speaking population has had lower mortality rates. The difference in life expectancy has been rather stable and amounts to about three years among men and one year among women (Saarela & Finnäs, 2006a). As of 2015, Finnish speaking men have a life expectancy of 79.1 years, Swedish-speaking men of 81.0 years. The

respective figures among women are 84.3 and 85.5 (Reini & Saarela, 2021). With the exception of infant mortality (Saarela & Finnäs, 2014a), Swedish speakers have lower mortality rates at any age. The difference is especially pronounced among adolescents and adults below age 50 among which a large percentage of all causes of deaths is due to unnatural causes, i.e. alcohol-related, accidents, and other external causes (Koskinen & Martelin, 2003; Saarela & Finnäs, 2008a; 2016; Sipilä & Martikainen, 2009). Among the population in ages 60+, the ethnolinguistic difference is less pronounced, yet it still amounts to a ten percent lower age-specific mortality risk on a national level (Saarela & Finnäs, 2006a). In ages 65+, the ethnolinguistic difference is most pronounced for causes of death related to ischaemic heart disease (Saarela & Finnäs, 2009b). All differences discussed above are more distinct among men than among women.

The mortality differential from ischaemic heart disease occurs late in the life course, but risk factors eventually leading to it start manifesting already earlier in the life course. Swedish speakers in the south of Finland fare slightly better for these risk factors, such as having lower body mass index, blood pressure, HDL cholesterol, and blood triglycerides (Lammintausta, et al., 2011), leading to a one fifths lower odds for a hypertension drug prescription (Suominen, et al., 2012). In the same vein, Swedish-speaking men in the city of Turku have a lower incidence of ischaemic stroke (Lammintausta, et al., 2009), as well as a lower incidence of myocardial attacks and mortality due to it (Lammintausta, et al., 2011).

The ethnolinguistic health differences also manifest in all-cause SA and all-cause DP, with the prevalence being lower for both indicators among the Swedish-speaking population. The risk for receiving SA is about 30 percent lower among men and 15 percent among women (Reini & Saarela, 2017). The respective figures for DP are 25 and 15 percent (Saarela & Finnäs, 2002a) and apply to all ages and diagnostic categories (Hyyppä & Mäki, 2001a). There appear to be differences in health among SA recipients, as Finnish speakers have a higher risk of not being employed later on. Three years after SA receipt, Finnish-speaking men have a 50 percent higher odds for being unemployed and a 20 percent higher odds for being in DP, whereas Finnish speaking women have a 30 percent higher odds for unemployment and the same risk for DP as Swedish-speaking women (Reini & Saarela, 2019).

The differences extend to labour market-related outcomes as well. There is a slightly higher share of Swedish speakers in employment (Saarela & Finnäs, 2003a; Saarela, 2021), and it has been quantified to amount to a two year longer working life in the areas of the bilingual areas on the West Coast (Hyyppä & Mäki, 2001a). As a result, the unemployment rate is lower among the Swedish-speaking population. As of 2018, unemployment is twice as prevalent among Finnish speakers: 4.3 percent among Swedish-speaking men and 8.7 percent among Finnish-speaking men in ages 30–54, and 3.6 and 6.7 percent among women respectively (Saarela, 2021). Even during the economic recession in the 1990s, the unemployment rate of Swedish speakers was lower (Saarela & Finnäs, 2003a). The reasons behind the lower recession unemployment have been found

in both personal and structural characteristics, such as differences in field of employment. While these factors account for some, they do not account for all of the difference (Saarela & Finnäs, 2002b; 2006b). In the Vaasa region, located on the West Coast, did Swedish speakers not only have a lower risk of becoming unemployed, they also had a higher risk of leaving unemployment, as well as shorter unemployment spells (Saarela & Finnäs, 2002b; 2003a).

In addition to health and labour market differences, there are also differences in SES. The Swedish-speaking population at all ages has slightly higher education (Saarela & Finnäs, 2003b; Saarela, 2021). This difference in education is the cause for a substantial part of the income advantage of almost one fifth which Swedish-speaking men in Helsinki enjoy, although there is no such difference among women (Saarela & Finnäs, 2004). When moving from the individual perspective to the perspective of couples, the income advantage increases to one quarter among unilingual Swedish-speaking couples residing in the Helsinki area. However, the differential is driven by the male income, since there are no ethnolinguistic differences between women (Härtull & Saarela, 2018). On the other side of the spectrum, Swedish-speaking couples also have a lower risk of facing income poverty, both with and without children (Härtull & Saarela, 2014; 2019). Even in a broader sense, the level of personal wealth is higher among the Swedish-speaking population. Where only about five percent of Finnish-speaking men had a net wealth exceeding 50.000 Euro during the 1990s, the share of Finnish-speaking men was twice as high. Among women, the difference was smaller and both ethnolinguistic groups had a level somewhat below that of Finnish-speaking men (Saarela, 2006).

The ethnolinguistic differences also extend into family life with the most notable difference being in the risk for union dissolution. The divorce risk of unilingual Swedish-speaking couples has been found to be only half that of unilingual Finnish-speaking couples (Finnäs, 1997), and this gradient appears to be rather constant over time (Saarela & Finnäs, 2018). Extending the view to all unions, married and cohabiting, with and without children, paints the same picture, albeit with a somewhat smaller differential (Saarela & Finnäs, 2013; 2014b). The overall trend in fertility is similar for both ethnolinguistic groups, yet a very small difference exists. Until the early 1980s, Swedish-speaking women had a somewhat lower Total Fertility Rate. With the exception of the decade following the mid-1990s, the fertility of Swedish-speaking women has been slightly higher since the 1980s (Saarela, 2021).

That concludes the overview of differences in health, socioeconomic, and demographic indicators which characterize the two ethnolinguistic groups. As shown, the Swedish-speaking Finns are by no means marginalized; quite the contrary, they are well-integrated into society. Although the Finnish-speaking majority fares slightly worse, they can hardly be described as being marginalized either. Since they constitute the vast majority of the Finnish society, they represent the normal situation from which the Swedish speakers might be considered to deviate to some extent.

4.3. The drivers behind the observable differences between Finnish and Swedish speakers

This chapter aims at providing an explanation for the observable ethnolinguistic differences described in the previous chapter. Three factors are discussed: differences in socioeconomic and demographic factors, cultural differences, and genetic factors. Each of these three factors appear to drive a certain amount of ethnolinguistic differences independently, but they also appear to interact with one another.

The first set of factors driving the observed ethnolinguistic differences are of socioeconomic nature. Quite generally, the distribution of socioeconomic control variables is somewhat more favourable among the Swedish-speaking population (see chapter 4.2.). Therefore, the overall ethnolinguistic difference, especially in health, decreases after controlling for SES. This is illustrated in the mortality difference of adults on the national level. Koskinen and Martelin (2003) find the adult mortality differential for the whole country to decrease by ten percentage points among men and disappear among women once SES is controlled for. Sipilä and Martikainen (2009) find the socioeconomic factors relating to half of the country-wide difference in mortality in ages 30+ among men and a quarter among women. Saarela and Finnäs (2005b) investigate the mortality in older working ages within the bilingual area and find the difference in the mortality hazard to decrease from 27 to 16 percent among men and from the 16 to six percent among women after controlling for SES. Other, less standard variables for SES are also at play. Observed differences in wealth are related to the internal migration status. The level of wealth is highest among those who have not migrated within Finland, somewhat lower among those whose parents have migrated, and lowest among persons who have migrated themselves. This gradient produces considerable differences in overall wealth since about half of all Finnish speakers are out-of-region migrants, whereas only five percent of Swedish speakers are (Saarela, 2006). These examples illustrate that SES does, indeed, explain a sizable part of the ethnolinguistic differences. However, an unexplained, statistically significant difference remains, especially among men.

The second aspect causing ethnolinguistic differences is culture. Since culture is hard to quantify, differences in behavioural aspects have to serve as a proxy to pinpoint differences in cultural practices. One prime example of behaviour as proxy for culture is the sum of things described as “healthy lifestyle”. In the last decades, the prevalence of indicators related to a healthy lifestyle has become more prevalent within the whole population, but it has been and continues to be more frequent among the Swedish-speaking population, especially in terms of alcohol intake (Helakorpi, et al., 2009). Finnish-speaking teenagers have a higher alcohol intake and more problematic drinking behaviour (Tigerstedt, et al., 2008). This is also the case among adults (Paljärvi, et al., 2009). The difference in alcohol-intake also shows up in alcohol-related mortality, which is higher among the Finnish-speaking population, even after controlling for SES (Blomgren, et al., 2004). Saarela and Kolk (2020) have found that, for the past 50 years, the odds of dying due to alcohol-related causes is two thirds lower among Swedish-

speaking men and women. Another aspect for culturally related differences in mortality is that the risk for suicide mortality is higher when a person's birth order is higher among their siblings. This gradient is only present among Finnish-speaking Finns, but not among their Swedish-speaking compatriots, and neither among the Swedish-born children of Finns who live in Sweden. The link between birth order and suicide, therefore, points towards a phenomenon related to the Finnish(-speaking) culture (Saarela & Kolk, 2021). This might be due to higher levels of psychological resistance resources and a higher sense of coherence among the Swedish-speaking population (Volanen, et al., 2006), as well as higher levels of social capital. The latter mostly relate to higher levels of social and civic engagement (Hyyppä & Mäki, 2003; Paljärvi, et al., 2009), such as singing in choirs (Hyyppä & Mäki, 2001b). Another indication for cultural differences might be found in occupational safety. Several small-scale studies conducted in the late 1980s and 1990s have found that there were less work-related accidents and injuries in Swedish-speaking companies in the area surrounding Vaasa. Overall, this difference amounted to about 40 percent, or about 20 percent in comparable positions (Salminen & Johansson, 2000). The accident frequency in Swedish-speaking companies was found to be similar to Sweden (Johansson & Salminen, 1999). As an explanation for these findings, the authors propose differences in the mental model of speakers of languages belonging to different language families. Indeed, Swedish speakers emphasized a collective element in their views of safety, as well as the need for coordination, while Finnish speakers emphasized personal responsibility (Salminen & Seppälä, 2005).

Looking into bilingual settings provides further evidence for cultural differences between the ethnolinguistic groups. The research on occupational safety finds that bilingual companies have the highest prevalence of accidents, even markedly exceeding that of Finnish-speaking companies, and attributes this explicitly to communication issues (Salminen & Seppälä, 2005). Being in a bilingual relationship is linked to a higher risk of union dissolution than that of unilingual Finnish-speaking couples (Finnäs, 1997; Saarela & Finnäs, 2013; 2014b; 2018). However, it is rather unlikely that this is caused by language barriers, and these studies, instead, pinpoint cultural differences between the partners to cause irreconcilable rifts in relationships (Finnäs, 1997; Saarela & Finnäs, 2013; 2014b; 2018).

The last factor driving health differences is genetics. The Swedish-speaking population lives along the southern and western shoreline and differs to some degree from the Finnish gene pool. The Åland islands, located in the Baltic Sea between Finland and Sweden and only remaining monolingual Swedish region, are known for their DNA differing entirely from mainland Finland (Norio, 2003a). The region surrounding the city of Vaasa, a bilingual area on the West Coast with Swedish as the majority language, has been found to belong to the Swedish genetic cluster (Hannelius, et al., 2008). On average, the Swedish-speaking population has genetic position in-between Sweden and Finland, but with a similarity of about two thirds, it is situated somewhat closer to the Finnish

gene pool (Virtaranta-Knowles, et al., 1991). However, to my knowledge, no study has explicitly related ethnolinguistic genetic differences to differences in health outcomes. In addition to that, the Finnish-speaking population is not genetically homogenous either, as there is a clear East-West-divide (or more precisely a Northwest-Southeast-divide) in their genetic structure. This genetic divide corresponds to old political borders, ancient settlements, differences in culture, and dialect (Norio, 2003b). Therefore, it reflects not only genetic but, to some degree, also cultural differences. The East-West-divide manifests as a clear gradient from the Northeast to the Southwest along which health outcomes become more favourable. It is one important factor for the ethnolinguistic health differential because the Swedish-speaking population almost exclusively originates from the Western and Southern parts of the country which traditionally have the lowest mortality, also among the Finnish-speaking population. The latter more often originate from the Northern and Eastern parts of the country which is correlated with increased mortality and DP risks, even decades after moving to the areas with lower morbidity and mortality (Saarela & Finnäs, 2005a; 2005b). The gradient is especially noticeable in mortality according to a person's, or person's parents', region of origin. It is present among juveniles and young adults (Saarela & Finnäs, 2008a), the prime working ages (Saarela & Finnäs, 2009a; 2011), the older working ages (Saarela & Finnäs, 2008b), retirement ages (Saarela & Finnäs, 2006a), and in retirement mortality due to ischaemic heart disease (Saarela & Finnäs, 2009b). The only exception is, consistently, the Helsinki region which has a higher mortality than the surrounding regions. All of the differences above are more pronounced among men than women.

The above discussion shows that it is most likely that cultural differences, and, potentially to some extent, genetic differences which underlie the observed ethnolinguistic gradient in health outcomes which remains after controlling for SES. However, cultural and genetic differences are not separate factors, as they are likely to overlap. Evidence for a purely genetic aspect can be found in infant mortality, which can hardly be attributed to differences in behaviour. New-born children who have one parent from each ethnolinguistic group have a significantly lower risk of dying, which may be related to a higher degree of gene admixture (Saarela & Finnäs, 2014a). Furthermore, differences in ischaemic heart disease might serve as evidence for genetic differences, as adults of mixed origin have a mortality in-between that of persons with unilingual background (Saarela & Finnäs, 2016). Nevertheless, the risk factors for this group of ailments include both genetic and behavioural factors, and differences for both sets of factors have been shown to be ample. The behavioural differences between the two ethnolinguistic groups are viewed as manifest representations of differences in culture in this kappa. Therefore, ethnolinguistic differences in mortality due to causes of death which are entirely related to behaviour provide evidence that a difference in culture is present. This argument is additionally strengthened when shifting the focus to persons with a mixed background since they have arguably been exposed to both cultures in their childhood home. Indeed, the risk

for alcohol-related mortality of persons with a mixed background is in-between that of unilingual persons (Saarela & Kolk, 2020). When viewing one's own language registration as a proxy for culture and cultural practices, persons with a mixed background are arguably closer to the culture of their own language registration in their self-identification. This argument is supported by the overall mortality of persons with a mixed background being, overall, in between persons with a unilingual background. Yet, according to their self-registration, the mortality of persons with a mixed background is closer to the levels of their compatriots with unilingual background (Reini & Saarela, 2021). However, overall mortality is influenced by both behaviour, i.e. cultural practices, and genetics. Hence, mortality due to alcohol and accidents yields a more accurate picture for differences in culture and, indeed, persons with a mixed background employ an in-between position which is more similar to persons with a unilingual ancestry, according to their own language registration (Saarela & Finnäs, 2016).

Finally, culture also overlaps with SES when it comes to ethnolinguistic differences. Within the so-called "socially most successful" group, outcomes for both language groups tend to be similar. This group is defined as those who have a high education, high income, and live with a partner. Men belonging to this group do not exhibit an ethnolinguistic difference in the risk for SA receipt (Reini & Saarela, 2017) and have the same mortality among adults (Koskinen & Martelin, 2003; Saarela & Finnäs, 2005b). This points towards similar patterns of behaviour in the upper social strata, yet there is a higher proportion of Swedish speakers in that position.

In conclusion, socioeconomic, demographic, cultural, and, potentially to some degree, genetic factors are likely to play a part in the observed ethnolinguistic differences. These differences in genes, SES, and culture can readily be approximated by using the indicator "mother tongue" which the population register readily provides. While all three factors likely play a role in the ethnolinguistic differences in health outcomes, in this kappa, "mother tongue" is understood to mainly be a tangible indicator for the intangible concept of "differences in culture". This is because SES is explicitly accounted for in a comprehensible manner in the analyses and because the influence of genes is far from conclusive. Therefore, the language indicator in the data from the population registry is of central importance to this kappa, not because of the language itself or language use, but rather because of the cultural and behavioural factors which are implicitly associated with the two languages. Consequently, "mother tongue" is a simple variable with only categories, Finnish and Swedish, but it is understood that the rich background of these two indicators has the potential to yield deeper insights into the observable differences in health and other areas of life.

4.4. Ethnolinguistic differences in the transition from one indicator of ill health to a more severe indicator

Differences in culture cannot directly be captured by information found in a population registry. Instead, the variable "mother tongue" is used as a manifest proxy for intangible differences in culture. This chapter discusses how these differences in culture, as measured by the variable "mother tongue", may show up in the two health associations in focus in this kappa, i.e. the expectations concerning research questions 3 and 4. SA receipt is an indicator of mild, temporary health impairment. DP an indicator of severe and permanent ill health. Death is the indicator of ultimate ill health.

