Socioeconomic inequalities in preventive health care use: a life course perspective

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Submitted to the Faculty of Political and Social Sciences of Ghent University in partial fulfilment of the requirements for the degree of Doctor of Sociology

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Academic year 2014-2015

Table of contents

Acknowledgements

Het schrijven van mijn doctoraatsthesis en het werken aan de vakgroep sociologie was vooral een heel toffe tijd. Het was naast de inhoudelijke uitdaging, vooral een periode van vrijheid, internationale ervaringen, leerrijke en minder leerrijke café-discussies, statistiek-mopjes, hilarische bureau- en koffiepauze momenten en zelfs sportieve hoogtepunten. Hiervoor ben ik heel veel mensen ontzettend dankbaar.

Piet, zonder je vraag om jouw assistent wou worden, had ik hier niet gestaan. Bedankt voor al het vertrouwen, alle vrijheid en vooral het delen van jouw onuitputtelijke wetenschappelijke kennis, enthousiasme en fantasie. Jouw deur stond altijd open. Merci!

Ook de leden van de examencommissie, Katherine Frohlich, Karel Neels, John Lievens, Sarah Van de Velde & Lesley Hustinx, wil ik graag bedanken voor jullie tijd en constructieve opmerkingen. A special thanks to Katherine for coming all the way from Canada. It is really an honour that you are a member of my examination committee.

De meeste tijd breng je door op je bureau. Ik heb het geluk gehad om mijn bureau te delen met echt heel leuke mensen. We hebben ongelofelijk hard gelachen, gezeverd en elkaar geholpen, maar eigenlijk ook samen de yucca plant verwaarloosd. Eerst en vooral is er de oude garde. Nina, altijd 'wegue wegue'! Charlotte (aka Dr. Tuckey), je was en blijft mijn grote voorbeeld! Wendy, merci voor de goeie 'vibes' die je achterliet op jouw bureau. De nieuwe garde nam over in stijl. Charlotte, aka Charlie met het bewonderenswaardige relativeringsvermogen, de boodschappentocht voor ons eerste Hederaweekend blijft legendarisch. Rozemarijn, straffe madam, jij mag altijd 'ne keer iets vragen'. Veerle, merci voor alle (laatavondlijke) aanmoedigingen en levendige no-nonsens discussies.

Een extra dank je wel aan Lore, Elien en Charlotte voor de vele avonturen in binnen- en buitenland, jullie geweldige fantasie en humor maar tevens jullie luisterend oor. WAFA! Ook een speciaal woord van dank aan de 'socio's' van ons jaar die ongeveer samen met mij startten aan de vakgroep, Stijn, Wouter & Mathias. De vele lunches en inspirerende e-mails zal ik missen!

Heel erg merci aan alle leden van de befaamde 'omnisportclub' voor alle vertier en vriendschap, opnieuw Elien (for president!), Lore & Charlotte (een waar sporttalent) en ook Elise (hoe heet kan een sauna zijn!?), Nina (Friendsgiving), Stijn, Wouter, Jef (skiteam-expert), Floor, Simon B. & Pizza Royal. De 'statistiek-club' maakte het pendelen en vooral het oplossen van examentaken een heel stuk plezanter (Stijn, Christophe, Jef, Steven & Koen). Merci! Ook heel erg bedankt aan alle andere

collega's die de koffiepauzes opvrolijkten en duidelijk maakten dat academia meer is dan publiceren alleen.

Bedankt ook aan alle vrienden, familie en schoonfamilie. Ik hoef geen namen toe noemen, jullie weten wie jullie zijn. Een levensloopbenadering zou hebben vereist dat ik mijn ouders eerst zou bedanken. Maar ik ben nu eenmaal graag af en toe een beetje tegendraads, dat weten zij maar al te goed. Vandaar dat een woord van dank aan jullie op het einde eigenlijk nog meer gepast is: dank je wel mama en papa om mij een zondagskind te laten zijn en ook dank voor de wekelijkse gemarineerde biefstuk!

Ten slotte, de grootste dank je wel is voor Simon. Je bent een schat!

Gent, 1 April 2015

1. General introduction

Disease prevention has substantial potential to enhance public health. The World Health Organization already identified equality in preventive care as a public health priority three decades ago (WHO, 1978). However, an abundant number of empirical studies show that not everybody makes equal use of preventive health services in Europe. People lower down the social ladder are less likely to participate in all kinds of preventive health practices, such as flu vaccinations, cancer screening and eye tests (Jusot, Or, & Sirven, 2012; Lorant, Boland, Humblet, & Deliege, 2002; Stirbu, Kunst, Mielck, & Mackenbach, 2007). To date, we are still some way from understanding the underlying mechanisms that drive these persistent socioeconomic inequalities, which leaves many policymakers frustrated. For example, how is it possible that inequalities persist, despite the fact that mammography screening has become widely available and free in many European countries? To gain a better understanding, the dominant perspectives in public health, epidemiology and other sciences in the health field will need to be complemented by insights from other disciplines. The standard approach is to treat health behaviour as a matter of individual choice and to minimize the relevance of social factors (Cockerham, 2007). Individuals are seen as being self-reflexive and are held responsible for monitoring their own health and making a range of motivated lifestyle choices (Annandale & Field, 2005).

Most epidemiological studies *describe* the endurance of socioeconomic inequalities in preventive health care (e.g. Jusot et al., 2012; Lorant et al., 2002), generally relying on the need-adjusted approach based on Andersen's heuristic model of health service use (Andersen, 1995; Andersen, Smedby, & Anderson, 1970). In order to *explain* differences in preventive health care behaviour, comprehensive theoretical models have been developed. However, these have also been criticized for their individualistic, reductive approach (Blane, 2008; Frohlich, Corin, & Potvin, 2001; Rajaram & Rashidi, 1998). Importantly, these models highlight the role of beliefs (about the perceived risks, severity, efficacy of personal action, benefits and costs) in preventive health care use, and contend that use is not determined by financial means alone, as is often assumed when adopting a need-adjusted approach (Rajaram & Rashidi, 1998). These agency-oriented paradigms, however, lack an understanding of how beliefs are socially and culturally structured (Blane, 2008; Frohlich et al., 2001; Rajaram & Rashidi, 1998) and how they are acquired over the course of an individual's life. As a result of this individualistic perspective, health promotion struggles to move beyond its roots in health education aimed at individual behaviour modification (Abel, 2007). Critics have argued that treating health behaviour as an individual characteristic legitimizes the denial of the complex

structural issues that underpin the political economy of health. In this way, it insidiously supports neoliberal ideology and responsibilization (Cohn, 2014) of which the famous statement of Prime Minister Margaret Thatcher in 1987 is illustrative: “There is no such thing as society! There are individual men and women and there are families and no government can do anything except through people and people look to themselves first.”

Recent theoretical developments in medical sociology have resulted in a reformulation of this dominant approach. There is now a challenge to the basic tenet in behavioural models and health promotion that health behaviour is a matter of purely rational individuals being endowed with a particular level of self-efficacy (Abel & Frohlich, 2012) and the structural opportunities that underlie health behaviour choices are being highlighted. In this way, stress is placed on the fact that not only economic factors shape people’s health behaviour, but also cultural resources. For example, unhealthy patterns of consumption such as smoking, excessive eating or drinking, or sedentary lifestyles, are all largely determined by people’s norms and values rather than by their financial means alone (Abel, 2008). Therefore, the explicit inclusion of cultural capital in explanatory approaches to social inequality in health and health behaviour has been advocated, rather than deducing it from general measurements of socioeconomic status (SES), such as social class and income (Abel, 2008; Abel & Frohlich, 2012; Shim, 2010). Drawing on Weber’s ([1922], 1978) notion of the social structuration of lifestyles, and extending Bourdieu’ hypothesis on capital conversion and his contention that capital is field specific (Bourdieu, 1984, 1986), scholars have been studying how capital can be converted into what is termed ‘cultural health capital’. This special form of cultural capital is used by individuals to take up a healthy lifestyle, such as engaging in preventive care. It is argued that cultural health capital is socially distributed and accumulates during an individual’s life (Abel, 2008; Shim, 2010). Except for Schori et al. (2014), pioneering empirical studies on cultural health capital (Dubbin, Chang, & Shim, 2013; Grineski, 2009, 2011) have treated this notion of accumulation as implicit. Accordingly, little is currently known about how cultural health capital and health lifestyles (Abel, 1991; Cockerham, 2013) come into being and develop or accumulate during the life course.

To advance understanding, I draw on the life course perspective, which focuses precisely on evolving dynamics and accumulation processes from early childhood onwards (Elder Jr. et al., 2003). Traditionally, the life course perspective has focussed on life trajectories in domains such as the family, education and employment. Recently, it has also established a central place in public health research (Due et al., 2011; Mayer, 2009), but has not previously been applied to inequalities in preventive health care use. Given the substantial analogies, the aim of this thesis is to enrich the recent theoretical developments in medical sociology with the five theoretical principles of the life

course perspective (Elder Jr. et al., 2003) in order to move the debate on preventive health care inequalities forwards. Central to the discussion is the role of the family in the formation of preventive health behaviour. It has been argued that cultural learning starts from the earliest days of life (Bourdieu, 1984). Parents transmit health beliefs and health behaviour by setting an example or via unintentional transmission processes (Lau, Quadrel, & Hartman, 1990). Hence, it is contended that norms regarding healthy behaviour are conditioned by the socioeconomic context in childhood (Singh-Manoux & Marmot, 2005). We thus need to revert to childhood in order to gain insight into the origins of cultural health capital accumulation and preventive health behaviour. However, socialization does not end after childhood but continues through adult life (Ryder, 1965) and there is a tendency for socioeconomic inequalities to accumulate over the entire life course (DiPrete & Eirich, 2006). Accordingly, the accumulation of cultural health capital and socioeconomic inequalities are also likely to proceed over the life course (Abel & Frohlich, 2012; Mirowsky & Ross, 2003). Importantly, health care arrangements or specific health policies can greatly influence people's habits concerning the use of preventive health care. Therefore, it should be possible to lower or remove the barriers to preventive health care that a disadvantaged background entails.

The objective here is to set out a framework that can be applied to different forms of preventive health behaviour and the application of each of the principles of the life course perspective is illustrated by using mammography screening as a case study. There are several reasons for this choice. First, breast cancer constitutes a very important public health issue, as it is the most frequently diagnosed form of cancer among European women (Ferlay, Parkin, & Steliarova-Foucher, 2010) and the leading cause of female death from cancer (Ferlay et al., 2013; Jemal, 2011). Mammography screening is the only evidence-based method for detecting breast cancer at an early stage (Youlden et al., 2012), and for women in the age range of 50 to 69, it has improved survival rates by between 19 and 32 per cent in several European countries (Hakama, Coleman, Alexe, & Auvinen, 2008). As with other forms of preventive health behaviour, socioeconomic inequalities have been reported for mammography screening (e.g. Duport & Ancelle-Park, 2006; Jusot et al., 2012), but the driving mechanisms remain poorly understood. The second reason for choosing mammography screening relates to data availability. Information is available about the year in which women commenced regular mammography screening, which is unique. It is somewhat unfortunate that information concerning timeliness is rare in the field of preventive health care, because it is a vital aspect of preventive health habits. This duration data allows the illustration of the potential of all five life course principles for preventive health care research, by means event-history analysis, a statistical technique that is particularly suited for and often used in life course research. The advent of the retrospective life histories encompassed in the Survey of Health, Ageing and Retirement in Europe (SHARE) provides a unique opportunity to empirically scrutinize this for the first time. It is

the only multi-national dataset that allows the analysis of how earlier life shapes the lives of respondents today, thereby accounting for the different historical, societal and political contexts in which individual lives are strongly embedded (Borsch-Supan, Brandt, & Schroder, 2013).

This thesis is structured as follows: first, I zoom in on breast cancer and mammography screening. Second, I outline how preventive health care inequalities have been approached traditionally, before focusing in detail on the sociological foundations for health lifestyle and cultural health capital theory. Next, each of the five principles of the life course perspective and their potential application and similarities with preventive health care research are elaborated. Data and methods are then discussed to illustrate these five applications in five empirical chapters. I conclude by discussing the results, limitations and suggestions for future research, as well as the implications for medical sociology and policymakers.

2. Background

2.1. Screening for breast cancer through mammography

2.1.1. Breast cancer

Thousands of women around the world are diagnosed with breast cancer every day, resulting in 1,384,155 new diagnoses worldwide in 2008. Globally, the age-standardized incidence rate (ASR) of breast cancer is about 42.3 new cases per 100,000 population, corresponding to 23 per cent of all female cancer diagnoses in 2008. However, the prevalence of breast cancer varies significantly across world regions. The incidence rate is about two and a half times higher in more advanced economies than in emerging economies (Youlden et al., 2012).

In Europe, breast cancer is the most frequently diagnosed form of cancer among women, accounting for 463,800 new cases in 2012 (28.8 per cent of all female cancer diagnoses in 40 European countries) (Ferlay et al., 2013). In Europe, breast cancer is also by far the leading cause of female death from cancer, with an estimated mortality rate of 16.8 per cent. Incidence rates also vary by the European regions. Women in Western (ASR = 126.8) and Northern Europe (ASR = 120.8) are most often diagnosed with breast cancer, while Central and Eastern European countries have a considerably lower incidence rate (ASR = 63.4). The Southern European countries have a middle position, with an ASR of 96.8 (Ferlay et al., 2013). Belgium is the absolute leader in terms of breast cancer diagnoses (ASR = 147.5), where every year, more than 10,000 women are diagnosed with the disease. It has been estimated that about 12 per cent of Belgian women will be diagnosed with breast cancer during their life (Belgian Cancer Registry, 2011).

Although the exact aetiology of breast cancer is still unknown, some risk factors have been identified and can be linked to this large regional variation. The Western lifestyle has been associated with an increased risk of breast cancer, including factors such as high alcohol consumption, obesity, lower levels of physical activity, use of hormone replacement therapy and a range of reproductive factors including nulliparity, delayed childbearing, reduced breast feeding, early menarche and late menopause (IARC, 2008; Lacey et al., 2009; Porter, 2008; Youlden et al., 2012). Genetic factors can also explain some of the worldwide variation, but to a relatively small extent. Genetic factors play a role in only about 10 per cent of the breast cancer cases in developed countries. Women who test positive for mutations in the tumour-suppressing genes BRCA1 and BRCA2 (Parkin & Fernandez, 2006), as well as women with a positive family history of breast cancer, are more vulnerable. The level of elevated risk for the latter women is contingent on the number and type of relatives affected and the age at which these relatives developed breast cancer (Verleye, Desomer, Gailly, & Robays,

2011). The ageing of the population will also contribute to an increase in the number of cases, because old age is a major risk factor for the disease (Ferlay et al., 2007). Finally, overdiagnosis may account for the regional variation. Many countries in the developed world organize screening programmes for breast cancer. Unfortunately, this entails cancers being detected that would otherwise have remained clinically insignificant (Youlden et al., 2012).

2.1.2. Mammography screening

Because the aforementioned risk factors are difficult to modify at the population level, secondary prevention is relied upon. Its goal is to detect breast cancer at the earliest stage in order to improve disease prognosis and reduce the mortality risk. For this purpose, mammography screening is considered the only evidence-based method (Wübker, 2013; Youlden et al., 2012). It is a type of medical imaging of the breast that uses X-rays to detect a lump before it can be felt (Gotzsche & Nielsen, 2009). The effectiveness of mammography screening has been assessed in several randomized clinical trials. These have reported a mortality reduction due to screening of between 20 and 30 per cent among women aged 50-69 years (Hakama et al., 2008; Schopper & de Wolf, 2009). In addition to these trials, several countries have set up population-based studies to evaluate the effectiveness of screening programmes, using comparisons of time trends and geographical differences between populations who were offered screening programmes of different intensity (Hakama et al., 2008). These population studies have identified similar mortality reductions to the randomized clinical trials. In Australia (BAEAC, 2009), a reduction of between 21 and 28 per cent due to screening was noted. In Denmark, England and Wales, the Netherlands and Sweden, breast cancer mortality decreased by between 19 and 32 per cent in the population (Hakama et al., 2008).

Despite this considerable volume of positive evidence, controversy still surrounds mammography screening. First, there is some discussion concerning the methodological weaknesses of the studies. Randomized trials have been challenged, amongst others, by the very influential Cochrane review in 2001 (Olsen & Gotzsche, 2001). These have suggested that the randomization and exclusions after randomization were inadequate, thereby hampering the comparisons between the trial arms, and thus limiting firm conclusions on mortality reduction. However, the validity of these criticisms has been refuted in many follow-up papers and extensive reviews have re-asserted the potential of mammography screening to reduce mortality (Schopper & de Wolf, 2009). The population-based studies have been criticized for having limited value in quantifying the exact impact of the introduction of a screening programme (Ferlay et al., 2013). For example, the observed effect of

screening programmes is downwardly biased, as population mortality rates include deaths in women who were diagnosed before the programme started or they include a period too soon after its commencement (Moss et al., 2012). Nevertheless, such trend analyses are considered useful to assess the overall success of breast cancer control (Ferlay et al., 2013), although they should be complemented by randomized approaches, which are considered the gold standard (Hakama et al., 2008). A second major discussion point concerns the side effects of mammography screening. In addition to mortality, screening programmes also affect morbidity and quality of life (Hakama et al., 2008). I previously mentioned that screening inevitably brings about overdiagnosis and overtreatment of breast cancers that would otherwise not be diagnosed during a woman's life (Gotzsche & Nielsen, 2009; Youlden et al., 2012). Other side effects include pain when the mammography is taken (Miller, Martin, & Herbison, 2002), and fear and psychological distress due to false positives (Brodersen & Siersma, 2013).

2.1.3. National screening programmes in Europe

Based on the evidence for the potential of mammography screening to reduce breast cancer mortality, national screening programmes were established in several industrialized countries in the 1980s and 1990s (Schopper & de Wolf, 2009), for example in Sweden (1986) and the Netherlands (1989).

In 1985, the European Union started the fight against breast cancer and launched a 'Europe Against Cancer' action programme in a meeting in Milan. In 2002, an International Agency for Research on Cancer (IARC) expert working group reviewed the international evidence regarding the effectiveness of mammography screening programmes. They confirmed that mammography screening as a public health policy is justified for women aged 50-69 years on a two-yearly basis (IARC, 2002). In June 2003, the European parliament called on its member states to make the reduction in breast cancer mortality a health policy priority. Member states should therefore have developed and implemented effective screening programmes by 2008, which complied with the European guidelines on quality assurances. The results of this should show a subsequent 25 per cent reduction in breast cancer mortality rates in the EU, as well as a 5 per cent reduction to the disparity in survival rates between member states (OJ C 68 E, 2004) (Perry et al., 2006). Most European countries, including Belgium, have now established mammography screening programmes, in which women are personally offered screening on a regular basis, mostly every two or three years from the age of 50 onwards. However, in some countries, only a few regions have organized a co-ordinated programme (for example Switzerland and Italy), while in other countries an organized screening programme is still completely

absent (for example, Austria and Greece). Further, despite the EU guidelines there is still variation in the organizational characteristics of programmes, their implementation stage, the method of offering screening and the participation rate (Bastos, Peleteiro, Gouveia, Coleman, & Lunet, 2010; Spadea, Bellini, Kunst, Stirbu, & Costa, 2010; von Karsa et al., 2008).

2.1.4. Socioeconomic inequalities in mammography screening

Especially in countries with national population-based and longstanding programmes, participation has grown (Bonfill, Marzo, Pladevall, Marti, & Emparanza, 2001; Spadea et al., 2010; Stirbu et al., 2007), but it remains strongly associated with socioeconomic position in many European countries, including Belgium (Aarts, Voogd, Duijm, Coebergh, & Louwman, 2011; Carrieri & Wuebker, 2013; Duport & Ancelle-Park, 2006; Jusot et al., 2012; Lagerlund et al., 2002; Lorant et al., 2002; Palencia et al., 2010; Puddu, Demarest, & Tafforeau, 2009; Puigpinos-Riera et al., 2011; Wübker, 2013; Zackrisson, Lindstrom, Moghaddassi, Andersson, & Janzon, 2007). Socioeconomic inequalities are assumed to be higher in countries with national screening programmes than in those with opportunistic screening programmes (Carrieri & Wuebker, 2013; Palencia et al., 2010; Stirbu et al., 2007), although this supposition still remains largely unproven.

Research is patchy with regard to the indicators used to measure socioeconomic inequalities. Various aspects of social stratification are often measured. Some studies focus on income inequalities (Aarts et al., 2011; Carrieri & Wuebker, 2013; Devaux, 2013; Duport & Ancelle-Park, 2006; Fabri, Leclercq, & Boutsen, 2014; Jusot et al., 2012; Lorant et al., 2002; Wübker, 2013; Zackrisson et al., 2007). Other European studies (also) include education as a measurement of social position (Carrieri & Wuebker, 2013; Duport & Ancelle-Park, 2006; Jusot et al., 2012; Palencia et al., 2010; Puddu et al., 2009; Renard, Demarest, Van Oyen, & Tafforeau, 2014; Stirbu et al., 2007; Wübker, 2013). Occupational class is also sometimes used (Kjellen & von Euler-Chelpin, 2010; Lagerlund et al., 2002; Menvielle, Richard, Ringa, Dray-Spira, & Beck, 2014; Puigpinos-Riera et al., 2011), as well as employment status (Carrieri & Wuebker, 2013; Duport & Ancelle-Park, 2006; Lagerlund et al., 2002; Menvielle et al., 2014), home ownership (Duport & Ancelle-Park, 2006; Lagerlund et al., 2002), cramped housing accommodation (Zackrisson et al., 2007) and health insurance (Menvielle et al., 2014). Furthermore, some scholars argue that summary measurements should be used to quantify the size of socioeconomic inequalities (Mackenbach & Kunst, 1997). Different indices have been applied to measure socioeconomic inequalities in mammography screening, either based on one component of social stratification (Carrieri & Wuebker, 2013; Devaux, 2013; Renard et al., 2014) or

a combination of multiple indicators (Klug, Hetzer, & Blettner, 2005; Lorant et al., 2002). Another point of discussion is whether the woman's own socioeconomic status should be used, or that of her partner or household (Kjellen & von Euler-Chelpin, 2010).

In addition to measuring socioeconomic inequalities with regard to preventive health care use, more attention should be directed towards the theoretical background in which these different measurements are embedded (Bartley, 2003; Galobardes, Shaw, Lawlor, Lynch, & Davey Smith, 2006a, 2006b; Muntaner, Borrell, Benach, Pasarin, & Fernandez, 2003; Muntaner et al., 2010). For example, occupational classes belong to a different theoretical framework than ranking measurements of social stratification, such as income and education (Bartley, 2003; Muntaner et al., 2003). Occupational classes entail employment relations and work conditions. Therefore, classes are based on relationships of power and control in the labour process and are thus inherently relational, in contrast to the hierarchical nature of the conventional ranking measurements of social stratification. The result is that occupational classes might capture a different aspect of the social variation and should thus be viewed as being complementary to income and education (Bartley, 2003; Muntaner et al., 2003; Muntaner et al., 2010).

It has also been argued that the peculiarities of income and education should be acknowledged (Krieger, Williams, & Moss, 1997; Mirowsky & Ross, 2003; Robert & House, 2000). With regard to health, recent work has assigned relatively greater importance to education than to income (Mechanic, 2007; Mirowsky & Ross, 2003). Education involves effective skills and learned effectiveness, which enable people to control their lives, including health (Mirowsky & Ross, 2003). Better-educated groups might be more future oriented and more willing to commit to a long-term goal, such as prevention (Mirowsky & Ross, 2003; Rosenstock, 1966). Income, by comparison, is not inherent to a person and is only a means of achieving good health (Mirowsky & Ross, 2003). In this thesis, attention is paid to these different theoretical backgrounds and aims, in order to provide a more theory-guided assessment of socioeconomic inequalities in mammography screening, thereby including the insightful notions of the life course perspective.

2.1.5. Informed consent in national screening programmes

The targeted mortality reduction of 25 per cent among women aged 50-69 years, has been anticipated based on a participation rate of 70 per cent (IARC, 2002). The European guidelines for quality assurance even set the preferable participation rate at 75 per cent (Perry, 2006). The

participation rate is considered a proxy for the protection rate, as such a mortality reduction can only be achieved if targeted women are sufficiently protected by the programme. In this regard, not only participation in single invitation rounds, but also adherence to the recommended biennial screening is vital in order to be sufficiently 'protected' (von Euler-Chelpin et al., 2006).

Unavoidably, screening programmes bring about ethical questions, because healthy women are exposed to interventions that can cause harm to some of them (Weller, Patnick, McIntosh, & Dietrich, 2009). From a public health perspective, low participation rates are undesirable, because they will result in an insufficient protection rate, poor (cost-)effectiveness and will raise questions of equity (Bonfill et al., 2001; Gummersbach et al., 2010). On the other hand, from a personalized perspective, individual women have the right to be fully and adequately informed about the pros and cons of breast cancer screening in order to make an informed decision about whether or not to participate in screening. However, explicit references to the side effects of mammography screening might discourage women from participating, thereby reducing the public health benefit of an extensive screening programme (Gummersbach et al., 2010).

There is empirical evidence that women are often not adequately informed, suggesting that a public health perspective has implicitly been taken in order to promote wide coverage (Strech, 2014). For example, most women tend to overestimate both the likelihood of developing breast cancer and the accuracy of a mammogram (IARC, 2002). Gigerenzer, Mata and Frank (2009) conclude that a sound basis for informed decisions on screening is mostly lacking in the nine European countries they studied, including seven countries that are studied here. They reveal that women aged 50-69 years – and thus those targeted by screening programmes – overestimate the benefits to a similar extent as women from other age groups. Consultations with physicians, health pamphlets and other health information sources seem not to lead to a reduction of this overestimation. Gummersbach and colleagues (2009) scrutinized the content of information leaflets and concluded that screening invitations in Germany, Italy, Spain and France lacked adequate information about possible side effects and did not mention overdiagnosis. Although physicians in particular have a major responsibility to guarantee informed decisions (Strech, 2014), there is evidence that they are not always able to correctly and transparently communicate the benefits and harms of screening (Wegwarth & Gigerenzer, 2011). The EU quality guidelines explicitly state that information should be balanced and truthful (Perry et al., 2006), however, performance indicators of European screening programmes do not include the extent to which women made an informed choice. Focusing on the participation rate as a performance indicator does not allow insight into informed decision making (Strech, 2014). Somewhat ironically, the fact that the positive aspects of

mammography screening are predominantly communicated to the public means that it still serves as an appropriate case to set up a new framework for studying preventive health care inequalities.

2.2. Traditional approaches to preventive health care inequalities

2.2.1. Historical background

Much empirical research on social inequalities in health behaviour is deeply rooted in the social epidemiological approach, which studies how patterns of health behaviour – including preventive health care use – are associated with unequal socioeconomic conditions (Frohlich & Abel, 2014). It is illuminating to position this common practice within the history of the tumultuous relationship between public health and medicine. Notwithstanding their shared commitment to health and social progress, they have developed over time into separate and often conflicting professions and institutions. In the 19th century, public health and medicine were two sides of the same coin and, for example, participation in public health campaigns was a way of achieving status and authority for physicians (Brandt & Gardner, 2000). In public health care and its branch of 'traditional epidemiology', the prevention of disease and the health needs of the population as a whole were emphasized (Pearce, 1996). At its inception, the focus of public health was on linking disease outcomes to environmental characteristics. Illustrative of this are John Snow's findings in 1854 that the outbreak of the cholera epidemic was linked to contaminated water from the Broad Street Pump in London.

However, in the early 20th century, the rising authority of medical science, the rigid separation of medical and public health education, and the emergence of the dominance of the biomedical model gave rise to hostile tensions between medicine and public health (Brandt & Gardner, 2000). This is aptly illustrated by the quote of Stephen Smith in 1873 (in Brandt & Gardner, 2000):

> If… the medical profession was as much devoted to the practice of the art of preventing as it is in curing disease, there can be no doubt that many diseases which now decimate communities would disappear altogether, and the larger number would have the mortality set opposite them greatly reduced.

This biomedical model entailed a shift from a population perspective towards a focus on individual patients, treated in an expanding tertiary health care system (Brandt & Gardner, 2000). After all, the model, derived from Louis Pasteur's germ theory of disease, postulates that all disease results from cellular abnormalities (Wade & Halligan, 2004), thereby uncoupling disease from its social roots.