The Finnish Constitution stipulates equal treatment for members of both ethnolinguistic groups and provides equal resources for them. However, state-provided resources are not the only resources shaping an individual's life. Individual behaviour does so too, and this behaviour is highly dependent on one's resources. These resources include, but are not limited to, economic, social, and psychological assets. The previous chapters have shown that the Swedish-speaking population is in a more favourable position in this regard. Because of these differences between the ethnolinguistic groups, the state cannot guarantee equal probabilities of being in ill health, even though it provides similarly for all of its citizens. It can only ensure an equal safety net in case a significant degree of ill health has manifested. In this setting, the desired outcome for the progression from one indicator of ill health to an indicator of more severe ill health is that it is the same for both ethnolinguistic groups, despite the fact the Swedish speakers have lower probabilities for being in either state.

In the light of the general health advantage of the Swedish-speaking population, the intuitive thought would be that their risk for progressing to severe ill health should be lower. But this is not necessarily the case if the health care and social security system work the way they are intended to. Despite different risks and proportions for being in either state, the institutional and societal framework in which both ethnolinguistic groups operate is the same, and both groups are entitled to similar treatment within the health care and social security system. As there is no reason to assume this stipulation would be violated, differences in proportions of people receiving SA or DP should be independent from the treatment people receive within the health care and social security system. Therefore, even though the proportion of people in a given state of ill health may be different, the treatment due to that given state within the institutions should be same. If that was the case, there should be no differences in the risk of progressing from one state off ill health to a state of more severe ill health.

The expectation of no ethnolinguistic differences in the progression from one indicator of ill health to an indicator of more severe ill health, as outlined above, is illustrated by another example in which both groups have different proportions for one indicator earlier in the life course and another one which is measured later in the life course: When examined separately, Swedish speakers have a more favourable outcome in SES in early adolescence and in adult

educational attainment. However, the highest education achieved during adulthood is similar for both ethnolinguistic groups when it is analysed conditional on the SES which an adolescent enjoyed in their parental home (Saarela & Finnäs, 2003b). This shows that the Finnish welfare system cannot offer the same resources to be available in Finnish- and Swedish-speaking childhood homes, but it does offer equal opportunities for educational attainment for Finnish- and Swedish-speaking citizens with a comparable background. In the same manner, it is expected that equal treatment within the social security and health care system is associated with a similar risk of progressing from one indicator of ill health to an indicator of more serious ill health in both ethnolinguistic groups. More precisely, it is to be expected that the transition from SA to DP, as well as from DP to death, is similar among both Finnish-and Swedish-speaking Finns.

If differences in the risk of progressing from less to more severe ill health are present, this could be due to two principal mechanisms: 1) People with equally worsened states of health are treated differently according to their ethnolinguistic affiliation. This might be due to some form of discrimination, but can also arise in the absence of it, e.g. communication problems or regional inequalities in access to health care professionals, medical, and rehabilitation opportunities. However, either of these explanations would be in violation of the constitutional stipulation. 2) There are sizable differences in the underlying medical conditions between the two ethnolinguistic groups. It has been shown in chapter 3 that different groups of conditions are associated with different risks for SA, DP, and mortality. It has further been shown in this chapter that both ethnolinguistic groups differ in their cultural habits, and to some degree in their genetic profile. This may in turn influence the medical reasons behind SA, DP, and mortality to the extent that ethnolinguistic differences in the risk for progressing from one indicator of ill health to an indicator of more severe ill health may manifest even in the absence of discrimination and the same amount of available resources for members of both ethnolinguistic groups.

To summarize the expectations concerning the two research questions which analyse ethnolinguistic differences, the expectation is that there are none, as both groups operate within the same institutional framework which, supposedly, treats them in an equal manner. As for research question 3, it may be presumed that there are no ethnolinguistic differences in the risk for receiving DP when previous SA receipt is accounted for. The expectation regarding research question 4 is that there are no ethnolinguistic differences in mortality according to previous labour market status, specifically previous DP receipt.

5. Data and methods

This chapter provides an overview of the data used in the analyses, which the four articles in this kappa are based on. Even though all articles use the same data set, the data restrictions are different. In the following, an overview is given for the exact data restrictions in each article, concerning ages and years analysed, alongside a comprehensive overview of how to arrive at the respective outcome variables, how the analyses are conducted, and which variables are being controlled for. Table 2 provides a condensed overview of the data restrictions in each of the four articles, the outcome variables, and the main explanatory variables.

The data used in all four articles stem from Statistics Finland's longitudinal employment statistics files, the so-called Työssäkäyntitilaston pitkittäistiedosto, used with permission number TK-53-768-12. They contain annual records for the years 1987–2011, representing individuals residing in Finland in any of these years, and allow for individual follow-up during that period. Each person has a unique mother tongue recorded in the Finnish population register. The dataset consists of a five percent random sample of people with Finnish (and mother tongues other than Swedish), as well as a similarly constructed 20 percent random sample of the Swedish-speaking population. The total dataset, without age restrictions, includes 328,697 persons born between 1903 and 2003. There are 12,810 persons with a mother tongue other than Finnish or Swedish, who are excluded from further analysis. This leaves 315,887 persons from which the samples for each of the four articles are derived.

The method of analysis for all four articles is Survival Analysis. The data specifications and analyses are similar in Articles 1 and 3, as well as Articles 2 and 4. The statistical software used to conduct the analyses is SPSS 23 for Articles 1 and 3, and Stata 14 SE for Articles 2 and 4. All analyses are carried out separately for men and women. Normalized weights, i.e. the inverse of the sampling proportion, account for the different sampling proportions for Finnish and Swedish speakers. Age consistently refers to age at the end of a calendar year.

Table 2. *Overview of the data restrictions, outcome variables, population under risk, and main explanatory variables in Articles 1–4.*

	Observation period **Focus**	**Risk** **Population under risk**	**Number of observations** **Person years (PY)**	**Outcome variable** **$N_{outcome\ variable}$**	**Main explanatory variable and its categories**
Article 1	1989–2010 Finland	Risk for DP Age 16–60	N=110,675 PY=2,278,882	DP receipt N_{DP}=10,524	SA receipt No/yes No/yes$_{<2months}$/yes$_{\geq 2months}$
Article 2	1987–2011 Finland	Risk of dying Age 65–70	Subsample 1: N=33,486 PY=138,438 Subsample 2: N=25,036 PY=106,475 Subsample 3: Sample size declining as age of labour market observation rises	Death Subsample 1: N_{dead}=2,828 Subsample 2: N_{dead}=1,787 Subsample 3: N_{dead}=different for each age of labour market observation	Labour market status at each single age 50–64: Working Statutory pension Part-time pension Unemployment DP Otherwise outside of the labour market
Article 3	1989–2010 Ethnolinguistic differences	Risk for DP Age 16–60	Finnish-speaking: N=91,022 PY=1,879,931 Swedish-speaking: N=19,368 PY=397,680	DP receipt Finnish-speaking: N_{DP}=9,189 Swedish-speaking: N_{DP}=1,334	Sickness allowance receipt No/yes No/yes$_{<2months}$/yes$_{\geq 2months}$
Article 4	1987–2011 Ethnolinguistic differences	Risk of dying Age 65–70	Subsample 50+: N=33,464 PY=138,463 Subsample 55+: N=47,313 PY=218,595 Subsample 60+: N=62,270 PY=304,322	Death N_{dead} Finnish-/ Swedish-speaking Subsample 50+: 1,490 / 327 Subsample 55+: 2,435 / 552 Subsample 60+: 3,689 / 836	Labour market status at each single age 50/55/60–64: Working DP Other

5.1.1. Article 1 – SA and DP in Finland

Article 1 examines how first observed receipt of SA is associated with the risk for receiving DP over the course of 22 years. This is done by comparing the DP risk of persons who have received SA with the risk of persons who have not received SA (yet). We do so on a year-to-year basis in order to be able to assess whether the DP risk changes as years since SA increase.

Article 1 relies on information for the years 1989–2010. The year 1987 has to be excluded because maternity benefits cannot be separated from SA payments. As a sickness spell can stretch over the turn of the year, the total amount of SA received is calculated by adding the amount received in one year to the amount in the following year. Due to the insufficient SA information in 1987, 1988 is excluded from analysis as well. The year 2011 has to be excluded because no information for the control variable "industry of work" is available for that year. It is not possible to determine how many separate sickness spells a person has in a given year, as the only information available is the absolute amount of SA received per calendar year. Based on this information, the total length of sickness absence per year is calculated via fixed income replacement rates.

The data are restricted to persons who are in ages 16–40 when entering the observation window in 1989, or who turn 16 in 1990–91 (see observation plan in Figure 3). The birth cohorts included in the study are 1949–75. The lower age limit is set to 16 because it is the youngest age at which SA and DP can be claimed. The upper age limit is set to 60 since by that age, many people are starting to drop out of the labour market permanently via old-age or other retirement schemes. The observation ends at age 60, when receiving DP, at death, or emigration, whichever occurs first. With this set up, people can be observed for a maximum of 22 years. The sample includes a total of 110,675 persons who are under risk of receiving DP. Out of the total sample, 39.5 percent, or 43,753 persons, are observed to receive SA at least once and 9.5 percent, or 10,524 persons, become disability pensioners at some point during follow-up (see Table 2).

The method of analysis in Article 1 is Survival Analysis using discrete-time hazard models which are episode-splitted by calendar year. In this manner, the hazard for receiving DP can be determined for every single year since entering the observation window. The comparison in focus is the hazard for DP among those who have not received DP (yet) in comparison to those who have received SA a given number of years ago. SA refers to the first SA receipt recorded in the data, and the variable distinguishes between "no SA observed (yet)", "SA receipt less than two months", and "SA receipt two months and longer". The risk for DP is calculated for a model containing 1) only the SA indicator and 2) the SA indicator and all control variables. The results are presented as hazard ratios (HRs), and people who have not received SA (yet) constitute the reference category. All analyses are carried out separately for men and women.

The control variables included are age (categorized as 16–19 and 5-year groups spanning ages 20–24 to 55–59), highest education attained (classified as primary, secondary, and tertiary), the presence of a partner in the household,

region of residence, population density of the municipality of residence (classified as rural, semi-urban, and urban), industry of work, income in quintiles, homeownership, as well as mother tongue (Finnish or Swedish). All control variables are time-varying.

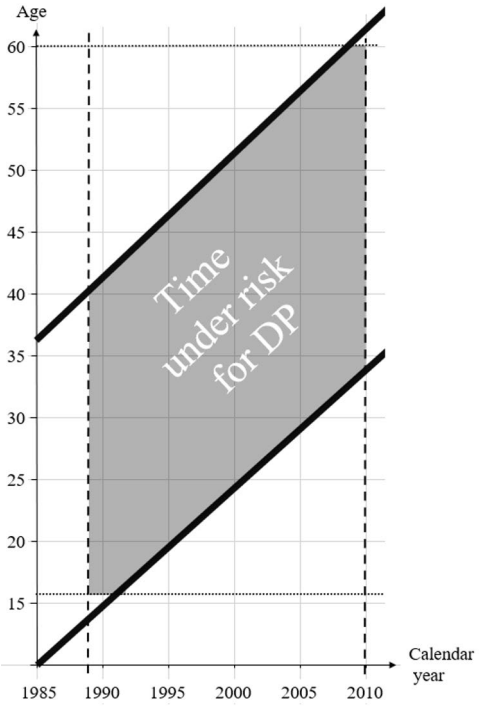

Figure 3. *Observation plan for Articles 1 and 3.*

5.1.2. Article 2 – Labour market status and retirement mortality in Finland

Article 2 explores the relationship between labour market status in the late working ages with mortality shortly after the statutory retirement age[4]. Even though DP is the labour market status of main interest, a wider focus on the most common labour market statuses in ages 50+ is applied in order to explore whether the importance of DP is diminishing as other labour market exit routes become available. Labour market status in each single age from 50 to 64 is related to survival in ages 65–70 so as to examine whether and how the association of labour market status and mortality may change over the course of 15 years.

In this article, the full range of years 1987–2011 is used and age is restricted to ages 50–70. Study persons are those who can be observed in every single age

[4] The statutory retirement age was raised from 65 to 68 in 2005, i.e. within the observation period of Article 2, and brought with it an increase in the share of persons still economically active at age 65. In 2004, five percent of men and three percent of women were still working at age 65, at the end of the observation period in 2011, this share had increased to 13 and ten percent respectively (Statistics Finland, 2020b). Despite the threefold increase in relative terms, the absolute occurrence of working past age 65 was still a rather rare occurrence. Hence, age 65 is used as a term synonymous to statutory retirement age.

from 50 to 65. Additionally, everyone who dies before the age 65 is disregarded. With these restrictions, the birth cohorts included are 1937–46. These people are under the risk of dying in ages 65–70, and observation ends at age 70, at death, or emigration, whichever occurs first (see observation plan in Figure 4). All information regarding ages 50–64 is used in terms of covariates only age. These restrictions result in a sample containing 33,486 persons out of which 8.4 percent, or 2,828 persons, are deceased by the end of follow-up (see Table 2).

The labour market statuses included in Article 2 are "working", "statutory pension", "part time pension", "unemployment", "DP", and "otherwise outside of the labour market". The order of these statuses is deliberately chosen in a manner which reflects a supposed increasing association with ill health. Labour market status is constructed for each single age 50–64 based on the variable "labour market status during the last week of a calendar year". The group of people who are "working" consists of both employed and self-employed persons. In addition to the assignment according to labour market status during the last week of the year, people are also defined as "unemployed" if they receive any amount of unemployment benefit or unemployment pension during a given calendar year. Likewise, "DP" is assigned if someone receives any amount of DP or individual early pension during a year. In case of several labour market statuses measured in the same year, each state overwrites the one mentioned before it. Those who are not defined by any of the specifications mentioned above are assigned the state "otherwise outside of the labour market".

The full sample of 33,486 persons is used in three ways: 1) "Subsample 1" uses all available observations, thus reflecting the labour market state in the late working ages among the whole Finnish population. 2) The data are restricted to those who are employed at age 50 in "Subsample 2" which results in a slightly positively health selected sample, as people who are working tend to have better health than those who are not. 3) "Subsample 3" is restricted to persons who are employed until the previous age in order to investigate whether leaving the labour market is associated with a change in the mortality risk. Two hypothetical examples illustrate how study persons are included in the three subsamples: a) A man, who is observed to be a disability pensioner in every single age 50–64. He would be counted as such for every age in Subsample 1. Because he is not employed at age 50, he would not be a part of Subsample 2 or 3. b) A woman who is working at age 50 becomes unemployed at age 54, works again in ages 55–62, and then transitions into statutory pension at age 63. She would be counted in each of these states at the respective ages in Subsample 1. She would also be analysed in Subsample 2 because she is employed at age 50. In Subsample 3, the last age she would be analysed would be 55, because she is working continuously in ages 50–54 and deviates from that state by age 55.

The size of Subsample 1 is 33,486 persons out of whom 8.4 percent, or 2,828 people, die. Subsample 2 consists of 25,036 persons out of whom 7.1 percent, or 1,787 people, die. Subsample 3 cannot as easily be described because the number of people diminishes as age of labour market observation increases. At age 51, Subsample 2 and 3 are identical, but afterwards, the number of people in

continuous employment shrinks further with every age, thus decreasing the number of observations per age in Subsample 3 (see Table 2).

The method of analysis for all three subsamples is Survival Analysis using Cox proportional hazard models. These are used to calculate the hazard of dying in ages 65–70 in relation to labour market status in every single age 50–64. For all three subsamples, the risk of dying is calculated according to 1) labour market status at every single age and 2) labour market status at every single age plus all control variables. The results are presented as HRs and at any given age, employed persons are the reference category. All analyses are carried out separately for men and women.

The control variables included are all time-constant and include birth cohort, whether a person was living with a partner at age 65, highest education ever achieved (classified as primary, secondary, and tertiary), homeownership at age 65, income at age 65 in quartiles, mother tongue (Finnish or Swedish), industry of work at age 50, and region of residence at age 65. If no industry of work can be observed at age 50, e.g. due to unemployment, the status for industry of work at the earliest age it can be observed is imputed. Income at age 65 is erroneously used 'as is', i.e. not inflation adjusted. The consumer price index increased with almost twenty per cent in the period 2001–11 (Statistics Finland, 2020). The income variable is, therefore, somewhat skewed upward, especially among the younger birth cohorts. However, this is unlikely to be a serious issue, because in Article 4, the same income variable, but inflation adjusted, is used, and the coefficients for similar analyses are comparable.

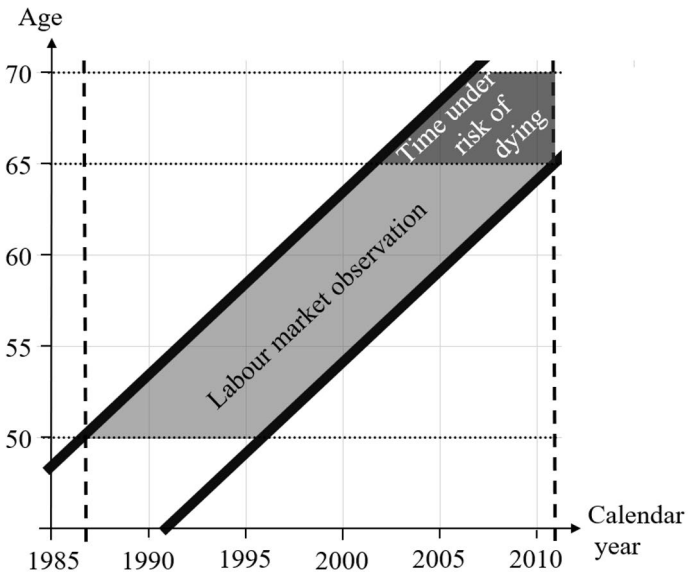

Figure 4. *Observation plan for Article 2.*

5.1.3. Article 3 – Ethnolinguistic differences in SA and DP

Article 3 has a similar premise as Article 1 but, additionally, takes ethnolinguistic affiliation into account. It examines how first observed receipt of SA is associated with the risk for receiving DP in the Finnish- and Swedish-speaking population. That shifts the focus from how the risk for DP changes as time since first observed SA receipt increases to whether the risk for DP, according to first observed SA receipt, differs between the Finnish- and Swedish-speaking population. Thus, the actual level of the risk for DP is of less interest, but rather whether there is a statistical difference between corresponding estimates of the two ethnolinguistic groups.