Then, the epidemiological transition, as well as the innovations in public health knowledge and practice, provided opportunities for reconcilement. By the mid-20th century, systemic chronic conditions such as cancer, diabetes and heart disease, had replaced infectious diseases as the primary causes of death (Omran, 1971). What was termed 'modern' or 'new' epidemiology offered the statistical techniques needed to study the multiple causes of systemic chronic diseases (Krieger, 1994; Susser, 1985), which was difficult for the biomedical paradigm given its focus on infectious agents (Brandt & Gardner, 2000). However, modern epidemiology and public health have increasingly adopted the biomedical model and as such have become reductionist approaches themselves (Pearson, 1996; Brandt & Gardner, 2000). Typically, (social) epidemiological approaches focus on individuals as carriers of multiple (social) risk factors in disease causation, and yield predictive models in order to identify these factors (Frohlich et al., 2001). Biomedical individualism, inherently incorporated in this multifactorial model, brings about the assumption that the characteristics of a person's social environment, such as age, SES and gender, are exogenous to the individual. It is as though people are dropped into a social environment, thereby overlooking the very social relationships of power that shape and pattern the social conditions (Krieger, 1994; Shim, 2002; Susser, 1985). For example, consider the well-established ethnic inequalities in health (Missinne & Bracke, 2012). Someone's ethnicity is a social construct, consisting of a set of social relationships and practices (Nazroo, 1998). Therefore, there is no direct causal link between ethnicity and health, meaning that it cannot be considered in a similar fashion as linking, for example, the biological determinant of smoking to lung cancer (Frohlich et al., 2001).

Accordingly, epidemiology remains primarily concerned with the identification of individual risk factors and has therefore been designated as 'risk factor epidemiology' (Shim, 2002). However, multiple levels of disease causation are increasingly being acknowledged and included in statistical models, for example through the statistical technique of multi-level modelling (e.g. Berkman & Kawachi, 2000; Diez-Roux, 1998; Macintyre, Maciver, & Sooman, 1993). These 'studies of context' certainly have their merit in questioning the methodological individualism in epidemiology, by scrutinizing ecological characteristics in addition to individual ones. However, they often suffer the same defects as traditional epidemiological approaches, by becoming an atheoretical search for new risk factors – at the macro level – rather than attempting to understand the underlying mechanisms (Frohlich et al., 2001; McKinlay & Marceau, 1999).

Even from within social epidemiology, there is a pressing call to (re)introduce theory (e.g. Bartley, 2003; Krieger, 2001; Pearce, 1996). Although Reeder contended in 1969, some 20 years after the inception of social epidemiology, that it should "include variables and concepts drawn from a theory" (Reeder, 1972), (social) epidemiologists still tend to shy away from theory and instead focus on

methodology (Frohlich et al., 2001; Krieger, 1994). However, as Frohlich and Abel (2014, p. 200) put it "the inability of public health to change individual behaviour on a large scale, despite expensive and labour-intensive large-scale interventions, has given epidemiologists reason to pause with regard to how they view behaviour and its causes and their ability to modify it".

2.2.2. Measurement of preventive health care inequalities: Andersen's behavioural model

Inequalities in preventive health care are usually assessed in a similar manner as curative health care inequalities. Most empirical studies on socioeconomic inequalities are carried out by social epidemiologists, health services researchers or health economists, and focus on horizontal equity (Lorant et al., 2002), which is commonly defined as the principle of equal access for equal need (Hanratty, Zhang, & Whitehead, 2007; Morris, Sutton, & Gravelle, 2005; van Doorslaer, Masseria, & Koolman, 2006; Wagstaff & van Doorslaer, 2000). For this purpose, the need-adjusted approach based on Andersen's heuristic model of health service use (Andersen, 1995; Andersen et al., 1970) is generally relied upon. Researchers define and adjust for indicators of 'need' and subsequently assess whether socioeconomic inequalities in health care use persist. Inequity arises, for example, if individuals in higher socioeconomic groups are more likely to use, or are using, a greater quantity of health services – after controlling for their level of ill-health – compared with lower socioeconomic groups (van Doorslaer et al., 2006). Several critiques have been raised concerning what is termed this objective approach (Colman, Missinne, & Bracke, 2014a; Mechanic & McAlpine, 2010). In this thesis, I assess three points explicitly.

First, there is some discussion about 'age'. Age is generally regarded as a control or a confounding variable, or is used as a proxy for 'need' (e.g. Jusot, Or, & Sirven, 2012). Considering age as a need factor is subject to a moral dilemma. Some argue that entitlement to health care should decline with age, because the capacity of older people to benefit from health care decreases (Williams & Evans, 1997). However, this discussion should not let us shy away from considering age extensively. Age also acts as a marker for the place of a person's cohort in the trends of history (Mirowsky & Ross, 1992). Therefore, age differences in preventive health behaviour reported in cross-sectional surveys can point to substantially different things. They can reflect true 'age effects', but age differences can also act as proxies for cohort and period effects. Certainly in the case of mammography screening, cohort and period effects can be substantive, given that knowledge about breast cancer and screening, as well as screening programmes, has evolved greatly over time (see e.g. Fisher,

Redmond, & Fisher, 2008) There is a lack of empirical studies that consider the historical context when addressing preventive health care inequalities.

Second, it is also necessary to consider 'age effects', since the effectiveness of preventive health care depends on a *timely initiation*. For example, the age at which cancer is detected is important for the disease prognosis and survival (Bloom, 1994; Elmore, Armstrong, Lehman, & Fletcher, 2005). However, the timeliness of preventive health behaviour has been generally ignored in research (Spadea et al., 2010; Costa, 2010). Most empirical studies focus on the probability or frequency of a particular type of (preventive) health care use. As a result of the focus on rates of illness-related health care use in Andersen's framework (Andersen, McCutcheon, Aday, Chiu, & Bell, 1983) and the dominant use of cross-sectional study designs, questions about (preventive) health care use are formulated along the lines of: "During the last xx months/years, have you consulted a specialist/GP/dentist/had a mammogram?". This design and question wording render it impossible not only to scrutinize the timeliness but also the *regularity* of preventive health behaviour. To capture a regular pattern of care, the perception of a 'usual source of care' (e.g. "Is there a particular doctor you usually go to when ill, or for advice about health") is also often used. However, this type of measurement also fails to adequately capture periodic behaviour or even the preventive nature of a visit (Newman & Gift, 1992).

Last, empirical research guided by this model focuses too much on individuals in isolation. This is regrettable, in view of the fact that seeking professional care is often not the result of an individual decision, but of an interactive process (Pescosolido, 1992). The earlier version of Andersen's model employed the family as the unit of analysis, but Andersen shifted this to the individual because of methodological concerns (Andersen, 1995).

2.2.3. Explanatory approaches to preventive health care inequalities

In addition to the need-adjusted approach of Andersen and colleagues (Andersen, 1995; Andersen et al., 1970), socioeconomic differences in preventive health care use, including mammography screening, have traditionally been explained by psychological models of health behaviour, such as the widely-used health belief model (Becker & Maiman, 1975) and the theory of reasoned action (Fishbein & Ajzen, 1975).

For more than 50 years, the *health belief model* (HBM) has constituted a prolific framework for explaining and predicting preventive health care behaviour, as well as for informing interventions.

Initially, it was developed by social psychologists in the U.S. public health service as a response to the failure to allow people to participate in free health prevention programmes in the 1950s (Hochbaum, 1958; Rosenstock, 1966). Since then, the model has been greatly discussed and extended (see reviews by Janz & Becker, 1984) to include all preventive health actions and sick role behaviour (Strecher, Champion, & Rosenstock, 1997). Largely routed in the confluence of learning theories, mainly derived from stimulus-response theory and cognitive theory, the model focusses on how the perceived susceptibility to and perceived severity of an illness relate to a particular form of health behaviour, taking into account its perceived benefits minus the perceived barriers (Rosenstock, Strecher, & Becker, 1988). Otherwise stated, people are motivated towards a particular health action if they regard themselves as susceptible to an illness with serious consequences and they see the health action as beneficial relative to its negative aspects (such as costs, side effects, unpleasantness, etc.) (Strecher et al., 1997). In 1988, Rosenstock and colleagues proposed a revised health belief model, which incorporates Bandura's (1977) concept of self-efficacy in order to increase its explanatory power. Self-efficacy, or efficacy expectation, can be defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, p. 79).

In 1975, Fishbein and Ajzen described the *theory of reasoned action* (TRA) as an alternative social cognitive model to predict health behaviour. It contends that the proximal determinant of behaviour is a person's behavioural intention, which in turn is held to be determined by that person's attitude (general evaluation of a particular behaviour) and the subjective norm (appraisal of social pressure and motivation to comply). The model was established for purely volitional behaviours that only require the formation of an intention and are thus solely dependent on personal agency. To counter criticism of the model, Ajzen (1991) added perceived behaviour control as a determinant of behavioural intention to account for factors outside individual control, such as personal resources or environmental determinants of behaviour. The model was renamed the *Theory of Planned Behaviour* (TPB).

Both social cognition models emphasize the beliefs about health hazards and health-protective behaviour (Weinstein, 1993) and describe how individual cognition and health behaviour is shaped by the evaluations of anticipated action outcomes, perceived social approval and perceptions of control (Abraham, Sheeran, & Henderson, 2011). Accordingly, the models describe similar underlying psychological processes (Bandura, 1998), although this is not always recognized (Weinstein, 1993). Especially important here is the fact that these models often do not account for socioeconomic position, gender and other indices of the social structure. This results partly from the assumption that the effect of social structural measurements are entirely mediated by behaviour-specific cognitions and do not independently contribute to predict behaviour (Abraham et al., 2011).

From a public health perspective, it is appealing to focus on these psychological variables, as they are more amenable to change via interventions than are sociostructural variables (Armitage & Conner, 2000).

However, empirical evidence suggests that the relationship between health beliefs and health-related behaviour is problematic (Williams, 1995). Researchers generally agree that these theories leave much of the health behaviour variance unexplained (Armitage & Conner, 2001; Traube, Holloway, & Smith, 2011; Williams, 1995) and have therefore now proposed more complex, multivariate relationships between beliefs and behaviour (Soliday & Hoeksel, 2000). Research in this area continues at a rapid pace and new models continue to be introduced, but the extent to which the field is moving forwards has been questioned (Noar & Zimmerman, 2005). One positive point is that these models highlight the role of beliefs in preventive health care use. They contend that use is not determined by financial means alone, as is often assumed when adopting a need-adjusted approach (Rajaram & Rashidi, 1998). Less positive is the fact that the social cognitive approach focuses on the self-management of health habits in order to stay healthy (Bandura, 1998). Therefore, individuals are seen as truly rational (Jayanti & Burns, 1998), and their behaviour can primarily be changed through some form of self-regulation (Frohlich et al., 2001). The standard approach in public health research and health promotion still treats health behaviour as a matter of individual choice and individual responsibility, thereby ignoring its collective characteristics and sociocultural influences (Cockerham, 2005; Frohlich et al., 2001). Behavioural models that ignore the effect of structure on the behaviour of individuals are examples of what Archer (1995, p. 4) calls “Upwards Conflation”. People are held to monopolize causal power that operates in a one-way upwardly direction, and which is incapable of acting in reverse to influence individuals. However, individual agency and social structure always operate in tandem in social settings, so neither form of conflation – upwards or downwards – captures the empirical reality. Both are always present, it is a matter of which one is dominant in a particular situation (Cockerham, 2005).

In 21st century medical sociology, there is a growing awareness that understanding the social rooting of health and illness requires a shift from the dominant agency-oriented paradigms towards a more neo-structural perspective (Cockerham, 2005, 2007). *Sociology of Health and Illness*, a leading British medical sociology journal, devoted a special issue to health behaviour (February 2014), in which all authors clearly expressed their unease with the contained and delineated character of the health behaviour concept, which is too far removed from everyday social life (Cohn, 2014).

2.3. Sociological approaches towards health behaviour

2.3.1. Introduction

Traditional approaches have left much unexplained, as they "tend to pay little or no attention to individuals or groups of individuals as social agents in the production and reproduction of health behaviour and social inequalities" (Frohlich & Abel, 2014, p. 20). This is precisely where (medical) sociology comes to the fore. Interestingly, medical sociology was also heavily influenced by medicine at the beginning, even more than by sociology (Cockerham, 2007). Similarly to (social) epidemiology and public health, medical sociology experienced a shift from a structural functionalist approach – ensuing from Durkheim's emphasis on 'social facts' (Durkheim, [1895] 1950) and Talcott Parsons' (1951) theory of the sick role – towards an agency orientation. The focus on individual agency was brought about by symbolic interactionism, which was the dominant orientation by the end of the 1960s. Although its popularity had declined by the 1980s, it was not until 1995 that social causation was resuscitated by Link and Phelan (Cockerham, 2007).

Sociology – and certainly medical sociology as well – has to contend with increasingly complex social phenomena. Fundamental transformations are taking place in society (Wasserman & Hinote, 2011) and the traditional industrial model is no longer applicable (Beck, 1992). A common theme among sociologists is "that of an epochal shift, discontinuity, or break with modernity, bringing new social conditions and principles" (Cockerham, Rutten, & Abel, 1997, p. 331). Although there is considerable disagreement about the exact definition, different terms for this oncoming period have been proposed: postmodernity (Bauman, 1992), high modernity (Giddens, 1991), reflexive modernity (Beck, 1992) and liquid modernity (Bauman, 2005). There is not really one historical event that marks the beginning of this period, but according to Lemert (1999), it should be situated in the late 1970s or early 1980s, when people began to talk seriously about postmodernism.

In current post-industrial societies, stratification is not driven by social class alone (Clark & Lipset, 2001). As a result of better labour conditions, increasing wages and more disposable time, consumption patterns have gained importance (Bogenhold, 2001). Postmodern conditions and the accompanying destabilization of industrial-age norms brings about greater diversity in lifestyle choices. People are pushed to make choices and seek improvement, regardless of their age and class of origin. This also entails people being pushed towards greater individual responsibility (Cockerham et al., 1997). The same applies to health. Good health has become envisaged as an individual achievement, so that the adoption of a healthy way of life amounts to an individual's social and moral responsibility (Clark & Lipset, 2001). People are expected to actively produce and maintain

their state of health throughout their individual life course and good health is no longer a question of being naturally endowed (Abel, 2007; Williams, 1995). Armstrong (2014) places this fundamental turn towards reflexive patients who take responsibility for health-related decisions in the second half of the 20th century. The Hochbaum (1958) report on non-participation in organized tuberculosis screening, marked a radical shift from Parson's (1951) sick role theory, in which patients were characterized by helplessness, technical incompetence and emotional involvement (strain), leaving little room for patient involvement. Hochbaum claimed that public health needs to promote a constant state of self-appraisal in all patients, in order to make them also alert to pre-symptomatic diseases such as tuberculosis, thereby transferring the potential for patient control from medicine to the patients themselves. The promotion of patient agency is now so consolidated in research and clinical practice "that it becomes increasingly difficult for patients to resist the demands that they are both reflexive and empowered to act" (Armstrong, 2014, p. 172).

In an attempt to bring the context back into research on health behaviour, the concepts of collective lifestyles (Frohlich et al., 2001) or health lifestyles (Abel, 1991, 2007; Cockerham, 2000, 2005, 2007, 2013; Cockerham et al., 1997; Cockerham, Abel, & Luschen, 1993; Williams, 1995) have been developed. In the same theoretical tradition, the explicit inclusion of cultural capital has been advocated as it is in modernity, whereby cultural capital constitutes of one of the most fundamental and socially-stratified resources for health (Abel, 2007). Applied to the field of health, incorporated cultural capital has been conceptualized as 'cultural health capital' (Abel, 2008; Shim, 2010). Before discussing these recent theory formations, I return to Weber's perspective on lifestyles in the early 20th century and to an updated vision on lifestyle by Pierre Bourdieu.

2.3.2. Max Weber and lifestyles

The theoretical origins of the (health) lifestyle concept can be traced back to Weber ([1922], 1978). Although the lifestyle concept had been used earlier in the political writings of Karl Marx in the 1850s (Marx, 1960) and in Veblen's theory of the leisure class ([1899], 1992), it was Weber who more thoroughly developed the lifestyle concept and its relationship to socioeconomic status (Cockerham et al., 1993). He does so in his book *Wirtschaft und Gesellschaft* ([1922], 1978), when outlining the three different forms of social stratification: 'classes', 'status groups' and 'parties'. Whereas classes are economically determined and parties reside in the sphere of power, "the place of status groups is within the social order, that is within the sphere of the distribution of honor" (Weber, [1922], 1978, p. 938). The lifestyle concept comes to the fore as a distinguishing

characteristic of social status, which "is normally expressed by the fact that above all else, a *specific style of life* is expected from all those who wish to belong to the circle" (Weber, [1922], 1978, p. 932, emphasis added). Social status thus corresponds to a person's level of social prestige, based on how their lifestyle is viewed by others. Social status is therefore a subjective dimension; however, the possible style of life of status groups is obviously usually conditioned economically, so in the long run, property is also a status qualification with extraordinary regularity (Weber, [1922], 1978). Accordingly, classes and status groups frequently overlap. However, contrary to classes, lifestyles are based on what people consume. According to Weber, "with some oversimplification, one might thus say that classes are stratified according to their relations to the production and acquisition of goods; whereas status groups are stratified according to the principles of their *consumption* of goods as represented by special styles of life" (Weber, [1922], 1978, p. 937, emphasis in the original). In the case of health, the ultimate goal of producing good health is also to be able to 'consume' it somehow, be it in terms of work, a longer life or a happier one (Cockerham et al., 1993).

Another major contribution by Weber to our understanding of contemporary lifestyles is his imposition of a dialectical capstone over the interplay of choice and structure (Abel & Frohlich, 2012; Cockerham et al., 1993; Cockerham et al., 1997). Life choices (*Lebensfüring*) constitute the agency component of lifestyles. This refers to the process by which people choose their course of action based on a critical evaluation (Cockerham, 2007). Although Weber gives more weight to choice in the determination of lifestyles (Cockerham et al., 1993; Cockerham et al., 1997), the probability of realizing these choices is determined by the social structure constituting life chances (*Lebenschancen*). Weber thus highlights that lifestyles are not random behaviours, but that people's choices are shaped by both material resources and the normative rules of their respective status group (Abel and Frohlich, 2012).

This idea of an interaction between individual choice (agency) and structural constraints is crucial to move beyond a notion of agency as being equivalent to 'risk behaviour' as has been described earlier (Abel & Frohlich, 2012). However, we will need an update of Weber's analysis to understand the contemporary stratification of health lifestyles. Apart from the economic dimension, Weber did not consider other dimensions of social stratification, such as gender and age, that have already been linked to health behaviour (Cockerham et al., 1997).

2.3.3. Pierre Bourdieu and the (re)production of social inequalities

A more updated discussion of lifestyles is provided by the very influential French sociologist, Pierre Bourdieu (1930–2002), in particular in his best-known work*, La Distinction* (Bourdieu, 1984). Bourdieu addresses the question of how the social practices of individuals are embedded within the external structure of their social world, which itself is reinforced consecutively by these practices (R. Jenkins, 1992). In this regard, the concept of 'habitus' is crucial, which Bourdieu refers to as:

> … systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles which generate and organize practices and representations that can be objectively adapted to their outcomes without presupposing a conscious aiming at ends or an express mastery of the operations necessary in order to attain them. (1990, p. 53).

The habitus is the structuring principle of tastes, perception and behaviour in the different domains – cultural, economic, political, social, etc. – of a person's life. It should be considered a generative schema that is formed through socialization processes, thereby reproducing existing social structures (Bourdieu, 1984). Habitus does not entail a mechanical response to all situations, instead it is an "open system of dispositions subjected to and affected by experiences in ways that can either reinforce or modify behaviour" (Cockerham et al., 1997, p. 327). In *Sociology in Question* (1993, p. 87), Bourdieu compares the habitus to a "computer program (though it's a mechanistic and therefore dangerous analogy) - but a self-correcting program. It is constituted from a systematic set of simple and partially interchangeable principles, from which an infinity of solutions can be invented, solutions which cannot be directly deduced from its conditions of production".

People who occupy a similar position in the social space will generate a similar habitus and thus share lifestyles, so that ultimately the social space will constitute a "space of lifestyles" (Bourdieu, 1984, p. 170) that is shared by class members. To enact practices, dispositions draw upon resources of powers, what Bourdieu terms 'capitals'. Bourdieu contends that this involves more than economics alone and defines capital as:

> accumulated labor (in its materialized form or its 'incorporated,' embodied form) which, when appropriated on a private, i.e., exclusive, basis by agents or groups of agents, enables them to appropriate social energy in the form of reified or living labor. It is *a vis insita*, a force inscribed in objective or subjective structures, but it is also *a lex insita*, the principle underlying the immanent regularities of the social world. (Bourdieu, 1986, p. 241).

So essentially, what Bourdieu says is that capital structures our society. Bourdieu (1986) further describes how someone's position in the social space depends upon the amount and composition of three different forms of capital: economic, social and cultural. The interplay and the accumulation of these different forms is important, in the sense that they are convertible into one another and that their use and acquisition presupposes the other forms of capital. In Karl Marx's sense of the word, economic capital consists of those material resources that are "immediately and directly convertible into money and may be institutionalized in the forms of property rights" (Bourdieu, 1986, p. 242). Examples are ownership, financial resources or property. Bourdieu posits that although economic capital is "at the root of all the other types of capital, these transformed, disguised forms of economic capital [are] never entirely reducible to that definition" (1986, p.89). Bourdieu considers social capital as a network-based individual resource, which he defines as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group" (Bourdieu, 1986, p. 247). The volume of someone's social capital "depends on the size of the network of connections he can effectively mobilize and on the volume of the capital (economic, cultural or symbolic) possessed in his own right by each of those to whom he is connected" (Bourdieu, 1986, p. 86).

Bourdieu is best known for his discussion of cultural capital and how people use it to reinforce their position in the social hierarchy. He identifies three different forms of cultural capital that again interplay with one another: objectivized (e.g. books, pictures, dictionaries, artefacts, paintings), institutionalized (e.g. education, job title) and the embodied state, in the form of long-lasting dispositions incorporating mind and body (e.g. values, skills, knowledge). Embodied and institutionalized cultural capital have the same biological limits as their carrier, i.e. the individual, in contrast to objectivized cultural capital, which can be transmitted in its materiality, as can economic capital. Embodied cultural capital, in the form of what is called 'culture', cultivation or *Bildung* in German, presupposes a process of embodiment; incorporation that often happens quite unconsciously. Bourdieu presumably intended a broad understanding of education by the term 'culture', encompassing "all forms of learning not only acquiring knowledge but also learning how to behave properly, how to make sense of the world etc. Thus, perceptions, skills and knowledge". (Abel, 2007, p. 52). According to Bourdieu, cultural capital is then undoubtedly "the best hidden form of hereditary transmission of capital, and it therefore receives proportionately greater weight in the system of reproduction strategies, as the direct, visible forms of transmission tend to be more strongly censored and controlled". (Abel, 2007, p. 84). The social conditions underlying this process of transition and acquisition are more disguised than those of economic capital, therefore "it is

predisposed to function as symbolic capital, i.e., to be unrecognized as capital and recognized as legitimate competence", for example in the marriage market". (Abel, 2007, p.84).

Bourdieu (1986) also highlights that the transmission and acquisition of cultural capital takes time, therefore the advantaged individuals are those who grow up in families with time free from economic necessity, preferably from their birth onwards, so that the accumulation period covers "the whole period of socialization" (Bourdieu, 1986, p. 85). Thus, according to Bourdieu, social inequalities are (re)produced in families, as "cultural competence … remains defined by its conditions of acquisition" and thus depends on the "total, early, imperceptible learning, performed within the family from the earliest days of life and extended by a scholastic learning which presupposes and completes it" (1984, p. 65-66). The educational system reproduces these inequalities, as teachers recognize and reward the middle or elite class cultures, thereby facilitating these children's educational and occupational attainment. In this way, schools contribute to the institutionalization of social inequalities (Bourdieu & Passeron, 1977). Bronfenbrenner, well-known for his pioneering theory of the ecology of human development (1979), describes aptly in the *Syracuse Post Standard* (1996) this presumed crucial role of the family of origin and how the family enables a child to learn in school: "Not because your parents are teaching you arithmetic, although that won't do any harm; it's because you learn from them how to relate to very complicated things."

The last important aspect for the argument here, is Bourdieu's third important thinking tool in addition to practice and habitus: field (Jenkins, 1992). A field is a structured system of specific power relationships that accrue to both individuals and institutions. Dependent on the amount and composition of the three forms of capital, people will be more adapted and powerful than others to act in a specific field. Bourdieu describes a field as an "arena" in which people and institutions use their capital to compete for scarce rewards. Bourdieu's concept of lifestyles is one of a means of distinction and the power individuals use to retain or improve their social position (Korp, 2008). The set of practices performed by individuals depends on the interplay between habitus and capital, which differs across fields, as represented in the following formula: [(habitus) (capital)] + field = practice (Bourdieu, 1984, p. 101). Accordingly, Bourdieu (1984, 1986) suggests that capital should be adapted to the field in order to be advantageous. This contention of field-specific capital led researchers to develop the idea of cultural capital that is specific to the field of health and is termed health-relevant cultural capital (Abel, 2008), or cultural health capital (Shim, 2010). In addition, Cockerham (2013) pays more explicit attention to Bourdieu's notion of field in his updated version of the health lifestyle theory.

To summarize, Bourdieu's concept of habitus is crucial for the understanding of how lifestyles are produced and reproduced. In contrast to Weber's emphasis on choice, Bourdieu gives more weight to structure (Cockerham et al., 1997). The concept of habitus has often been criticized for its deterministic focus on structure, which leaves little room for individual reflexivity and conscious agency (Abel & Frohlich, 2012; Atkinson, 2010; Frohlich et al., 2001; Schafer, Ferraro, & Mustillo, 2011). Another frequently-voiced critique relates to the 'relative irreversibility' of the habitus (Bourdieu & Wacquant, 1992). Although Bourdieu argues that the class-based habitus is open to change, he allocates disproportionate weight to childhood experiences in the formation of the habitus (Atkinson, 2010; Daenekindt & Roose, 2013a). Nevertheless, the habitus concept helps to reduce the conceptual gap left in Weber's analysis of how life chances determine life (and lifestyle) choices (Cockerham et al., 1997). Finally, Bourdieu's concept of field has been nourishing for the theoretical developments of cultural health capital specific to the field of health, as well as health lifestyle theory.

2.3.4. Health lifestyle theory

The concept of lifestyle has been widely adopted by researchers in health promotion, social epidemiology and other branches of public health (Frohlich et al., 2001). However, its current conceptualization is far from the original meaning proposed by Weber (Frohlich & Potvin, 1999) and Bourdieu (Korp, 2008). In sociomedical discourse, lifestyle is used in terms of individual behavioural patterns operating as risk factors for health (Abel, 1991; Frohlich et al., 2001). As well as this adopted individualistic connection, the term 'lifestyle' has been stripped of its original meaning by leaving out the interplay between life chances and life choices (Frohlich et al., 2001).

Indeed, the foundations provided by Weber also need an update to account for the contemporary social conditions of postmodernity, where lifestyles can play a major role in health and life expectancy (Cockerham et al., 1997). Frohlich, Corin and Potvin (2001) propose the term of 'collective lifestyles', to stress the relationship between people's social conditions and their health-related behaviour. The 'health lifestyle' theory was developed by Thomas Abel and William Cockerham. Abel (1991, p. 901) initially defines health lifestyles as comprising "patterns of health related behaviors, values, and attitudes adapted by groups of individuals in response to their social, cultural and economic environment". William Cockerham and colleagues (1997, p. 338) suggest that health lifestyles can be defined as "collective patterns of health-related behavior based on choices from options available to people according to their life chances". Both definitions contain Weber's notion of the dialectic interplay between life choices and life chances in the shaping of lifestyle

outcomes. Importantly, Cockerham et al. (1997) do not confine life chances to social class circumstances, as do Weber and Bourdieu, but highlight that age, gender, ethnicity and other variables also determine lifestyle choices.