The data restrictions and observation plan for Article 3 are similar to those for Article 1, described in chapter 5.1.1. The observation starts with persons who are in ages 16–40 in 1989, or who turn 16 in 1990–91. The observation ends at age 60, when receiving DP, death, or emigration, whichever occurs first (see observation plan in Figure 3 in chapter 5.1.1.). The main difference between Article 1 and 3 is that Article 3 explicitly takes ethnolinguistic differences into account. It does so by dividing the whole sample of 110,390 persons into two samples, one that only contains persons with Finnish as their mother tongue and one that contains persons with Swedish as their mother tongue. The sample of Finnish speakers contains 91,022 persons out of whom 39.5 percent, or 35,931 persons, are observed to receive SA at least once and 10.1 percent, or 9,189 persons, become disability pensioners. The sample of Swedish speakers contains 19,368 persons out of whom 34.4 percent, or 6,673 persons, receive SA at least once and 6.9 percent, or 1,334 persons, shift into DP (see Table 2).

Analogue to the procedure in Article 1, the hazard for receiving DP is determined by using discrete-time hazard models which are episode-splitted by calendar year. The SA indicator is identical to the one used in Article 1, i.e. it refers to the first SA receipt recorded in the data and distinguishes between "no SA observed (yet)", "SA receipt less than two months", and "SA receipt two months and longer". The analyses are run separately for the sample of Finnish and Swedish speakers. The results are presented as HRs, with people who have not received SA (yet) constituting the reference category. Corresponding estimates are examined for statistical difference using standard t-tests. Although the maximum time for follow-up is 22 years, results are only presented up to year 15 because the estimates become somewhat erratic after that, due to declining numbers of people under risk. All analyses are carried out separately for men and women.

The control variables included are age (categorized as 16–19 and 5-year groups spanning ages 20–24 to 55–59), highest education attained (classified as primary, secondary, and tertiary), the presence of a partner in the household, region of residence, population density of the municipality of residence (classified as rural, semi-urban, and urban), industry of work, income in quintiles, and homeownership. All control variables are time-varying.

5.1.4. Article 4 – Ethnolinguistic differences in labour market status and retirement mortality

Article 4 investigates the association of labour market status in the late working ages with mortality thereafter in a similar manner as Article 2 but, additionally, takes ethnolinguistic affiliation into account. Labour market status at each single age 50/55/60–64 is related to mortality in ages 65–70 among Finnish- and Swedish-speaking Finns. That shifts the focus from whether there are differences in the mortality risk associated with each labour market status at a given age to whether there is a difference in the mortality risk between the ethnolinguistic groups for any given labour market status at any given age.

Articles 4 uses data for the years 1987–2011 and three partly overlapping subsamples. The ages of observation are 50/55/60–70. Mortality before age 65 is disregarded. The time under risk of dying starts at age 65 and ends at age 70, at death, or emigration, whichever occurs first. Information regarding the ages up to 64 is used in terms of covariates only. The first subsample, so-called "Subsample 50+", is identical with the full Subsample 1 used in Article 2, i.e. people can be observed in every single age 50–65. The other two subsamples are constructed in a similar manner but have later minimum ages of entry into the observation window. "Subsample 55+" contains persons who can be observed in ages 55–65. "Subsample 60+" contains persons who can be observed in ages 60–65. Therefore, each subsample with a later starting age contains all observations of the subsample(s) with a lower age at entry in the observation window and additionally adds older birth cohorts (see observation plan in Figure 5). Although this sampling strategy introduces some inference of period and cohort effects, the added statistical power outweighs this drawback. Furthermore, comparing the similarity of estimates in the overlapping observation ages between the three subsamples allows for an assessment of the validity of the principal associations between labour market and mortality.

The birth cohorts included in Subsample 50+ are 1937–46, 1932–46 in Subsample 55+, and 1927–46 in Subsample 60+. Subsample 50+ contains 33,464 persons out of whom 5.4 percent, or 1,817 persons, are deceased by the end of follow-up. The same numbers for Subsample 55+ are 47,313 study persons out of whom 6.3 percent, or 2,987 persons, die. For Subsample 60+, the numbers are 62,270 persons out of whom 7.3 percent, or 4,525 persons, die (see Table 2).

Article 2 clearly determines that the main difference in retirement survival can be found between those who are working and those who are disability pensioners. Therefore, the number of labour market statuses analysed in Article 4 is reduced to only three, "working", "DP recipient", and groups together everyone else as "other". "Working" and "DP recipient" are determined in a similar manner as in Article 2, i.e. according to the labour market status in the last week of a year. DP is additionally assigned if a person has received any amount of DP or individual early pension during a given year. Everyone not assigned either of these two states is grouped together as "other". Another difference to Article 2, in which labour market statuses can be switched back and forth, is that Article 4 treats DP as an absorbing state. That means that once a

person is observed to receive DP, they remain in that state for the current and all later ages, regardless of possible later transitions. The labour market status variable is additionally divided by ethnolinguistic group. The resulting variable has six categories for every single age 50–64: "working & Swedish-speaking", "working & Finnish-speaking", "DP & Swedish-speaking", "DP & Finnish-speaking", "other & Swedish-speaking", and "other & Finnish-speaking".

The method of analysis in Article 4 is Survival Analysis using Cox proportional hazard models. These are used to calculate the hazard of dying in ages 65–70 as related to labour market status in ages 50/55/60–64 according to ethnolinguistic affiliation. For each of the three partly overlapping subsamples, the risk of dying is calculated for a model containing 1) only the variable combining labour market status and ethnolinguistic affiliation at each single age, 2) the variable combining labour market status and ethnolinguistic affiliation at each single age, plus all control variables, except for industry of work, and 3) the variable combining labour market status and ethnolinguistic affiliation at each single age, plus all control variables, including for industry of work. The results are presented as HRs with employed Swedish speakers (at any given age) being the reference category. In order to test whether the HR estimates for corresponding labour market statuses of Finnish and Swedish speakers at any given age are statistically significant, the same analysis was run with a changed reference category. Additional markers are applied at the ages and for the labour market statuses where there is a statistically significant difference. In this manner, both the absolute difference to the mortality level of employed Swedish speakers and the differences between the ethnolinguistic groups within one labour market status can be displayed in the same graph. All analyses are carried out separately for men and women.

The control variables are all constant and include birth cohort, whether a person is living with a partner at age 65, highest education ever attained (classified as primary, secondary, and tertiary), homeownership at age 65, income at age 65 in quartiles (standardized to the year 2000), region of residence at age 65, and industry of work at the earliest age it can be observed. Because of the possibility of entering the observation at different ages, industry of work cannot be measured with the same accuracy for all three subsamples. Especially in Subsample 60+, the age of measurement can vary considerably between individuals; for some people, it may refer to age 50, while others are first observed at age 60 and by that age may already have left the labour market. This incongruence makes it necessary to introduce this control variable separately. The introduction of industry of work does lower the mortality risk slightly, however, sensitivity analyses show that almost entire effect of this variable is not due to the actual industry of work, but whether or not a person has been economically active or not.

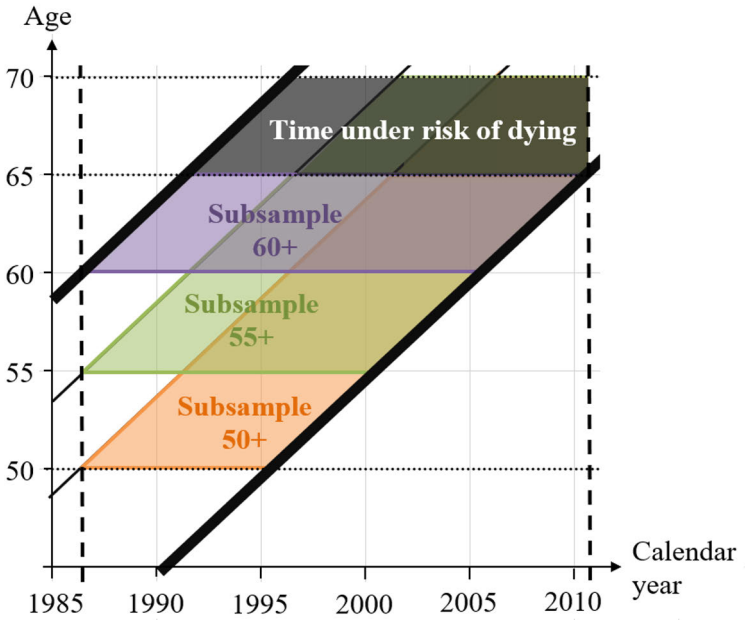

Figure 5. *Observation plan for Article 4.*

5.2. Ethical Statement

The data were used with permission number TK-53-768-12. They are register-based and anonymized. Since individuals cannot be identified directly from the data, there was no need to seek ethical approval for these studies explicitly. According to the Statistics Act in Finland, Statistics Finland decides independently on all licences of use granted for its basic data (Statistics Finland, 2004). Statistics Finland's guidelines for handling data were followed. The data used in all four articles can be obtained by other researchers from Statistics Finland, however, service fees apply.

6. Summaries of the results of the articles

This chapter provides a brief summary of the main results of all four articles. The discussion of how these findings relate to research question 1–4 can be found in chapter 7.

6.1. Article 1 – SA and DP in Finland

Article 1 examines how first-time receipt of SA is associated with the risk for receiving DP over the course of 22 years among the working-aged population in the whole of Finland.

Those who have received SA have a considerably higher risk for transitioning into DP compared to those who have not received SA over the course of 22 years. The DP risk is especially high one year after SA receipt is first observed, but it remains considerably raised, on a stable level, for the two following decades. The peak in the DP risk in the first year following SA receipt (HR>80) is a reflection of the Finnish system in which people move to DP after having exhausted their 300 days of SA. In line with this regulation, the peak in the DP risk is absent among persons who receive SA for less than two months. However, even short periods of SA receipt are associated with a risk for DP which is 15–20 times as high as that of people who did not receive any SA, and this risk remains fairly stable for the whole observation period. People whose SA receipt exceeds two months have a higher DP risk during the first ten years, with HRs around 25, but after that, both groups have an equally raised DP risk. The results are highly similar for men and women. Within a timeframe of five years, control variables do almost not modify the association of SA and DP but have an increasingly modifying influence after that.

In summary, first observed SA receipt is a strong signal for future work inability, among both men and women. The risk for DP is especially high in the year following the first observed SA receipt, but it remains considerably raised for over 20 years to come.

6.2. Article 2 – Labour market status and retirement mortality in Finland

Article 2 analyses the association of labour market status in each single age 50–64 with mortality in ages 65–70, also referred to as “retirement mortality”.

In accordance with previous studies, employed persons at all ages have the lowest risk for retirement mortality, while all other labour market groups experience a higher risk. This is more pronounced among men than women. However, most of the excess mortality is explained by the control variables. The only group showing a consistently elevated risk for retirement mortality, independent of socioeconomic and demographic background variables, are disability pensioners whose hazard for mortality is about twice as high as that of people who are working in any given age 50–64. The results are fairly similar for both sexes, although among men, there is a clear rising trend in the mortality risk

among those who received DP from the late 50s onwards which is not present among women. The only other groups having a significantly raised mortality risk are men who become unemployed a few years before age 65 and men who retire a few years before the statutory retirement age. Both groups have a mortality hazard up to 50 percent higher than men who, at the same age, are employed. The only groups showing a consistently and considerably lower retirement mortality are men who are part-time pensioners at age 56, as well as men who are employed at age 50 but are outside of the labour market past their mid-50s. Both groups can be assumed to be highly selective. The lowest age for entering part-time pension was as low as 56 only for a four-year period. Men who are otherwise outside of the labour market but were employed at age 50 are presumably a very different social group than men who are in this position with no previous employment recorded in the data. Aside from these two groups of men who have a lower mortality risk in ages 65–70, the results for men and women are largely similar.

There is no evidence for any association between leaving the labour market and retirement mortality, according to the analyses with Subsample 3. There is, however, evidence for a slightly positive health selection among those who are employed, according to the analyses with Subsample 2. Albeit, this effect disappears after controlling for socioeconomic and demographic background variables. These results are similar for both sexes.

In conclusion, the analysis of the most common labour market statuses in ages 50–64 and their association with mortality in ages 65–70 shows clearly that the only status having a strong and consistent negative association with mortality, net of socioeconomic and demographic background variables, is DP.

6.3. Article 3 – Ethnolinguistic differences in SA and DP

Article 3 examines how first-time receipt of SA is associated with the risk of receiving DP over the course of 15 years among the working-aged population but additionally stratifies the analysis according to ethnolinguistic affiliation. Therefore, the level of the DP risk among former SA recipients is of less interest than whether there are statistically significant differences in corresponding estimates between the ethnolinguistic groups.

In accordance with the results of Article 1, the risk for DP is extremely high in the first year after SA receipt was observed but remains considerably raised, on a rather stable level, for 15 years to come. This pattern is highly similar for both ethnolinguistic groups, as well as between men and women. Hence, there is no evidence for systematic ethnolinguistic differences in the risk for becoming disability pensioner following SA receipt.

However, there are two exceptions from the overall similarity between the two ethnolinguistic groups. In the first year after SA receipt was first observed, men of both ethnolinguistic groups have a very high risk of transitioning into DP, but the risk of Swedish-speaking men exceeds that of Finnish-speaking men significantly. This differential is present both among those who received SA for only a short amount of time, i.e. less than two months, as well as those who

received SA for a longer period. In both cases, the risk of Swedish-speaking men exceeds that of their Finnish-speaking counterpart by at least one third. The other exception is found among women in the long run. While the DP risk for Finnish-speaking women stays on the same level after the peak in the first year after SA receipt, the risk among Swedish-speaking women fluctuates somewhat below the level of their Finnish-speaking compatriots. This results in some statistically significant differences, in year eight for those who received SA for less than two months, as well as in years 13–14 among those whose initial SA period was longer than two months.

In conclusion, men and women of both ethnolinguistic groups have highly similar risks for receiving DP, conditional on previous SA receipt, over the course of 15 years, and there are only minor exceptions from the overall similarity.

6.4. Article 4 – Ethnolinguistic differences in labour market status and retirement mortality

Article 4 analyses the association of labour market status in each single age 50–64 with mortality in ages 65–70, also referred to as "retirement mortality", but additionally stratifies the analyses according to ethnolinguistic affiliation. In a similar manner as Article 3, this shifts the focus from analysing the level of mortality risk which is associated with a certain labour market status to whether there are statistically significant differences between corresponding estimates of Finnish and Swedish speakers for a given labour market status.

In accordance with Article 2, employed persons in all ages 50–64 have the lowest risk for retirement mortality, DP recipients the highest risk, and the group encompassing all others has a somewhat intermediate position. Introducing the control variables leaves only disability pensioners with a heightened mortality risk in ages 65–70. This overall pattern holds true among men and women in both ethnolinguistic groups. Within the same labour market status, the effects are very similar for both ethnolinguistic groups. There are only a few significant differences between the ethnolinguistic groups, and they are entirely explained by socioeconomic and demographic background variables.

As a sidenote, Article 4 explores the reason behind the rising mortality HRs among the non-employed labour market groups in the ages closest to the statutory retirement age. Although the actual hazard for retirement mortality is decreasing for every labour market status in both ethnolinguistic groups, the hazard among those who remain employed decreases somewhat more. Therefore, even though the negative health-selectivity among DP recipients declines as age increases, those who remain employed become positively health-selected to a slightly stronger degree, and, thus, drive up the relative differences which are reflected in HRs.

In conclusion, DP receipt in ages 50–64 is associated with a raised mortality risk in ages 65–70. However, there are no ethnolinguistic between persons occupying the same labour market status. Therefore, DP receipt is equally detrimental for the survival of Finnish and Swedish speakers.

7. Discussion

This chapter discusses the four research questions posed in chapter 1 and, as far as possible, relates them to the previous research in order to emphasize the new findings which this kappa adds to the existing body of knowledge. Research question 1 is based on the findings from Article 1. Research question 2 is mainly based on the results of Article 2, but also uses results from Article 4, which has a very similar approach. Research question 3 is solely based on the results of Article 3, and research question 4 on the findings of Article 4.

7.1. Research question 1 – SA and DP in Finland

How does the risk for receiving DP, dependent on previous SA receipt, change on a year-to-year basis over the course of two decades among the working-aged population in Finland?