Bourdieu's habitus concept is the centrepiece of the health lifestyle model. It is essential to understand how the interplay of chances and choices become embodied in someone's mind and produce individual lifestyle dispositions (Cockerham, 2005). According to Cockerham (2013, p. 148), the habitus should be thought of as "a process of thinking in which social norms and cultural conventions are internalized in the mind, along with the individual's own inclinations, preferences, and interpretations". With regard to health, lifestyles include actions situated both within the health care system, such as physical check-ups, flu vaccinations and cancer screenings, and outside of it, such as brushing teeth, a healthy diet, exercising, not smoking and so on (Cockerham, 1995). These health actions (or inactions) lead to the reproduction, modification or nullification of health lifestyles through feedback to the habitus (Cockerham, 2005). Health lifestyles are largely shared by individuals close to one another in a social space, and whose similar opportunities in terms of life chances give rise to a shared general habitus (Bourdieu, 1984). Hence, choices of health lifestyles are not uncoordinated, but are largely shared by social class members (Cockerham 2005, 2007). Bourdieu's concept of habitus (1984) also entails that "health-related behaviour can be seen as a largely routinized feature of everyday life which is guided by a practical or implicit logic" (Williams, 1995, p. 583). Therefore, health behaviour is not entirely consciously organized, but is determined by socioeconomic circumstances and their impact on the habitus (Cockerham, 2007; Shim, 2010). According to Cockerham (2007, 2013), the enduring dispositions produced by the habitus are not only normative, but also habitual and even intuitive, so that health practices are integrated into routine behavioural repertories. Bourdieu's notion of "distance from necessity" helps us to understand that people free from economic necessity have greater freedom, time and resources to adopt the healthiest practices (Cockerham, 2013). In his updated version of health lifestyle theory , Cockerham (2013) includes the work of Peter Korp (2008), who elaborates on the implications of Bourdieu's concept of field for health lifestyle theory. The relational analysis, implicit to the concept of field, entails that healthy lifestyles can be viewed as habitual practices, which act as a means of distinction. A healthy lifestyle can therefore constitute symbolic power in those social fields where healthy living is considered important.

Cockerham (2007) highlighted that health practices comprise an overall pattern and that there is empirical support for a general behavioural orientation towards a health lifestyle (Donovan, Jessor, & Costa, 1993). However, he also acknowledges that the specific complexities of health practices should be recognized.

2.3.5. Cultural (health) capital theory

A person's habitus is not directly tangible, so we are confined to using the direct manifestations of the social stratification it encompasses (Bourdieu, 1986). Therefore we should reintroduce "capital in all its forms and not solely in the one form recognized by economic theory" (Bourdieu, 1986, p. 242). Indicators of both social capital (e.g. Osler, McGue, Lund, & Christensen, 2008; Wang et al., 2011; Wilson, 2002) and economic capital (e.g. Glendinning, Shucksmith, & Hendry, 1994; Jusot, Or, & Sirven, 2012; Lorant et al., 2002) have been extensively linked to health behaviors. A cultural approach might complement the economic explanations, which fail to understand social differences in health behaviors that are not determined solely by a lack of financial means. Only recently has attention been directed towards the role of cultural capital in health behavior and health inequalities. Grineski (2009, p. 109) highlights that "the focus on culture does not devalue or oppose a political economic explanation for inequality; on the contrary, it strenghtens it". Culture is not separate from the social and economic structures, instead it is embedded in them and constitutes a source of power (Mitchell, 1995).

Generally speaking, there are two approaches towards the inclusion of cultural capital in studies on health behavior inequalities. First, a number of studies have investigated how health is related to indicators or indices comprising cultural participation or culturally-oriented leisure-time activities (Pinxten & Lievens, 2014; Khawaja & Mowafi, 2006), cultural tastes and knowledge (Kamin, Kolar, & Steiner, 2013; Veenstra, 2007), and the possession of cultural items such as books, CDs, computers and an Internet connection (Kamin et al., 2013). Similar indicators of cultural capital have also already been related to health behaviour, such as body mass index (BMI) (Christensen, 2011; Christensen & Carpiano, 2014; Pampel, 2012). Abel (2008) argues that these associations may operate through processes of distinction, as cultural activities are part of a distinct and often more healthy lifestyle. These can also enhance a person's feeling of belonging or can entail social support; both of which are beneficial to health. However, the true mechanisms linking cultural capital to health and health behaviour remain hidden. The indicators have their value in ascertaining people's position in the social space, but for a better understanding of the underlying mechanisms, we need to revert to the genuine meaning of cultural capital – in terms of symbolic and informational resources for action – and apply this to the field of health (Abel, 2008).

Second, scholars have accordingly drawn on Bourdieu's contention that capital is field specific (1984, 1986) to develop what is termed health-relevant cultural capital (Abel, 2008) or cultural health capital (Shim, 2010). Abel defines health-relevant capital as "comprising all culture-based resources that are available to people for acting in favour of their health. In its incorporated form it comprises

health-related values, behavioural norms, knowledge and operational skills" (Abel 2008, p.2). This form of cultural capital becomes directly relevant to health through the adoption of healthy lifestyles, such as engaging in preventive health care use (Abel, 2008; Abel & Frohlich 2012; Shim, 2010). In this sense, it is argued that health literacy (for a discussion, see Nutbeam, 2008; Sorensen et al., 2012) and health lifestyles as described above, are specific forms of incorporated cultural capital in the field of health (Abel, 2008). Shim (2010) focuses specifically on the health care context. She outlines how cultural health capital can shape the content and tone of health care interactions and how it is essential in order for these encounters to be effective.

Cultural health capital theory[1] provides the framework to distinguish between *health-relevant* economic, social and cultural resources, and to study how these are embedded within the broader opportunity structure, drawing on Bourdieu's capital conversion hypothesis (1986). Bourdieu argues that social inequalities can only be understood if we examine how the different forms of capital – economic, cultural and social – are interrelated and how they interact with the wider social structures to reproduce social inequalities (Grineski, 2009). In addition, the three different states of cultural capital – institutionalized, objectivized and incorporated – are intertwined and mutually beneficial for improving health. Incorporated cultural capital is the least visible form, but it is crucial in the exchanges of the different types of capital (Abel, 2007, 2008). In research carried out on an American sample, Grineski (2009) shows how parents employed certain types of cultural health capital, such as comfort with the health care system, questioning doctors about treatment, literacy and education, to secure good treatment for children suffering from asthma. These forms of cultural capital were shown to facilitate the selection of insurance plans, the selection of providers and treatment, and the efficacy of efforts to solve problems with health care. It is apparent that more economically-affluent participants and native-born US citizens were much more likely to possess these cultural resources, as well as the social resources that are beneficial for experiences with asthma care, such as personal relationships with health care professionals. This is not to say that the poorest families did not possess social capital. On the contrary, they used it as a substitute for their lack of economic and cultural capital, as social capital was one of their only sources of power. Social capital is not created equal. The social capital resources of poorer families were less effective in the health care field, as they comprised for example relationships with school nurses rather than doctors (Grineski, 2009). The fact that the possession of capital eases the further generation of capital, together with the interconvertability of the different forms of capital, reinforces social inequalities.

[1] The concepts of health-related cultural capital and cultural health capital are embedded in the same theoretical discussion and significantly overlap. Therefore, I do not distinguish between the two and use the term cultural health capital throughout the text.

Grineski (2009) shows that the social and cultural advantages of affluent parents extend well beyond the financial accessibly of care. Moreover, Shim (2010) points out that cultural health capital theory goes beyond the existing notion of health literacy, by highlighting that cultural health capital operates as symbolic capital, as it is bestowed with positive distinction and approval (Bourdieu, 1986). Other pioneering empirical studies have already revealed the role of cultural health capital in the interactional dynamics of patient-centred care (Dubbin et al., 2013) smoking behaviour (Schori et al., 2014) and transnational health care use (Grineski, 2011).

Analogous to life course research, a longer view of an individual's life is taken when elaborating on how cultural health capital develops. It has been argued that the health-relevant knowledge and skills used to lead healthy lives start accumulating in childhood and that this continues during the life course through repeated contacts with health care providers and lifelong socialization (Abel & Frohlich, 2012; Mirowsky & Ross, 2003; Shim, 2010). Bourdieu's theory of social reproduction (1990), suggests that cultural health capital is reproduced across generations, while his notion of habitus (1984) entails that not every use of available resources, including cultural health capital, is as conscious as traditional models of health behaviour assume (Shim, 2010).

2.3.6. Fundamental social cause theory

Bruce Link and Jo Phelan (Link & Phelan, 1995; Phelan & Link, 2013; Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004) resurrected the social causation argument in medical sociology (Cockerham, 2005) and it has remained dominant ever since (Grineski, 2009). According to the first statement of the theory in 1995 (Link & Phelan, 1995, p 87), the social 'cause' of health and mortality is 'fundamental' when 1) it influences multiple disease outcomes, 2) it affects these diseases through multiple risk factors, 3) the association is reproduced over time via the replacement of intervening mechanisms, and 4) when it involves access to resources that can be used to avoid risks or minimize the consequences of disease if it occurs. According to the fundamental cause theory, people or groups deploy broadly usable and flexible resources, such as knowledge, money, power, prestige and beneficial social connections to protect their health, no matter what the risk and protective factors are in any given circumstances. These flexible resources can be conceptualized as "causes of causes" or "risks of risks" (Phelan & Link, 2013) that determine individuals' health behaviour by "influencing whether people know about, have access to, can afford and are motivated to engage in health-enhancing behaviors" (Phelan et al., 2004, p. 267). These resources also operate at the contextual level by shaping the "access to broad contexts such as neighborhoods, occupations,

and social networks that vary dramatically in associated profiles of risk and protective factors" (Phelan et al., 2004, p. 267). Fundamental social cause theory challenges the tenacious focus on risk factors in epidemiology. Freese and Lutfey (2011, p. 70) comment:

> A complete articulation of a specific proximate mechanism of inequality is not a full explanation if it misses an incisive explanation of the mechanisms themselves–incisive in that it makes sense of a diverse set of mechanisms, offers predictive insight into why the population distribution of disease will be surprisingly robust to changes in the causes of ill-health, and calls attention to the possibility of more encompassing interventions.

The fundamental social cause theory was significantly extended by Lutfey and Freese (2005).. The first point that is especially relevant here is the argument that the theoretical ideas of Bourdieu can help to advance our understanding of how "fundamental causes" produce their effects (Freese & Lutfey, 2011). In a similar vein as Cockerham (2005), Bourdieu's habitus concept can elucidate how health lifestyles develop. Importantly, the habitus concept entails that not all actions are consciously aimed at improving health, whereas with regard to the core idea of flexible resources, Link and Phelan posit that its use is purposeful (Phelan et al., 2004). In this regard, Shim (2010, p. 5) argues that the Bourdieusian view of actors "complicates the fundamental cause framework's emphasis on purposefulness and intentionality by accounting for the myriad pathways through which the acquisition and use of cultural resources to improve health are simultaneously strategic yet also tacit, deliberate yet also highly ingrained". Grineski (2009) points out that Bourdieu's (1986) contentions on cultural and social capital, as well as his capital conversion hypothesis, are also crucial to understand how socioeconomic position acts as a fundamental cause. After all, socioeconomic position is closely linked to power, such as incorporated cultural capital, that accumulates over the life course.

A second important point raised by Freese and Lutfey (2011) and acknowledged as such by Phelan and Link (2013), is the inclusion of institutional agency. The authors highlight that social institutions, such as the health care system, should not be viewed as static entities to which individuals do or do not have access. An institution should instead be viewed "as a dynamic institution that may respond directly to a patient's efforts to mobilize resources for health, but may also either amplify or mitigate those same efforts" (Freese & Lutfey, 2011, p. 74). It is precisely the dynamics of unequal treatment that Shim (2010) wants to account for when elaborating how cultural health capital can shape the tone and content of a patient-provider interaction.

2.4. Insights from life course theory

2.4.1. Introduction

Nowadays, the life course perspective is considered the dominant theoretical orientation in the study of human development (Elder Jr. et al., 2003; George, 2003). It has advanced into an interdisciplinary research stance combining anthropology, demography, economics, sociology and developmental psychology (Mayer, 2009). Yet, there have been different times when life histories and future trajectories of individuals were generally ignored (Elder Jr. et al., 2003; George, 2003), except for some important pioneering longitudinal studies (e.g. Buhler, 1935; Thomas & Znaniecki, 1927). It was not until the mid-1970s that scholars started to identify their studies as 'life course' research. This research really started to take off after the 1980s, when agreement developed on how the term 'life course' differs from related terms such as 'life cycle' (Billari, 2009; George, 2003; Mayer, 2009). Rather than an integrated theory, it is considered as a theoretical perspective, consisting of a set of paradigmatic principles. It has been argued that such a unified theory of the life course should not necessarily have been pursued. It might not even be possible at all, given that the social structuring of human lives involves many mechanisms at the individual, meso and macro levels (George, 2003; Mayer, 2009).

Broadly speaking, two perspectives in life course studies can be distinguished (Dannefer & Daub, 2009; George, 2003). The first one focusses on the life course itself as a social construct and its institutional genesis (e.g. Dannefer & Uhlenberg, 1999; Kohli, 1985). The subject of study is how individuals move during their life through a sequence of events and social roles in different life domains that are at least partially age-differentiated, such as family, education and employment. The historical shifts and cross-cultural differences in these forms of age structuring have also received attention, as well as the way they are reinforced through social policies and practices so that a "road map" of a typical life course is furnished (Settersten, 2003). The second perspective concentrates less on the life course itself, but incorporates some of the central life course principles to study individual-level outcomes. Traditionally, the transitions and developmental trajectories of individuals have been studied within various life domains (Turner & Schieman, 2008). In the last two decades, a crucial emerging topic in life course research has been the trajectories of health outcomes, including age-specific exposure to health risks and the age-specific variation in the impact of such risks. It is the fastest growing research area in life sociology, and will contribute to a better understanding of life course mechanisms and their interplay with health (Billari, 2009; Mayer, 2009). The life course perspective was introduced into social epidemiology by Blane (1999), Kuh and colleagues (2003),

and Halfon and Hochstein (2002). Studies have already revealed that early or midlife factors, such as childhood socioeconomic conditions and health, have long-term influences on adult health and mortality (Due et al., 2011; Hayward & Gorman, 2004), and healthy ageing (Brandt, Deindl, & Hank, 2011). In addition, an increasing number of studies show the relationship between early life factors and health-related behaviour in adulthood, mostly focusing on smoking, alcohol consumption, diet and physical activity (Gilman, Abrams, & Buka, 2003; Huurre et al., 2003; Lynch, Kaplan, & Salonen, 1997; Power et al., 2005). However, the role of the life course perspective in terms of preventive health care use has not yet received attention. In the following sections, I will elaborate on each of the five principles of the life course perspective and their potential application, and the similarities with preventive health care research and the theoretical frameworks outlined above.

2.4.2. Principle 1: life-span development

The life course perspective is distinctive for its extended time frame and its focus on evolving dynamics that begin in early childhood (Elder Jr. et al., 2003). A key issue that is addressed is the sociogenesis of inequality between people over the life course (Schafer et al., 2011). Early advantage or disadvantage can set in motion a series of cascading socioeconomic and lifestyle events that have consequences across different domains in later life (Gamoran & Mare, 1989; Gangl, 2004).

Scholars have been recently seeking to qualify the mechanisms underlying the social structuration of human lives (Mayer, 2009). With regard to health, three main models for the association between early life circumstances and later life health have been identified: the latency model, pathway model and accumulation model (Brandt, Deindl, & Hank, 2011; Graham, 2002; Hertzman & Power, 2004; Kestilä, 2008). The *latency model* explicates a direct link between early life experiences and later life outcomes, irrespective of intervening experiences. With regard to health, it is argued that there are critical periods in the developmental phase in early life – before or after birth – that have permanent and long-lasting effects (Barker, 1997; Ben-Shlomo & Kuh, 2002; Kuh & Ben Shlomo, 2004; O'Rand & Hamil-Luker, 2005). The *pathway model* emphasizes that the effects of early life (dis)advantages operate mainly through indirect pathways. For example, childhood economic and social hardship will affect health through adulthood socioeconomic position (Case, Fertig, & Paxson, 2005; Lundberg, 1997; Wadsworth & Kuh, 1997). This model differentiates between direct and indirect pathways and is closely connected to the status attainment model developed by Blau and Duncan (1967). The *accumulation model* suggests that exposure to risk and protective factors accumulate over the life course, in addition to critical period effects (Haas, 2008; Hertzman & Power, 2004; Kestilä, 2008;

Kuh & Ben-Shlomo, 1997). These models are largely encompassed under the general framework of cumulative (dis)advantage theory (Dannefer, 1987, 2003; DiPrete & Eirich, 2006; Merton, 1968; O'Rand, 1996). It is acknowledged that none of the processes run in a vacuum, but that they can have cumulative and combined effects (Graham, 2002; Hertzman & Power, 2004; Schafer et al., 2011).

In addition, an increasing number of studies show the relationship between early life factors and health-related behaviour in adulthood, mostly focusing on smoking, alcohol consumption, diet and physical activity (Gilman et al., 2003; Huurre, Aro, & Rahkonen, 2003; Lynch et al., 1997; Power et al., 2005). The role of life course factors in preventive health care use, including mammography screening, still needs to be assessed, but a role is expected in view of the fact that childhood socioeconomic conditions can shape the development of health-related behaviour (Kuh, Power, Blane, & Bartley, 2004) when parents transfer skills and knowledge to their children (Abel & Frohlich, 2012; Singh-Manoux & Marmot, 2005). In addition to setting an example by buying food, (alcoholic) beverages, engaging in sports, taking their children for regular dental check-ups, etc., the beliefs supporting parents' own health behaviour are transmitted unintentionally or via explicit teaching efforts (Lau et al., 1990; Tinsley, Markey, Ericksen, Ortiz, & Kwasman, 2002).

The principle of lifespan development and its concomitant notions of the accumulation and reproduction of inequality are central to the work of Bourdieu and the fundamental social cause theory. Bourdieu (1986) highlights that a key property of capital is its tendency to accumulate, thereby further favouring those who possess capital. Similarly, central to the idea of fundamental causality is the fact that it is precisely the accumulation of many small, pervasive advantages that underlie the persistent relationship between socioeconomic position and health (Lutfey & Freese, 2005). For example, living in a privileged neighbourhood entails a host of health-enhancing circumstances that come in a 'package deal', such as less crime, lower levels of pollution and closer health-care facilities, parks, etc. (Phelan & Link, 2013, p. 107). Drawing on the Bourdieusian framework, cultural health capital theorists have implicitly adopted the idea of life-span development. However, the way in which cultural health capital is acquired and how it evolves over time remains unexplored (Shim, 2010). We are in the dark regarding whether specific life stages or experiences are crucial in the development of cultural health capital or health lifestyles, and if they are crucial, which ones (Singh-Manoux & Marmot, 2005). The pioneering empirical studies on cultural health capital that have already been conducted (Grineski, 2009, Grineski, 2011, Dubbin et al. 2013) do not address the developmental dimension of cultural health capital, except for Schori et al., (2014). The latter identified that both the intergenerational transmission of health-related dispositions and educational opportunities drive socioeconomic inequalities in smoking. Bourdieu's

(1984) assertion that cultural learning takes off from the earliest days of life suggests that understanding the role of the family in producing and reproducing preventive health care inequalities is crucial.

Incorporating a longer-term view, will allow us to gain a better understanding of the origins of socioeconomic inequalities in mammography screening. To date, the socioeconomic position that is considered when measuring inequalities has been almost exclusively assessed at one single time point, namely the time of data collection. The first empirical study here aims to fill this gap by examining how childhood conditions are related to mammography screening. It can be expected that women who experience unfavourable socioeconomic conditions in childhood, will be less likely to undergo regular mammography screening in later life. Drawing on Bourdieu's framework, I assume that cultural capital and cultural health capital in childhood might play a role beyond those of conventional socioeconomic indicators in childhood and adulthood. Preventive health behaviour in childhood is used as an indicator of cultural health capital that starts to accumulate in early life. The accumulation of cultural health capital is likely to continue during the life course through repeated contacts with health care providers (Shim, 2010) and lifelong socialization (Abel & Frohlich 2012; Mirowsky & Ross, 2003). In the following text, I will elaborate on how other significant network members, for example marital partners (see the principle of linked lives), become important for health behaviour (Christakis & Fowler, 2007) (see principle of agency vs. structure).

2.4.3. Principle 2: linked lives

The principle of linked lives highlights that individuals' lives are lived interdependently in a network of shared relationships (Elder Jr, et al., 2003). Because experiences are shared, the relevance of various social events and transitions is widened (Heinz & Krüger, 2001). These interpersonal experiences are also located within a specific historical time and place that can impact on these micro-level settings (Elder Jr., et al. 2003).

Research on preventive health care and health care in general has focused too much on the individual in isolation. Andersen's (1970, 1995) heuristic model focuses on how individual need, socioeconomic and demographic characteristics, and individual health beliefs are related to health service use. Rather than being an individual decision, an interactive process often underlies the decision to seek care (Pescosolido, 1992). Recently, Umberson and colleagues (2010) drew explicitly on the life course perspective to provide a theoretical framework to unravel the mechanisms underlying the relationship between social ties and health behaviour, including preventive health care use and treatment attendance. Predominantly, the focus is on the presumed beneficial effects of

marriage. Health-related social control theories propose that partners try to influence and regulate each other's health behaviour in order to keep their partners healthy (Lewis et al., 2006; Umberson, 1992). However, the universal protective nature of marriage has been challenged (Carr & Springer, 2010). The discussion is hindered by the wide use of cross-sectional designs, which make it impossible to discern to what extent the effects attributed to marriage can also be ascribed to premarital health habits and premarital socioeconomic conditions (Meyler, Stimpson, & Peek, 2007). Individual lives are not unwritten pages at the time of marriage. As outlined in the life-span development principle, conditions earlier in life are crucial to the development of health behaviour. Although marital partners are the most important and powerful source of influence in a person's adult life, parents are predominant during childhood (Umberson, 1992), and also influence socialization into healthy behaviours (Cardol et al., 2005).

The well-documented tendency towards educational homogamy (Blackwell, 1998; Kalmijn, 1998; Smith & Christakis, 2008; Smits, Ultee, & Lammers, 2000) can exacerbate the effects of privileged or underprivileged childhood conditions and further generate systematic divergences over the life course. Therefore, it can be hypothesized that cumulative life course advantages or disadvantages accumulate at the household level and will be greater than at the individual level. Cultural health capital theory might benefit from the explicit inclusion of the notion of linked lives. To elaborate on how capital is acquired and accumulates over time, it is important to understand the role of the childhood and adult preventive health behaviours of both partners. Freese and Lutfey (2011) propose the concept of 'spillovers' to link the findings about social network effects on health behaviour (Christakis & Fowler 2007, 2008) to the fundamental relationship between socioeconomic position and health.

Some studies have focused on the role of having a partner (Lagerlund et al., 2002; von Euler-Chelpin et al., 2008; Zackrisson et al., 2007), or the prevalent health behaviour of the partner, on mammography screening (e.g. Clark, Rakowski, & Ehrich, 2000). As the previously described principle of life-span development highlights, preventive health behaviour is likely to be shaped by conditions earlier in life than the time when partners meet. However, to the best of my knowledge there is no empirical research that takes a developmental perspective on the health behaviour of both partners and studies how it is related to mammography screening. The second empirical study here explicitly addresses this point by scrutinizing how the preventive health behaviour in childhood of both partners affects women's mammography screening. It is likely that socioeconomic conditions in early life will further accumulate at the marriage level, as partners provide each other with information and norms on health behaviour (Thomas, 2011). This study will provide further insight into the developmental dimension of cultural health capital.

2.4.4. Principle 3: agency vs. structure

The principle of agency stresses that individuals are not passive recipients. Encapsulated in life course research is the question of how the interplay between individual action and the social structure shapes the lives of individuals. Individuals act and make choices within the opportunities and constraints of their world (Elder Jr. et al., 2003). For example, Elder describes how parents and children successfully adapted to the difficult circumstances during the Great Depression (Elder, 1974; Elder Jr., 1998).

The dialectic nature of agency and structure is a central debate in life course theory, as well as in the sociological field more generally (Hitlin & Elder Jr., 2006; Schafer et al., 2011). The debate is less ubiquitous in social psychology, given its focus on the level of individual development and interaction (Hitlin & Elder Jr., 2006), although some researchers do recognize the importance of contextual influences (e.g. Bandura, 2001). Agency is embedded in the symbolic interactionist paradigm, which provided a social psychological model of behaviour that has been incorporated into sociology (Cockerham, 2007). From an interactionist point of view, Mead's (1934) concept of the 'self' and its reflexive character is at the core of human agency (Gecas, 2003). Individuals are active agents in their environment, who interpret and decide on their actions (Blumer, 1969; Goffman, 1959). These reflexive processes bring about intrinsic motivation for action (Gecas, 2003). Bandura's sociocognitive concept of self-efficacy (Bandura, 1977), previously discussed within the context of the health belief model, has been called the most important aspect of agency. People who believe they have control over their circumstances and believe they are capable of carrying out actions that will produce the desired effects, will be more likely to be the architects of their lives and see themselves as such (Gecas, 2003). In general terms, agency refers to the capacity that individuals have to freely choose their behaviour regardless of structural constraints (Cockerham, 2007), but it remains an elusive and slippery concept that is used differently depending on the theoretical perspective (Emirbayer & Mische, 1998; Hitlin & Elder Jr., 2007). However, all now acknowledge that "counterposing agency with structure is a misplaced and false dichotomy" (Dannefer & Daub, 2009, p. 20). Instead, they can be recursive (Frohlich et al. 2001) and the question is the extent to which one or the other is dominant in a particular situation (Cockerham 2005, 2007).

Life course researchers stress the fact that agency is a temporally embedded process, "informed by the past (in its 'iterational' or habitual aspect) but also oriented toward the future (as a 'projective' capacity to imagine alternative possibilities) and toward the present (as a 'practical-evaluative' capacity to contextualize past habits and future projects within the contingencies of the moment)" (Emirbayer and Mische, 1998 p. 962). Past experiences can thus shape later life actions, but the extent to which they do remains largely undiscovered. Life course researchers identify themselves as

being responsible for the few empirical treatments of agency, thereby contrasting themselves to those who stick to abstract discussions (Hitlin & Elder Jr., 2006; Hitlin & Elder Jr., 2007). One of these recent empirical studies was performed by Schafer et al., (2011), who argue that human agency is limited due to the enduring impact of early disadvantage on life evaluations and expectations for the future.

Engagement in preventive health care requires a proactive approach in information seeking, an orientation towards the future and long-term goals (Lorant et al., 2002; Mirowsky & Ross, 2003; Rosenstock, 1966; Wübker, 2012). Learned effectiveness enables people to live healthy lives, a skill that Mirowksy and Ross (2003) attribute to education. I previously touched on the agency-structure debate in health lifestyle theory and the underlying sociological theories. Recently, medical sociologists have endeavoured to theorize the *relative* importance of agency and structure for health and health lifestyles (Williams, 1995). To deal with Bourdieu's much criticized 'deterministic' concept of habitus (e.g. Atkinson, 2010; Schafer et al., 2011), scholars have drawn on Weber's idea of the interplay between life choices and life changes (Abel & Frohlich, 2012; Cockerham, 2005, 2007) and Giddens' (1984) structuration theory (Cockerham et al., 1997; Frohlich et al., 2001). Similar to Weber, Giddens highlights that structure and agency are co-dependent. Action reproduces structure, therefore structure without action is impossible. Giddens does give primacy to choice, as choices shape and maintain an individual's identity (Giddens, 1991). Amartya Sen's capabilities approach (Abel & Frohlich, 2012; Frohlich & Abel, 2014; Frohlich et al., 2001) was formulated in order to move from explaining who possesses what capital, to finding opportunities for health promotion to change behaviour (Cohn, 2014). On the other hand, there are scholars who argue that the critique on Bourdieu's theory of practice results from a failure to understand its elements – habitus, doxa, capital and fields – as relationally-bound phenomena. Relationships between the elements, rather than the elements themselves, should be focused on (Veenstra & Burnett, 2014a, 2014b).

I argue that another way to gain insight into the structure-agency debate is by focusing on the different socialization contexts socially-mobile individuals encounter during their life. Each social position largely determines the 'life chances' of individuals at that time and these positions constitute the structuring forces of 'life choices' (agency) on health lifestyles (Cockerham, 2005). The weight that Bourdieu attributes to childhood experiences in the formation of the habitus has often been criticized (Daenekindt & Roose, 2013a). Social mobility research parallels this idea by addressing the multiple contexts of socialization, each with its own health-related practices. Socialization continues into adulthood, when individuals are confronted with new experiences (Ryder, 1965) and other significant network members become important for health behaviour (Christakis & Fowler, 2007), for example marital partners (see the principle of linked lives). Social mobility research can provide

insights into the development of health lifestyles by scrutinizing the relative impact of the social position in childhood versus the prevalent social position.

Research on social mobility and health behaviour is still in its infancy (Pollitt, Rose, & Kaufman, 2005), notably regarding mammography screening, for which studies are entirely lacking. An important reason for this is that research is hampered by a longstanding methodological challenge. Because social mobility is linearly dependent on both the social position of origin and that of destination, particular non-linear models are required (Hendrickx, Degraaf, Lammers, & Ultee, 1993; Sobel, 1981). In the third empirical study, I introduce the appropriate statistical technique, namely Sobel's (1981) diagonal reference model, to study the mammography screening practices of socially-mobile women and test the hypotheses derived from social mobility theory.

2.4.5. Principle 4: timing of outcomes

Life course researchers are particularly interested in the "social patterns in the timing, duration, spacing and order of events and roles" (Elder & Rockwell, 1979, p. 2). Attention is paid to how certain transitions or events can produce different effects, depending on their timing within the life course (George, 1993). For example, the consequences of the Great Depression were different for older and younger children (Elder, 1974). In addition, in life course epidemiology the notions of timing and duration are central to the three main models for the association between early life circumstances and later life: the latency model, pathway model and accumulation model (Graham, 2002).

As previously outlined, the temporal dimension of preventive health behaviour has been generally ignored in both empirical research (Spadea et al., 2010) and medical sociological theory. This is unfortunate, given that the *timely detection* of breast cancer is crucial because the stage of the illness (or tumour size) at diagnosis is strongly linked to survival rates (Elmore et al., 2005; Hakama, Coleman, Alexe, & Auvinen, 2008). Therefore, the Council of the European Union has recommended that screening programmes should target women between 50 and 69 years of age (von Karsa et al. 2008), who have the highest risk of developing breast cancer. Between 40 and 49 years of age, 1 in 50 women will suffer from breast cancer. This increases to 1 in 28 and 1 in 25 from the age of 50 to 59 and 60 to 69 respectively, before it decreases again to 1 in 32 for women aged 70 to 79. However, there is a further issue, as the side effects of the radiation women are exposed to during a mammogram are also linked to age. Between the age of 40 and 49, the risk of radiation-induced breast cancer tumours does not outweigh the potential benefits of screening (Kohn, 2013). For other forms of preventive health behaviour, timely initiation can obviously be defined for different ages. For the first dental check-up, the recommendations vary between 1 and 3 years old. Nevertheless, the

dental profession agrees that childhood dental visits are important for the prevention of oral diseases as well as for the parents' education in preventive strategies and the establishment of a relationship with the dentist (Soxman, 2002). Childhood visits are also argued to be important for the development of children's attitudes and beliefs about dentists and dental treatment (Riley & Gilbert, 2005). Flu vaccinations can be used as a final example. In addition to health care workers and the chronically ill, the primary target groups for annual flu vaccinations are also age-related: pregnant women, children between 6-59 months and people aged 65 years and above (Michel, Lang, & Baeyens, 2009; WHO, 2014). The *regular take-up* of preventive health practices is also important for their effectiveness. For dental check-ups, 6-month intervals are recommended (Riley, Worthington, Clarkson, & Beirne, 2013). For mammography screening, it is recommended that women undergo this every two years (European Commission, 2003), in order to be sufficiently 'protected' by the screening programme (von Euler-Chelpin et al., 2006).

In mammography screening research, cross-sectional designs are still dominant, together with question wordings along the lines of: "During the last xx months/years, have you had a mammogram?" (for an exception see Klug et al., 2005). These features make it impossible to scrutinize the timeliness of mammography screening initiation. In this regard, age differences established in cross-sectional surveys can denote 'true' age effects, but also period and cohort effects resulting from the historical evolution of knowledge about breast cancer and the implementation phases of screening programmes. The longitudinal retrospective data incorporated in the SHARE enables better modelling of age, period and cohort effects, by providing retrospective information concerning the age at which women commenced *regular* mammography screening. A true separation of age, period and cohort effects has been called "a futile quest" (Glenn, 1976, 2003). Therefore, in the fourth empirical paper, I have followed the author's suggestion to use a more informal and explorative approach. Age differences are examined by tabulating the age trajectories of mammography screening initiation by five 10-year birth cohorts in the 13 European countries participating in the SHARELIFE. These are then framed within the context of the implementation phase of the screening programmes in the different countries. The notion of regularity is captured by the dependent variable (see infra).

With regard to socioeconomic inequalities, it can be expected that these will be manifest in the timely use of preventive services, in addition to the probability of engaging in preventive health care. Cultural health capital might entail knowledge about the appropriate age to start preventive health care use, as well as the understanding of the importance of its regular use. This contention is empirically considered in the first study.

2.4.6. Principle 5: principle of time and place

This principle refers to the fact that the life of every individual is embedded in and shaped by a certain historical context and place (Elder Jr et al. ,2003). Historical change can affect an individual's life. It can engender cohort effects when it alters the lives of successive birth cohorts, and period effects when the effect is more uniform across these cohorts (Elder Jr., 1994). The different aftermath of World War II in Europe to that in the United States, illustrates that historical events might also impact differently across regions or nations (Elder Jr. et al., 2003). To translate this idea into empirical practice, life course researchers urge us to expand the scope from national studies, the results of which can be challenged as being too context specific, into international comparative studies (Billari, 2009; Blane, Netuveli, & Stone, 2007).

Although the cross-national comparative approach is well established in research concerning health (e.g. Mackenbach, 2012) and health care (e.g. Devaux, 2013), it is still relatively new in preventive health care research (Jusot, Or, & Sirven, 2012). The studies that exist have already revealed substantial cross-national variation in preventive health care habits, including mammography screening (e.g. Wübker, 2013). An important question relates to which institutional differences are the driving forces behind this cross-national variation (Blane et al., 2007). For mammography screening, it seems that the country-specific characteristics of mammography screening policies affect screening participation to a substantial extent, more so than general (health care) indicators, such as health care expenditure, the number of physicians and gross domestic product (Jusot et al., 2012).

However, the life course perspective encourages us to incorporate how these institutional factors change over time and how this can potentially interplay with individual development (Elder Jr. et al., 2003, p. 11). During recent decades, European health care systems have been the subject of almost continuous policy reforms. Many of these reforms have been ad hoc interventions aimed at containing rising expenditure (Mossialos, 1997). With regard to the financing of health care, there is a notable evolution towards growing reliance on private expenditure, from out-of-pocket payments and health insurance schemes (Thomson, Foubister, & Mossialos, 2010). In addition, the breakdown of the old regimes has entailed substantial reforms in the health care sector of the former Soviet Union countries (Borisova, 2011). Mammography screening policies in general have undergone a substantial evolution. For example, in Belgium the first initiatives were taken in 1975 (Van Oyen & Verellen, 1994), but it was not until 2001 that a national screening programme was actually implemented. Countries also differ greatly with regard to this evolution. National coverage had already been achieved in Sweden in 1997 (Schopper & de Wolf, 2009), while Poland (Bastos et al., 2010) and Denmark (Schopper & Wolf 2009) first implemented their national programmes about a decade later. Integrating this temporal variation into the study of preventive health care inequalities, in addition to the cross-national variation, will move the debate forwards.

In a similar vein, Bourdieu stresses the fact that practice is *located in time and space* (R. Jenkins , 1992). Studying three European countries, Abel et al. (2011) suggest that the role of cultural capital for health may be contingent upon societal factors, such as the general relevance and meaning of educational degrees and the distribution of material affluence. The notion of time is also central to the fundamental social cause framework (Link & Phelan, 1995; Phelan & Link, 2013; Phelan et al., 2004). The latter precisely covers large time periods and the evolution of (health) technologies, in order to understand the persistency of the relationship between health and socioeconomic position (Glied & Lleras-Muney, 2008; Lutfey & Freese, 2005; Phelan & Link, 2005). Willson (2009) expanded the focus on the US of these studies and introduced the cross-national comparative perspective in fundamental social cause theory. Comparing the United States with Canada, he concludes that social policy related to healthcare and economic inequality can buffer the relationship between socioeconomic resources and the incidence of preventable disease. Rather than focusing on changing health knowledge and technology, cultural health capital theory can account for how health disparities are preserved or even widened in times when the organization and culture of health care provision are changing (Shim, 2010). As described previously, patients are increasingly being encouraged to be self-directive (Armstrong, 2014).

The few existing empirical studies on cultural health capital are each confined to a single country and do not cover a significant historical time span (Dubbin et al., 2013; Grineski, 2009, 2011; Schori, Hofmann, & Abel, 2014). It would be fruitful for cultural health capital theory and health lifestyle theory to address this notion of time and place further, in order to situate the accumulation processes within the country-specific institutional context at a given moment in time. Life course researchers also suggest expanding the scope of cross-national comparisons (Billari, 2009; Blane et al., 2007). Europe is blessed with quite fragmented political and institutional systems, including divergent institutional set-ups for health care systems and mammography screening policies. Therefore, a cross-national comparative approach will allow us to gain insight into the role of institutional set-ups with regard to mammography screening. To date, only seven studies have addressed cross-national differences in mammography screening practices in Europe. All have focused on the prevalent socioeconomic position, thereby ignoring the life course origins of socioeconomic inequalities. Moreover, these studies have not taken into account the historical evolution related to breast cancer and screening programmes. The data of the SHARELIFE allows this in the fifth empirical study here, which enables us to follow the recent and promising trend to move from cross-sectional to longitudinal designs in cross-national research (Missinne, Vandeviver, Van de Velde, & Bracke, 2014; Welkenhuysen-Gybels & Billiet, 2002).

3. Research aims and situating empirical papers

The data of the Survey of Health, Ageing and Retirement (SHARE) allows us for the first time to empirically apply each of the paradigmatic life course principles to mammography screening inequalities. This population-based survey has many unique features. First, in its third wave of data collection, SHARELIFE, retrospective life histories were included, comprising several unique measurements that enable pioneering empirical tests of cultural health capital accumulation. Second, the way the SHARELIFE investigates mammography screening includes both life course notions of temporality and regularity. The question, "*In which year* did you start having mammograms *regularly*?" was given to all women who answered yes to the question "Have you ever had mammograms regularly over the course of several years?". Therefore, in contrast to the dominant question wording in surveys, this longitudinal data allows us to better account for age, period and cohort effects. Third, the SHARE provides data that is not only longitudinal, but also dyadic. Therefore, it provides retrospective life histories of both partners, which for the first time enables empirical exploration of how cultural health capital accumulates at the marriage level. The dyadic nature rules out the bias that might otherwise result from relying on one partner's report, as often occurs (Cardol et al., 2006; Lewis & Butterfield, 2007). Fourth, this dyadic and longitudinal data was collected in 13 European countries in a comparative way. This not only allows us to scrutinize the accumulation processes of cultural health capital in each of the countries, but also aids in framing expected period effects within the context of national screening policies

In each of the empirical papers here, one of the five life course principles is the main focus of study and related hypotheses are tested. Obviously, the empirical papers also incorporate the other life course principles when appropriate. In the first three studies, I focus on the Belgian situation. In the two last empirical papers, I extend this to the 13 countries participating in the SHARELIFE and apply a cross–national comparative approach. The *life span development principle* is primarily focused on in the first empirical paper: 'Reconsidering inequalities in preventive health care: an application of cultural health capital theory and the life‐course perspective to the take up of mammography screening' (Chapter 5.1.), but all other chapters except for Chapter 5.4. also include this principle. The *linked lives principle* is addressed in the paper: 'Spousal influence on mammography screening: a life course perspective' (Chapter 5.2.). The *agency-structure discussion* is focused on in the paper: 'The social gradient in preventive health care use: what can we learn from socially mobile individuals?' (Chapter 5.3.). The *principle of timing* is incorporated in the dependent variables and thus in each paper. The question concerning socioeconomic inequalities in timely initiation is tested empirically in the first study (Chapter 5.1.). Further questions on timeliness are addressed in the

study titled: ‘Age differences in mammography screening reconsidered: life course trajectories in 13 European countries’ (Chapter 5.4.). This latter paper also includes the final *principle of time and place*, which is then further elaborated in the last empirical paper: ‘A cross-national comparative study on the role of individual life course factors on mammography screening’ (Chapter 5.5.).

4. Methodology

4.1. Data

4.1.1. Survey of Health, Ageing and Retirement

The SHARE is a multidisciplinary and cross-national panel database on health, socioeconomic status and social and family networks. It was developed in harmonization with its sibling surveys, the U.S. Health and Retirement Study (HRS) and the Longitudinal Study of Ageing (ELSA), and has become a model for several other ageing surveys worldwide, such as the Korean Longitudinal Study of Ageing (KLoSA) and the Mexican Health and Aging Study (MHAS) (Kapteyn, 2008). In contrast to these similar examples, the SHARE is a multi-national survey conducted in an increasing number of European countries in every wave. All aspects of the data collection and data generation processes have been ex-ante harmonized according to strict quality standards in order to minimize artefacts created by country-specific survey designs (Borsch-Supan et al., 2013). It therefore differs from the Eurostat approach (e.g. in the European Union Statistics on Income and Living Conditions (EU-SILC)), where each country is responsible for administering its national survey. The SHARE consists of probability samples, drawn from population registers or from multistage sampling. Respondents aged 50 or above, together with their partner (and in wave 1, other household members aged at least 50), were interviewed face-to-face using structured computerized questionnaires (for details see Borsch-Supan et al., 2013; Börsch-Supan & Jürges, 2005). The first wave was carried out in 2004. From the beginning, the aim of the SHARE project was to construct a longitudinal panel database. Therefore, original respondents were re-contacted in a second wave of data collection (2006-2007). In addition, a 'refresher' sample was drawn using the same sampling methods as in wave 1, except for an oversampling of women born in 1955 or 1956 in order to keep the sample representative for women aged 50 years or older. The third wave (called SHARELIFE, 2008-2009) was intended to complement the panel data with retrospective life histories. This retrospective data enables the application of the life course perspective to preventive health care inequalities, as it contains unique information about preventive health habits in childhood as well as socioeconomic indicators throughout the individual's life course. Information on education and wealth was retrieved from wave 1 or wave 2, with priority given to the most recent information when both were available. These two waves were also used to complement missing information on basic demographic details and for the indicator of diagnosed breast cancer. Given the focus here on mammography screening, the samples were confined to women. The first three empirical papers focus on the Belgian situation, with a sample of 1,348 women in the first study. In the second empirical paper, which illustrates the

linked lives principle, the sample was confined to married couples where both partners participated in the SHARELIFE (N = 734). The third empirical study uses two samples, i) women who had participated in the labour market during their lives (N = 963) and ii) women with a partner, but here it was not necessary for the partner to have participated in the survey (N = 1,015). In the fourth (N = 14,068) and fifth empirical paper (N = 12,958), the focus is extended to the 13 participating countries of the SHARELIFE: Sweden, the Netherlands, Spain, Belgium, the Czech Republic, France, Germany, Poland, Denmark, Italy, Switzerland, Austria and Greece[2].

4.1.2. Recall of retrospective information

A great deal of effort has been made to improve the recall of retrospective information. Firstly, the interview modules of the SHARELIFE are ordered according to what is most important to the respondent and is thus recalled most accurately. Next, a life grid – a computerized version of the Life History Calendar (LHC) (Schröder, 2011) – is used, in which the respondent's life is represented graphically by a grid that is completed during the interview.

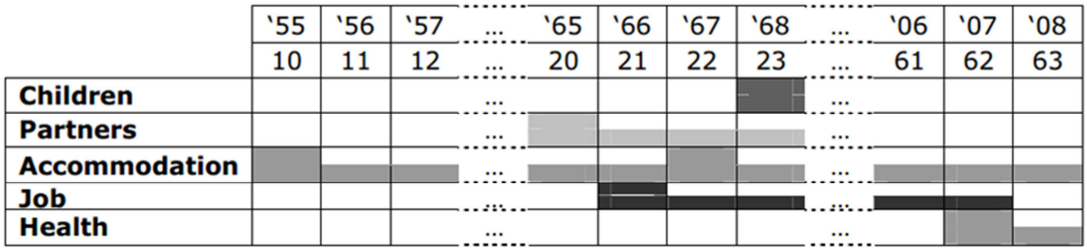


Figure 1: Example of a Life History Calendar. Reprinted with permission of the Mannheim Research Institute for the Economics of Ageing (MEA).

This method relies on the hierarchical structure of autobiographical memory and uses salient events such as marriage or the birth of a child as anchors for recalling other events (Belli, 1998). In addition, a list of prominent external events is incorporated in the LHC for every year (for example, in Belgium the World's Fair in 1958 or the dioxin affair in 1999), which can help to determine the date of personal events. See Figure 1 for an example.

[2] In the period between 2009 and 2011, Ireland also collected life histories, but the data has not yet been released.

4.1.3. Response rates and retention rates

The household response rate in the first wave was on average 62 per cent and the country variation reflects the patterns of other international surveys (Borsch-Supan et al., 2013). Individual response rates amount to 85 per cent on average. In Belgium, a household and individual response rate of respectively 39.2 and 90.5 per cent were attained in wave 1 (SHARE 2012).

Table 1: Individual and household response rates for wave 1 of the SHARE (http://www.share-project.org/data-access-documentation/sample.html)

Country	Total N	Household response rate	Individual response rate
Austria	1,893	55.6%	87.5%
Belgium	3,827	39.2%	90.5%
Denmark	1,707	63.2%	93.0%
France	3,193	81.0%	93.3%
Germany	3,008	63.4%	86.2%
Greece	2,898	63.1%	91.8%
Israel	2,598	60.1%	83.9%
Italy	2,559	54.5%	79.7%
Netherlands	2,979	61.6%	87.8%
Spain	2,396	53.0%	73.7%
Sweden	3,053	46.9%	84.6%
Switzerland	1,004	38.8%	86.9%
Total	**31,115**	**61.6%**	**85.3%**

Table 1 shows the figures for the other countries. Efforts were made by the SHARE team to keep the attrition throughout the different waves to a minimum, which has led to an overall retention rate of 71 per cent (Borsch-Supan et al., 2013). For the calculation of more refined retention rates, a distinction needs to be made between household and individual retention rates.

The longitudinal sample in wave 2 was complemented with an additional 'refreshment sample' to increase the net sample size and compensate for the attrition of first wave respondents (Börsch-Supan et al., 2013). For this refreshment interview, only one age-eligible person per household and his or her partner were sampled, in contrast to the first wave and the longitudinal sample in wave 2. An argument could be made for using both the individual and the household retention rates. The household is the main unit of analysis in the SHARE and the household retention rates do not pose comparison problems between the first wave and the refreshment sample in wave 2. On the other hand, many researchers – including myself – focus on individual differences and are therefore also interested in the individual retention rates (Blom & Schröder, 2011). For individual retention rates, a comparison problem does arise, although this is small given the large number of two-person

households in the first wave. Furthermore, different retention rates can be calculated (Blom & Schröder, 2011): wave 3 retention in relation to: i) All individuals/households interviewed in wave 1, ii) All individuals/households interviewed in wave 2 (including the refresher sample in wave 2), iii) All individuals/households interviewed in wave 1 or 2. The difference is important given that retention rates vary depending on whether the previous wave was the first a person participated in or whether they had participated in both previous ones (Blom & Schröder, 2011). I would like to refer to the methodology handbook that accompanies the SHARELIFE for these different retention rates (Blom and Schröder, 2011, p. 57-59).

4.2. Methods

Event history analysis is commonly used in life course research, as the concept of a transition is central to both the theoretical perspective of life course research and to the statistical modelling of event histories (Wu, 2003). Event history (or survival) analysis refers to a broad range of statistical techniques, which examine both the patterns and correlates of the occurrence of events (Yamaguchi, 1991). Accordingly, in addition to the occurrence of an event, the time elapsed before the event is of substantial interest to event-history analysts and is incorporated in dependent variables (Mills, 2011).

This time or duration until event occurrence is referred to as survival time, episode, interval or risk period (Mills, 2011). Individuals are perceived to 'survive' or to be 'at risk' until a certain event occurs. The beginning of the risk period is the time when everybody in the population is still at risk of experiencing the event and they therefore all occupy the same initial 'state' (Singer & Willett, 2003). The end of the risk period is defined either by the moment when the event occurs (i.e. here, the age of commencing regular mammography screening) or by the moment the individual is censored (i.e. cases that do not experience the event during the observation period) (Yamaguchi, 1991). For this current research, women who did not engage in mammography screening were censored at the time of data collection in the SHARELIFE (2008 or 2009). This type of censoring is termed right-censoring and is quite common in longitudinal data (Mills, 2011; Yamaguchi, 1991). A key feature of all methods of event-history analysis is that they can adequately deal with right-censoring, in contrast to standard statistical methods such as linear regression or logistic regression (Allison, 1984; Yamaguchi, 1991). Another advantage of event-history analysis over linear or logistic regression is the ability to include time-varying covariates. Certain characteristics of individuals may differ over time (Mills, 2011; Singer & Willett, 2003), such as employment status or education. A

time-varying predictor records the potentially differing status on each associated measurement occasion (Singer & Willett, 2003). One such time-varying covariate – eligibility for a screening programme – is included in the first, second and last empirical studies.

As stated above, a whole family of statistical methods exists to model time to event data. In four of the five empirical studies, two types of event-history analyses are employed to model the time until women commenced regular mammography screening, namely Kaplan-Meier estimates and discrete-time hazard models. In the third study, the best-suited statistical technique to estimate social mobility effects is introduced, namely Sobel's (1981) DRMs. It is not a standard technique in life course research but as argued here, it has great potential to become so.

4.2.1. Kaplan-Meier estimates

The first step consists of an exploration of the data. For this purpose, the Kaplan-Meier procedure is very useful, as it makes no assumptions about the shape of the hazard function or the way the predictors can influence this shape (non-parametric model) (Mills, 2011).

The Kaplan-Meier method uses the actual observed event times to describe the distribution of event occurrence. Instead of collapsing event times into intervals, as is done in discrete-time methods, it capitalizes on raw event times and constructs intervals that contain only one event. The conditional probabilities of event occurrence are firstly computed and the complements are then multiplied to retrieve the Kaplan-Meier estimate of the survivor function (Singer & Willett, 2003). However, the drawback of this method is that it does not give an estimate of the continuous-time hazard. Nevertheless, it is possible to estimate the cumulative hazard $H(t_{ij})$, which assesses at each point in time the amount of accumulated risk that an individual i has faced between the beginning of the time period studied and each observed event time t_j. In this way, information can be retrieved about the shape of the underlying hazard function:

$$H(t_{ij}) = \underset{\text{between } t_0 \text{ and } t_j}{\text{cumulation}} \, h(t_{ij}) = \int_0^j h(t_{ij})dt$$

It is not the tabulation of the function of the cumulative hazard, but its graphical behaviour over time that is informative. Often, the logarithm of the cumulative hazard function is plotted (Singer & Willett, 2003). Different cumulative hazards will be tabulated for the categories of a certain predictor

to obtain an initial idea about the association with mammography screening practices. By means of a log-rank test, the significance of these bivariate associations will be tested (Singer & Willett, 2003).

4.2.2. Discrete-time hazard models

To take the analyses a step further and to estimate the effects of the covariates, discrete-time hazard models are employed in the first, second and last studies. A discrete-time method is used, because the SHARELIFE records the time in years when women commenced regular mammography screening (Allison, 1984; Singer & Willett, 2003). Before the actual analysis, the first step in discrete-time analysis is to restructure the data into what is termed 'person-period-format'. In this longer data format, a separate observational record is created for each unit of time when an individual is at risk.

For those individuals who did experience the event, a score of 0 is given for all the time periods except the last one. They are given a score of 1 for the last time period, which denotes the event: namely the time when they commenced regular mammography screening. Censored individuals will have a code of 0 for all their person-periods. Because the observation is updated for each discrete-time point, the inclusion of time-varying covariates, such as the eligibility for screening, is relatively straightforward in discrete-time models (Allison, 2010). With the exception of eligibility for screening, all the independent measurements are time-constant and thus obtain their respective scores in all of the time-periods (Singer & Willett, 2013).

The discrete-time hazard h is a conditional probability, which is defined as the probability that an individual will experience the event during interval t, given that no event has occurred until then, where T is the event time:

$$h(t) = \Pr(T = t | T \geq t)$$

As the discrete-time hazard is bounded between 0 and 1, a model is required that is suited for binary responses. A complementary log-log link function is used in all the analyses. This has the fundamental advantage that a proportional hazard assumption is built-in, so that the exponentiated parameter estimates can be interpreted as hazard ratios. It is the popular discrete-time equivalent of Cox regression (Singer & Willett, 2003). All models here were calculated by means of the xtcloglog command in STATA 11. I calculated different models, in which childhood and adulthood conditions were included step-wise to get a better idea of the underlying mechanisms. Because the focus is on preventive screening and I want to capture the role of screening policies, the observation time starts at the age of 40 for Belgian women and at 35 in the cross-national comparative study (paper 5), as

the screening programmes of some European countries already target women from 40 years onwards.

Unobserved heterogeneity is the last issue to be dealt with. This occurs if the hazards of the observations are conditionally different and this is not accounted for in the systematic part of the model. What happens is that high-hazard individuals will experience the event and leave the risk set more rapidly (they are more 'frail') than low-hazard individuals, if this different hazard is not included. Therefore, in the course of time, the risk set will increasingly comprise low-hazard individuals leading to a declining estimated hazard over time (Zorn, 2000), also termed as spurious duration dependence (Elbers & Ridder, 1982). In addition to the downward bias on duration dependence (Vermunt, 1997), ignoring unobserved heterogeneity will lead to biased covariates and a violation of the proportionality assumption, as the proportionate effect will then depend on survival time (S.P. Jenkins, 2005). How was unobserved heterogeneity dealt with? The first step consists of a careful specification for the model (Zorn, 2000). A great deal of attention was paid to the specification of the models, both the baseline hazard and a theory-guided inclusion of the covariates. By means of the model comparison approach, the best functional form of the baseline hazard was identified. In this way, I allowed for a fully flexible specification of the baseline hazard, which already reduces the bias in the non-frailty model (S.P. Jenkins, 2005). Second, the 'frailty' (or random effects) models introduce an unobserved, random parameter, which has a multiplicative effect on the baseline hazard function to account for unobserved heterogeneity (Zorn, 2000). Such random-effects models were used by nesting person-years in individuals. Although some researchers have proposed a non-parametric characterization of the frailty distribution (Heckman & Singer, 1984), most use a parametric distribution, of which the Gamma and the Normal (Gaussian) are the most popular ones (S.P. Jenkins, 2005). Since there is little theoretical guidance, I started from a Normally (Gaussian) distributed random term and checked whether a Gamma distribution for the random term impacted on the results. To perform this test, I used the pgmhaz8 program, a complementary module for STATA developed by S.P. Jenkins (1997). As no large differences were apparent, the results based on a Normally (Gaussian) distributed random term are reported for all the studies. Given this and the simulation study by Nicoletti and Rondinelli (2010), I am confident that the results are not biased due to misspecification of the random term. Nicoletti and Rondinelli conducted a Monte Carlo simulation study to estimate the bias that results from specifying an incorrect normality assumption for the random term. They encouragingly concluded that neither the duration dependence nor the covariates are biased in such a case.

4.2.3. Diagonal reference models

Diagonal reference models (DRMs) are strongly tied to the theoretical framework of social mobility, so the extensive rationale behind this model can be found in the empirical paper in which both social mobility theory and methodology are elaborated on (Chapter 5.3.). Further, it is useful here to point out that DRMs and event-history models should be viewed as complementary. Both techniques have their pros and cons.

Sobel's (1981) DRMs, are considered "the only acceptable method to model mobility effects" (Houle, 2011, p. 764) and to disentangle the effects of social position of origin, social position of destination and the effect of transitioning between them. Conventional regression models cannot correctly handle the fact that social mobility is linearly dependent on both the social position of origin and of destination (Hendrickx et al., 1993; Sobel, 1981). Event-history models are also unable to do so. However, event-history models have the advantage of being better able than DRMs to deal with age, period and cohort effects, which is crucial if we want to contextualize health behaviour correctly in time and place.