The risk for all-cause DP is highly dependent on the receipt of all-cause SA, and, according to Article 1, there is no indication that this relationship would be weakening over the course of 22 years. The DP risk is extremely high in the first year after SA receipt is initially observed and drops dramatically thereafter. Nevertheless, the risk remains considerably raised on a stable level for the two following decades. In the first decade following SA receipt, the risk for DP is higher among those who receive SA for longer than two months, but after about ten years, the risk associated with short and long SA receipt converges. The results are highly similar for men and women.

It is firmly established that the risk for DP rises the longer the initial SA receipt is (see chapter 3.1.). The findings in this kappa are well in line with this for the first ten years, which is a time frame rarely exceeded in previous studies. All other studies have bundled up time under risk for DP. While that by no means implies the HR is the same for all of the years under risk, the intuitive interpretation, nevertheless, is that the risk would be stable, and that the same would apply to the ratio between short and long SA receipt. Analysing the DP risk on a year-by-year basis reveals that short SA receipt of up to two months is, indeed, associated with a rather stable DP risk over two decades. SA receipt exceeding two months, on the other hand, shows notable variation over time. The most notable variation is the massive peak in the risk for DP one year after the first SA receipt is recorded. This peak is a reflection of the Finnish social security system in which people move to DP after having exhausted their 300 days of SA per same sick leave diagnosis. In line with that, the peak is absent among those who receive SA only for a short time. Even though the peak is a reflection of a particular feature of the Finnish welfare state where people are forced to transition into DP after having received SA for 300 working days for the same diagnosis within a two-year period, it is possible that a similar peak in the DP risk shortly after the first observation of SA receipt might also present in other countries. Even though there is no upper limit for how long SA can be received in Sweden (Försäkringskassan, 2021), the two Swedish studies which divide the time under risk for DP into two intervals of five years each find the

risk for DP to be decreasing as time since SA increases (Karlsson, et al., 2008; Kivimäki, et al., 2007). It is possible that this decrease from the first to the second interval is not reflective of a slow decrease over time, but instead, it might be caused by an overall rather stable long-term DP risk and pronounced peak early in the first interval of time under risk. Since both of these studies have combined their time under risk into longer periods, a variation in the risk for DP in this manner would not show up as distinctly as it does in Article 1.

The other distinct variation in the risk for DP receipt which shows up in the year-by-year analysis is that the positive relationship of length of SA receipt and DP risk weakens in the long run. Article 1 shows that within the first years, long periods of SA receipt are related to a much greater DP risk than short periods of SA receipt. However, the risks of both SA groups converge after about ten years because the risk associated with long SA receipt decreases. This convergence has so far eluded detection because in most studies, the time under risk for DP ends before that convergence occurs. Even in those studies which have a longer follow-up time, the convergence is unlikely to be detected because the overall risk among those with long SA receipt would be skewed upwards due to the high DP risk this group experiences within the first years since SA receipt. The implication of that newly detected convergence between those with short and long SA receipt is that length of SA receipt diminishes greatly as an indicator for ill health as time since SA receipt increases. This is likely because persons with the most severe ill health drop out of the population under risk faster, i.e. they become disability pensioners. Therefore, as time under risk for DP increases, the group of previous SA recipients becomes less and less negatively selected for health, presumably to the point at which the average health of those with short and long SA receipt is converging and, thus, the risk for DP in both groups converges as well. A possible explanation for the hypothesized selective drop out of the unhealthiest persons could be related to different medical afflictions, as it may be assumed that different underlying conditions are associated with different degrees of ill health, which, in turn, may cause a different pace of labour market drop out. However, since diagnoses for neither SA nor DP are available in the data, this theory cannot be tested with the data at hand.

Concerning the magnitude of the HRs for the association of SA and DP, the risks found Article 1 exceed those found in other studies markedly. Even when disregarding the peak one year after first SA receipt, Article 1 finds the long-term hazard for DP to be about 15 times higher among SA recipients compared to non-recipients. Alexanderson et al. (2012) find the HRs for DP receipt over 13 years, among French quasi-civil servants according to different SA diagnoses, to vary between two and eight. Kivimäki et al. (2007) find the hazard for DP over 11 years, among Swedish residents in one county, to be 3.3 times higher among those who received SA. However, when the authors disregarded those who received DP in the first five years after SA receipt, it brought the HRs for different medical diagnosis categories of SA to range between five and 14, and, thus, closer to the level observed in Article 1. Salonen et al. (2018) study the DP risk over eight years among Finns and find that SA receipt exceeding 180 days to be

associated with HRs for DP receipt ranging between seven and 19 and, thus, close to the risks observed in Article 1. Salonen et al.'s study finds a strong negative socioeconomic gradient in the DP risk, even among those who do not receive any SA. The authors find that the DP risk of persons who are outside of employment and did receive no SA to be higher than the risk of upper non-manual workers who did receive SA up to one month, among men even up to two months. By contrast, the reference category in Articles 1 comprises of everybody without SA receipt, which means the reference category in that article is likely to have a much higher baseline hazard than the reference category in Salonen et al.'s study. That makes the observed DP risks in Article 1 even more remarkable. However, it has to be pointed out again that all articles hitherto have analysed the time under risk for DP as one single interval (or two large intervals) of time under risk, and, therefore, the magnitude of effects cannot easily be compared. Yet despite the differences in magnitude, Articles 1 finds a strong association of SA receipt and the risk for DP, with a strong gradient according to the length of SA receipt, which is very well in alignment with previous research.

When it comes to the influence of the control variables, Article 1 finds their importance to be limited in the short run. Controlling for SES markedly attenuates the peak in the first year after SA receipt was initially observed. Additionally, SES increasingly attenuates the risk for DP, starting about a decade after SA receipt was first observed. It is not surprising that the peak in the DP risk after the exhaustion of SA days is responsive to socioeconomic and demographic variables because there are substantial differences in the health risks and risk behaviour between the socioeconomic strata which have a marked impact on the respective risk for DP (Leinonen, et al., 2012). By contrast, the increasing importance of SES over time is somewhat surprising, since the only study partitioning the time under risk and explicitly examining the effect of SES finds no such thing (Karlsson, et al., 2008). Albeit, the study compares the DP risk one to five and six to ten years after SA receipt and, therefore, ends observation before the time frame in which the control variables start becoming more important in Article 1. Even though the rising impact of control variables cannot be related to other studies, it makes sense that factors besides SA receipt which occurred over a decade ago would start impacting the DP risk as well.

Lastly, focusing on sex differences, Article 1 finds the DP risk for men and women to be highly similar. While other studies do find differences between the sexes, these tend to be rather small, especially after all control variables are entered (Gjesdal & Bratberg, 2002; Karlsson, et al., 2008; Wallmann, et al., 2009). Considering the strong labour market attachment of women in Finland, as well as the small to non-existent sex differences in other studies, the findings presented here are well in line with previous research.

In conclusion, the analysis of the year-to-year change in the risk for DP according to previous SA receipt shows a very strong association between these two indicators, both in the short term, but also in the long and very long run. The DP risk is positively related to the length of SA receipt only for the first decade and converges after that. Overall, medically certified sickness periods are an

early indicator for compromised health and may be a first indicator for the potential loss of working ability much later on. The association of SA and DP receipt is similar for men and women. These findings are in line with existing research. A new finding derived from Article 1 is a notable peak in the DP risk one year after SA was first observed, which is caused by the rules of the Finnish DP system. Article 1 shows that the established gradient between length of SA receipt and risk for DP is strongest in the short term and diminishes over time. After about ten years, the DP risk of all SA recipients converges towards the low and stably raised risk of those with short SA periods. This is likely caused by the convergence of ill health among those with long and short sickness periods, as those with the most severe ill health have already dropped out of the labour market. Furthermore, the DP risk appears to be higher when analysed on a year-by-year basis.

7.2. Research question 2 – Labour market status and retirement mortality in Finland

How do the most common labour market statuses in Finland in ages 50–64 relate to the mortality risk in ages 65–70? Analysing the labour market status on an age-to-age basis, the three following sub-questions are asked:

a) *Does the negative association with DP diminish once other routes of labour market exit routes become available?*
b) *Are the associations between labour market status and mortality changing as retirement age approaches?*
c) *Are the associations similar to the ones found in other European countries?*

Article 2 finds that mortality in ages 65–70, i.e. retirement mortality according to previous labour market status is lowest among those who were employed at any given age between 50 and 64. All other labour market statuses are associated with higher mortality. However, after controlling for SES, it is almost solely previous DP recipients whose retirement mortality is elevated. Therefore, the analysis of the association between labour market status in late working life and retirement mortality focuses largely on the juxtaposition of the mortality of persons who are still employed and disability pensioners. The hazard for retirement mortality among disability pensioners is about twice as high as that of same-aged persons who are working. The results for both sexes are very similar, yet slight differences do exist. The risk for retirement mortality rises for men who are DP recipients at age 60 or later, whereas it only rises from age 63 to 64 among female DP recipients. Among men, also not being employed late in working life has a slight negative association with retirement mortality, albeit to a lesser degree than DP. This is demonstrated by the slightly elevated risk of men who were unemployed past age 60, as well as men who were already retired at age 63 and 64.

The first research sub-question asks whether the negative association of DP with retirement mortality decreases when other labour market exit routes become available. Neither Article 2 nor Article 4 finds any evidence that would

support this hypothesis. Both articles very clearly show that it is almost solely previous disability pensioners who are subject to higher retirement mortality. Article 2 analyses the different labour market statuses in more detail and finds that, among men, late unemployment and retiring a few years before age 65 are associated with a slightly raised mortality risk during retirement. This implies some degree of ill health being present in these groups of men, but the elevated risk associated with these two states is merely a third of the risk associated with DP. Therefore, the importance of DP as a predictor for retirement mortality does not diminish as retirement age approaches. On the contrary, it appears to remain the main pathway for health impaired men and women to leave the labour market, even when other routes for labour market withdrawal become available. These findings allow for the conclusion that discussion about the association of labour market status in late working life and retirement mortality may reasonably be simplified by focusing on those who remain employed and those who are disability pensioners while grouping all other labour market groups together.

The second sub-question is concerned with whether the association of labour market status and retirement mortality changes with age. As shown above, this question can be reduced to analysing whether the difference between those who remain employed and those who receive DP changes. Both Articles 2 and 4 clearly show that the risk for retirement mortality of disability pensioners compared to employed persons is elevated by the same margin throughout ages 50–60, and it holds true for DP being an absorbing state and a state that can be transitioned out of. Among men, DP receipt past age 60 is associated with a rising mortality risk, whereas among women this is only the case in ages 63–64. As a rough average encompassing all ages, disability pensioners have a risk for retirement mortality twice as high as that of same aged persons who are working, and that risk increases to about two and a half times towards age 65. One explanation for the rising risk associated with DP receipt could be that the health of disability pensioners is increasingly compromised the later they enter this state, while the average health of those remaining active in working life remains similar. This could be due to a simple selection effect of the less healthy individuals out of the labour market, but it would also be the observable result if leaving the labour market *caused* health to deteriorate. The latter scenario aligns with the long-discussed notion that retirement causes the onset of ill health (Behncke, 2012; Brockmann, et al., 2009; Hessel, 2016; Minkler, 1981), and that, in order to promote health among the older population, people should be kept in employment for as long as possible. Whether this is the case is the case is tested by two different means. Firstly, Article 2 explicitly examines whether leaving the labour market is in some way associated with retirement mortality and finds no statistically significant effects whatsoever. Another explanation for the rising retirement mortality risks associated with rising age among DP recipients could also be a selection effect which varies with age. It has been shown in a variety of settings and countries that the mortality of DP recipients is higher the younger the DP receipt was observed (Karlsson, et al., 2007; Wallmann, et al., 2006), and

this holds true even for retirement mortality (Kühntopf & Tivig, 2012; Quaade, et al., 2002; Wallmann, et al., 2006). This implies that DP becomes less of an indicator for ill health the later in life its receipt starts. While this seemingly contradicts the rising mortality risk associated with DP observed in Articles 2 and 4, it is important to remember that the rising risk is measured via HRs, i.e. the ratio of the hazard rate among disability pensioners compared to the hazard rate of persons working. It is obvious that the *relative* distance between those two groups increases past age 60, but that may be driven by a change in the hazard rate of either group. The long-known "Healthy worker selection effect" postulates that it is the group of persons remaining employed in the late working ages which becomes increasingly selected for good health (Carlsson, et al., 2012; Kühntopf & Tivig, 2012; Minkler, 1981). Indeed, the Finnish legislation explicitly allowed for less strict health evaluation in the Individual Early Retirement scheme, whose recipients are counted as disability pensioners, and less strict criteria still apply less strict criteria when evaluating DP applications past age 60 (Hakola, 2000; KELA, 2019a). The age discrimination of older workers is likely to add to the push of less healthy individuals out of workplaces which would additionally fuel the positive health selection among those who remain employed. It would remove mildly health impaired persons from those active on the labour market and add them to the pool of unemployed persons. Article 2 finds evidence for this theoretical scenario in the slightly raised and rising mortality risk of unemployed men past age 60 and men who retire one or two years before age 65, as compared to the risk of men who are still working. Article 4 explicitly analyses whether there is a "Healthy worker selection effect" present by looking at the (actual) hazard rates instead of the ratio between them, i.e. the HRs. It becomes apparent that the hazard for retirement mortality decreases for every labour market group as age increases, but the decline is somewhat stronger among those who remain employed. The rising risk for retirement mortality among disability pensioners past age 60 is, therefore, not indicative of particularly ill health in that group, but rather the opposite; those who remain employed are increasingly selected for good health. In conclusion, the association between retirement mortality and labour market status is rather stable when the latter is observed between age 50 and 60. From age 60 onwards, not working is ostensibly associated with an increasingly compromised survival during retirement. However, this is likely a selection effect which causes only the healthiest persons to remain in employment.

The last sub-question seeks to answer whether the situation in Finland is comparable to other countries. As shown in chapter 3.3 for a variety of countries and settings, the labour market status primarily associated with an elevated retirement mortality risk is DP, while all other groups have mortality largely equal to that of employed persons. The effect size found Articles 2 and 4 is not comparable to other studies because the different approaches cannot be related to each other directly. The only study with a somewhat comparable set up is Quaade et al. (2002) who measure labour market status of Danes born in 1930 at age 60 and follow up for mortality in ages 60–70. They find that disability

pensioners are approximately four times more likely to die than those who are employed at age 60. Even though the set-up of the analysis is somewhat comparable to Article 2, and the birth cohorts, as well as age under risk, show some overlap, the differences between the two studies are too vast to relate both effect sizes directly. It is, therefore, more fruitful to analyse whether the pattern of excess mortality among DP recipients compared to working persons is also present in other studies. The rising excess mortality of disability pensioners is not present in other studies at first glance. Rather the opposite is found, as the excess mortality is bigger the earlier a person retired. This is the case in the study of Tsai et al. (2005) which relates mortality in ages 65+ to (early) retirement in ages 55, 60, and 65. The study finds that only those who already retire by age 55 have a higher mortality than those who retire at age 65. However, the sample size is small and stems from employees of the American Shell Oil company. The institutional framework in that setting is quite different from Finland, and it is possible that the absence of the increasing relative difference between early and statutory retirees is due to the higher pressure of remaining employed in the United States. A more comparable setting is provided by Brockmann et al. (2009), who relate the mortality of Germans who retire in ages 60–65 to those remaining employed. They also find the mortality risk to be higher the earlier a person transitioned into DP. The findings of Tsai et al. (2005) and Brockmann et al. (2009) are, in fact, in alignment with the results in Article 2 and 4 in which the set up does not distinguish when a person transitions into DP but, instead, sums all DP recipients together. The lowering hazard rates among those who are disability pensioners which are present in Article 4 indicate that persons who enter this group later are in better health and, thus, drive the (absolute) hazard downward. This indirectly confirms that those who enter DP earlier are in worse health. This finding is also in line with Kalwij et al. (2013) who relate mortality in ages 65+ to years spent in different labour market statuses from age 58 onwards in the Netherlands. While that study does not explicitly find a rising mortality risk among DP recipients, it finds that every additional year spent in that state raises the mortality risk, which points toward a compounding negative effect. Lastly, Kühntopf and Tivig (2012) find that the remaining life expectancy at age 65 rises the later a person retires. This can be viewed as the inverted picture of the decreasing mortality hazard among those who are still employed found in Article 4. A novel finding in Article 2, which has not been present in any study thus far, is the substantially *lower* mortality risk among men who were part time pensioners at age 56, as well as among men who were outside of the labour market in their 60s but who had been employed at age 50. While being outside of the labour market is usually associated with a particularly vulnerable situation, the opposite seems to be the case among men who are in that state after having been employed at age 50. However, the low mortality risk of male part time pensioners might be evidence for a health preserving effect of reducing working hours, especially since the lower risk was also present in other ages, even though it was not statistically significant.