4.3. Measurements

4.3.1. Operationalization of the dependent variable: mammography screening

The dependent variable, the timing of regular mammography, was retrieved from the question '*In which year* did you start having mammograms regularly?' This was presented to all the women who had answered yes to the question 'Have you ever had mammograms *regularly* over the course of several years?' Women who had not undergone screening were censored at the time of data collection during the SHARELIFE (2008 or 2009). Importantly, the way the SHARELIFE examines mammography screening includes notions of both temporality ('*in which year*') and regularity ('*mammograms regularly*') which allows the inclusion of the important life course principle of timing in all empirical papers.

4.3.2. Operationalization of independent measurements

Various indicators of childhood and adulthood conditions, as well as contextual variables, are included in all the papers, except for the fourth study that focusses exclusively on the role of

historical time and place. Table 2 gives an overview of which measurements are used in each of the empirical studies. Below, the central variables are discussed. The univariate distributions of the measurements in the respective samples can be found in the relevant empirical papers.

4.3.2.1. Childhood conditions

Two indicators of social position in childhood are included. The *economic capital during childhood* is assessed by the occupation of the main breadwinner of the household when the respondent was 10 years old, employing the International Standard Classification of Occupations (ISCO-88). Rooted in Weberian sociological tradition, the ISCO-88 classification rests on the class scheme developed by Goldthorpe and colleagues (Erikson, Goldthorpe, & Portocarero, 1979; Erikson and Goldthorpe, 1992; Goldthorpe & Hope, 1974). The aim of a class schema "is to differentiate positions within labour markets and production units or, more specifically ... to differentiate such positions in terms of the employment relations that they entail" (Erikson & Goldthorpe, 1992, p. 37). Therefore, occupational classes are inherently relational in contrast to the other indicators of socioeconomic position used here. The ten possible answer categories are: legislator, senior official or manager; professional; technician or associate professional; clerk; service, shop or market sales worker; skilled agricultural or fishery worker; craft or related trades worker; plant/machine operator or assembler; elementary occupation; and armed forces. These were then reduced to six categories, in line with Dumont (2006), i) white-collar high skilled (reference category); ii) white-collar low skilled; iii) blue-collar high skilled; iv) blue-collar low skilled; v) armed forces; and vi) missing information or the absence of a main breadwinner when the respondent was aged 10.

The SHARELIFE also includes a measurement that captures *objectivized cultural capital in childhood* in terms of the number of books present in the house when the respondent was a child. After inspection of the univariate distribution, the five possible answer categories – none or very few (0-10 books); enough to fill one shelf (11-25 books); enough to fill one bookcase (26-100 books); enough to fill two bookcases (101-200 books); enough to fill two or more bookcases (more than 200 books) – were reduced to two, so that respondents with none or very few books (0) are contrasted with those who had at least enough books to fill one shelf.

Table 2: Overview of the measurements used in the different empirical studies

	1	2	3	4	5
Childhood individual characteristics					
ISCO of male breadwinner when the respondent was aged 10	**x**		**x**		**x**
Presence of books when the respondent was aged 10	**x**	**x**			**x**
Number of childhood illnesses	**x**				
Regular dental check-ups when a child	**x**	**x**			**x**
Adulthood individual characteristics					
Education (N, %)	**x**	**x**			**x**
Regular lifelong dental check-ups (N, %)		**x**			
Own ISCO-88 of main or last main job			**x**		
Household wealth	**x**	**x**			**x**
Partner characteristics					
Education		**x**			
Regular dental check-ups when a child		**x**			
Regular lifelong dental check-ups		**x**			
ISCO-88 of main or last main job			**x**		
Contextual effects					
Year of birth	**x**	**x**			**x**
Historical periods	**x**	**x**		**x**	**x**
Eligible for screening (time-varying)	**x**	**x**			**x**
Eligible for screening at least once (0-1)			**x**		

The concept of *cultural health capital* is central to this thesis. There were two candidates for the measurement to capture the accumulation of cultural health capital that starts in early life. The first one is the number of illnesses the respondent reported having during childhood. The hypothesis here is that childhood ill health involves more encounters with health care providers, expanding a person's cultural health capital. After an inspection of the univariate distribution, three categories describe childhood health as the number of illnesses during childhood (none, one, two or more). The illnesses comprise: infectious disease; polio; asthma; respiratory problems other than asthma; allergies (other than asthma); severe diarrhoea; meningitis/encephalitis; chronic ear problems; speech impairment; difficulty seeing even with eyeglasses; severe headaches or migraines; epilepsy, fits or seizures; emotional, nervous, or psychiatric problem; broken bones; fractures; appendicitis; childhood diabetes or high blood sugar; heart trouble; leukaemia or lymphoma; and cancer or malignant tumour (excluding minor skin cancers). Respondents with no childhood illnesses are used as the reference category. After the first empirical study, this indicator was omitted in the following empirical studies, as it appears to capture cohort effects rather than cultural health capital.

Second, and a clearer indicator of the early life accumulation of cultural health capital, is preventive health habits during childhood. A measurement is included that indicates whether the respondent went regularly for dental check-ups from birth up to the age of 15 (0 = no; 1 = yes). However, we

want to rule out the possibility of the supply of dental care provision affecting the results. Fortunately, the SHARELIFE also examined the reasons for foregoing regular dental care over the life course and the resulting information suggests that we should not be overly concerned. On average in the 13 countries, only 5 per cent of the women pointed to the unavailability of dental care services. There is no substantial variation between most of the countries, although the number is notably higher in Greece (12.6 per cent) and Poland (13.5 per cent). In Belgium, only 3.2 per cent of the women reported unavailable services as the reason for forgoing dental care.

4.3.2.2. Adulthood conditions

Level of education is included as a measurement of institutionalized cultural capital in Bourdieu's framework. It is assessed using four categories based on the modified ISCED-97 (International Standard Classification of Education) provided by the SHARE. The first category (reference category) includes respondents who did not complete primary education and those who completed primary or the first stage of basic education at most. The other categories are lower secondary, upper secondary and higher education. The latter comprises individuals who completed the first or second stage of tertiary education.

To account for financial barriers to mammography screening, *household wealth* is included. Wealth refers to the situation at the time of interview in wave 1 or wave 2, and is used as a proxy for lifelong wealth, as no time-varying information on wealth or income is available in the SHARELIFE. It is constructed by combining detailed financial information about the main residence (if owned and minus any mortgage), the value of other real estate and the household's net financial assets (MEA, 2010). Wealth was chosen instead of income, because the former more accurately captures the actual financial situation of the respondents, particularly for this age group (Galobardes et al., 2006a). In order to deal with missing information for the wealth measurement, the multiple imputed datasets provided by the SHARE are used. There are five imputed values for each missing value, so that there are five datasets that contain different values for the imputed ones, but are identical with respect to the non-missing ones. In this way, a distribution of the missing value is created, rather than making a single estimate for it or allocating it to a separate category for missing values (for details see Christelis, 2011). Multiple imputation procedures are used for the statistical analyses.

4.3.2.3. Contextual variables

Several measurements are included to contextualize mammography screening practices within their historical time and place. There has been a huge evolution in knowledge about breast cancer (Fisher, Redmond, & Fisher, 2008) as well as in the policies on mammography screening that were developed

during the study period. In the first, second and last empirical studies, the respondent's *year of birth* is first included to account for cohort effects, as is common strategy. Second, *historical periods* were constructed to incorporate the broader changes in mammography screening policies. For Belgium, three historical periods were defined (1975-1988; 1989-2000; 2001-2009). In the other twelve countries, the start of the second and third periods vary substantially, according to the large variation between European countries in the development of mammography screening policies. The details can be found on page 161-162 (last study). Third, a variable is included that indicates whether the respondent was *eligible for a national (or regional) population-based screening programme*. In contrast to all previous measurements, this is a time-varying dichotomy. Taking Belgium as an example (see also Figure 2), the national screening programme was launched in 2001 and targets women between the ages of 50 and 69 for biennial mammography screening. Therefore, Belgian women are given a score of 0 when they are not age-eligible for the programme, i.e. being younger than 50 or older than 69 during the period in which the screening programme was administered – 2001 to 2008 (the time of the SHARELIFE interview). Women are susceptible (score 1) if they were aged between 50 and 69 during the period between 2001 and 2008. These women (born between 1932 and 1951) are given a score of 1 if the time measurement passes their respective age in 2001. A proportion of this group (i.e. women born between 1932 and 1938) will have turned 70 during the observation period and will have no longer been included in the government screening programme. Therefore, if the time measurement passes the age of 70, their score reverts to 0. Next, women born between 1952 and 1958 will become susceptible for screening at the age of 50, as they turned 50 during the observation period between 2001 and 2008 (time of SHARELIFE interview). For example, women born in 1952 will be at the susceptible age of 50 in 2002, women born in 1953 will be so in 2003 and so on. This latter group will be given a score of 1 as soon as the time measurement passes the age of 50. Figure 2 illustrates this time-varying covariate of screening eligibility.

The same strategy is followed for the other 12 European countries, also accounting for regional differences in mammography screening policies in Sweden and Spain in terms of the age range covered and the implementation phase. Concretely, the Nomenclature of territorial units for statistics (NUTS level) of the place of residence allows for the inclusion of regional variations in Sweden and Spain. In Switzerland and Italy, this was not possible because the region identifier was not available at the level of screening initiatives (NUTS 3 level). In the third and fourth empirical studies, policy effects are accounted for in a different way, in accordance with the alternative statistical methods used.

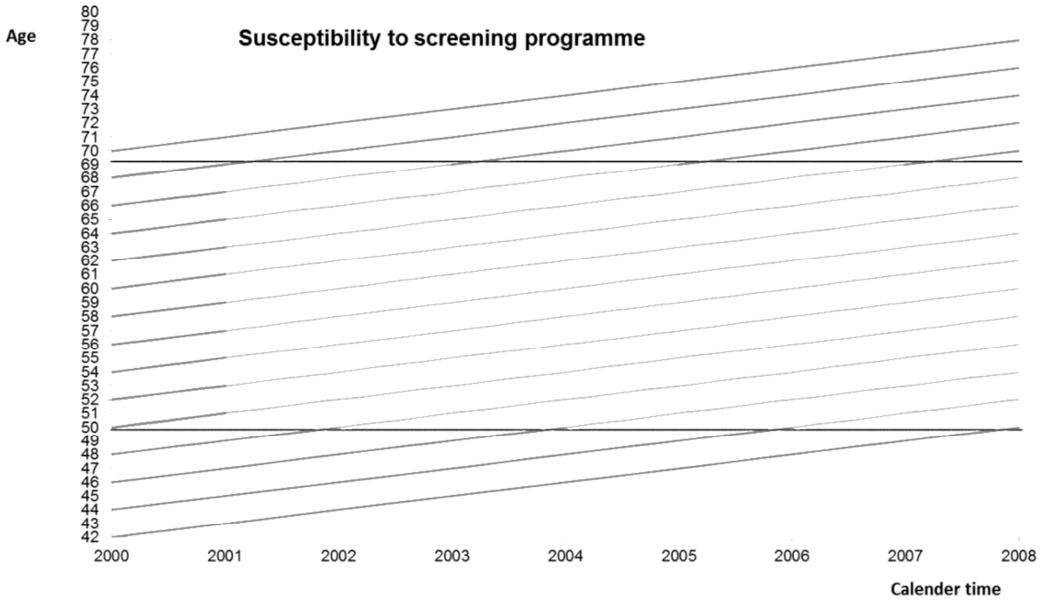


Figure 2: Susceptibility to the Belgian screening programme (2001-2008) according to age

5. Empirical studies

5.1. Reconsidering inequalities in preventive health care: an application of cultural health capital theory and the life course perspective[3]

5.1.1. Introduction

The World Health Organization (WHO) identified equality in preventive care as a public health priority three decades ago (WHO, 1978). Nevertheless, most epidemiological studies still describe enduring socio-economic inequalities in preventive health care, with more-deprived individuals being less likely to have preventive check-ups (Jusot et al., 2011; Lorant et al., 2002; Stirbu et al., 2007). However, the broader social mechanisms underlying this relationship are not well understood. In health sociology, there is a growing awareness that understanding the social causes of health and illness requires a more neo-structural perspective than is usually employed (Cockerham, 2007). Therefore, recent efforts at theory formation go back to sociology's "classics". They draw on Weber's notion of lifestyles being socially structured (Weber, 1978), and expand on Bourdieu's hypothesis of capital conversion (Bourdieu, 1986) to explain how economic and cultural capital can be converted into cultural health capital (Abel and Frohlich, 2012; Mirowsky and Ross, 2003; Shim, 2010). Individuals have a certain amount of health-relevant knowledge and skills to lead healthy lives, including engaging in preventive care (Abel, 2008; Abel and Frohlich, 2012; Phelan et al., 2004; Veenstra, 2007). It is argued that cultural health capital is socially distributed and is accumulated over time (Abel and Frohlich, 2012; Mirowsky and Ross, 2003; Shim, 2010). This accumulation is likely to start early in life, as childhood socio-economic conditions shape the development of health-related behaviours (Kuh et al., 2004) when parents transfer skills and knowledge to their children (Abel and Frohlich, 2012; Singh-Manoux and Marmot, 2005). A favourable position early in life can then generate systematic divergences across the life course through path dependence, as contended by cumulative advantage theory (Dannefer, 1987, 2003; Merton, 1968; O'Rand, 1996; for a review see DiPrete and Eirich, 2006). Recently, authors have shown that early disadvantage sets in motion a series of "cascading socio-economic and lifestyle events" that have negative consequences for mortality (Hayward and Gorman, 2004) and health (Willson et al., 2007). This idea, however, has not yet been applied to the field of preventive health care.

[3] Missinne, S. Neels, K., & Bracke P. (2014). *Sociology of Health & Illness*, 36(8), pp. 1259–1275

For prevention to be effective, the timely initiation of preventive behaviours is necessary. Studies show that early use of preventive care leads to better health outcomes, for example for breast cancer (Bloom, 1994; Ell et al., 2007), common eye diseases (Stirbu et al., 2007), cardiovascular risks (Broyles et al., 2000) and oral diseases (Riley and Gilbert, 2005). If cultural health capital includes and entails knowledge about the beneficial effects of timely preventive care, it can be expected that socio-economic inequalities in preventive health care will also be manifested in the timeliness of its use. However, the cross-sectional study designs on which conclusions about socio-economic inequalities primarily continue to hinge, and the relevant question wordings contained in surveys, do not allow this timeliness to be taken into account.

The notions of accumulation and timeliness are central to the life-course perspective, a research field that has developed outside the domain of health care use (Elder Jr. et al., 2003). Life course researchers focus on how early life conditions can impact upon later life outcomes, and more specifically upon the timing of these outcomes (Elder Jr. et al., 2003; Turner and Schieman, 2008). It is somewhat surprising, given the substantial overlap between these two theoretical traditions, that the life-course perspective has not yet been applied to inequalities in preventive health care. Data meeting the special requirements of this approach has been lacking for a long time, but retrospective data from the Survey of Health, Ageing and Retirement (SHARE) fills this gap. The aim of this research paper is to elaborate on cultural health capital theory by applying the theoretical principles and methodology of the life-course perspective to preventive health care use. Specifically, the role of early life factors on commencing mammography screening is examined for a sample of women in Belgium. Mammography screening was chosen for several reasons. First, the link between cultural health capital and healthy lifestyles is clearer in the case of preventive health care, where ill health is to a lesser extent the driving force behind engagements with health care providers. Second, breast cancer constitutes a major public health issue, as it is the most frequently diagnosed cancer among women worldwide (WHO, 2012). Mammography screening is the only current option for detecting breast cancer at an early stage, (Palencia et al., 2010; Puddu et al., 2009). Therefore, the WHO (2012) and the European Union (OJ C 68E, 2004) recommend that countries develop early detection strategies as the cornerstone of breast cancer control. However, despite these recommendations not all women engage in mammography screening and socio-economic inequalities in screening seem to persist (Duport and Ancelle-Park, 2006; Lagerlund et al., 2002; Lorant et al., 2002; Jusot et al., 2011; Puddu et al., 2009; Zackrisson et al., 2007). Further, the underlying mechanisms driving these inequalities remain unclear (Wübker, 2012).

5.1.1.1. Traditional approaches to preventive health care inequalities

Inequalities in preventive health care are usually assessed in a similar way to curative health care inequalities. A need-adjusted approach based on Andersen's heuristic model of health service use (1995) is generally adopted. Most research focuses on horizontal equity (Lorant et al., 2002), which is commonly defined as the principle of equal access for equal need (Wagstaff and van Doorslaer, 2000; van Doorslaer et al., 2006; Hanratty et al., 2007). Horizontal equity is typically measured as the degree to which utilisation is still related to income after differences in needs across the income distribution have been standardised for (Wagstaff and van Doorslaer, 2000). Inequity then arises, for example, if individuals in higher socio-economic groups are more likely to use, or are using, a greater quantity of health services, after controlling for their level of ill-health compared to lower socio-economic groups (Wagstaff and van Doorslaer, 2000; van Doorslaer et al., 2006; Hanratty et al., 2007).

Traditionally, socio-economic differences in preventive health care use are explained by theoretical models of health behaviour, such as the widely-used health belief model (Becker and Maiman, 1975; Janz and Becker, 1984) and the theory of reasoned action (Fishbein and Ajzen, 1975). These models concentrate on divergent beliefs of perceived risks, perceived severity, perceived efficacy of personal action, and expected benefits and perceived costs (Rajaram and Rashidi, 1998). Importantly, these models highlight the role of beliefs in preventive health care use, and contend that use is not determined by financial access alone, as is often assumed when adopting a need-adjusted approach. However, these agency-oriented paradigms lack an understanding of how beliefs are socially and culturally structured (Blane, 2008; Frohlich et al., 2001; Jayanti and Burns, 1998; Rajaram and Rashidi, 1998) and how they are acquired. The standard approach in public health research still treats health behaviour as a matter of individual choice, thereby ignoring its collective characteristics (Frohlich et al., 2001; Cockerham, 2005).

5.1.1.2. Cultural health capital

In current post-industrial societies, it has been argued that stratification is not driven by social class alone (Clark and Lipset, 2001). Therefore, scholars have recently argued for the explicit inclusion of cultural capital in explanatory approaches to social inequality in health and health behaviour, rather than deducing it from general measurements of socio-economic status (SES), such as social class and income (Abel, 2008; Abel and Frohlich, 2012; Pampel, 2012; Shim, 2010). Bourdieu (1986) describes how inequality can be reproduced by the interplay of three different forms of capital: economic, social and cultural. He further identifies three different forms of cultural capital: objectivised (e.g. books, artefacts, paintings), institutionalised (e.g. education, job title) and the

embodied state incorporating mind and body (e.g. values, skills, knowledge). When applying Bourdieu's (1986) notion of cultural capital to health and health care research, cultural health capital can be defined as "comprising all culture-based resources that are available to people for acting in favour of their health" (Abel, 2008, p.2). In its incorporated form, Shim (2010) conceptualises cultural health capital as "a specialised form of cultural capital that can be leveraged in health care contexts to effectively engage with medical providers" and posits that it "develops in and through the repeated enactment of health-related practices" (Shim, 2010, p.3). Examples are: knowledge of medical topics and vocabulary, instrumental attitude towards the body, self-discipline, orientation towards the future, etc. (Shim, 2010). This form of cultural capital becomes directly relevant to health through the adoption of healthy lifestyles, such as engaging in preventive care (Abel, 2008; Abel and Frohlich, 2012; Phelan et al., 2004; Shim, 2010; Veenstra 2007). Cultural health capital theory highlights that people's behavioural options and preferences are structurally constrained and unequally distributed between social groups (Abel 2008). As such, micro-level practices are linked to the broader macro-structural level of unequal distribution of resources (Abel 2008; Abel and Frohlich 2012; Cockerham 2007; Mirowsky and Ross 2003; Shim 2010). In line with Bourdieu's notion of habitus (1984), this entails that not every use of available resources is as conscious as traditional models on health behaviour assume (Abel and Frohlich, 2012; Shim, 2010).

The concept of cultural health capital is not entirely new. It has much in common with the concept of "health literacy" (for a discussion, see Nutbeam, 2008 and Sorensen et al., 2012). However, with regard to operationalisation, educational level is most often used as a proxy for health literacy. Education involves essential problem-solving skills and learned effectiveness, which enable people to control their lives, including health (Mirowsky and Ross, 2003, 2007). However, when educational level alone is assessed, the way in which cultural health capital is acquired and accumulated over time remains unexplored (Shim, 2010). Pioneering empirical studies on cultural health capital are currently being conducted (Shim, 2010). We aim to add to these by exploring how the life-course perspective can help in understanding cultural health capital and preventive health care inequalities.

5.1.1.3. The life-course perspective in preventive health care use

Life-course researchers focus on how early life conditions can impact upon later life outcomes, and more specifically how they influence the timing of these outcomes (Elder Jr. et al., 2003; Turner and Schieman, 2008). Traditionally, the transitions and developmental trajectories of individuals are studied within various life domains, such as family, education and employment (Turner and Schieman, 2008). The life-course perspective has recently taken a central place in public health research (Due et al., 2011; Mayer, 2009) and has shown that early or midlife factors, such as

childhood SES and health, exhibit long-term influences on adult health and mortality (Due et al., 2011; Hayward and Gorman, 2004; Margolis, 2010), and ageing (Brandt et al., 2011). In addition, an increasing number of studies show the relationship between early life factors and health-related behaviour in adulthood, mostly focusing on smoking, alcohol consumption, diet and physical activity (Lynch et al., 1997; Gilman et al., 2003; Power et al., 2005; Huurre et al., 2003).

In this paper, we apply three basic principles of the life-course perspective (see Elder Jr. et al., 2003) to examine the role of early-life factors (principle 1) on the timing of mammography screening (principle 2), allowing for changing historical factors and public policy (principle 3). Before proceeding to the empirical part of the paper, the analogies between life-course research and preventive health care research for these three principles are elaborated.

The principle of life-span development describes how patterns in later life are linked to childhood conditions (Elder Jr. et al., 2003). Accordingly, cultural health capital theorists have implicitly adopted a longitudinal view of an individual's life. When describing how cultural health capital develops, they stress that it is not a fixed reality, but develops and accumulates through repeated engagements with health care providers over the life course and lifelong socialisation (Abel and Frohlich, 2012; Mirowsky and Ross, 2003; Shim, 2010). Therefore, the question is which conditions at what life stages contribute to the accumulation of cultural health capital. A fully path-dependent cumulative advantage process would imply that the effect of socio-economic conditions early in life has continuing influences on later life outcomes, even when a person's socio-economic position is accounted for (DiPrete and Eirich, 2006; Willson et al., 2007). Such long-term effects of childhood conditions have been documented for health outcomes (Ball and Mishra, 2006) and mortality (Hayward and Gorman, 2004), but still need to be assessed for preventive health care use.

The principle of timing refers to the fact that life transitions or events may affect individuals differently, depending on their timing within the life course (Elder Jr. et al., 2003). Similarly, the timely initiation of regular preventive care is of crucial importance to its effectiveness (Bloom, 1994; Ell et al., 2007; Stirbu et al., 2007; Broyles et al., 2000; Riley and Gilbert, 2005). The WHO (2012) recommends screening from the age of 50 onwards. Therefore, socio-economic inequalities can also be manifested in the timely use of preventive services, in addition to the probability of engaging in preventive care. However, the temporal dimension has received little attention in empirical research (Spadea et al., 2010). Rather, age is conceived as a control or confounding variable, or is used as a proxy for "need" for preventive health care, because "need" factors are not always apparent (e.g. Jusot et al., 2011; Or et al., 2010; Wübker, 2012).

The principle of time and place refers to the fact that the life of individuals is embedded in and shaped by historical context and place (Elder Jr. et al., 2003). For example, in 2001, a population-based screening programme was implemented by the Belgian government, in which all women aged between 50 and 69 were offered free mammography screening every two years (Vlaams agentschap Zorg en Gezondheid, 2010). This has led to an increase in mammography screening between 2001 and 2004, as reported by Puddu and colleagues (2009).

5.1.2. Data & methods

5.1.2.1. Data

Our analysis uses data from the Belgian sample of the Survey on Health, Ageing and Retirement (SHARE): a multidisciplinary and cross-national panel survey on health, SES and social and family networks. Details about the sampling procedure can be found elsewhere (Börsch-Supan and Jürges 2005), but generally it consists of probability samples, drawn from population registers or multistage sampling. The third wave (SHARELIFE 2008-2009) was designed to complement existing data by adding retrospective life histories. All measurements are taken from the SHARELIFE, except for "wealth"[4] and education. To improve recall when collecting retrospective data, a Life History Calendar (LHC) was used (Schröder, 2011; see appendix for an example). This method relies on the hierarchical structure of autobiographical memory and uses salient events such as marriage or the birth of a child as anchors for recalling other events (Belli, 1998). Also, a list of prominent external events is incorporated in the LHC for every year (for example, the world exposition in 1958 or the dioxin affair in 1999), which can help to determine the date of personal events. In addition, special efforts have been made to reduce attrition and attain high retention rates (Blom and Schröder 2011). Except for the wealth measurement, missing data shows low rates (0.0-4.19%) for both independent and dependent variables and is deleted list-wise. Because of the focus on preventive mammography screening, women diagnosed with breast cancer during their lives are excluded from the sample (N=67). The final sample of 1,348 Belgian women provides longitudinal data on the commencement of breast cancer screening between 1975 and 2009. Women enter the risk set for screening initiation at age 40 and are censored at age 69.

[4] The previous waves (1 and 2) were also used to add missing information for the year of birth and for the indicator of diagnosed breast cancer. The most recent available information was used.

5.1.2.2. Measurements

Mammography screening initiation

Our dependent variable, the timing of regular mammography screening, was retrieved from the question "In which year did you start having mammograms regularly?" given to all women who answered yes to the question "Have you ever had mammograms regularly over the course of several years?". Women who did not undergo screening were censored at the time of its collection during SHARELIFE.

Childhood conditions

The analysis incorporates four indicators on childhood conditions.

Economic capital during childhood is assessed by the occupation of the main breadwinner of the household when the subject was 10 years old, employing the International Standard Classification of Occupations (ISCO-88). Following Dumont (2006), six categories are created: i) white collar high skilled (reference category); ii) white collar low skilled; iii) blue collar high skilled; iv) blue collar low skilled; v) armed forces; and vi) missing information or the absence of a main breadwinner when the interviewee was aged 10.

Number of books in the parental house, is used to capture objectivised cultural capital in childhood. Respondents with none or very few books (0) are contrasted with those who had at least enough books to fill one shelf (1).

Number of childhood illnesses[5] is used as a proxy for encounters with the health care system. Based on the univariate distribution, three categories are considered in the analysis: i) no diseases during childhood (reference category); ii) one disease; and iii) two or more diseases.

Childhood preventive health care use is assessed by including information on regular dental check-ups during childhood (0=no; 1=yes).

Adulthood conditions

Level of education (institutionalised cultural capital) is assessed using four categories based on the modified ISCED-97 (International Standard Classification of Education). The first category (reference category) includes respondents who did not complete primary education or completed primary education at most. The other categories are lower secondary, upper secondary, and higher education. The latter comprises individuals who completed the first or second stage of tertiary education.

[5] The questionnaire included the following diseases: infectious disease, polio, asthma, respiratory problems other than asthma, allergies (other than asthma), severe diarrhea, meningitis/encephalitis, chronic ear problems, speech impairment, difficulty seeing even with glasses, severe headaches or migraines, epilepsy, fits or seizures, emotional, nervous or psychiatric problems, broken bones, fractures, appendicitis, childhood diabetes or high blood sugar, heart problems, leukemia or lymphoma, and cancer or malignant tumour (excluding minor skin cancers).

Wealth refers to the situation at the interview in wave 1 or wave 2, and is used as a proxy for lifelong wealth, since no time-varying information on wealth or income is available. The information from wave 1 or wave 2 is very detailed and combines details on the value of the main residence (if owned and minus any mortgage), the value of other real estate, and any share of businesses and cars. The SHARE team imputed missing values for this measurement to recreate a distribution of the missing value, rather than making a single guess about it (for details, see Christelis, 2011), which is used in the analyses.