To sum up the considerations concerning research question 2, DP is and remains an important indicator for ill health in the late ages of labour market participation, it remains so up until the statutory retirement age, and its predictive power does not diminish when other routes for labour market withdrawal become available. Even though the selection for good health among those remaining active on the labour market increases with age, the relative difference between those who are working and DP recipients remains constant until about age 60, whereafter the differential increases among men, but only in ages 63 and 64 among women. That implies that measuring labour market status at age 60 is still a reliable proxy for adult age health, while measurements after that age may be misleading because of the increasing selection for very good health among those remaining employed, especially among men. Even though the exact effect size cannot be compared to other countries, the overall process appears to be similar to what is found in other studies.

7.3. Research question 3 – Ethnolinguistic differences in SA and DP

Are there ethnolinguistic differences in the risk of receiving DP according to previous SA receipt?

By and large, Article 3 finds that there are no ethnolinguistic differences in the risk for DP following SA receipt, despite Finnish-speaking people having higher risks of receiving both SA and DP. As neither group is marginalized, it can be concluded that it is not lack of access to resources which drives ethnolinguistic differences in the risk for being in either state of ill health, but that it is individual behaviour which influences those risks. Chapter 4 shows how differences in individual behaviour may be linked to differences in culture, i.e. differences in cultural practices and access to social and economic capital, and that these differences can be approximated by using the indicator of one's mother tongue. Hence, the Finnish welfare state has few options for equalizing both ethnolinguistic groups' risk for being in good or ill health and, instead, has to focus on equalizing the adverse outcomes when ill health has had an onset. Therefore, the absence of ethnolinguistic differences in progressing from a mild and temporary health impairment, i.e. SA receipt, to permanently and severely impaired health, i.e. DP receipt, is a success for the Finnish health care and social security system, as it implies that members of both ethnolinguistic groups are treated in a similarly when their state of health has objectively deteriorated.

Even if slight ethnolinguistic differences in progressing to DP after having received SA are present, this does not automatically imply that members of the two groups are treated differently within the Finnish welfare state. Chapter 3.1 shows that the risks for all-cause SA and DP sperately, as well as for DP according to previous SA receipt, are not overly sensitive for different proportions of underlying causes. This is in line with the findings in Article 3, where there are no systematic differences between Finnish and Swedish speakers – even though it is likely that there are differences in the medical diagnoses which are causing

the need for SA or DP (see below). Only if there were stark differences between Finnish and Swedish speakers in the proportion of underlying medical conditions would this have the potential to cause significant ethnolinguistic differences in the risk for progressing from SA to DP. This hypothetical scenario explains the two exceptions in which significant ethnolinguistic differences were found in Article 3.

The first exception from a similar risk for DP, conditional on SA receipt, is present one year after SA receipt is first recorded. In that year, the risk for transitioning to DP is at its absolute maximum among those who received SA compared to those who did not, and Swedish-speaking men have a substantially *higher* risk for DP, both among those with short and long SA receipt. If Swedish-speaking men were to have a higher proportion of conditions which are associated with low chances for recovery, then a fast transition from SA to DP could be the result. To my knowledge, there is as of yet no research which analyses ethnolinguistic differences in the proportions of underlying conditions for SA and DP. However, it can be indirectly deduced that such a difference in proportions is likely to exist by comparing the diagnosis which led to the granting of DP among those who did and did not hold a job before becoming disability pensioner. New disability pensioners who did hold a job have a higher proportion of musculoskeletal diagnoses, while those who did not hold a job have a much higher proportion of mental diagnoses (Finnish Centre for Pensions, 2020b; 2020c). Since a higher share of Swedish speakers is employed, it may be possible that a higher proportion of Swedish speakers has musculoskeletal conditions which causes their need for DP. Even though previous research cannot find a clear gradient for the DP risk associated with different medical diagnoses, it is obvious that different medical diagnoses are related to different DP risks (see chapter 3.1.). It is possible that some conditions imply a higher DP risk in the short run, while others may imply a higher risk in the long run. This would not necessarily show in analyses which sum up all years under risk, and that might be the reason behind different gradients between the conditions showing up for different lengths of follow-up time. If different conditions were, indeed, related to different DP risks at different times, it would show in the set-up as employed in Article 3, even though it does not control for medical diagnoses. Different conditions being associated with different risks for DP at different times and/or different proportions of underlying conditions between the ethnolinguistic groups could possibly explain the significant ethnolinguistic differences which are present among men, one year after the receipt of SA, without violating the constitutional stipulation of equal treatment for both ethnolinguistic groups.

The second exception from the overall ethnolinguistic similarity in the risk for DP subsequent to SA receipt is a sporadically lower risk among Swedish-speaking women in the long run, i.e. from eight years since first SA receipt forward. It is present both among those who received SA for a shorter and a longer period. It can be speculated that this finding may be related to a lower prevalence of mental issues among Swedish-speaking women for a variety of

reasons: Even though the ethnolinguistic gradient for any outcome tends to be smaller among women, when it comes to the risk of receiving SA, the gradient between disfavouring Finnish speakers is largest among women who do not have a partner, are unemployed, and have low income (Reini & Saarela, 2017). The named three risk factors in turn are known to increase SA and DP, especially due to mental health issues (Leinonen, et al., 2014; 2018b; Polvinen, et al., 2016). Swedish-speaking women, on the other hand, have a higher union stability (Saarela & Finnäs, 2013; 2014b; 2018), tighter family relations (Nyqvist, et al., 2008), and experience more social cohesion (see chapter 4.3.) which are likely to modify the risk for ill health so grave that the need for DP arises, especially due to mental issues. Furthermore, even given the same amount of ill health, it is possible that Swedish-speaking women may have other means of providing for themselves, e.g. relying on their partner's income, instead of going through the process of applying for DP. The higher income of Swedish-speaking husbands might allow for such an arrangement more often (Härtull & Saarela, 2018; Saarela & Finnäs, 2004). In addition to that, Swedish-speaking women have been found to be outside of the labour market slightly more often than Finnish-speaking women (Saarela & Finnäs, 2005a). Even though this mechanism is vastly different than that speculated to cause the significant difference in the DP risk one year after SA receipt among men, it is again not marginalization on part of the Finnish state, but rather a difference in culture on part of the individual which is speculated to be the cause the observable ethnolinguistic difference in the association of SA and DP.

The Finnish Constitution stipulates that both ethnolinguistic groups are to be treated and provided for on an equal basis. Even though there are sizeable differences in the risk for receiving SA and DP between the Finnish- and Swedish-speaking citizens of Finland, their risk of progressing to DP according to previous SA receipt is similar. There are two exceptions from the overall similarity, but these are likely related to differences in underlying conditions which, in turn, are related to differences in culture which is associated with belonging the respective ethnolinguistic group. In conclusion, the Finnish welfare system does provide equity for both its ethnolinguistic groups in the case ill health has had an onset, as analysed in the association of SA receipt with the risk for DP receipt.

7.4. Research question 4 – Ethnolinguistic differences in labour market status and retirement mortality

Are there ethnolinguistic differences in the mortality risk according to previous labour market status?

According to Article 4, the lowest mortality risk in ages 65–70 is found among persons who were still employed in the late working ages, while DP recipients have the highest risk. There are no apparent differences between the ethnolinguistic groups whatsoever.

In accordance with the absence of ethnolinguistic differences in the risk for receiving DP according to previous SA receipt, i.e. research question 3 (see

chapter 7.3.), neither are there are ethnolinguistic differences in the mortality risk according to previous DP receipt, even though Finnish-speaking Finns have a significantly higher risk of being in either state. This adds further evidence to the proposition that it is differences in the culture associated with belonging to either ethnolinguistic group which are responsible for shaping the risk of being in good or ill health. The risk of progressing from one indicator of ill health to an indicator of more severe ill health, on the other hand, is shaped by the Finnish welfare state, and it appears that it treats members of both ethnolinguistic groups in a similar manner once a given amount of health deterioration has had an onset. Even though it is likely that the proportions of medical diagnoses leading to being granted DP, as well as causes of death, differ between the two groups, it appears that the relationship between all-cause DP and all-cause mortality is not overly sensitive to differences in underlying medical conditions.

In summary, the risk for retirement mortality according to previous labour market status is similar for both ethnolinguistic groups. This adds further evidence to the conclusion of research question 3; the Finnish welfare state does provide similarly for its Finnish- and Swedish-speaking Finns once ill health has had an onset and fulfils the stipulation set in the Constitution.

8. Concluding remarks

This thesis uses three indicators in order to capture three different stages of ill health which are available from register data. SA captures short-term health impairments, whereas DP is indicative of more serious and long-standing health impairments, and death is the ultimate form of ill health. These indicators also roughly correspond to the progression through a person's life course as SA is analysed over the whole working life, DP typically occurs in the later stages of working life, and mortality is then analysed in the early ages of retirement. The analyses presented in this kappa show that these three indicators, SA, DP, and mortality, are highly interrelated and well-suited to capture the progression from good health towards ill health but also through the life course. This is paired with the set-up of a natural experiment in which two readily distinguishable population groups, none of which are marginalized, operate within the same institutional framework, yet show marked differences in behaviours and culture.

8.1. Main findings and policy implications

Starting from a point relatively early in the life course, at which people are still very healthy, SA is found to be a major risk factor for future DP receipt, and it remains so for up to two decades into the future. This is very much in line with other studies, albeit the risks found in the articles this kappa is based are much higher than what any other study has found. Another new finding is that the association of SA and DP continues to be significant and strong over the course of two decades. This suggests, on the one hand, that present data on SA receipt may be a useful tool for projecting future DP needs. On the other hand, the long reach of first-time SA receipt suggests that, in order to prevent the need for DP, the need for SA should be targeted. Therefore, early interventions, prevention, and regular check-ups might have the potential to decrease the need for DP. SA receipt should be treated as an important early warning sign and preventive, as well as restorative, measures should ideally be targeted towards healthy persons in order to avoid any low-level health impairment which may leave a person in need for sick leave long enough warrant the receipt of SA.

Moving on to a later point in late working life when severe, permanent ill health has already had an onset, DP is found to be a major risk factor for a heightened mortality risk during retirement. This is in line with studies from other countries, and the level of the association found in Finland is roughly comparable to what other studies have found. The strong association of DP and retirement mortality suggests that monitoring the numbers of disability pensioners may help to project future mortality rates, and how these might change as a consequence of the current and continuous decline in the number of DP recipients. Furthermore, it appears that people who become disability pensioners very late in their working life might not be in overall bad health. This means that changing the attitudes on the employability of older workers might open up a new segment of hitherto unused, but highly skilled and experienced workforce. Especially when combined with measures to keep up health, regular

monitoring, and measures to combat onsetting health problems, this may boost the work force, thus, lowering the societal cost for DP and increasing the final amount of pensions for the individual. This appears to be a feasible, since the negative health selectivity of disability pensioners decreases markedly past age 60, while simultaneously the positive health selectivity of those who remain employed increases. The current system in which most people are already retired by the age of 65 is wasting the manpower of persons who may very well still be able to work. It has been found that involuntary retirement is related to health deterioration, while voluntary retirement is not (see chapter 3.3.). This thesis extends this picture with hints that reduced working hours might be associated with a mortality advantage. All of this lends credibility to the theory proposing to extend working lives up to age 75, but at lower working hours than today over the whole life course, in order to prepare the social security systems for the increased longevity of the population, as it would keep the total amount of work hours over the life course constant (Vaupel & Loichinger, 2006).

For both the association between SA and DP, as well as that between DP and retirement mortality, no ethnolinguistic differences are found. This suggests the absence of different treatment by the welfare system in general and nurses, physicians, and officials in charge of making DP decisions in particular – which is the outcome envisioned by the Finnish Constitution, and the results as presented in this kappa confirm that this is the case. However, the absence of differences in this progression towards ill health despite marked differences for the risk of being in either state allows for an additional conclusion: It has to be kept in mind that the people who are analysed for either association, i.e. SA with DP and DP with retirement mortality, do not overlap according to the specifications of the data selection. However, it is not unreasonable to assume that the principal mechanisms of progressing from good health towards ill health which were at play when people who are old today were young decades ago will still be at play in a few decades when those who are young today will be old. We know that DP is a major risk factor for mortality and that SA is a major risk factor for DP. We know that Swedish speakers have a lower risk for either of these outcomes, but there are no ethnolinguistic differences in the progression from one outcome to an outcome of more severe ill health. Under the assumption that the general factors at play remain somewhat comparable, it stands to reason that the ethnolinguistic differences in mortality are ultimately decided by factors which occur much earlier in the process of health deterioration, and presumably much earlier in the life course, i.e. factors affecting the first observed SA receipt. This argument reinforces the already stated need for easy access to high-quality health care and prevention. It does not only apply to health impairments which are already in need of care, but also, and especially, to early interventions and prevention measures in order to avoid having developing health impairments cross the threshold of needing clinical treatment. Ideally, prevention would include emphasis on a healthy lifestyle, as this one of the aspects in which the ethnolinguistic groups are known to differ. Already today, there seem to be no ethnolinguistic differences in health outcomes between those who are the

"socially most successful", i.e. those who have a partner, high education, and high income, which shows that the gap in health outcomes between the two ethnolinguistic groups does not have to be a given fact. The findings in this kappa might serve as a compass for amending the differences in health outcomes which are prevalent in Finland between the two ethnolinguistic groups, even in absence of marginalization and discrimination and with equal access to public resources.

8.2. Strengths and limitations

The strength of this thesis is that it is based on high-quality register data. The data are, thus, highly valid, and there are no problems stemming neither from sample or panel attrition nor self-report bias. The data have a very long follow-up time during which individuals can be followed up longitudinally, which, to my knowledge, is the longest follow-up time for research concerning the association of SA and DP. The very large sample size allows for reliable analyses of the Finnish population as a whole, and the oversampling of the Swedish-speaking population allows for meaningful analyses comparing the two ethnolinguistic groups.

Nevertheless, five areas of limitations have to be pointed out as well. Firstly, a more detailed sickness absence variable would have deepened the analysis. We did not have any information on actual sickness spells because the length of the total sickness absence was approximated via known income replacement rates. Therefore, it is unknown whether the total period of sickness absence was continuous or contained several separate sickness spells. It is also unknown whether SA was paid for full or partial sick leave. However, it was only possible to draw partial SA from 2007 onwards, and, hence, this problem only applies to the last four years of the whole observation period of 22 years. In addition to that, partial SA is up until today not very widely used and only a marginal share of sickness spells were partial sickness spells when it was first introduced.

Secondly, it was not possible either to determine whether DP was paid as a full or partial benefit. Partial disability pensioners retain a link to the labour market, even though their health is objectively deteriorated. Whether the aspect of working or DP is of higher importance is a matter of what research question is asked. Questions concerning how people with decreased states of health may remain economically active, i.e. how to prolong the working life, would not be complete without researching partial DP as a separate state. However, this thesis uses a lens that views work ability in more discrete terms of "yes" and "no". Therefore, among partial DP recipients, the aspect of decreased work ability is of more importance than the aspect of remaining partially active in the labour market. Furthermore, partial DP is not widely used and, thus, should not severely affect the results reported in this kappa.

Thirdly, no information for the underlying medical diagnoses for SA or DP receipt was available. Including these in the analysis would have had the potential to shed additional light on 1) whether different medical conditions alter the association of progressing to a state of more severe ill health, 2) whether this relationship is different at different times, and 3) whether the two

ethnolinguistic groups differ in this respect. Even if the association of all-cause SA and DP receipt, as well as all-cause DP and mortality, is the same in both ethnolinguistic groups, it is possible that there are differences by disease categories, as it was speculated to be the reason behind the few statistically significant differences between Finnish and Swedish speakers in the association of SA and DP.

Fourthly, this thesis relies on the language indicator issued by Statistics Finland, i.e. a person's own mother tongue. However, as outlined in chapter 4, many Swedish speakers have a bilingual background. Hence, it is likely that there is a great number of persons who are registered with Finnish as their mother tongue who, nevertheless, have strong ties to the Swedish-speaking community, and vice versa. To my knowledge, there is no research so far on how persons with mixed background fare in terms of SA and DP. However, from other health aspects and mortality (see chapter 4.3.), it is known that this group usually occupies an in-between position, with a position of one's own language closer to the unilingual background. It is, therefore, likely that this would also be the case for the risk of receiving SA or DP. However, the analysis of how persons with mixed background progress towards ill health, especially from SA to DP, would yield additional insights in how cultural background modifies the risk in the two time points where ethnolinguistic differences were found.

Lastly, even though the overall sample size of the data used is large, the case numbers still are quite small in small some groups. This mainly concerns Article 3 where there are very few DP events past year 10, especially among the Swedish-speaking population. This is not a concern so grave that the whole effect would become questionable, but the effect size does become slightly erratic. This is also a reason why the length of SA receipt was only dichotomized into "less than two months" and "two months and longer". Even though a more detailed scale might have revealed a more detailed gradient in the impact on the DP, the numbers in each group would have been very small and the estimates less stable.

8.3. Future research

Firstly, although the data set, which all analyses in this kappa are based on, is of high quality, even bigger data sets, e.g. involving the whole of Finland, would allow for analyses with more detail. This would be especially beneficial when the research question involves an ethnolinguistic component. In addition to that, a multigenerational link would be desirable, as it would allow to study persons of mixed background as a separate group. While the follow-up time of over 20 years in the data set used is good as it is, the observation ended a decade ago from the time this thesis was written. Thus, longer follow-up involving the latest data available would deepen the understanding by possibly adding a time trend dimension, especially in light of declining numbers of DP recipients. Additionally, the last pension reform caused and continues to cause a rise in the age at which people retire, thus, increasing share of people who remain employed until age 65 and even beyond that. Paired with the decreasing share of disability pensioners,

the increasing selection for good health among those who remain employed past age 60, as found in Article 4, might be changing in recent years.

Secondly, medical aspects would be worth exploring further. This encompasses factors such as more precise length of sickness absences, as well as information on full and partial SA and DP benefits. But especially the underlying medical conditions would provide valuable insights. It appears to be a promising avenue to explore whether certain diagnoses for SA result in different DP patterns over time and how these DP diagnoses relate to mortality. This would be particularly interesting from an ethnolinguistic point of view, as it could confirm whether the speculated differences in underlying diagnoses do, indeed, contribute to the few observable ethnolinguistic between Finnish and Swedish speakers found in Article 3.

Lastly, more research into the ethnolinguistic health differences centring on DP would be enlightening. This encompasses the mortality risk of working-aged disability pensioners according to previous SA receipt. Since SA appears to be a very early indicator for future severe ill health, it would be worthwhile to research factors leading to SA receipt in general and whether these differ between the Finnish- and Swedish-speaking population, and the position of persons with mixed background in this regard. Finally, it could be worth exploring how SA receipt itself is associated with mortality, overall as well as for persons with mono- and bilingual background.

References

Adelman, R. D., Tmanova, L. L., Delgado, D., Dion, S. & Lachs, M. (2014). Caregiver burden: a clinical review. JAMA, 311(10), 1052–1060. doi: https://doi.org/10.1001/jama.2014.304

Alexanderson, K. A., Borg, K. E. & Hensing, G. K. (2005). Sickness absence with low-back, shoulder, or neck diagnoses: An 11-year follow-up regarding gender differences in sickness absence and disability pension. Work, 25(2), 115-124.

Alexanderson, K., Kivimäki, M., Ferrie, J. E., Westerlund, H., Vahtera, J., Singh-Manoux, A., Melchior, M., Zins, M., Goldberg, M. & Head, J. (2012). Diagnosis-specific sick leave as a long-term predictor of disability pension: a 13-year follow-up of the GAZEL cohort study. Journal of Epidemiology & Community Health, 66(2), 155-159. doi: http://dx.doi.org/10.1136/jech.2010.126789

Allardt, E. & Starck, C. (1981). Språkgränser och samhällsstruktur. Finlandssvenskarna i ett jämförande perspektiv. [Language boundaries and societal structure. Finlandswedes in a comparative perspective]. Stockholm: Almqvist & Wiksell.

Babinska, I., Veselska, Z., Bobakova, D., Pella, D., Panico, S., Reijneveld, S., Jarcuska, P., Zezula, I.. Geckova, A. M. & The HEPA-meta team. (2013). Is the cardiovascular risk profile of people living in Roma settlements worse in comparison with the majority population in Slovakia? International Journal of Public Health, 58(3), 417-425. doi: https://doi.org/10.1007/s00038-013-0463-4

Bakhshaie, J., Rogers, A. H., Mayorga, N. A., Ditre, J., Rodríguez-Cano, R., Ruiz, A. C., Viana, A. G., Garza, M., Lemaire, C., Ochoa-Perez, M., Bogiaizin, D. & Zvolensky, M. J. (2019). Perceived Racial Discrimination and Pain Intensity/Disability Among Economically Disadvantaged Latinos in a Federally Qualified Health Center: The Role of Anxiety Sensitivity. Journal of Immigrant and Minority Health, 21(1), 21-29. doi: https://doi.org/10.1007/s10903-018-0715-8

Baumann, I. (2016). Job search strategies and unemployment duration. In I. Baumann, The Plight of Older Workers. Labor Market Experience after Plant Closure in the Swiss Manufacturing Sector (pp. 91-108). Springer Open. doi: https://doi.org/10.1007/978-3-319-39754-2

Behncke, S. (2012). Does retirement trigger ill health? Health Economics, 21(3), 282-300. doi: https://doi.org/10.1002/hec.1712

Björkenstam, C., Alexanderson, K., Björkenstam, E., Lindholm, C. & Mittendorfer-Rutz, E. (2014). Diagnosis-specific disability pension and risk of all-cause and cause-specific mortality – a cohort study of 4.9 million inhabitants in Sweden. BMC Public Health, 14, 1247. doi: https://doi.org/10.1186/1471-2458-14-1247

Blom, N., Huijts, T. & Kraaykamp, G. (2016). Ethnic health inequalities in Europe. The moderating and amplifying role of healthcare system characteristics. Social Science & Medicine, 158, 43-51. doi: https://doi.org/10.1016/j.socscimed.2016.04.014

Blomgren, J., Martikainen, P., Mäkelä, P. & Valkonen, T. (2004). The effects of regional characteristics on alcohol-related mortality—a register-based multilevel analysis of 1.1 million men. Social Science & Medicine, 58(12), 2523-2535. doi: https://doi.org/10.1016/j.socscimed.2003.09.027

Borg, K., Hensing, G. & Alexanderson, K. (2004). Risk factors for disability pension over 11 years in a cohort of young persons initially sick-listed with low back, neck, or shoulder diagnoses. Scandinavian Journal of Public Health, 32(4), 272-278. doi: https://doi.org/10.1080/14034940310019524

Boutziona, I., Papanikolaou, D. S. & Apostolidis, A. (2020). Healthcare Access, Quality, and Satisfaction Among Albanian Immigrants Using the Emergency Department in Northern Greece. Journal of Immigrant and Minority Health, 22(2), 512-525. doi:

https://doi.org/10.1007/s10903-020-00983-x

Brockmann, H., Müller, R. & Helmert, U. (2009). Time to retire – Time to die? A prospective cohort study of the effects of early retirement on long-term survival. Social Science & Medicine, 69(2), 160-164. doi: https://doi.org/10.1016/j.socscimed.2009.04.009

Brown, R. L. & McDaid, J. (2013). Factors Affecting Retirement Mortality. North American Actuarial Journal, 7(2), 24-43. doi: https://doi.org/10.1080/10920277.2003.10596083

Böckerman, P., Kanninen, O. & Suoniemi, I. (2018). A kink that makes you sick: The effect of sick pay on absence. Journal of Applied Economics, 33(4), 568-579. doi: https://doi.org/10.1002/jae.2620

Börsch-Supan, A., Bucher-Koenen, T. & Hanemann, F. (2020). Early determinants of work disability in an international perspective. Demography, 57(5), 1853–1879. doi: https://doi.org/10.1007/s13524-020-00902-7

Carlsson, S., Andersson, T., Michaëlsson, K., Vågerö, D. & Ahlbom, A. (2012). Late retirement is not associated with increased mortality, results based on all Swedish retirements 1991-2007. European Journal of Epidemiology, 27, 483-486. doi: https://doi.org/10.1007/s10654-012-9696-4

Coe, N. B. & Lindeboom, M. (2008). Does retirement kill you? Evidence from early retirement windows. Discussion Paper No. 3817, Bonn, Germany: Institute for the Study of Labor. doi: https://doi.org/10.2139/ssrn.1295315

Coe, N. B. & Zamarro, G. (2011). Retirement effects on health in Europe. Journal of Health Economics, 30(1), 77-86. doi: https://doi.org/10.1016/j.jhealeco.2010.11.002

Das-Munshi, J., Leavey, G., Stansfeld, S. A. & Prince, M. J. (2012). Migration, social mobility and common mental disorders: critical review of the literature and meta-analysis. Ethnicity & Health, 17(1-2), 17-53. doi: https://doi.org/10.1080/13557858.2011.632816

du Plooy, D. R., Lyons, A. & Kashima, E. S. (2019). The Effect of Social Support on Psychological Flourishing and Distress Among Migrants in Australia. Journal of Immigrant and Minority Health, 21(2), 278-289. doi: https://doi.org/10.1007/s10903-018-0745-2

Espinoza-Castro, B., Vásquez Rueda, L. E., Mendoza Lopez, R. V. & Radon, K. (2019). Working Below Skill Level as Risk Factor for Distress Among Latin American Migrants Living in Germany: A Cross-Sectional Study. Journal of Immigrant and Minority Health, 21(5), 1012-1018. doi: https://doi.org/10.1007/s10903-018-0821-7

Finlex. (2021). Språklag 6.6.2003/423 [Language Law 6.6.2003/423]. Retrieved 24.8.2021, from https://www.finlex.fi/sv/laki/ajantasa/2003/20030423

Finnish Centre for Pensions. (2020a). Different pensions: When your working ability has been reduced. Retrieved 8.12.2020, from https://www.tyoelake.fi/en/different-pensions/disability-pension-if-your-working-ability-has-been-reduced/#title

Finnish Centre for Pensions. (2020b). New retirees on an earnings-related disability pension by disease category. Retrieved 3.11.2020, from https://tilastot.etk.fi/pxweb/en/ETK/ETK_120tyoelakkeensaajat_40tyoelakkeelle_siirtyneiden_lkm/elsi_t10_tk_diag.px/?rxid=27530ec5-a6b9-488d-b9a0-3912bdb1214d

Finnish Centre for Pensions. (2020c). New retirees on earnings-related and national disability pensions by disease category. Retrieved 25.2.2021, from https://tilastot.etk.fi/pxweb/en/ETK/ETK_110kaikki_elakkeensaajat_30elakkeelle_siirtyneiden_lkm/elsi_k10_tk_diag.px/?rxid=27530ec5-a6b9-488d-b9a0-3912bdb1214d

Finnish Centre for Pensions. (2022a). New retirees on an earnings-related disability pension by disease category. Retrieved 6.2.2022, from

https://tilastot.etk.fi/pxweb/en/ETK/ETK_120tyoelakkeensaajat_40tyoelakkeelle_siirtyneiden_lkm/elsi_t10_tk_diag.px/table/tableViewLayout1/?rxid=27530ec5-a6b9-488d-b9a0-3912bdb1214d

Finnish Centre for Pensions. (2022b). National pension. Retrieved 21.1.2022, from https://www.etk.fi/en/finnish-pension-system/pension-security/national-pension/

Finnish Institute for Health and Welfare. (2020). Sotkanet.fi; Population aged 25-64 receiving disability pension, as % of total population of same age. Retrieved 19.10.2020, from https://sotkanet.fi/sotkanet/en/taulukko/?indicator=s84vtU4ptNatMAMA&region=s07MBAA=&year=sy5ztC7V0zUEAA==&gender=m;f;t&abs=f&color=f&buildVersion=3.0-SNAPSHOT&buildTimestamp=202010160741

Finnäs, F. (1986). Den finlandssvenska befolkningsutvecklingen 1950–1980. En analys av en språkgrupps demografiska utveckling och effekten av blandäktenskap. [The Finlandswedish population developement 1950–1980. An analysis of the language group's demographic development and the effect of mixed marriages]. Helsinki: Svenska Litteratursällskapet i Finland.

Finnäs, F. (1997). Heterogeneity, and Divorce: The Case of the Swedish-speaking Population in Finland. Acta Sociologica, 40(3), 263-277. doi: https://doi.org/10.1177/000169939704000303

Försäkringskassan. (2021). Sickness benefit. Retrieved 19.2.2021, from https://www.forsakringskassan.se/english/sick/employee/sickness-benefit

Gjesdal, S. & Bratberg, E. (2002). The role of gender in long-term sickness absence and transition to permanent disability benefits: Results from a multiregister based, prospective study in Norway 1990–1995. European Journal of Public Health, 12(3), 180-186. doi: https://doi.org/10.1093/eurpub/12.3.180

Gjesdal, S. & Bratberg, E. (2003). Diagnosis and duration of sickness as predictors for disability pension: results from a three-year, multi-register based and prospective study. Scandinavian Journal of Public Health, 31(4), 246-254. doi: https://doi.org/10.1080/14034940210165154

Gjesdal, S., Bratberg, E. & Mæland, J. G. (2011). Gender differences in disability after sickness absence with musculoskeletal disorders: five-year prospective study of 37,942 women and 26,307 men. BMC Musculoskeletal Disorder, 12, 37. doi: https://doi.org/10.1186/1471-2474-12-37

Gjesdal, S., Haug, K., Ringdal, P., Mæland, J. G., Hagberg, J., Røraas, T., Vollset, S. E., Alexanderson, K. (2009a). Sickness absence with musculoskeletal or mental diagnoses, transition into disability pension and all-cause mortality: A 9-year prospective cohort study. Scandinavian Journal of Public Health, 37(4), 387-394. doi: https://doi.org/10.1177/1403494809103994

Gjesdal, S., Mæland, J. G., Svedberg, P., Hagberg, J. & Alexanderson, K. (2008). Role of diagnoses and socioeconomic status in mortality among disability pensioners in Norway—a population-based cohort study. Scandinavian Journal of Work, Environment & Health, 34(6), 479-482. doi: https://doi.org/10.5271/sjweh.1286

Gjesdal, S., Svedberg, P., Hagberg, J. & Alexanderson, K. (2009b). Mortality among disability pensioners in Norway and Sweden 1990—96: Comparative prospective cohort study. Scandinavian Journal of Public Health, 37(2), 168-175. doi: https://doi.org/10.1177/1403494808100937

Gould, R., Nyman, H. & Lampi, J. (2008). Osatyökyvyttömyyseläkkeen toimivuus työeläkejärjestelmässä [How well does the partial disability pension function in the earnings-related pension scheme. In Finnish]. Eläketurvakeskuksen keskustelualoitteita 2008:7, Helsinki, Finland: Finnish Centre for Pensions. https://www.julkari.fi/handle/10024/129127

Hakola, T. (2000). Navigating through the Finnish pension system. VATT Discussion

Papers No. 224, Helsinki, Finland: Government Institute for Economic Research. https://urn.fi/URN:NBN:fi-fe2018042618824

Halford, C., Wallman, T., Welin, L., Rosengren, A., Bardel, A., Johansson, S., Eriksson, H., Palmer, E.; Wilhelmsen, L. & Svärdsudd, K. (2012). Effects of self-rated health on sick leave, disability pension, hospital admissions and mortality. A population-based longitudinal study of nearly 15,000 observations among Swedish women and men. BMC Public Health, 12, 1103. doi: https://doi.org/10.1186/1471-2458-12-1103

Hallberg, D., Johansson, P. & Josephson, M. (2014). Early Retirement and Post Retirement Health. IZA Discussion Paper No. 8260, Bonn, Germany: Institute for the Study of Labor. https://ssrn.com/abstract=2460203

Halonen, J. I., Solovieva, S., Pentti, J., Kivimäki, M., Vahtera, J. & Viikari-Juntura, E. (2016). Effectiveness of legislative changes obligating notification of prolonged sickness absence and assessment of remaining work ability on return to work and work participation: a natural experiment in Finland. Occupational and Environmental Medicine, 73, 42-50. doi: https://doi.org/10.1136/oemed-2015-103131

Hannelius, U., Salmela, E., Lappalainen, T., Guilllot, G., Lindgren, C. M., von Döbeln, U., Lahermo, P. & Kere, J. (2008). Population substructure in Finland and Sweden revealed by the use of spatial coordinates and a small number of unlinked autosomal SNPs. BMC Genetics, 9, 54. doi: https://doi.org/10.1186/1471-2156-9-54

Hannikainen, M. (2013). Comparison, measurement and economization. The origin of the retirement age of 65 in Finland. In H. Haggrén, J. Rainio-Niemi & J. Vauhkonen (Eds.), Multi-layered Historicity of the Present : Approaches to Social Science History (pp. 297-311). Helsinki: Unigrafia.

Heikkilä, R. (2011). Bättre folk, bättre smak? Suomenruotsalaisten maku ja kulttuuripääoma [Better people, better taste? Finlandswedish taste and cultural capital]. Doctoral thesis, Helsinki, Finland: University of Helsinki, Faculty of Social Sciences, Department of Social Studies.

Helakorpi, S., Suominen, S., Laitalainen, E., Lindström, B., Uutela, A. & Puska, P. (2009). Suomen- ja ruotsinkielisten erot elintavoissa ja koetussa terveydessä [Differences in lifestyle and perceived health between Finnish and Swedish speakers]. Suomen Lääkärilehti, 64(36), 2891-2899.