Period and cohort effects

In addition to cohort effects, assessed by *year of birth*, three *historical periods* (1975-1988; 1989-2000; 2001-2009) reflect changes in Belgian policy concerning mammography screening. Finally, a time-varying dichotomy indicates whether a woman was *eligible for the population-based screening programme*. Specifically, women get a score of 1 for the time intervals when they were between 50 and 69 years old during the period in which the screening programme was administered (2001 to 2009).

5.1.2.3. Statistical analysis

Event-history analysis is commonly used in life-course research, since the concept of transition is central both to the theoretical perspective and the statistical modelling of event histories (Wu, 2003). First, we use the Kaplan-Meier estimates to explore the data. This procedure uses the actual observed event times to describe the distribution of event occurrence. Second, discrete time hazard models are employed, since the timing for mammography screening is measured in years (Allison, 1984; Singer and Willett, 2003). The models use a complementary log-log link function. As a result, the exponentiated parameter estimates can be interpreted as hazard ratios, comparing the risk of commencing mammography screening in the group considered, to that of the reference category. The baseline hazard function combines a quadratic effect of time elapsed since age 40, with a categorical specification allowing increased hazards at ages 40, 45, 50, 55, 60 and 65, after visual inspection and likelihood ratio tests for model fit. To assess their unique contributions, childhood and adulthood conditions are first entered into the model separately (Model 1 and Model 2), before being estimated together (Model 3). To account for unobserved time-constant characteristics that might affect the commencement of mammography screening, a random-effects model is used, where person-years of observation are nested in individuals. All analyses use STATA 11.

5.1.3. Results

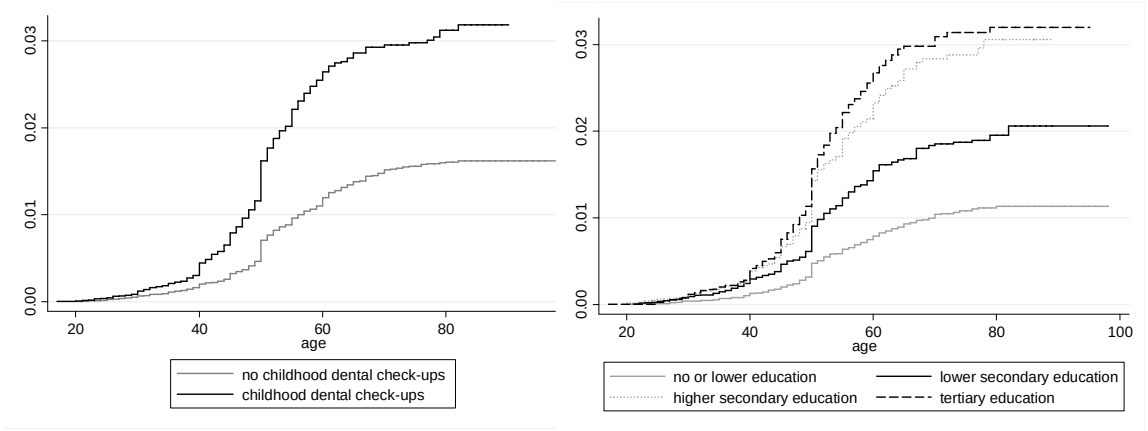
Table 1 shows the socio-demographic characteristics as well as preventive health care use of the women included in our sample.

Table 1: Characteristics of Belgian women, Survey of Health, Ageing and Retirement

	Women (N=1,348)
Regular mammography screening? *(N, %)*	
Yes	979 (72.6%)
No	369 (27.4%)
Childhood characteristics	
ISCO of male breadwinner when 10 (N, %)	
White collar high skilled	187 (13.9%)
White collar low skilled	167 (12.4%)
Blue collar high skilled	431 (32.0%)
Blue collar low skilled	477 (35.4%)
Armed forces	28 (2.1%)
Missing or no male bread winner	58 (4.3%)
Presence of books when 10 (N, %)	
None or very few	595 (44.1%)
At least one shelf	753 (55.9%)
Number of childhood illnesses (N, %)	
None	145 (10.8%)
One	780 (57.9%)
Two or more	423 (31.4%)
Regular dental check-ups when child (N, %)	
Yes	558 (41.4%)
No	790 (58.6%)
Adulthood characteristics	
Education (N, %)	
No or lower education	339 (25.1%)
Lower secondary	339 (25.1%)
Higher secondary	341 (25.3%)
Tertiary	329 (24.5%)
Wealth (N, %, multiple imputation)	
50% or less of median wealth	327 (24.2%)
>50-80% of median wealth	212 (15.7%)
>80-120% of median wealth	283 (21.0%)
More than 120% of median wealth	526 (39.0%)
Age at time interview (Mean, SD)	66.7 (10.7)

About 73% of the women reported in 2008-2009 to have commenced engaging in regular mammography screenings during their lives. Notably, 44% of respondents had none or only very few books at home during childhood and about 70% grew up in blue collar households. The dentist was visited regularly in childhood by about 60% of the women.

From the Kaplan-Meier graphs, it appears that a large share of women start screening around the recommended age of 50, but substantial differences in screening behaviour emerge, depending on childhood preventive behaviour (figure 1), education (figure 2) and wealth (figure 3). It seems that socio-economic status affects the likelihood of ever having a mammogram, rather than the age when screening commences.



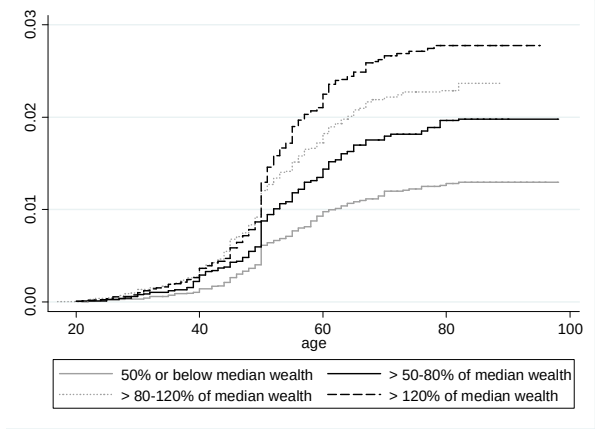


Figure 1-3: Cumulative hazard functions for mammography screening initiation by childhood dental check-ups, education and wealth (Nelson-Aalen estimates), Surveyof Health, Ageing and Retirement

In line with previous research, crucial effects from education and wealth emerge, net of cohort and period effects. For example, the hazard of screening is respectively 1.68 times and about 1.35 times greater for tertiary-educated women and those with a household wealth above at least 80% of the median, compared to their less-privileged counterparts (Model 3, Table 2).

With regard to childhood, it is cultural capital that predicts mammography screening later in life. The hazard for screening is 1.25 times greater for women who had books at home during childhood than those who did not (Model 1). However, this childhood advantage does not persist after controlling for adulthood socio-economic position. More convincingly, childhood preventive health behaviour, the clearest indicator of cultural health capital, is associated with a hazard which is 1.45 times greater. There is almost no decrease in the parameter estimate when controlling for socio-economic status in adulthood (see model 1 and model 3). As suggested by the full-path dependence model, childhood conditions seem to play a substantial role in engagement in preventive health behaviour during later life and the accumulation of cultural health capital.

The example provided by childhood illnesses illustrates the relevance of a longitudinal design. In contrast to expectations, there appears to be no association with screening. Additional analyses (results not reported) reveal that the number of childhood illnesses also captured cohort effects, with younger cohorts reporting more illnesses. Since younger cohorts also engage more in screening, we would have incorrectly concluded that the number of childhood illnesses might be considered as a proxy for cultural health capital if cohort effects are not accounted for.

For every year a woman has been born later, the hazard for ever undergoing mammography screening regularly after age 40 is 1.04 times greater (model 3). In addition, longitudinal analyses reveal clear period effects, which is not surprising given the changes to knowledge and policy concerning breast cancer and screening. Compared to the period 1975-1988, the hazard is 1.98 times greater in the period 1989-2000, and 3.86 times greater in the period 2001-2009 (see model 3). Finally, being an appropriate age to qualify for the screening programme implemented by the Belgian government did not yield a significant association after controlling for period effects. However, this does not mean that the screening programme was not effective. Data limitations hinder us in discerning the motivations of women to commence screening. Therefore, it was not possible to disentangle fully the effects of the screening programme from the effects of periodical change.

Table 2: Exponentiated coefficients (hazard ratios) of random-effects complementary log log model of mammography screening initiation in Belgium (imputed data)

	Model 1: childhood characteristics		**Model 2: adulthood characteristics**		**Model 3: childhood and adulthood**	
	Exp (B)	p	Exp (B)	p	Exp (B)	p
Age	2,09	***	2,02	***	2,09	***
Age square	0,99	***	0,99	***	0,99	***
Age 40	5,29	***	5,22	***	5,33	***
Age 45	2,17	***	2,18	***	2,17	***
Age 50	5,61	***	5,63	***	5,58	***
Age 55	2,00	***	2,00	***	2,01	***
Age 60	2,09	***	2,09	***	2,09	***
Period and cohort effects						
Year of birth	1,05	***	1,05	**	1,04	**
Period (ref cat 1975-1988)						
(1989-2000)	2,01	***	2,00	***	1,98	***
(2001-2009)	3,88	***	3,92	***	3,86	***
Eligible for screening	1,02		0,99		1,02	
Childhood conditions						
ISCO of male breadwinner (ref cat: white collar high skilled)						
White collar low skilled	1,41	*			1,44	*
Blue collar high skilled	1,16				1,25	
Blue collar low skilled	1,05				1,23	
Armed forces	1,44				1,54	
Missing or no male bread winner	0,76				0,86	
Presence of books when 10	1,25	*			1,13	
Cultural health capital						
Childhood illnesses (ref cat: none)						
One	1,14				1,11	
Two or more	1,35	+			1,34	+
Regular dental check-ups	1,45	***			1,38	***
Traditional adulthood SES measures						
Education (ref cat: no or lower education)						
Lower secondary			1,27	+	1,23	+
Higher secondary			1,53	**	1,36	*
Tertiary			1,93	***	1,68	***
Wealth (ref cat:50% or below median)						
>50-80% of median wealth			1,25		1,26	
>80-120% of median wealth			1,34	*	1,38	*
More than120% of median wealth			1,32	*	1,34	*

Source: Survey of Health, Ageing and Retirement. Own calculations
+ p<0,10, *p<0.05, **p<0.01, ***p<0.001

5.1.4. Discussion and conclusion

We argued that there is substantial theoretical overlap between cultural health capital theory and the life-course paradigm. We evaluate this empirically by focussing on socio-economic inequalities in mammography screening, using retrospective longitudinal data from SHARE. The longitudinal design allows not only a long-term perspective, but also the correct time ordering of the conditions. Time ordering is often obscured in health care research, since need for health care is almost always defined by means of questions about prevailing health (at the time of the interview), while items on (preventive) health care employ the previous week, month or year as a time framework. This has hampered conclusions on health care inequalities until now, as research is predominantly based on cross-sectional designs.

Recent developments on cultural health capital theory seem promising. In line with the theory, the results suggest the presence of cultural health capital, which starts accumulating early in life, even after traditional measures of cultural capital and socio-economic position are controlled for. The hazard to undergo mammography screening later in life is as much as 1.38 times greater for women who visited the dentist regularly during childhood. This clearly shows that a healthy lifestyle cannot be perceived as the uncoordinated behaviours of disconnected individuals, and supports the need for a more structural approach (Cockerham, 2005). For policy makers, this implies that not only socio-economic barriers to mammography screening need to be tackled.

Some limitations are worth noting. First, retrospective data has been challenged for the possibility of recall error. However, multiple efforts have been taken by the SHARE team to minimise this form of bias (ex-ante approach) and to evaluate the quality of the data (ex-post approach) (Schröder, 2011). Concerning the first approach, the interview modules in the SHARELIFE are ordered according to what is most important to the respondent and thus recalled most accurately. Then, a life-grid computerised version of the LHC is used to minimise recall errors (Schröder, 2011). Although additional quality checks on the SHARELIFE data are still needed, strong consistency has already been found for personal events (Garrouste, 2011) and childhood conditions (Havari and Mazzonna, 2011). The second limitation concerns the question wordings regarding mammography screening. It is impossible to discern fully whether women started mammography screening for preventive purposes only or for other reasons. However, with the information on health history, we are able to exclude from the sample women diagnosed with breast cancer.

Much more research is needed and different indicators of cultural health capital should be considered, as well as different (preventive) health care outcomes. In this regard, the results show

the importance of disentangling indicators from cohort and period effects, as exemplified by the indicator of childhood illnesses. In addition, effective engagements with health care providers are necessary for the development of cultural health capital. However, studies have repeatedly shown that even in health care interactions, socio-economic inequalities exist. For example, it has been reported that more-deprived individuals receive a lower quality of care (Hall and Dornan, 1990), spend less time with a doctor (Videau et al., 2010) and receive less information (Goddard and Smith, 2001; Waitzkin, 1985; Willems et al., 2005). Sociological explanations for these divergences are scarce (Waitzkin, 1985; Willems et al., 2005), but important insights could be derived from the observation that patients in a higher socio-economic position secure more information from doctors, through effective expressiveness and assertiveness (Street, 1991; Verlinde et al., 2011). This active stance precisely constitutes the underlying idea for Shim (2010) developing how cultural health capital may shape the content and tone of patient-provider interactions.

In line with previous studies (Stirbu et al., 2007; Puddu et al., 2009), the crucial role of education in influencing the likelihood of mammography screening has been highlighted. Higher-educated groups might be more future oriented and more willing to commit to a long-term goal, such as prevention (Mirowsky and Ross, 2003; Rosenstock, 1966; Wübker, 2012). In addition, engagement in preventive care requires a more proactive stance in information seeking and lower SES groups are more likely to seek information for their immediate needs only (Avitabile and Padula, 2008; Leydon et al., 2000; Lorant et al., 2002). The role of physicians is crucial (Wübker, 2012) and the aforementioned socio-economic inequalities in health care encounters are at the core of the discussion.

We also argued that the notion of timeliness should be included in the assessment of socio-economic inequalities in preventive health care. In line with what studies have traditionally assumed, socio-economic inequalities are manifested in Belgium as a lower probability of ever having a mammogram, rather than in the late commencement of screening. This finding should be interpreted in the light of the rather small age range for which screening is recommended. The discussion on timeliness should therefore not be closed. For example, for preventive services that begin far more early in life, such as dental check-ups, timeliness might reveal clearer socio-economic inequalities in preventive health care. In sum, our findings illustrate the potential of the life-course perspective and cultural health capital to further our understanding of preventive health care inequalities. A more longitudinal perspective that covers the whole life course is needed if we want to explain the inequalities that persist today.

5.2. Spousal influence on mammography screening: a life course perspective[6]

5.2.1. Introduction

Research on the determinants of (preventive) health care use has traditionally concentrated on disparities related to individual characteristics. A need-adjusted approach based on Andersen's heuristic model of health services use (1995) is generally adopted when considering how health care use is the consequence of individual need, socio-economic and demographic characteristics, and individual health beliefs (Hanratty, Zhang, & Whitehead, 2007; van Doorslaer, Masseria, & Koolman, 2006; Wagstaff & van Doorslaer, 2000). However, the lives of individuals do not run in isolation, but interdependently (Elder Jr., Johnson, & Crosnoe, 2003). Therefore, seeking professional care is often not the result of an individual decision, but of an interactive process (Pescosolido, 1992). The ways in which social ties affect health behavior are central in models that seek to explain the well-established positive effect of social ties on health (House, Landis, & Umberson, 1988; Umberson, Crosnoe, & Reczek, 2010; Umberson & Montez, 2010). Predominantly, researchers have focused on the beneficial effects of marriage (House et al., 1988; Martikainen et al., 2005; Umberson et al., 2010; Umberson & Montez, 2010). It is argued that marriage instills norms and a sense of obligation around responsibility for family members (Thomas, 2011; Umberson, 1987; Waite, 1995), inhibiting risky behaviors (Berkman & Breslow, 1983; Chilcoat & Breslau, 1996; Duncan, Wilkerson, & England, 2006; Liang & Chikritzhs, 2012; Staff et al., 2010) and promoting more positive health behaviors (Osler, McGue, Lund, & Christensen, 2008; Wang et al., 2011; Wilson, 2002). However, the mechanisms underlying the positive health behaviors of married individuals are poorly understood and interventions that involve the partners' influence on health promotion seem unsuccessful (Black, Gleser, & Kooyers, 1990; Lewis et al., 2006; Lichtenstein & Glasgow, 1992). Hence, in the past decade, researchers have challenged the contention that marriage is universally protective for all people and all health outcomes (Carr & Springer, 2010). New insights could be gained by scrutinizing if and how the presumed beneficial health effect of marriage differs among socio-economic groups. It is somewhat surprising that socio-economic differences between partners are largely ignored, given the well-established social gradient in health (Mackenbach et al., 2008; Marmot et al., 1991; Robert & House, 2000) and health behavior (Lynch, Kaplan, & Salonen, 1997; Puddu, Demarest, & Tafforeau, 2009; Stringhini et al., 2010).

[6] Missinne, S, Colman, E., & Bracke, P. (2013). *Social Science & Medicine*, Vol. 98, pp 63-70.

The discussion is hindered by the use of cross-sectional designs, amongst others. These widely-used designs make it impossible to discern to what extent the effects attributed to marriage can also be ascribed to premarital health habits and premarital socio-economic conditions (Meyler, Stimpson, & Peek, 2007). Individual lives are not unwritten pages at the time of marriage. Just as lives are lived interdependently, they are also imbedded in a personal life course. Recent longitudinal studies have shown that premarital health behavior influences substance use later in life (Homish, Leonard, Kozlowski, & Cornelius, 2009), as well as drinking (Leonard & Das Eiden, 1999; Leonard & Mudar, 2003), regular exercise, routine physical examinations, and healthy eating (Homish & Leonard, 2008). In these studies, premarital health behavior is assessed immediately prior to marriage, at the time of applying for a marriage license. However, we should revert to conditions earlier in life in order to understand the development of health behavior throughout an individual's life. Life course researchers urge giving consideration to the dynamic nature of social ties and health behavior (Thomas, 2011; Umberson et al., 2010). Although marital partners are the most important and powerful source of influence in a person's adult life, parents are predominant during childhood (Umberson, 1992). Socialization into healthy behaviors start when children observe and learn their parents' attitudes, beliefs, and values on health behavior (Cardol et al., 2005; Uhlenberg & Mueller, 2003) and the process continues throughout adult life, as proposed by health-related social control theory (Lewis & Butterfield, 2007).

The life course perspective has recently established a central position in public health research (Due et al., 2011). Mounting evidence demonstrates that the childhood socio-economic position exerts long-term influences on health-related behavior in later life (Kuh, Power, Blane, & Bartley, 2004), for example for alcohol consumption (Lynch et al., 1997; Poulton et al., 2002), physical activity (Lynch et al., 1997; van de Mheen, Stronks, Looman, & Mackenbach, 1998), obesity (Lynch et al., 1997; Power et al., 2005), oral health (Poulton et al., 2002; Thomson et al., 2004), and dental service use (Peres, Peres, de Barros, & Victora, 2007). Social homogamy might even further amplify these antecedent individual differences (Monden, 2007). On the one hand, direct assortative mating may occur, when a partner is selected on the basis of a common healthy lifestyle. On the other hand, and more likely, similarities in healthy behavior between partners may be an indirect consequence of partner selection based on other socio-economic or cultural resources (Falba & Sindelar, 2008; Monden, 2007). Given the importance of education in influencing health behavior (Mirowsky & Ross, 2003), and preventive health care use in particular (Puddu et al., 2009; Stirbu, Kunst, Mielck, & Mackenbach, 2007), the well-documented tendency toward educational homogamy (Blackwell, 1998; Kalmijn, 1998; Smith & Christakis, 2008; Smits, Ultee, & Lammers, 2000) may play a crucial role.

By analogy, cultural health capital theorists have recently subscribed to a longer-term view of an individuals' life, when elaborating on how cultural health capital develops. They have argued that the health-relevant knowledge and skills used to lead healthy lives, start accumulating in childhood and this proceeds over the life course through repeated contacts with health care providers and lifelong socialization (Abel & Frohlich, 2012; Mirowsky & Ross, 2003; Shim, 2010). At the time of marriage, individuals have already gained a certain degree of cultural health capital, which is likely to impact not only on their own health behavior, but also on that of their partner. Given the aforementioned tendency to marry similar others in terms of socio-economic position or cultural resources (Kalmijn, 1998), cultural health capital can accumulate at the marriage level. Therefore, assortative mating can produce cumulative life course advantages or disadvantages (DiPrete & Eirich, 2006; Willson, Shuey, & Elder Jr., 2007), which could be greater at the household level than at the individual level (Monden, 2007).

The Survey of Health Ageing and Retirement (SHARE) enables empirical exploration for the first time of how cultural health capital accumulates at the marriage level, by providing data that is both dyadic and longitudinal. The aim of this paper is to investigate within a life course framework how women's preventive health care behavior in later life is influenced not only by their own cultural health capital, but also by that of their partner. Therefore, the influence of childhood and adult preventive health care behavior of both partners on the initiation of mammography screening will be investigated for a sample of women in Belgium. The rationale behind the choice of mammography screening is twofold. First, the link between cultural health capital and healthy lifestyles is clearer in the case of preventive health care, where ill health is not the major driving force behind engagements with health care providers. Second, breast cancer constitutes a major public health issue, as it is the most frequently diagnosed cancer among women worldwide (WHO, 2012), including in Belgium (Puddu et al., 2009). Mammography screening is the only option for detecting breast cancer at an early stage (Palencia et al., 2010; Puddu et al., 2009). Yet, despite recommendations by the World Health Organization (WHO, 2012) and the European Union (OJ C 68E, 2004), not all women engage in mammography screening, and socio-economic inequalities in the take up of screening seem to persist (Duport & Ancelle-Park, 2006; Jusot, Or, & Sirven, 2011; Lagerlund et al., 2002; Lorant, Boland, Humblet, & Deliege, 2002; Puddu et al., 2009; Zackrisson et al., 2007).

5.2.2. Theoretical Framework: Cultural Health Capital

The concept of cultural health capital (Abel & Frohlich, 2012; Shim, 2010) has been developed to move toward a more neo-structural approach to explain socio-economic inequalities in (preventive) health care. It draws on Weber's description of lifestyle as a collective social phenomenon (Weber, [1922], 1978) and Bourdieu's elaboration, as well as his conversion capital hypotheses (Bourdieu, 1986), to explain how economic and cultural capital can be transformed into cultural health capital (Abel & Frohlich, 2012; Shim, 2010). The latter can be defined as 'comprising all culture-based resources that are available to people for acting in favour of their health' (Abel, 2008, p. 2), such as engaging in preventive care (Abel, 2008; Abel & Frohlich, 2012; Phelan et al., 2004; Shim, 2010; Veenstra, 2007). Examples are knowledge of medical topics and vocabulary, instrumental attitude toward the body, self-discipline, orientation toward the future, etc. (Shim, 2010). Cultural health capital is not a fixed entity, but develops and accumulates over the life course and is shaped by socio-economic conditions (Abel & Frohlich, 2012; Mirowsky & Ross, 2003; Shim, 2010). The accumulation starts early in life and might then continue at the marriage level, when partners provide each other with information and norms on health behavior (Thomas, 2011). Therefore, it can be expected that (un)favorable socio-economic conditions of both partners in childhood will impact on health behavior in later life. Assortative mating can exacerbate these effects and generate systematic divergences over the life course, as contented by cumulative advantage theory (Dannefer, 1987, 2003; DiPrete & Eirich, 2006; Merton, 1968; O'Rand, 1996). Therefore, theory formation as well as empirical studies on cultural health capital might benefit from considering the principle of 'linked lives,' as formulated by life course researchers (Elder, 1974; Elder Jr. et al., 2003).

A similar idea has been developed in health economy by Jacobson (2000), in expanding Grossman's (1972) seminal work on individual health capital to include the family as a producer of health. In the original model, good health is treated as both a consumption commodity (i.e. sick days being a source of disutility) and an investment commodity (i.e. the total amount of time available for market and nonmarket activities). However, the benefits of good health may not be derived just from a person's own health, but also from other members of their family (Jacobson, 2000). For example, investments and choices for preventive health care use are made to optimize their utility (Falba & Sindelar, 2008). It is likely that partners influence each other's preventive health behavior in order to maximize their productivity at the family level (Jacobson, 2000). Drawing on the life course perspective and cultural health capital theory, we hypothesize that women are more likely to commence regular mammography screening when they already engaged in preventive health behavior as a child (hypothesis 1) and when their partner did so (hypothesis 2).

This study adds to the field in various ways. First, the dyadic and longitudinal design enables us to study the origins of preventive health care behaviors of both partners, and the relationship with women's preventive health care use in later life. By assessing the role of two of the most important social relationships in life, parents and marital partners, the dynamic nature of social ties is accordingly acknowledged. Second, this study can guide further development of cultural health capital theory. In particular, for elaboration of how it is acquired and accumulated over time, it is important to understand the role of childhood and adult preventive health behaviors of both partners. Third, the dyadic nature of the Survey of Health, Ageing and Retirement rules out the bias that might otherwise result from relying on one partner's report, as often occurs (Lewis & Butterfield, 2007; Cardol, 2007).

5.2.3. Data and methods

5.2.3.1. Data

We make use of the Belgian sample of the survey on Health, Ageing and Retirement (SHARE), which contains detailed information on health, health care use, and socio-economic status, amongst other items. The longitudinal information for our research question is retrieved from the third wave (SHARELIFE, 2008-2009), when retrospective life histories were collected. Data on wealth and educational level was retrieved from the previous waves. In Belgium, households were selected based on multi-stage probability samples (for details see MEA, 2010). All respondents aged 50 or over at the time of the interview, and their partners where available, were interviewed face-to-face using structured computerized questionnaires. The questionnaires incorporate what is termed a 'life history calendar' (LHC), to improve recall of the retrospective information (Schröder, 2011). This method uses the hierarchical structure of autobiographical memory and employs salient events such as marriage or the birth of a child as anchors for recalling other events (Belli, 1998). Further, the interview modules of the SHARELIFE are ordered according to what is most important to the respondent, and thus recalled with the greatest possible accuracy. In addition, special efforts were made to reduce attrition and attain high retention rates (Blom & Schröder, 2011).

We selected Belgian married couples (N = 782) where both partners took part in the SHARELIFE and in one of the first two waves. To ensure that the partner at the time of the interviews was the same as the one when making the decision on mammography screening, we excluded: i) couples who married after the initiation of mammography screening by the woman, and ii) couples who married after the woman's 40th birthday for those who did not engage in screening. Because of the focus on preventive mammography screening, women who were diagnosed with breast cancer during

their lives were excluded from the sample (N = 12). Except for the wealth measurement (see below), missing data shows low rates (0.0% - 1.3%) and is deleted listwise. The final sample of 722 Belgian women enters the risk set for mammography screening at age 40 and is censored at age 69, during the observation period of 9,050 person-years between 1975 and 2009.

5.2.3.2. Measurements

Initiation of Mammography Screening

Our dependent variable, the timing of regular mammography screening, was retrieved from the question 'In which year did you start having mammograms regularly?' given to all women who answered yes to the question 'Have you ever had mammograms regularly over the course of several years?' Women who did not undergo screening are censored at the time of its collection during SHARELIFE.

Measurements of Women's Childhood and Adult Conditions

First, two childhood characteristics of women are considered. The *number of books in the parental house*, is used to capture cultural capital in childhood. In social science literature, this is considered a powerful proxy for the educational, social, and economic background in early life (Schutz, Ursprung, & Wossmann, 2008). Based on the univariate distribution, two categories are created: i) respondents with none or very few books, and ii) respondents who had at least enough books to fill one shelf. After careful consideration and inspection of available indicators, *regular childhood dental check-ups* (0 = no; 1 = yes) is used as a proxy for the early-life start of cultural health capital accumulation. Previous research has yet pointed to the lingering effects from childhood experiences with dental care. Listl (2012) has shown the perseverance of socially-determined dental attendance behaviors over the life course using the same data of the SHARE. In addition, Riley and Gilbert (2005) concluded that socialization which occurs through childhood dental visits is crucial for positive attitudes and beliefs about dental care in later life, even when the experience was unpleasant. In Belgium, a health insurance is compulsory and it includes the reimbursement of dental check-ups.