Helgadóttir, B., Narusyte, J., Ropponen, A., Bergström, G., Mather, L., Blom, V. & Svedberg, P. (2019). The role of occupational class on the association between sickness absence and disability pension: A Swedish register-based twin study. Scandinavian Journal of Work, Environment and Health, 45(6), 622-630. doi: https://doi.org/10.5271/sjweh.3816

Herbig, B., Dragano, N. & Angerer, P. (2013). Health in the long-term unemployed. Deutsches Ärzteblatt International, 110(23-24), 413-419. doi: https://doi.org/10.3238/arztebl.2013.0413

Hernaes, E., Markussen, S., Piggott, J. & Vestad, O. L. (2013). Does retirement age impact mortality? Journal of Health Economics, 32(3), 586-598. doi: https://doi.org/10.1016/j.jhealeco.2013.03.001

Hessel, P. (2016). Does retirement (really) lead to worse health among European men and women across all educational levels? Social Science & Medicine, 151, 19-26. doi: https://doi.org/10.1016/j.socscimed.2015.12.018

Hietaniemi, M. & Ritola, S. (2007). The Finnish Pension System. Handbooks 2007:6, Helsinki, Finland: Finnish Centre for Pensions. https://urn.fi/URN:ISBN:978-951-691-081-2

Hjellset, V. T. & Ihlebæk, C. (2019). Bidimensional Acculturation and Psychological Distress in Pakistani Immigrant Women in Norway: A Cross-Sectional Study. Journal of Immigrant and Minority Health, 21(3), 508-514. doi: https://doi.org/10.1007/s10903-018-0764-z

Hong, J. (2019). Effects of Ethnic Identity on the Relationship Between Mental Health

and Perceived Discrimination Among Ethnic Return Migrants: The Case of Korean Chinese Return-Migrated to South Korea. Journal of Immigrant and Minority Health, 21(3), 522-532. doi: https://doi.org/10.1007/s10903-018-0775-9

Hult, C., Stattin, M., Janlert, U. & Järvholm, B. (2010). Timing of retirement and mortality - A cohort study of Swedish construction workers. Social Science & Medicine, 70(10), 1480-1486. doi: https://doi.org/10.1016/j.socscimed.2009.10.043

Hummer, R. A., Benjamins, M. R. & Rogers, R. G. (2004). Racial and Ethnic Disparities in Health and Mortality Among the U.S. Elderly Population. In N. B. Anderson, R. A. Bulatao & B. Cohen (Eds.), Critical Perspectives on Racial and Ethnic Differences in Health in Late Life. Washington: National Academies Press (US). https://www.ncbi.nlm.nih.gov/books/NBK25528/

Hytti, H. (2006). Why are Swedes sick but Finns unemployed? International Journal of Social Welfare, 15(2), 131-141. doi: https://doi.org/10.1111/j.1468-2397.2006.00412.x

Hyyppä, M. T. & Mäki, J. (2001a). Why do Swedish-speaking Finns have longer active life? An area for social capital research. Health Promotion International, 16(1), 55-64. doi: https://doi.org/10.1093/heapro/16.1.55

Hyyppä, M. T. & Mäki, J. (2001b). Individual-Level Relationships between Social Capital and Self-Rated Health in a Bilingual Community. Preventive Medicine, 32(2), 148-155. doi: https://doi.org/10.1006/pmed.2000.0782

Hyyppä, M. T. & Mäki, J. (2003). Social participation and health in a community rich in stock of social capital. Health Education Research, 18(6), 770-779. doi: https://doi.org/10.1093/her/cyf044

Härtull, C. & Saarela, J. (2014). Ethno-linguistic Groups during an Economic Recession: Low-income Earners in the 1990s' Finland. Finnish Yearbook of Population Research, 49, 87-103. doi: https://doi.org/10.23979/fypr.48425

Härtull, C. & Saarela, J. (2018). Endogamy and income in native couples: the case of Finland. International Journal of Manpower, 39(2), 205-221. doi: https://doi.org/10.1108/IJM-01-2016-0017

Härtull, C. & Saarela, J. (2019). Ethno-Linguistic Affiliation and Income Poverty in Native Households with Children: Finland 1987–2011. Social Indicators Research, 144(1), 403-424. doi: https://doi.org/10.1007/s11205-018-2041-x

Ilmakunnas, P. & Ilmakunnas, S. (2018). Health and retirement age: Comparison of expectations and actual retirement. Scandinavian Journal of Public Health, 46(19), 18-31. doi: https://doi.org/10.1177/1403494817748295

Johansson, A. & Salminen, S. (1999). A minority with few occupational accidents: The case of Swedish-speaking Finns. American Journal of Industrial Medicine, 36(S1), 37-38. doi: https://doi.org/10.1002/(SICI)1097-0274(199909)36:1+<37::AID-AJIM14>3.0.CO;2-U

Kalwij, A., Alessie, R. & Knoef, M. (2013). Pathways to retirement and mortality risk in the Netherlands. European Journal of Population, 29(2), 221-238. doi: https://doi.org/10.1007/s10680-013-9283-8

Kangas, O., Niemelä, M. & Varjonen, S. (2013). Narratives and numbers. Politics in the making of sickness insurance in Finland. In H. Haggrén, J. Rainio-Niemi & J. Vauhkonen (Eds.), Multi-layered historicity of the present. Approaches to social science history (pp. 271-296). Helsinki: University of Helsinki.

Karlsson, N. E., Carstensen, J. M., Gjesdal, S. & Alexanderson, K. A. (2007). Mortality in relation to disability pension: Findings from a 12-year prospective population-based cohort study in Sweden. Scandinavian Journal of Public Health, 35(4), 341-347. doi: https://doi.org/10.1080/14034940601159229

Karlsson, N. E., Carstensen, J. M., Gjesdal, S. & Alexanderson, K. A. (2008). Risk factors for disability pension in a population-

based cohort of men and women on long-term sick leave in Sweden. European Journal of Public Health, 18(3), 224-231. doi: https://doi.org/10.1093/eurpub/ckm128

Karpansalo, M., Manninen, P., Kauhanen, J., Lakka, T. A. & Salonen, J. T. (2004). Perceived health as predictor of early retirement. Scandinavian Journal of Work, Environment & Health, 30(4), 287-292. Retrieved from http://www.jstor.org/stable/40968790

Kausto, J., Virta, L., Luukkonen, R. & Viikari-Juntura, E. (2010). Associations between partial sickness benefit and disability pensions: initial findings of a Finnish nationwide register study. BMC Public Health, 10, 361. doi: https://doi.org/10.1186/1471-2458-10-361

KELA. (2017). Disability pension and rehabilitation subsidy. Retrieved 23.10.2020, from https://www.kela.fi/web/en/disability-pension-and-rehabilitation-subsidy

KELA. (2019a). Disability pension and rehabilitation subsidy: Eligibility. Retrieved 23.10.2020, from https://www.kela.fi/web/en/disability-pension-and-rehabilitation-subsidy-eligibility

KELA. (2019b). National pensions. Retrieved 24.10.2020, from https://www.kela.fi/web/en/national-pensions

KELA. (2020a). Kelan tilastollinen vuosikirja - FPA:s statistiska årsbok - Statistical Yearbook of the Social Insurance Institution 2019. Helsinki, Finland: The Social Insurance Institution of Finland. Retrieved from http://urn.fi/URN:NBN:fi-fe2020120399332

KELA. (2020b). Sickness allowance. Retrieved 22.10.2020, from https://www.kela.fi/web/en/sickness-allowance

KELA. (2021). Statistikdatabasen Kelasto: Sjukdagpenningar - Mottagare av sjukdagpenning och utbetalda sjukdagpenningar 1993–2019 [Statistical database Kelasto: Sickness allowances - Recipients of sickness allowance and sickness allowance pay out in 1993–2019]. Retrieved 3.2.2021, from http://raportit.kela.fi/linkki/70472796

Kivimäki, M., Ferrie, J. E., Hagberg, J., Head, J., Westerlund, H., Vahtera, J. & Alexanderson, K. (2007). Diagnosis-specific sick leave as a risk marker for disability pension in a Swedish population. Journal of Epidemiology & Community Health, 61(10), 915-920. doi: http://dx.doi.org/10.1136/jech.2006.055426

Kommunförbundet. (2021). Tvåspråkiga kommuner [Bilingual municipalities]. Retrieved 24.8.2021, from https://www.kommunforbundet.fi/kommuner-och-samkommuner/tvasprakiga-kommuner

Koskinen, S. & Martelin, T. (2003). Why is Mortality Low among the Swedish-Speaking Minority in Finland? Yearbook of Population Research in Finland, 39, 15-31. doi: https://doi.org/10.23979/fypr.44982

Kuhn, A., Wuellrich, J.-P. & Zweimüller, J. (2010). Fatal attraction? Access to early retirement and mortality. IZA Discussion Paper No. 5160. Bonn, Germany: Institute for the Study of Labor. Retrieved from http://hdl.handle.net/10419/46065

Kwon, S. & Han, D. (2019). Discrimination, Mental Disorders, and Suicidal Ideation in Latino Adults: Decomposing the Effects of Discrimination. Journal of Immigrant and Minority Health, 21(1), 143-150. doi: https://doi.org/10.1007/s10903-018-0726-5

Kühntopf, S. & Tivig, T. (2012). Early retirement and mortality in Germany. European Journal of Epidemiology, 27(2), 85-89. doi: https://doi.org/10.1007/s10654-012-9658-x

Laaksonen, M. & Blomgren, J. (2020). The Level and Development of Unemployment before Disability Retirement: A Retrospective Study of Finnish Disability Retirees and Their Controls. International Journal of Environmental Research and Public Health, 17(5), 1756. doi: https://doi.org/10.3390/ijerph17051756

Laaksonen, M. & Gould, R. (2015). Return to Work After Temporary Disability Pension in Finland. Journal of Occupational

Rehabilitation, 25(3), 471–480. doi: https://doi.org/10.1007/s10926-014-9554-1

Laaksonen, M., Blomgren, J. & Gould, R. (2016). Sickness allowance trajectories preceding disability retirement: a register-based retrospective study. European Journal of Public Health, 26(6), 1050-1055. doi: https://doi.org/10.1093/eurpub/ckw081

Lammintausta, A., Immonen-Räihä, P., Lehtonen, A., Räihä, I., Harald, K., Torppa, J., Airaksinen, J. K. E.; & Salomaa, V. (2011). Myocardial infarction events and cardiovascular risk factor levels in Finnish- and Swedish-speaking populations of Finland. Annals of Medicine, 43(7), 562-569. doi: https://doi.org/10.3109/07853890.2010.526136

Lammintausta, A., Lehtonen, A., Immonen-Räihä, P., Kaarisalo, M., Torppa, J., Airaksinen, K. E. & Salomaa, V. (2009). Stroke morbidity in Swedish- and Finnish-speaking populations of Turku, Finland. Scandinavian Cardiovascular Journal, 43(2), 117-122. doi: https://doi.org/10.1080/14017430802389537

LaVeist, T. A. & Isaac, L. A. (Eds.). (2013). Race, Ethnicity, and Health: A Public Reader (2nd ed.). San Francisco: John Wiley & Sons.

Leinonen, T., Laaksonen, M., Chandola, T. & Martikainen, P. (2016). Health as a predictor of early retirement before and after introduction. Social Science & Medicine, 158, 149-157. doi: https://doi.org/10.1016/j.socscimed.2016.04.029

Leinonen, T., Martikainen, P. & Lahelma, E. (2012). Interrelationships between education, occupational social class, and income as determinants of disability retirement. Scandinavian Journal of Public Health, 40(2), 157-166. doi: https://doi.org/10.1177/1403494811435492

Leinonen, T., Martikainen, P. & Myrskylä, M. (2018a). Working Life and Retirement Expectancies at Age 50 by Social Class: Period and Cohort Trends and Projections for Finland. The Journals of Gerontology, 73(2), 302-313. doi: https://doi.org/10.1093/geronb/gbv104

Leinonen, T., Martikainen, P., Laaksonen, M. & Lahelma, E. (2014). Excess mortality after disability retirement due to mental disorders: variations by socio-demographic factors and causes of death. Social Psychiatry and Psychiatric Epidemiology, 49(4), 639-649. doi: https://doi.org/10.1007/s00127-013-0747-2

Leinonen, T., Viikari-Juntura, E., Husgafvel-Pursiainen, K., Virta, L., Laaksonen, M., Autti-Rämö, I. & Solovieva, S. (2018b). Labour Market Segregation and Gender Differences in Sickness Absence: Trends in 2005–2013 in Finland. Annals of Work Exposures and Health, 62(4), 438-449. doi: https://doi.org/10.1093/annweh/wxx107

Litwin, H. (2007). Does early retirement lead to a longer life? Ageing & Society, 27(5), 739-754. doi: https://doi.org/10.1017/S0144686X07006216

Madsen, A. Å. (2020). Return to work after first incidence of long-term sickness absence: A 10-year prospective follow-up study identifying labour-market trajectories using sequence analysis. Scandinavian Journal of Public Health, 48(2), 134-143. doi: https://doi.org/10.1177/1403494818821003

Martikainen, P. T. & Valkonen, T. (1996). Excess mortality of unemployed men and women during a period of rapidly increasing unemployment. The Lancet, 348(9032), 909-912. doi: https://doi.org/10.1016/S0140-6736(96)03291-6

McRae, K. D. (1999). Conflict and compromise in multilingual societies, Vol. 3: Finland. Helsinki: Finnish Academy of Science and Letters.

Ministry of Justice. (2021). Språkliga rättigheter: Finska och svenska språket [Linguistic rights: Finnish and Swedish]. Retrieved 4.8.2021, from https://oikeusministerio.fi/sv/finska-och-svenska-spraket

Minkler, M. (1981). Research on the Health Effects of Retirement: An Uncertain Legacy. Journal of Health and Social Behavior, 22(2), 117-130. doi: https://doi.org/10.2307/2136288

Moore, S., Antoni, S., Colquhoun, A., Healy, B., Ellison-Loschmann, L., Potter, J., Garvey, G. & Bray, F. (2015). Cancer incidence in indigenous people in Australia, New Zealand, Canada, and the USA: a comparative population-based study. The Lancet Oncology, 16(15), 1483-1492. doi: https://doi.org/10.1016/S1470-2045(15)00232-6

Moring, T. & Husband, C. (2007). The contribution of Swedish-language media in Finland to linguistic vitality. International Journal of the Sociology of Language, 187-188, 75-101. doi: https://doi.org/10.1515/IJSL.2007.051

Norio, R. (2003a). Finnish Disease Heritage II: population prehistory and genetic roots of Finns. Human Genetics, 112, 457-469. doi: http://www.doi.org/10.1007/s00439-002-0876-2

Norio, R. (2003b). Finnish Disease Heritage I. Human Genetics, 112, 441-456. doi: http://www.doi.org/10.1007/s00439-002-0875-3

Nyqvist, F., Finnäs, F., Jakobsson, G. & Koskinen, S. (2008). The effect of social capital on health: The case of two language groups in Finland. Health & Place, 14(2), 347-360. doi: https://doi.org/10.1016/j.healthplace.2007.09.001

OECD. (2016). Mainstream income support and employment services and their effectiveness for displaced workers in Finland. In Back to Work: Finland: Improving the re-employment Prospects of Displaced Workers (pp. 87-132). Paris, France: OECD Publishing. doi: https://doi.org/10.1787/9789264264717-7-en

Oksanen, T., Vahtera, J., Westerlund, H., Pentti, J., Sjösten, N., Virtanen, M., . . . Kivimäki, M. (2011). Is retirement beneficial for mental health? Antidepressant use before and after retirement. Epidemiology, 22(4), 553-559. doi: http://www.doi.org/10.1097/EDE.0b013e31821c41bd

Oksanen, T. & Virtanen, M. (2012). Health and retirement: a complex relationship. European Journal of Ageing, 9, 221-225. doi: https://doi.org/10.1007/s10433-012-0243-7

Olesen, S. C., Butterworth, P., Leach, L. S., Kelaher, M. & Pirkis, J. (2013). Mental health affects future employment as job loss affects mental health: findings from a longitudinal population study. BMC Psychiatry, 13, 144. doi: https://doi.org/10.1186/1471-244X-13-144

Olsson, D., Alexanderson, K. & Bottai, M. (2018). Assessing the degree of residual confounding: a cohort study on the association between disability pension and mortality. European Journal of Public Health, 28(5), 836-841. doi: https://doi.org/10.1093/eurpub/cky022

Paljärvi, T., Suominen, S., Koskenvuo, M., Winter, T. & Kauhanen, J. (2009). The differences in drinking patterns between Finnish-speaking majority and Swedish-speaking minority in Finland. European Journal of Public Health, 19(3), 278-284. doi: https://doi.org/10.1093/eurpub/ckp007

Palo, J. U., Ulmanen, I., Lukka, M., Ellonen, P. & Sajantila, A. (2009). Genetic markers and population history: Finland revisited. European Journal of Human Genetics, 17, 1336-1346. doi: https://doi.org/10.1038/ejhg.2009.53

Paradies, Y., Ben, J., Denson, N., Elias, A., Priest, N., Pieterse, A., Gupta, A., Kelaher, M & Gee, G. (2015). Racism as a Determinant of Health: A Systematic Review and Meta-Analysis. PLoS ONE, 10(9), e0138511. doi: https://doi.org/10.1371/journal.pone.0138511

Perhoniemi, R., Blomgren, J. & Laaksonen, M. (2020). Determinants of disability pension applications and awarded disability pensions in Finland, 2009 and 2014. Scandinavian Journal of Public Health, 48(2), 172-180. doi: https://doi.org/10.1177/1403494819843778

Piper, K., Youk, A., James, A. & Kumar, S. (2017). Paid sick days and stay-at-home behavior for influenza. PLoS ONE, 12(2), e0170698. doi:

https://doi.org/10.1371/journal.pone.0170698

Polvinen, A., Gould, R., Lahelma, E. & Martikainen, P. (2013). Socioeconomic differences in disability retirement in Finland: the contribution of ill-health, health behaviours and working conditions. Scandinavian Journal of Public Health, 41(5), 470-478. doi: https://doi.org/10.1177/1403494813482400