Second, the role of two adult characteristics is assessed. The *level of education* is included, using four categories based on the modified International Standard Classification of Education (ISCED-97). The first category (reference category) includes respondents who did not complete primary education and those who completed primary or the first stage of basic education at most. The other categories are 'lower secondary, 'upper secondary' and 'higher education.' We also appraised lifelong preventive health care use by including information on *regular lifelong use of dental care.* To ensure the correct time ordering, women are given a score of 1 if they commenced regular dental check-ups prior to the

initiation of mammography screening. Women who did not start regular dental check-ups, as well as women who did not continue to go to the dentist regularly from the stated time onwards, are given a score of 0.

Finally, three indicators reflect the historical period in which the life course of the women is embedded. We follow common practice in capturing *cohort effects* by including the year of birth of the women. In addition, three *historical periods* (1975-1988; 1989-2000; 2001-2009) reflect changes in Belgian policy concerning mammography screening. In 1975, the first initiatives were taken by the national Belgian government to develop a program concerning breast cancer. A first round of screening was administered from 1989 to 1992 in the provinces of Antwerp and Limburg. Further, in 2001 the Belgian government started a population-based screening program, targeting all Belgian women aged between 50 and 69 to undergo free mammography screening every two years (Van Oyen & Verellen, 1994; VAZG, 2010). In contrast to all the previous items, the last variable included in the analysis is a time-varying dichotomy, which indicates the actual *eligibility of a woman for the population-based screening program*. Concretely, women are given a score of 1 for all the time intervals their age was between 50 and 69 during the implementation period of the program (2001 to 2009).

Household Socio-Economic Status

To capture any financial barriers to mammography screening, *household wealth* is included. Wealth refers to the situation at the interview in wave 1 or wave 2, and is used as a proxy for lifelong wealth, since no time-varying information on wealth or income is available. It is captured by combining detailed financial information on the value of the main residence (if owned and minus any mortgage), the value of other real estate, and any share of businesses and cars. In order to deal with missing information on the wealth measurement, we employ the multiple imputed datasets provided by the SHARE. By imputing each missing value five times, a distribution of the missing value is created, rather than making a single estimate of it (for details see Christelis, 2011).

Measurements for Partners' Childhood and Adult Conditions

Given its importance in assortative mating, we include the *level of education of the woman's partner*, measured analogously to the educational level of the woman. Second, we add the cultural health capital of the partner, as approximated by *regular childhood dental check-ups* and *regular lifelong use of dental care.* Again, we confirm that the start of continued regular dental check-ups during the partner's life is temporally prior to the mammography screening of his wife. For reasons related to

parsimony and convergence, the other childhood SES item (number of books) is not taken into consideration for the partner.

5.2.3.3. Statistical analysis

We use discrete time hazard models for event history analysis, because the timing to mammography screening is measured in years (Allison, 1984; Singer & Willett, 2003). First, the data is explored by means of the Kaplan-Meier procedure, which makes no assumption about the shape of the baseline hazard, but uses the actual observed event times to describe the distribution of event occurrence (Mills, 2011). Second, models are estimated using a complementary log-log link function. Therefore, the exponentiated parameter estimates can be interpreted as hazard ratios that compare the risk of initiating mammography screening in the group considered to that of the reference category. After visual inspection and likelihood ratio tests for model fit, the baseline hazard function is defined by a quadratic effect of time elapsed since age 40 and a categorical specification allowing increased hazards at ages 40, 45, 50, 55, 60, and 65. A random-effects model is specified to account for unobserved time-constant characteristics that may affect screening initiation. In this model, person-years are nested within individuals. All analyses are performed in STATA 11 and use the multiple imputation procedure.

5.2.4. Results

The descriptive profiles of married women and their partners regarding childhood and adult conditions are presented in Table 1. About three quarters of the married women ever started regular mammography screening (78.1 percent). Many of these women commenced screening at the recommended age of 50, as can be seen from the Kaplan-Meier graphs (Figures 1 and 2). According to hypothesis 1, the hazard for screening differs substantially in line with women's preventive health behavior earlier in life. Both childhood as well as lifelong dental check-ups seem to be independently related to screening, even when the economic and cultural background in childhood - as approximated by the number of books - is controlled for. It appears that women who went to the dentist regularly as a child are 40 percent more likely to engage in preventive mammography screening many years later in life (Table 2 and Figure 1, log-rank: $p<0.001$).

Table 1: Characteristics of Belgian married women in dyadic sample, Survey of Health, Ageing and Retirement

	Women (N=734)
Regular mammography screening? *(N, %)*	
No	158 (21.9%)
Yes	574 (78.1%)
Women characteristics	
Presence of books when aged 10 (N, %)	
None or very few	322 (43.9%)
At least one shelf	412 (56.1%)
Regular dental check-ups when child (N, %)	
No	397 (55.0%)
Yes	325 (45.0%)
Regular lifelong dental check-ups (N, %)	
No	301 (41.7%)
Yes	421 (58.3%)
Education (N, %)	
No or lower education	163 (22.6%)
Lower secondary	197 (27.3%)
Higher secondary	191 (26.5%)
Tertiary	171 (23.7%)
Household wealth (N, %, multiple imputation)	
50% or less of median wealth	111 (15.4%)
50-80% of median wealth	118 (16.3%)
80-120% of median wealth	219 (30.3%)
120% or more of median wealth	274 (38.0%)
Partner characteristics	
Education (N, %)	
No or lower education	146 (20.2%)
Lower secondary	85 (11.8%)
Higher secondary	360 (49.9%)
Tertiary	131 (18.1%)
Regular dental check-ups when child (N, %)	
No	509 (70.5%)
Yes	213 (29.5%)
Regular lifelong dental check-ups (N, %)	
No	421 (58.3%)
Yes	301 (41.7%)
Age at time interview (Mean, SD)	64.3 (9.6)

These results show that premarital habits are important predictors of later life health behavior and suggest that the accumulation of cultural health capital starts in childhood, when parents instill values and accompany their children in preventive health care engagements. Even though childhood preventive health care use is strongly associated with lifelong dental check-ups ($r = 0.539^{**}$), the hazard for mammography screening increases additionally by 41 percent if women continuously went for regular dental check-ups during their life prior to screening. Consistent with previous research (Duport & Ancelle-Park, 2006; Lagerlund et al., 2002; Jusot, Or & Sirven, 2011; Zackrisson et al., 2007), crucial net effects from household income emerge. Women whose household wealth is

at least 80 percent of the median are around 60 percent more likely to undergo screening, compared to their less-privileged counterparts.

We are particularly interested in whether the premarital preventive health behavior of the partner impacts on the woman's hazard for screening. In line with hypothesis 2, childhood preventive health behavior of the partner seems to yield analogous divergent mammography screening hazards (Figure 2, log-rank: $p<0.001$). It is associated with an increased hazard of screening of 25 percent (Model 3), even after the woman's own cultural health capital and the educational level of both partners are taken into account. Strictly, the net effect merely surpasses the arbitrary cut-off point of .05 ($p=0.081$). However, this emanate from the lack of statistical power and the complexity of the model related to the correspondence between partner characteristics due to social homogamy. Interestingly, lifelong dental check-ups of the partner did not yield a similar association. This is not due to its considerable overlap with childhood dental check-ups ($r=0.460^{**}$). The association is also not significant in Model 2, where childhood dental check-ups are not yet considered.

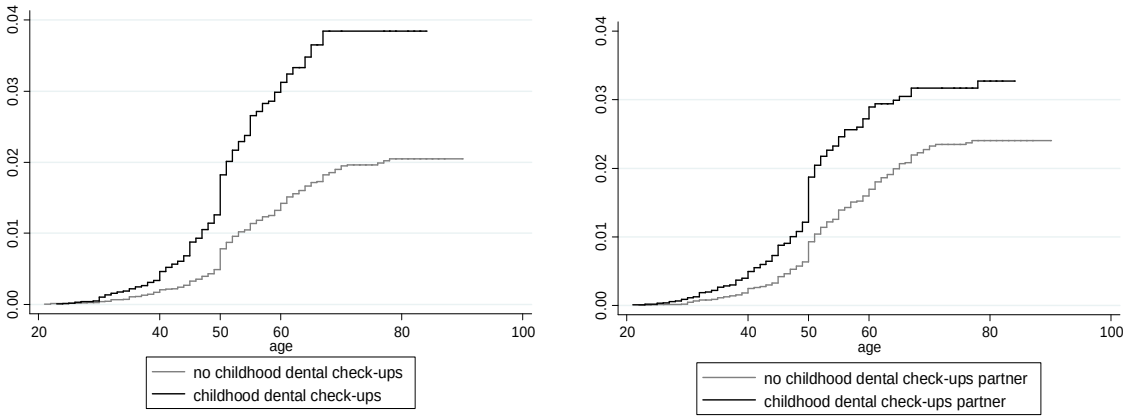


Fig 1-2: Cumulative hazard functions for the initiation of mammography screening, by childhood dental check-ups of the women and partners (Nelson-Aalen estimates), Survey of Health, Ageing and Retirement

The results suggest that cultural health capital accumulates at the marriage level, given that premarital preventive health care use of the partner independently impacts on the woman's screening behavior after marriage. When taking the characteristics of the partner into account, there is almost no decrease in the parameter estimate of women's childhood preventive health care use (0.8% = [1.40-1.39]/1.40). Further, the role of childhood preventive health care use of both partners is relatively similar in magnitude (Exp (B) = 1.40 for women; Exp (B) = 1.25 for men). This indicates that the premarital behaviors of both partners are important for the later life preventive health behavior of women.

Table 2: Initiation of Mammography screening in Belgium, by childhood and adulthood characteristics of women and partners. Exponentiated coefficients (hazard ratios) of the random-effects complementary log-log model (imputed data).

	Model 1			Model 2			Model 3		
	Exp (B)	**p**	**CI**	**Exp (B)**	**p**	**CI**	**Exp (B)**	**p**	**CI**
Women characteristics									
Presence of books when 10	1,03		0,82 - 1,30	1,04		0,82 - 1,31	1,03		0,81 - 1,30
Lifelong dental check-ups	1,41	*	1,09 - 1,82	1,38	*	1,06 - 1,82	1,39	*	1,06 - 1,83
Child dental check-ups	1,40	*	1,08 - 1,83	1,42	**	1,08 - 1,85	1,39	*	1,06 - 1,81
Education (ref cat: no or lower education)									
Lower secondary	1,14		0,85 - 1,54	1,16		0,85 - 1,57	1,16		0,86 - 1,57
Higher secondary	1,28		0,92 - 1,78	1,29		0,92 - 1,79	1,28		0,92 - 1,78
Tertiary	1,12		0,79 - 1,60	1,11		0,77 - 1,59	1,10		0,77 - 1,57
Partner characteristics									
Education partner (ref cat: no or lower education)									
Lower secondary				0,91		0,63 - 1,31	0,88		0,61 - 1,27
Higher secondary				1,03		0,79 - 1,34	1,01		0,78 - 1,32
Tertiary				0,93		0,68 - 1,29	0,90		0,65 - 1,25
Lifelong dental check-ups				1,03		0,82 - 1,29	0,96		0,75 - 1,22
Child dental check-ups partner							1,25	+	0,97 - 1,60
Household SES									
Wealth in % of median (ref cat: below 50%)									
50-80%	1,38	+	0,92 - 2,08	1,37		0,91 - 2,06	1,38	+	0,92 - 2,08
80-120%	1,68	**	1,17 - 2,40	1,68	**	1,17 - 2,42	1,69	**	1,18 - 2,42
120% or more	1,54	*	1,08 - 2,21	1,54	*	1,07 - 2,22	1,52	*	1,06 - 2,18
Period and cohort effects									
Year of birth	1,04	*	1,00 - 1,08	1,04	*	1,00 - 1,08	1,04	*	1,00 - 1,08
Period (ref cat 1975-1988)									
(1989-2000)	2,65	***	1,56 - 4,50	2,65	***	1,56 - 4,49	2,64	***	1,56 - 4,49
(2001-2009)	4,39	***	2,12 - 9,10	4,38	***	2,11 - 9,07	4,34	***	2,10 - 9,00
Eligible to screening	1,09		0,78 - 1,53	1,10		0,78 - 1,54	1,09		0,78 - 1,54
Baseline hazard									
Age	1,94	***	1,47 - 2,54	1,94	***	1,48 - 2,55	1,95	***	1,48 - 2,56
Age square	0,99	***	0,99 - 1,00	0,99	***	0,99 - 1,00	0,99	***	0,99 - 1,00
Age 40	4,73	***	2,68 - 8,34	4,75	***	2,69 - 8,38	4,75	***	2,69 - 8,39
Age 45	2,33	***	1,59 - 3,43	2,33	***	1,59 - 3,43	2,33	***	1,59 - 3,43
Age 50	5,55	***	4,27 - 7,19	5,54	***	4,27 - 7,19	5,56	***	4,28 - 7,22
Age 55	2,01	**	1,29 - 3,12	2,01	**	1,29 - 3,12	2,01	**	1,30 - 3,13
Age 60	1,54	+	0,90 - 2,65	1,54	+	0,90 - 2,65	1,55	+	0,90 - 2,65

Source: Survey of Health, Ageing and Retirement, own calculations
+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

5.2.5. Discussion and Conclusion

In line with Daalman and Elder Jr. (2007), we argued for a more comprehensive contextualization of health care use. Health-related behavior will be better understood if we consider it within the context of the family. We therefore follow the suggestion of life course researchers that the stability and change of family relationships throughout the life course should be considered (Elder Jr. et al., 2003). Accordingly, we expand the traditional focus on marriage to encompass early life experiences and the premarital health habits of both partners, in order to shed light on socio-economic differences in preventive health care use among married couples. Several important results are worth noting. First, premarital preventive health care use seems to be an important predictor of mammography screening many years later in life. To the best of our knowledge, the relationship between childhood characteristics and mammography screening has not previously been investigated, apart from our own work in progress. These findings and the aforementioned studies on dental care (Listl, 2012; Riley & Gilbert, 2005) are in line with the contention of Bourdieu (1984; see also Daenekindt & Roose, 2011) that the habitus is acquired during primary socialization and they point to the structural dimensions of health lifestyles (Weber [1922] 1978; Cockerham, 2005, 2007). The findings also reveal systematic inequalities among married individuals. We think that the life course approach and an explicit focus on the accumulation of (cultural health) capital can yield further insights not only into the mechanisms underlying the effect of marriage but also into the "fundamental social cause" of SES for health and health behavior (Link & Phelan, 1995; Phelan et al., 2004; Phelan, Link &Tehranifar, 2010). Our approach suggests that more attention should be given to fundamental cultural causes of health inequalities, next to structural and material conditions. In contrast to previous studies that highlighted its crucial role (Puddu et al., 2009; Stirbu et al., 2007), no differences are found according to education. However, we have reasons to believe that the absence of significant differences is attributable to a lack of statistical power. We ran additional analyses on the sample of Belgian women (N = 1,348), that did not require dyadic data. In these analyses, large educational inequalities were found between all levels, controlling for childhood SES, cultural health capital, and household wealth.

Second, childhood divergences seem to accumulate at the marriage level. The results suggest that the cultural health capital of both partners impacts on women's preventive health care use. This is consistent with the contention of Monden (2007) and Jacobson (2000), and shows the importance of the contextualization of preventive health care use. As recently advocated, marriage might be not universally protective, but its role in health behavior might depend on the previous life chances of both partners. Theoretical developments as well as future empirical studies on cultural health capital

might benefit from bringing family members into the picture more explicitly. Although our data allowed us to include the role of two of the most important social relationships in life, future research should include other significant social network members in a dynamic way. In older age, in addition to partners, friends and offspring are also important agents of social control (Lewis & Butterfield, 2007; Tucker, 2002). However, the results of Keating et al. (2011) suggest that the health behavior of friends is less 'contagious' for screening than for other health behaviors such as alcohol consumption (Rosenquist, Murabito, Fowler, & Christakis, 2010), eating habits (Christakis & Fowler, 2007; Pachucki, Jacques, & Christakis, 2011) and smoking (Christakis & Fowler, 2008). With regard to offspring, it can be expected that the impact of cultural health capital operates in a similar way to that of the partner, given the importance of primary socialization in health behavior by parents themselves. Besides, researchers should include the impact of relationship quality, divorce and adverse events both in childhood and adulthood. In addition, it would be interesting to assess the preventive health care use of men in the same manner. Data limitations hindered us from doing so, which is regrettable given that gender differences are expected (Umberson, 1992). Future research should also consider different indicators of cultural health capital over an individual's life, as well as different outcomes of health behavior.

Before turning to the conclusion, two last limitations should be acknowledged. First, retrospective data may raise some concerns regarding recall bias. However, the SHARE took this concern seriously. In addition to the aforementioned measures to minimize akin bias at the time of data collection, quality checks on the respective data have been conducted. Although more research is needed, strong consistency has already been found for personal events (Garrouste, 2011) and childhood conditions (Havari & Mazzonna, 2011). The second limitation concerns the question wordings regarding mammography screening. It is impossible to discern fully whether women started mammography screening for preventive purposes only, or for other reasons. A family history of breast cancer is related to perceived risk for breast cancer, which in turn impacts on the commencement of mammography screening (Calvocoressi et al., 2004). However, with the information on health history, we are able to exclude women diagnosed with breast cancer.

In sum, the results show the importance of considering premarital health habits when studying how marital partners influence each other's health behavior. In order to shed further light on the mechanisms at play, a longitudinal perspective is highly warranted.

5.3. The social gradient in preventive health care use: what can we learn from socially mobile individuals[7]

5.3.1. Introduction

Departing from Weber's lifestyle concept (1978), Cockerham (2005, 2007) developed a 'health lifestyle theory' to underline the structural dimensions of health lifestyles. He described health lifestyles as "collective patterns of health-related behaviour based on choices from options available to people according to their life chances" (Cockerham 2000, p. 165). Health lifestyles are largely shared by individuals close to one another in the social space, and whose similar opportunities with regard to life chances give rise to a shared habitus as elaborated by Bourdieu in *La Distinction* (1984). In the same vein as Weber and Bourdieu, cultural health capital theory has recently been developed to explain persisting social inequalities in healthcare use. This field of research suggest that the social distribution of health-relevant knowledge and the skills used to lead healthy lives emanate from accumulation processes that start in childhood and proceed throughout the life course (Abel and Frohlich 2012; Mirowsky & Ross 2003; Missinne, Colman & Bracke. 2013), "through repeated contacts with healthcare providers and lifelong socialization" (Shim 2010).

Little is known about how these accumulation processes of cultural health capital evolve. We are in the dark regarding whether and which specific life stages or experiences are crucial in the development of cultural health capital or health lifestyles (Singh-Manoux and Marmot 2005). Early life experiences seem important, as childhood socio-economic conditions shape the development of health-related behaviours (Kuh et al., 2004) when parents transfer skills and knowledge to their children (Abel and Frohlich 2012; Singh-Manoux and Marmot 2005). In addition to setting an example by buying food, (alcoholic) beverages, engaging in sport, taking their children for regular dental check-ups, etc., the beliefs supporting parents' own health behaviour are transmitted unintentionally or via explicit teaching efforts (Lau et al. 1990; Tinsley 2002). The childhood socio-economic environment has been empirically linked to several health behaviours in adulthood, such as smoking, alcohol consumption, diet, physical activity and dental service use (Gilman et al. 2003; Huurre et al. 2003; Lynch et al. 1997; Powe et al. 2005; Peres et al., 2007).

Socialisation into health behaviour continues throughout adult life, as proposed by health-related social control theory (Lewis and Butterfield 2007). Marital partners are considered the most

[7] Missinne, S., Daenekindt, S., & Bracke, P. (In press). Accepted by *Sociology of Health and Illness*.

important and powerful source of influence in a person's adult life (Umberson 1992), but other social network members, such as friends and offspring, can also become influential actors for health-related social control (Lewis and Butterfield 2007; Tucker 2002). With regard to health behaviour, life course researchers urge giving consideration to the dynamic nature of social ties (Thomas 2011; Umberson et al. 2010) and similarly, to social positions through each stage of the life course (e.g. Kuh et al. 2004; Lynch et al. 1997; Power et al. 2005; van de Mheen et al. 1998).

We believe that social mobility research can yield insights into the development of health behaviour, as socially mobile individuals have encountered different contexts of socialisation, each with its own characteristic levels of cultural (health) capital and health-related practices. We focus on intergenerational mobility, which refers to the change of position within the social hierarchy between parents and their children (Sorokin 1927). Studying the health behaviour of these individuals might help us to gain insight into the relative importance of a person's social position of origin compared with their social position of destination for the development of health behaviour.

Much uncertainty remains with regard to the issue of social mobility and health behaviour (Pollitt et al. 2005). Investigation into this topic is hampered by a longstanding methodological difficulty to simultaneously estimate the effects of social position of origin, social position of destination and social mobility. Since social mobility is linearly dependent on both the social position of origin and destination, the parameterization of the independent effect of origin, social position of destination and social mobility in a traditional regression framework is not possible (Hendrickx et al. 1993; Sobel 1981). Health behaviour research still largely draws on this linear regression approach (e. g. Bowes et al. 2013; Gall et al. 2010; Karvonen et al. 1999; Kuntz and Lampert 2013; Pearce et al. 2009; Peres et al., 2007; Silverwood et al., 2012; Watt et al. 2009), rendering conclusions very tentative.

We employ Sobel's (1981) diagonal reference model, which is considered to be "the only acceptable method to model mobility effects" (Houle 2011, p. 764). This technique allows us to disentangle the effects of social position of origin, social position of destination and the effect of transitioning between them. The theoretical starting point of this statistical technique is the idea that socially immobile individuals represent the core of each social stratum. For example, De Graaf et al. (1995, p. 1007) argue that the characteristic attitudes of a farmer can be best understood by going to those men who were "born and bred a farmer". Therefore the health-related behaviour of socially immobile individuals is considered characteristic for that social position. The estimates will be derived by comparing the health behaviour of socially mobile individuals to the health behaviour of the immobile individuals situated in the corresponding social position of origin and destination. Within

the scope of this paper, we focus on mammography screening, which is the only current option for detecting breast cancer at an early stage (Palencia et al. 2010). It is the most frequently diagnosed form of cancer and the leading cause of death from cancer among women, with an estimated mortality rate of 16.7% (Ferlay et al. 2007; Jemal 2011; World Health Organization [WHO] 2013). Despite recommendations by the WHO (2013) and the European Union (OJ C 68E, 3 March 2004, pp. 611-17), not all women aged 50-69 years engage in mammography screening and socio-economic inequalities in its use seem to persist in Europe, including Belgium (Jusot et al. 2012; Lorant et al. 2002; Puddu et al. 2009; Renard et al. 2014).

Because mammography screening is a relatively recent health practice and is only recommended between the ages of 50-69 years, not many women in our sample will have seen their mothers set an example. However, Cockerham (2007) highlighted that notwithstanding their own complexities, health practices comprise an overall pattern so that the regular take-up of preventive mammography screening can be viewed as an expression of a health lifestyle that started to develop during childhood. Bourdieu's notion of the habitus (1984) entails that "health-related behaviour can be seen as a largely routinized feature of everyday life which is guided by a practical or implicit logic" (Williams 1995, p. 583). Missinne et al. (2014b) argue for a general behavioural orientation towards a health lifestyle (Donovan et al. 1993) by linking different forms of preventive health behaviours across the life course. Women whose parents took them for dental check-ups seem to be more likely to take up regular mammography screening in later life, irrespective from traditional measures of childhood and adulthood socio-economic factors and despite the efforts of the Belgian government to engage all women aged 50-69 in free mammography screening. In addition to that of the parents, the health lifestyle of the partner can affect individual's health behaviour. A follow-up study showed that also the partners' preventive health behaviour in childhood predicts the woman's regular mammography screening, independently from her own childhood preventive health behaviour and the aforementioned factors (Missinne et al. 2013b).

Studying the example of mammography screening offers two important advantages. First, this type of preventive health behaviour is only recommended from the age of 50 onwards (WHO 2013), when social mobility processes are likely to have been actualised. Therefore, this form of health behaviour is unlikely to affect the course of social mobility. In most studies, such a process of reversed causality cannot be ruled out and hampers causal interpretations of the effect of social mobility (Claussen et al. 2005). Second, it is very unlikely that mammography screening is related to the event and accompanying stress of social mobility itself, as has been suggested for health-compromising behaviours such as alcohol use or dietary patterns (Karvonen et al. 1999).

5.3.2. Theoretical expectations and hypotheses

Social mobility constitutes a central topic in sociology (e.g. Blau and Duncan 1967; Ganzeboom et al. 1991; Lipset and Zetterberg 1956). In his pioneering work, Sorokin (1927) defined social mobility as the shifting of individuals within social space, and he claimed that socially mobile individuals exhibit distinctive attitudes and values as a result of the cross-fertilisation of attitudes and values originating from different social strata (Sorokin 1927). A large body of social inequality research focuses on social mobility to arrive at a better understanding of the stratification process, the openness of a society, its meritocratic character and other factors (e.g. the Wisconsin longitudinal study). Although related, our research questions pertain to the individual experience of social mobility and how it is expressed in everyday life, in the form of the health-related choices individuals make and the way these are socially structured. Our interest in socially mobile individuals departs from the fact that they have been socialised by two different social strata. It is plausible that both contexts of socialisation will manifest themselves in the behaviour of socially mobile individuals. However, hypotheses can be formulated as to which context has the predominant effect on the health behaviour of socially mobile individuals.

Traditional socialisation theory considers parental socialisation as deep and lasting, because children are believed to be much more malleable than adults (Brim 1968; Rosow 1974).People are imprinted with socialising messages during childhood; imprints which are deemed to continue to manifest themselves throughout the life course. According to Bourdieu (1984, 1990), lived experiences during childhood are crucial in the formation of the habitus. Viewing preventive mammography screening as a manifestation of positive health behaviour, this would lead us to expect the behaviour to be predominantly shaped by the primary socialisation context: the social position of origin. In line with research on social mobility effects (e.g. Tolsma et al. 2009), we term this the *origin hypothesis*.

However, the depiction of socialisation in traditional theory has been criticised as being too unidirectional and too straightforward. Contemporary theory reframes socialisation as a group-to-group relationship, instead of a dyadic relationship between parent and child (e.g. Corsaro 2005; Harris 1995; Thorne 1993). Furthermore, it stresses that socialisation is never complete. Although parents are important socialising agents, socialisation continues into adulthood when individuals are confronted with new experiences (Ryder 1965) and other significant network members become important for health behaviours (Christakis and Fowler 2007, 2008). Accordingly, it has been suggested that the idea of a class-rigid and static habitus founded in childhood experiences no longer holds true (e.g. Daenekindt and Roose 2013a; Lahire 2011). In line with these arguments, we can formulate a contrasting hypothesis to the origin hypothesis – the *destination hypothesis* – which

states that the health behaviour of socially mobile individuals will be predominantly associated with the social position of destination.

The destination and origin hypotheses implicitly depart from the assumption that upward and downward mobility are similar in their effects. This is not necessarily the case, as the experience of upward social mobility is quite different from that of downward social mobility. For example, the latter is often associated with feelings of failure (Blau 1956). In accordance with this line of thinking, the *maximisation hypothesis* has been proposed (De Graaf and Ganzeboom 1990). According to this, socially mobile individuals adapt to the highest status group. For upwardly mobile individuals this means that they would adapt to the lifestyle patterns of their newly achieved social position, while downwardly mobile individuals retain the lifestyle of their social position of origin. Monden and de Graaf (2012) reasoned that the former individuals reflect the more healthy lifestyle of their achieved social position, while the latter notice the negative health effects of the lifestyle of their new social group. In health research, this phenomenon, through which past social conditions protect against vulnerability, has also been termed 'social protection' (Heraclides and Brunner 2010).

5.3.3. Data and methods

5.3.3.1. Data

We use data from the Belgian sample of the Survey of Health, Ageing and Retirement (SHARE), which contains detailed information on health, healthcare use and socio-economic status, among other factors. All respondents aged 50 or over at the time of the interview, and their partners where available (and children older than 50 living with their parents), were interviewed face-to-face using structured, computerised questionnaires. In Belgium, households were selected based on multi-stage probability sampling (for details see Mannheim Research Institute for the Economics of Ageing [MEA] 2010). The first wave was carried out in 2004. In Belgium, household and individual response rates were 39.2% and 90.5% respectively (SHARE 2012). Information on the social position of destination was retrieved from this first wave. After a second wave of data collection (2006-2007), respondents were re-contacted for a third wave (SHARELIFE 2008-2009), which complemented the panel data with retrospective life histories. This third wave provides longitudinal information on the social position of origin and on mammography screening. Special efforts were made to reduce attrition and attain high retention rates (Blom and Schröder 2011). For our study, we exclude women older than 85 in 2004 (N = 17), so that our observation period starts when the first initiatives for mammography screening were introduced (from 1989 to 1992 in the provinces of Antwerp and Limburg) (Van Oyen and Verellen 1994; Vlaams Agentschap Zorg en Gezondheid

[VAZG] 2010). In addition, given our focus on preventive healthcare behaviour, women diagnosed with breast cancer during their lives are also excluded (N = 34; 2.4%).