Polvinen, A., Laaksonen, M., Gould, R., Lahelma, E. & Leinonen, T. (2016). Socioeconomic Differences in Cause-Specific Disability Retirement in Finland, 1988 to 2009. Journal of Occupational and Environmental Medicine, 58(8), 840-845. doi: https://doi.org/10.1097/JOM.0000000000000808

Polvinen, A., Laaksonen, M., Gould, R., Lahelma, E., Leinonen, T. & Martikainen, P. (2015). Socioeconomic inequalities in cause-specific mortality after disability retirement due to different diseases. Scandinavian Journal of Public Health, 43(2), 159-168. doi: https://doi.org/10.1177/1403494814562597

Quaade, T., Engholm, G., Johansen, A. M. & Møller, H. (2002). Mortality in relation to early retirement in Denmark: a population-based study. Scandinavian Journal of Public Health, 30(3), 216-222. doi: https://doi.org/10.1177/14034948020300030 8

Reini, K. S. & Saarela, J. (2017). Differences in Sickness Allowance Receipt between Swedish Speakers and Finnish Speakers in Finland: A Register-based Study. Finnish Yearbook of Population Research, 52, 43-58. doi: https://doi.org/10.23979/fypr.66598

Reini, K. & Saarela, J. (2019). Return to Work after Sickness Absence: A Register-based Comparison of Two Indigenous Population Groups. Public Health, 169, 93-100. doi: https://doi.org/10.1016/j.puhe.2019.01.016

Reini, K. & Saarela, J. (2021). Life Expectancy of the Ethnically Mixed: Register-Based Evidence from Native Finns. International Journal of Environmental Research and Public Health, 18(7), 3415. doi: https://doi.org/10.3390/ijerph18073415

Reynolds, M. M. & Childers, T. B. (2019). Cardiovascular Disease Screening Among Immigrants from Eight World Regions. Journal of Immigrant and Minority Health, 21(4), 820-829. doi: https://doi.org/10.1007/s10903-018-0796-4

Riekhoff, A.-J. & Järnefelt, N. (2017). Gender Differences in Retirement in Welfare State with High Female Labour Market Participation and Competing Exit Pathways. European Sociological Review, 33(6), 791-807. doi: https://doi.org/10.1093/esr/jcx077

Rogne, A. F. & Syse, A. (2018). The effect of retirement on male mortality. Quasi-experimental evidence from Norway. European Sociological Review, 34(5), 501-517. doi: https://doi.org/10.1093/esr/jcy023

Saarela, J. (2006). Wealth in Two Ethnic Groups: The Role of Internal Migration Background. Finnish Yearbook of Population Research, 42, 43-64. doi: https://doi.org/10.23979/fypr.45026

Saarela, J. (2021). Finlandsvenskarna 2021 - en statistisk rapport [Finlandswedes 2021 - a statistical report]. Helsinki: Svenska Finlands Folkting. https://folktinget.fi/Site/Data/1597/Files/Finlandssvenskarna%202021_statistisk%20rapport_Folktinget_KLAR.pdf

Saarela, J. & Finnäs, F. (2002a). Language-group Differences in Very Early Retirement in Finland. Demographic Research, 7(3), 49-66. doi: https://doi.org/10.4054/DemRes.2002.7.3

Saarela, J. & Finnäs, F. (2002b). Ethnicity and Unemployment in Finland. Ethnic Studies Review, 25(1), 26-37. doi: https://doi.org/10.1525/esr.2002.25.1.26

Saarela, J. & Finnäs, F. (2003a). Unemployment and native language: the Finnish case. The Journal of Socio-Economics, 32(1), 59-80. doi: https://doi.org/10.1016/S1053-5357(03)00007-6

Saarela, J. & Finnäs, F. (2003b). Social Background and Education of Swedish

and Finnish Speakers in Finland. European Journal of Education, 38(4), 445-456. doi: https://doi.org/10.1111/j.0141-8211.2003.00160.x

Saarela, J. & Finnäs, F. (2004). Interethnic Wage Variation in the Helsinki Area. Finnish Economic Papers, 17(1), 35-48.

Saarela, J. & Finnäs, F. (2005a). Geographical Extraction and the Finnish-Swedish Health Differential in Finland. Finnish Yearbook of Population Research, 41, 61-73. doi: https://doi.org/10.23979/fypr.45014

Saarela, J. & Finnäs, F. (2005b). Mortality inequality in two native population groups. Population Studies, 59(3), 313-320. doi: https://doi.org/10.1080/00324720500249372

Saarela, J. & Finnäs, F. (2006a). Regional mortality variation in Finland: A study of two population groups. Genus, 62(2), 169-211. Retrieved from https://www.jstor.org/stable/29789314

Saarela, J. & Finnäs, F. (2006b). Can the Low Unemployment Rate of Swedish speakers in Finland be Attributed to Structural Factors? Journal of Socio-Economics, 35(3), 498-513. doi: https://doi.org/10.1016/j.socec.2005.11.062

Saarela, J. & Finnäs, F. (2008a). Cause-specific mortality at young ages: Lessons from Finland. Health & Place, 14(2), 265-274. doi: https://doi.org/10.1016/j.healthplace.2007.06.007

Saarela, J. & Finnäs, F. (2008b). Internal Migration and Mortality: The Case of Finland. Environmental Health Insights, 1(2), 1-12. doi: https://doi.org/10.4137/EHI.S831

Saarela, J. & Finnäs, F. (2009a). Geographic Ancestry and Cause-specific Mortality in a National Population. Population Research and Policy Review, 28(2), 169-194. doi: https://doi.org/10.1007/s11113-008-9079-4

Saarela, J. & Finnäs, F. (2009b). Geographic Ancestry and Mortality from Ischemic Heart Disease: Evidence from the Finnish Population Register. Population Review, 48(1), 64-82. doi: https://doi.org/10.1353/prv.0.0015

Saarela, J. & Finnäs, F. (2011). Family origin and mortality: prospective Finnish cohort study. BMC Public Health, 11, 385. doi: https://doi.org/10.1186/1471-2458-11-385

Saarela, J. & Finnäs, F. (2013). Ethnic Affiliation of Children and the Risk of Union Dissolution. Journal of Comparative Family Studies, 44(5), 609-621., 44(5), 609-621. doi: https://doi.org/10.3138/jcfs.44.5.609

Saarela, J. & Finnäs, F. (2014a). Infant Mortality and Ethnicity in an Indigenous European Population: Novel Evidence from the Finnish Population Register. Scientific Reports, 4, 4214. doi: https://doi.org/10.1038/srep04214

Saarela, J. & Finnäs, F. (2014b). Transitions within and from Ethno-linguistically Mixed and Endogamous First Unions in Finland. Acta Sociologica, 57(1), 77-92. doi: https://doi.org/10.1177/0001699313487533

Saarela, J. & Finnäs, F. (2016). The Ethno-linguistic Community and Premature Death: A Register Based Study of Working-aged Men in Finland. Journal of Racial and Ethnic Health Disparities, 3(2), 373-380. doi: https://doi.org/10.1007/s40615-015-0163-2

Saarela, J. & Finnäs, F. (2018). Ethno-linguistic Exogamy and Divorce: Does Marital Duration Matter? Sociological Focus, 51(4), 279-303. doi: https://doi.org/10.1080/00380237.2018.1431506

Saarela, J. & Kolk, M. (2020). Alcohol-related mortality by ethnic origin of natives: a prospective cohort study based on multigenerational population register data from Finland and Sweden. BMJ Open, 10, e042234. doi: http://dx.doi.org/10.1136/bmjopen-2020-042234

Saarela, J. & Kolk, M. (2021). Birth Order and Alcohol-related Mortality by Ethnic Origin and National Context: Within-family Comparisons for Finland and Sweden. Drug and Alcohol Dependence, 226,

108859. doi: https://doi.org/10.1016/j.drugalcdep.2021.108859

Salminen, S. & Johansson, A. (2000). Occupational Accidents of Finnish-and Swedish-Speaking Workers in Finland: A Mental Model View. International Journal of Occupational Safety and Ergonomics, 6(2), 293-306. doi: https://doi.org/10.1080/10803548.2000.11076456

Salminen, S. & Seppälä, A. (2005). Safety Climate in Finnish- and Swedish-Speaking Companies. International Journal of Occupational Safety and Ergonomics, 11(4), 389-397. doi: https://doi.org/10.1080/10803548.2005.11076657

Salonen, L., Blomgren, J., Laaksonen, M. & Niemelä, M. (2018). Sickness absence as a predictor of disability retirement in different occupational classes: a register-based study of a working-age cohort in Finland in 2007-2014. BMJ Open, 8(5), e020491. doi: https://doi.org/10.1136/bmjopen-2017-020491

Sand, G. & Gruber, S. (2018). Differences in Subjective Well-being Between Older Migrants and Natives in Europe. Journal of Immigrant and Minority Health, 20, 83-90. doi: https://doi.org/10.1007/s10903-016-0537-5

Sanderson, W. & Scherbov, S. (2010). Remeasuring Aging. Science, 329(5997), 1287-1288. doi: http://www.doi.org/10.1126/science.1193647

Schmitz, H. (2011). Why are the unemployed in worse health? The causal effect of unemployment. Labour Economics, 18(1), 71-78. doi: https://doi.org/10.1016/j.labeco.2010.08.005

Sipilä, P. & Martikainen, P. (2009). Language-group mortality differentials in Finland in 1988–2004: assessment of the contribution of cause of death, sex and age. European Journal of Public Health, 19(5), 492-498. doi: https://doi.org/10.1093/eurpub/ckp074

Statistics Finland. (2004). Statistics Act (280/2004). Retrieved 28.8.2020, from https://www.stat.fi/meta/lait/statistics-act-2802004_en.html

Statistics Finland. (2020). Value of money converter. Retrieved 14.12.2020, from https://stat.fi/tup/laskurit/rahanarvonmuunnin_en.html

Statistics Finland. (2020a). Statistics Finland's PxWeb databases: Life table by age and sex, 1986-2019. Retrieved 24.10.2020, from http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__kuol/statfin_kuol_pxt_12ap.px/table/tableViewLayout1/

Statistics Finland. (2020b). Statistics Finland's PxWeb databases: Population by main type of activity, sex, yearly age groups and year, 1987-2019. Retrieved 24.10.2020, from https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__tyokay/statfin_tyokay_pxt_115c.px/

Stypińska, J. & Nikander, P. (2018). Ageism and Age Discrimination in the Labour Market: A Macrostructural Perspective. In L. Ayalon & C. Tesch-Römer, Contemporary Perspectives on Ageism (pp. 91-108). Cham, Switzerland: Springer Open. doi: https://doi.org/10.1007/978-3-319-73820-8

Sundell, T., Kammonen, J., Halinen, P. & Onkamo, P. (2014). Archaeology, genetics and a population bottleneck in prehistoric Finland. Antiquity, 88(342), 1132-1147. doi: https://doi.org/10.1017/S0003598X00115364

Suominen, S., Forsén, T., Volanen, S. M., Isomaa, B., Vahlberg, T. & Eriksson, J. (2012). Lower Incidence of Hypertension among Swedish Speakers as Compared to Finnish Speakers in the Helsinki Birth Cohort from Finland – An Example of Early Programming of Disease? In K. Eriksson-Backa, A. Luoma & E. Krook (Eds.), Exploring the Abyss of Inequalities. WIS 2012. Communications in Computer and Information Science, vol 313 (pp. 52-59). Berlin, Heidelberg: Springer. doi: https://doi.org/10.1007/978-3-642-32850-3_5

Takala, M. & Väänänen, N. (2016). Does part-time pension extend working lives? A Finnish case study. Reports 05-2016, Helsinki, Finland: Finnish Centre for

Pensions. https://urn.fi/URN:ISBN:978-951-691-248-9

Tigerstedt, C., Markkula, J., Karlsson, T., Jokela, J. & Pietikäinen, M. (2008). Finlands svenskspråkiga ungdomars dryckesvanor i Österbotten och huvudstadsregionen: En jämförelse med finskspråkiga ungdomar [The drinking habits of Finland's Swedish-speaking adolescents in Ostrothnia and the capital city region: A comparison with Finnish-speaking adolescents]. Nordic Studies on Alcohol and Drugs, 25(1), 5-21. doi: https://doi.org/10.1177/145507250802500102

Tikanmäki, H., Lappo, S., Merilä, V., Nopola, T., Reipas, K. & Sankala, M. (2019). Statutory Pensions in Finland - Long-term Projections 2019. Helsinki: Finnish Centre for Pensions. Retrieved from https://urn.fi/URN:ISBN:978-951-691-302-8

Toivonen, L. (2012). Statutory and occupational sickness benefits in Finland in 2011. Online working papers 34/2012, Helsinki: Social Insurance Institution of Finland. https://helda.helsinki.fi/handle/10138/29614

Tsai, S. P., Wendt, J. K., Donelly, R. P., de Jong, G. & Ahmed, F. S. (2005). Age at retirement and long term survival of an industrial population: prospective cohort study. BMJ, 331, 995. doi: https://doi.org/10.1136/bmj.38586.448704.E0

Usera-Clavero, M., La Parra-Casado, D., Caballero, P., Vives-Cases, C. & Gil-Gonzáles, D. (2019). Smoking Prevalence Inequalities Among Roma and Non-Roma Population in Spain Between 2006 and 2014. Journal of Immigrant and Minority Health, 21(6), 1282-1289. doi: https://doi.org/10.1007/s10903-019-00863-z

Vasilevska, M., Ross, S. A., Gesink, D. & Fisman, D. N. (2012). Relative risk of cervical cancer in indigenous women in Australia, Canada, New Zealand, and the United States: A systematic review and meta-analysis. Journal of Public Health Policy, 33(2), 148-164. doi: https://doi.org/10.1057/jphp.2012.8

Vaupel, J. W. & Loichinger, E. (2006). Redistributing Work in Aging Europe. Science, 312(5782), 1911-1913. doi: http://www.doi.org/10.1126/science.1127487

Vinni, K. & Hakama, M. (1980). Healthy worker effect in the total Finnish population. Occupational and Environmental Medicine, 37(2), 180-184. doi: https://doi.org/10.1136/oem.37.2.180

Virtanen, P., Janlert, U. & Hammarström, A. (2013). Health status and health behaviour as predictors of the occurrence of unemployment and prolonged unemployment. Public Health, 127(1), 46-52. doi: https://doi.org/10.1016/j.puhe.2012.10.016

Virtaranta-Knowles, K., Sistonen, P. & Nevanlinna, H. R. (1991). A Population Genetic Study in Finland: Comparison of the Finnish-and Swedish-. Human Hereditary, 41(4), 248-264. Retrieved from https://www.jstor.org/stable/45102430

Volanen, S. M., Suominen, S., Lahelma, E., Koskenvuo, M. & Silventoinen, K. (2006). Sense of coherence and its determinants: A comparative study of the Finnish-speaking majority and Swedish-speaking minority in Finland. Scandinavian Journal of Public Health, 34(5), 515-525. doi: https://doi.org/10.1080/14034940600585812

Wallmann, T., Wedel, H., Johansson, S., Rosengren, A., Eriksson, H. W. & Svärdsudd, K. (2006). The prognosis for individuals on disability retirement An 18-year mortality follow-up study of 6887 men and women sampled from the general population. BMC Public Health, 6, 103. doi: https://doi.org/10.1186/1471-2458-6-103

Wallmann, T., Wedel, H., Palmer, E., Rosengren, A., Johansson, S., Eriksson, H. & Svärdsudd, K. (2009). Sick-leave track record and other potential predictors of a disability pension. A population based study of 8,218 men and women followed for 16 years. BMC Public Health, 9, 104. doi: https://doi.org/10.1186/1471-2458-9-104

Warner, D. F. & Brown, T. H. (2011). Understanding how race/ethnicity and gender define age-trajectories of disability: An intersectionality approach. Social Science & Medicine, 72(8), 1236-1248. doi: https://doi.org/10.1016/j.socscimed.2011.02.034

Wikimedia Commons. (2010). File:Suomi.kunnat.2010.svg [Finnish municipalities 2010]. Retrieved 22.9.2021, from https://commons.wikimedia.org/wiki/File:Suomi.kunnat.2010.svg

Wikimedia Commons. (2016). File:Languages of Finnish municipalities (2016).svg. Retrieved 22.9.2021, from https://commons.wikimedia.org/w/index.php?curid=51093366#filelinks

Julia Klein

Essays on the Interrelation Between Sickness Allowance, Disability, and Mortality in Finland

National and Ethnolinguistic Perspectives

The central topic of this thesis is disability pension. The first set of research questions focuses on disability pension as outcome and examines how the risk for disability pension receipt is related to previous sickness allowance receipt in working-ages. The second set of research questions focuses on disability pensions as determinant for mortality and examines how disability pension receipt in late working-life is related to mortality during early in retirement. Both sets of questions are examined for Finland as a whole and for the two ethnolinguistic groups, i.e. whether the association in question is similar for Finnish- and Swedish-speaking Finns.

ISBN 978-952-12-4153-6