5.3.3.2. Measurements

Independent variables: social position of origin and social position of destination

Similar to studies on social mobility and health-related behaviour (e.g. Karvonen et al. 1999; Pearce et al. 2009; Silverwood et al. 2012; Thomson et al. 2004), we operationalise social mobility as occupational mobility. Our focus on older women entails the need to consider carefully how homemakers are classified. A substantial number of the women had never worked during their lives, as their working age coincided with a period characterised by the male breadwinner model (Tilly and Scott 1987; Vanhautte 2002). To maximise the robustness of the findings, we test the hypotheses in two ways. First, we confine the sample to women who have been in the labour market at some time during their lives and we use their own occupational position. Second, we include all women in the sample and use the occupation of the husband instead. The reasoning behind this is the well-documented tendency for social homogamy (Blackwell 1998; Kalmijn 1998; Smits et al. 2000) and the concordance of health behaviours between partners (Falba and Sindelar 2008).

The *social position of origin* is assessed by means of the occupational category of the main breadwinner when the respondent was ten years old. The occupational categories provided are the ten major groups of the International Standard Classification of Occupations (ISCO-88) developed by the International Labour Organization[8]. We use the same categories as Dumont (2006): i) white-collar high skilled; ii) white-collar low skilled; iii) blue-collar high skilled and iv) blue-collar low skilled, except that we exclude the very small number of armed forces personnel. Together with individuals who have missing information, this results in omitting 97 cases (7.1%) from the first sample and 93 cases (6.9%) from the second.

The *social position of destination* is derived from the 4-digit ISCO-88 codes generated by the SHARE team. The first digit, which refers to the previously mentioned major groups, is used to categorise the occupations in a similar manner to that used for the social position of origin. For the first set of analyses, we retrieve the information on women's own ISCO by means of the answers to "the exact name or title" of their main job or their last main job. The former applies to women who were still employed at the time of interview in 2004, while the latter refers to women who stated they were

[8] The ten groups are: legislator, senior official or manager; professional; technician or associate professional; clerk; service, shop or market sales worker; skilled agricultural or fishery worker; craft or related trades worker; plant/machine operator or assembler; elementary occupation; and armed forces.

retired, unemployed, permanently ill/disabled or homemakers. From the results, the occupational position of 18.3% women is classified as blue-collar low skilled, 7.8% blue-collar high skilled, 23.6% white-collar low skilled and 29.1% white-collar high skilled. Some 12.9% had a higher social position in 2004 than when they were children, while 52.8% were downwardly mobile (results not shown). In total, 21.1% of the women could not be included because information on occupational position was lacking, in most cases because they had never entered the labour market (14.6%).

For the second sample, we make use of the dyadic nature of the SHARE. It is the male partner who reported the "exact name or title" of their main job or last main job. If the married or cohabiting partner was no longer alive or did not take part in the survey, his last occupation was reported by the partner through the question "What is the most recent job your [ex-/late] partner had?" The use of the partners' occupational position results lead us to categorise 15.4% of women as blue-collar low skilled, 19.3% blue-collar high skilled, 11.4% white-collar low skilled and 38.8% white-collar high skilled. Social mobility figures are similar here. Some 13.6% of the women had moved up the social latter while 32.2% had moved down (results not shown). In this sample, 15.6% of the cases had to be omitted, because of missing information on partners' occupational position (12%) and because some women had never married (3.6%). Tables 1 and 2 show the number of socially mobile individuals for both samples.

Dependent variable: mammography screening

We examine whether or not women had commenced regular mammography screening before 2004. This time coincides with the data collection for the first wave, when the destination social position was appraised. We combine the information for the questions "Have you ever had mammograms regularly over the course of several years?" and "In which year did you start having mammograms regularly?" As it is recommended to have mammography screening every two years (European Commission 2003), women who started screening but did not continue it on a regular basis during the recommended age range (50 to 69 years old) are given a score of zero, together with those who never started screening. The majority of women had started mammography screening during their lives (63.2% in the first sample and 59.2% in the second). Information on screening is lacking for only a small number of women and they are therefore deleted list-wise (respectively 3.2% and 3.1%). Accordingly, the final sample consists of 963 women using the first sample and 1,015 women using the second.

Covariates: age

Risk factors for breast cancers are not well understood (Palencia, 2010), besides age and those associated with prolonged exposure to endogenous estrogens, such as late age at first childbirth and early menarche (Lacey et al. 2009)[9]. Women aged 50-69 are at the highest risk for breast cancer (Kohn, 2013) and therefore constitute the target group of national screening programs. In 2001, a population-based screening programme was implemented by the Belgian government, in which all women aged between 50 and 69 were offered free mammography screening every two years (VAZG 2010). We introduce a dichotomous variable in the models to control for the effect of public policy concerning mammography screening, as this has changed over time. Women who had been offered screening at least once (those born between 1931 and 1954) are compared with women who had not (those born before 1931).

5.3.3.3. Statistical analysis

To estimate the relative impact of social position of origin and of destination, we use Diagonal Reference Models (DRMs). DRMs were designed specifically to study the effects of social mobility. This method has been used in a wide variety of research fields, such as political behaviour, (e.g. Weakliem 1992), antagonistic attitudes (e.g. Tolsma et al. 2009) and cultural participation (e.g. Daenekindt and Roose 2013b, 2014; De Graaf 1991). They have also been applied in health research (e.g. Claussen et al. 2005; Monden and de Graaf 2012; Monden et al. 2003, Houle and Martin 2011, Houle 2011).

Central to this technique is the idea that immobile individuals represent the core of a specific social position. Consequently, the health behaviour of socially mobile individuals is modelled as a function of the characteristic behaviour of immobile individuals from the social position of origin and of destination. The baseline model (including age) is:

$$Y_{ijk} = p * \mu_{ii} + (1 - p) * \mu_{jj} \ (+\sum \beta_b x_{ijb}) + \varepsilon_{ijk} \qquad \text{(Model A)}$$

where i refers to the social position of origin and j to that of destination. Y_{ijk} is the value of the dependent variable in cell ij, which has k observations and represents the health-related behaviour of socially mobile individuals whose social position of origin is i and of destination is j. μ_{ii} and μ_{jj} are both estimates of Y in the diagonal cells. The relative importance of the social position of origin is

[9] We do not include these risk factors in the analyses, since previous work has shown that they did not yield independent effects from socio-economic position parameters.

represented by *p*. *p*-parameters significantly higher than .5 indicate that *Y* is predominantly associated with the social position of origin, which is in line with the *origin hypothesis*. Vice versa, *p*-parameters significantly lower than .5 indicate a stronger relationship with the social position of destination, therefore consistent with the destination hypothesis. The calculation of the DRMs is illustrated by figure 1.

Figure 1: Visual representation of the DRM method

	Destination			
Origin	1	2	3	4
1	**µ11**	(p*µ11)+((1-p)*µ22)	(p*µ11)+((1-p)*µ33)	(p*µ11)+((1-p)*µ44)
2	(p*µ22)+((1-p)*µ11)	**µ22**	(p*µ22)+((1-p)*µ33)	(p*µ22)+((1-p)*µ44)
3	(p*µ33)+((1-p)*µ11)	(p*µ33)+((1-p)*µ22)	**µ33**	(p*µ33)+((1-p)*µ44)
4	(p*µ44)+((1-p)*µ11)	(p*µ44)+((1-p)*µ22)	(p*µ44)+(1-p)*µ33)	**µ44**

The maximisation model is an extension of the baseline model and states that the health-related behaviour of socially mobile individuals is predominantly associated with the highest social position they have encountered, whether that of origin or of destination. To test the maximisation hypothesis, we construct a dummy x_{ijm}: downwardly mobile individuals score 1, upwardly mobile individuals score 0. The maximisation model can be expressed as:

$$Y_{ijk} = \left(p + mx_{ijm}\right) * \mu_{ii} + \left(1 - \left(p + mx_{ijm}\right)\right) * \mu_{jj} + \sum \beta_b x_{ijb} + \varepsilon_{ijk} \qquad \text{(Model B)}$$

For upwardly mobile individuals, the relative importance of the social position of origin is *p*. For downwardly mobile individuals, the relative importance of the social position of origin in this model is represented by '*p+m*'. Because our dependent variable is dichotomous, we apply a logistic regression model (Daenekindt and Roose 2013a). For example, Model A thus becomes as follows, where $\pi_{(x)} = E(Y \mid x)$ is the conditional mean of *Y*, given *x*:

$$\pi_{(x)} = \frac{e^{p*\mu_{ii}+(1-p)*\mu_{jj}+\sum \beta_b x_{ijb}+\varepsilon_{ijk}}}{1 + e^{p*\mu_{ii}+(1-p)*\mu_{jj}+\sum \beta_b x_{ijb}+\varepsilon_{ijk}}}$$

5.3.4. Results

5.3.4.1. Bivariate relations

As could be expected and as illustrated in Table 1 and Table 2, mammography screening practices are stratified according to social position. The proportion who engaged in regular mammography screening is substantially higher among white-collar skilled women (76% and 65%) than blue-collar skilled women (45% and 57%).

Table 1: Intergenerational mobility of women in Belgium who had ever been employed, percentage of women engaging in mammography screening in parentheses

	Destination: own ISCO-88 of main or last main job									
Origin	Blue-collar low skilled		Blue-collar high skilled		White-collar low skilled		White-collar high skilled		Total	
Blue-collar low skilled	138	(59%)	38	(42%)	114	(67%)	97	(75%)	387	(64%)
Blue-collar high skilled	60	(60%)	54	(46%)	85	(66%)	119	(82%)	318	(68%)
White-collar low skilled	8	(25%)	4	(50%)	50	(60%)	58	(76%)	120	(65%)
White-collar high skilled	8	(25%)	2	(50%)	44	(66%)	84	(69%)	138	(65%)
Total	214	(57%)	98	(45%)	293	(65%)	358	(76%)	963	(65%)

Table 2: Intergenerational mobility of Belgian women, using the social position of the partner, percentage of women engaging in mammography screening in parentheses

	Destination: partner's ISCO-88 of main or last main job									
Origin	Blue-collar low skilled		Blue-collar high skilled		White-collar low skilled		White-collar high skilled		Total	
Blue-collar low skilled	92	(57%)	84	(43%)	58	(55%)	159	(70%)	393	(59%)
Blue-collar high skilled	64	(55%)	106	(50%)	38	(58%)	151	(70%)	359	(60%)
White-collar low skilled	14	(57%)	24	(67%)	24	(63%)	61	(67%)	123	(65%)
White-collar high skilled	9	(56%)	15	(33%)	14	(64%)	102	(74%)	140	(67%)
Total	179	(56%)	229	(48%)	134	(58%)	473	(70%)	1.015	(61%)

Based on the partners' ISCO-88 code, the figures are somewhat less pronounced (respectively 70% and 58% compared with 56% and 48%). The diagonals of both Table 1 and Table 2 show that a similar social structuration of mammography screening can be found among the immobile individuals (the shaded boxes). Their screening behaviour is taken as the reference points in the DRM models.

5.3.4.2. Diagonal Reference Models

To test our hypotheses, we estimate the baseline and the maximisation model. For both models, we do this twice: once using the ISCO-88 of the respondent herself, and once for the operationalisation of social mobility where we use the ISCO-88 of the partner.

Table 3: Goodness of fit statistics for diagonal reference models predicting mammography screening.

	Model	Description	AIC	*d.f.*
Own ISCO	A	Baseline model	1072.7	958
	B	Maximisation model	1076.7	957
Partner's ISCO	A	Baseline model	1197.2	1009
	B	Maximisation model	1198.5	1008

Table 4: Parameters for diagonal reference model predicting mammography screening — Model A: baseline model.

	Own ISCO-88		**Partner's ISCO-88**	
		Odds & probabilities		Odds & probabilities
Weight parameters				
p: social position of origin	.00 (.078)		.116 (.190)	
(1-p): social position of destination	1.00 (.078)		.884 (.190)	
Estimated means for the diagonals, *i.e.* immobile individuals				
μ_{11}: Blue-collar low skilled	.612 (.154)	1.844 & .648	.483 (.196)	1.621 & .618
μ_{22}: Blue-collar high skilled	.377 (.267)	1.458 & .593	.404 (.162)	1.498 & .599
μ_{33}: White-collar low skilled	.870 (.130)	2.387 & .705	.715 (.251)	2.044 & .672
μ_{44}: White-collar high skilled	1.550 (.142)	4.711 & .825	1.285 (.223)	3.615 & .783
Covariate				
Age	-2.473 (.235)	.084 & .078	-2.095 (.190)	.123 & .109

Based on the Akaike Information Criterion (AIC), we see that the baseline model fits best in both instances (Table 3). We can therefore reject the maximisation hypothesis which stated that both upwardly and downwardly mobile individuals adapt to the screening behaviour of the highest status group. The effect of social mobility will thus be similar for both upwardly and downwardly mobile individuals.Now, we know that we should turn to the parameters of the baseline model to examine the origin and destination hypotheses (Table 4). Similar to the aforementioned descriptive statistics, the estimated means of the diagonals show the extent to which mammography screening is stratified. Immobile women with a higher social position have a higher probability of commencing regular mammography screening. For example, blue-collar low skilled women have much lower probability

(.648) of screening than white-collar high skilled women do (.825). The same pattern is found in the general female population in which homemakers are included. The probabilities of screening are respectively .618 and .783.

The weighting parameters – which are calculated based on the estimates of the immobile women- are the most interesting part of the analysis and will decide on the origin and destination hypothesis . In both cases – own ISCO-88 and partner's ISCO-88 – we see that screening is predominantly influenced by the social position of destination. By delineating a confidence interval around both *p*-parameters, it can be observed that both are significantly lower than .5, thus providing evidence for the destination hypothesis. For example, the 95% confidence interval around .116 becomes [-.256; .488]. P-parameters significantly smaller than .5 indicate that the outcome variable – mammography screening – is predominantly guided by the social position of destination.

The rejection of the maximisation hypothesis implies that the predominant influence of the social position of destination applies to both upwardly and downwardly mobile individuals. By means of the p-parameters and the values for the immobile women (shaded boxes), we can calculate the probabilities of mammography screening associated for all socially mobile women, according to the strategy outlined in figure 1 (see Table 5). Given the p-value of zero in the first sample, socially mobile women (off-diagonals) reflect the health behaviour of the immobile women (diagonals) exactly. In the second sample, the small p-value leads to a very close reflection of the screening probabilities of socially mobile women to that of immobile women.

The effect of the control variable is in line with previous research (Missinne et al. 2013b). Women who were not age eligible for the national screening programme have much lower probability in both samples of ever commencing regular screening (0.078; 0.109).

Table 5: Probabilities for mammography screening for mobile and immobile individuals (gray), controlled for age.

	Own ISCO-88				**Partner's ISCO-88**			
	Destination				**Destination**			
Origin	1	2	3	4	1	2	3	4
1	.648	.593	.705	.825	.618	.602	.665	.764
2	.648	.593	.705	.825	.616	.600	.663	.762
3	.648	.593	.705	.825	.625	.608	.672	.770
4	.648	.593	.705	.825	.638	.621	.684	.783

5.3.5. Discussion and conclusion

Williams (2003) argues that a longitudinal approach is necessary to understand the role of social structure on health and health lifestyles (Williams 2003). We take a different approach to pioneering longitudinal studies on health that have concentrated on unraveling the direct and indirect long-term effects of childhood social position (Hayward and Gorman 2004; O'Rand and Hamil-Luker 2005). Instead, we argue that the health behaviour of socially mobile individuals can elucidate how cultural health capital and health lifestyles develop over the course of an individual's life. Within the scope of the present research question, these individuals are interesting with regard to shedding light on the underlying mechanisms of the social structuration of mammography screening that remain unexplained (Wübker 2012).

The retrospective longitudinal data of the SHARE allows to study *regular* mammography screening, which is a more clear expression of a health lifestyle. This notion of regularity is an important aspect of preventive health care but is often ignored in empirical research on socio-economic inequalities (Spadea et al. 2010). Also for mammography screening, its take up is only reported for a period of one or two years, which does not allow the study of its long-term use at the recommended regular intervals (European Commission 2003). Using a statistical technique which enables to accurately separate the effects of social position of origin, social position of destination and social mobility itself, we conclude that regular mammography screening is stratified according to women's occupational position in adulthood. Both upwardly and downwardly socially mobile individuals seem to largely adapt to the behavioural patterns of the social position of destination. Our results thus suggest that there is little room for imprints from childhood socialization into health behaviours. These results are in line with recent contentions that the habitus is less rigid than Bourdieu depicted and more adaptable to experiences other than those in childhood (Daenekindt and Roose 2013a; Lahire 2011). Indeed, also for health behaviours specifically, it has been argued that adult socialization is important (Lewis and Butterfield 2007).

However, concluding that childhood socio-economic environment does not matter at all for health-relevant dispositions and for mammography screening in particular, would be jumping to conclusions. We could only use occupation to define a person's position in the social structure, as this is the only indicator for which we have information for both childhood and adulthood. Therefore, data limitations prevent us from considering other components of the social structure that might be crucial to the development of cultural health capital, such as educational level. This is regrettable given the strong association between educational level and preventive healthcare use, including

mammography screening (Puddu et al. 2009; Stirbu et al. 2007; Missinne et al. 2014b; Renard et al., 2014). Besides including the educational level of the parents, future research should apply a cross-national perspective, which would allow moving beyond 'controlling' for the supply effect of a population-based screening initiative as we have done here. National screening policies play an important role in mammography screening behaviour (Missinne & Bracke, 2014), but the question remains of how these affect the relative impact of childhood and adult socialisation. Studying changes over time could also help to elucidate how adult socialisation is intertwined with social policy. Finally but most importantly, other forms of health behaviour of socially mobile individuals should be considered in order to shed light on the impact of the underlying general health lifestyle relative to the unique component of mammography screening practices (cfr. Wickrama 1999; Cockerham 2007).

We have already mentioned that data limitations prevent us from considering other components of the social structure. Additional limitations should also be acknowledged. Information is only available for two time points and is lacking with regard to the age at which individuals moved up or down the social ladder. There might be different effects of social mobility according to the amount of time spent in the different social positions (Bartley and Plewis 2007), as proposed by cumulative exposure models (Willson et al. 2007). Finally, the example of mammography screening confines us to women. Studying other forms of health behaviour would allow us to examine whether the same processes apply to men, as masculinity beliefs have already been shown to be moderating factors for preventive healthcare use (Springer and Mouzon 2011).

In sum, studying the health behaviour of socially mobile women, we learn that mammography screening is predominantly shaped by their adulthood social position. Question is whether similar findings will result when using other indicators of social position. These and similar research questions about the social origins of health lifestyles, can benefit from an integration of the life course perspective and social mobility research.

5.4. Age differences in mammography screening reconsidered: life course trajectories in 13 European countries[10]

5.4.1. Introduction

Breast cancer is the most frequently diagnosed form of cancer among European women, accounting for 319 900 cases in 2006 (30.9% of all cancer diagnoses). It is the leading cause of death from cancer among women, with an estimated mortality rate of 16.7%. Breast cancer will remain an important public health issue, given that even more women are likely to be affected in the future due to the ageing population (Ferlay et al., 2007).

Research has predominantly focused on the role of national programs in reducing the well-documented socio-economic inequalities in mammography screening (e.g. Duport & Ancelle-Park, 2006; Jusot, Or, & Sirven, 2012; Puddu, Demarest, & Tafforeau, 2009). In contrast, the timely initiation of screening has received much less attention (Spadea, Bellini, Kunst, Stirbu, & Costa, 2010), despite its crucial importance for cancer prognosis (Bloom, 1994). After all, the stage at diagnosis (or tumour size) is strongly linked to survival (Elmore, Armstrong, Lehman, & Fletcher, 2005). Since women aged 50-69 are at the highest risk for breast cancer, both the World Health Organization (WHO) and the Council of the European Union (von Karsa et al., 2008) recommend that national programs target these women for regular check-ups.

In general, age is regarded as a control or a confounding variable, or is used as a proxy for "need" for care, because "need" factors are not always apparent (e.g. Jusot et al., 2012; Wübker, 2012). Occasionally, age differences are theoretically hypothesized based on the economic theory of human health capital (Grossman, 1972). Good health is treated as both a consumption commodity (i.e. sick days being a source of disutility) and an investment commodity (i.e. the total amount of time available for market and nonmarket activities). In the case of medical screening, early detection and intervention of the illness does not only improve the disease prognosis as previously mentioned, it can also reduce treatment costs (Picone, Sloan, & Taylor, 2004). As such, investments and the choice for mammography screening are made in order to optimize their utility (Wübker, 2012). During these cost-benefit considerations, women are likely to consider factors other than just financial costs such as the fear of false positives (Brodersen & Siersma, 2013), pain (Miller, Martin, & Herbison, 2002) and overtreatment (Gotzsche & Nielsen, 2009). With regard to age, different hypotheses can be formulated. On the one hand, the returns on investment from preventive screening are

[10] Missinne, S. & Bracke, P. (2014). European Journal of Public Health, doi: 10.1093/eurpub/cku077

hypothesized as being reduced for older women, given that overall health deteriorates with increased age and the years that can potentially be saved also declines (Cropper, 1977). On the other hand, greater returns on investment can be hypothesized for older women, since they face a higher risk of breast cancer (Ferlay et al., 2007).

Empirical studies generally report lower engagement in screening among older women (Wübker, 2012), but confusion remains high. One of the reasons for this is that studies still predominantly rely on cross-sectional designs, in which women are asked to report whether or not they engaged in screening during a prior period, usually two years. This design and question wording render it impossible to examine the extent to which age differences reflect 'true' age effects rather than age acting as a proxy for period effects, which are expected given the changing knowledge over time about breast cancer and screening programs. Moreover, this snapshot perspective does not allow study of the long-term use of mammography screening at the recommended regular intervals of two years (European Commission, 2003). The retrospective data from the Survey of Health, Ageing and Retirement (SHARE, 2008-2009, known as SHARELIFE), provides information about the age at which women commenced regular mammography screening. This allows to discern largely age effects from broader period effects and includes the notion of regularity.

In addition, the cross-national dimension of the population-based data enables us to frame potential period effects within the context of nationally implemented screening programs. These programs can reduce or eliminate financial and other costs and therefore change age-eligible women's' cost-benefit analysis. Despite general guidelines (European Commission, 2003), European countries differ greatly in screening strategies (left-hand columns, Table 1). Most have now organized national population-based programs, in which women are personally offered screening on a regular basis, mostly every two or three years from the age of 50 onwards. However, in Switzerland and Italy, programs of this nature have only been implemented in some regions (Bastos, Peleteiro, Gouveia, Coleman, & Lunet, 2010; Spadea et al., 2010; von Karsa et al., 2008), and other countries, such as Austria and Greece, still rely completely on opportunistic screening, where individuals request screening themselves or are recommended to do so by health advisors (Miles, Cockburn, Smith, & Wardle, 2004). Further, large differences exist in the organizational characteristics of programs, their implementation stage, the method of offering screening, and the participation rate (Bastos et al., 2010; Spadea et al., 2010; von Karsa et al., 2008).

By comparing different institutional contexts, we highlight the supply side, which influences preventive health care use along with frequently-cited individual factors such as socio-economic status (Andersen, 1995). To date, seven studies have addressed cross-national differences in mammography screening in Europe, using population-based data from the World Health Survey

(2002) (Palencia et al., 2010), the Eurobarometer (66.2, 2006) (Walsh, Silles, & O'Neill, 2011), the first two waves of the SHARE (2004/2006) (Jusot et al., 2012; Stirbu, Kunst, Mielck, & Mackenbach, 2007; Wübker, 2012), and SHARELIFE (Sirven & Or, 2011; Wübker, 2013). Except for the last studies, all have focused on socio-economic inequalities using cross-sectional data, rendering the study of age differences in regular screening problematic. Also using data from SHARELIFE, Sirven and Or (2011) very briefly mention age differences in the commencement of regular mammography screening for three large birth cohorts and four large European regions. This current paper aims to provide a more in-depth discussion, paying explicit attention to country differences and their associations with the characteristics of national screening policies.

5.4.2. Data and methods

5.4.2.1. Data

SHARE is a multidisciplinary and cross-national panel database on health, socio-economic status, and social and family networks. Details about the sampling procedure can be found elsewhere (Borsch-Supan et al., 2013), but in general it consists of probability samples, drawn from population registers or from multistage sampling. Respondents aged 50 or above together with their partner (and other household members in wave 1, aged at least 50) were interviewed face-to-face using structured computerized questionnaires. This study uses data from the third wave (SHARELIFE, 2008-2009), in which retrospective information was collected about preventive health care use during the life course, among other items. To improve recall of retrospective data, a life history calendar (LHC) was used. The respondent's life is represented graphically by a grid that is completed during the interview (Schröder, 2011). Special efforts were made to reduce attrition and attain high retention rates throughout the different waves. This has led to an overall retention rate of 71% (Borsch-Supan et al., 2013) (for details see (Blom & Schröder, 2011)). The household response rate in the first wave was on average 62% and country variation reflected patterns from other international surveys (Borsch-Supan et al., 2013). Individual response rates amount to 85% on average (for country-specific figures see website: http://www.share-project.org/data-access-documentation/sample.html). Data was collected in six Western European countries (Belgium, France, The Netherlands, Germany, Switzerland, and Austria), two Northern European countries (Denmark and Sweden), three Southern European countries (Spain, Greece, and Italy) and two countries in Eastern Europe (Poland and The Czech Republic). Because of the focus on preventive mammography screening, a small number of women who were diagnosed with breast cancer during their lives are excluded from the sample (N = 285; 2.0%). This information was retrieved from wave 1 (2004) and wave 2 (2006). There is only a

small amount of information missing for mammography screening practices (5.3%) and this is therefore deleted listwise.

5.4.2.2. Measurements

Regular mammography screening initiation

Our dependent variable, the commencement of regular mammography screening, is retrieved from the question 'In which year did you start having mammograms regularly?' given to all women who answered yes to the question 'Have you ever had mammograms regularly over the course of several years?'

Birth cohorts

We construct five birth cohorts from 1910 to after 1949 in ten-year intervals. These cohorts act as proxy for period effects. Depending on their birth cohort, women were the recommended age for screening and/or the eligible age for population-based screening programs in different time periods.

5.4.2.3. Statistical analysis

We apply event history analysis, to model the time until women commenced regular mammography screening. The end of the risk period is defined either by the time the event occurred (i.e. the age of commencing regular mammography screening) or by the time the individual is censored (i.e. those who did not experience the event during the observation period) (Singer & Willett, 2003). Here, women who did not engage in mammography screening are censored at the time of the retrospective data collection in SHARELIFE (2008 or 2009). Unlike standard statistical methods such as linear or logistic regression, event history analysis can adequately deal with censoring. The Nelson-Aalen method is used to calculate the cumulative hazard function, which assesses at each point in time the amount of accumulated risk between the beginning of the examined period and each observed event time. Exploring behavior graphically over time allows us to retrieve information about the shape of the underlying hazard function (Singer & Willett, 2003). The graphs will thus show at each age, the accumulated risk factor for women of a specific birth cohort to commence regular screening. A log rank test is performed to assess whether these cumulative hazards differ significantly by birth cohorts. Also, simple descriptive statistics are calculated to give an overview of the proportion of women in each country that ever commenced regular screening. All analyses are carried out in Stata 11.

5.4.3. Results

First, we focus on the age trajectories. Figure 1 shows that the cumulative hazard increases at a similar rate across age in all countries, except for a large increase at the age of 50, which reflects the generally recommended age for commencing screening. A notable exception is found for Sweden, where the likelihood of screening increases sharply among 40-year-old women. This is not that remarkable, as about 65% of Swedish counties start offering screening for women at the age of 40 (von Karsa et al., 2008).

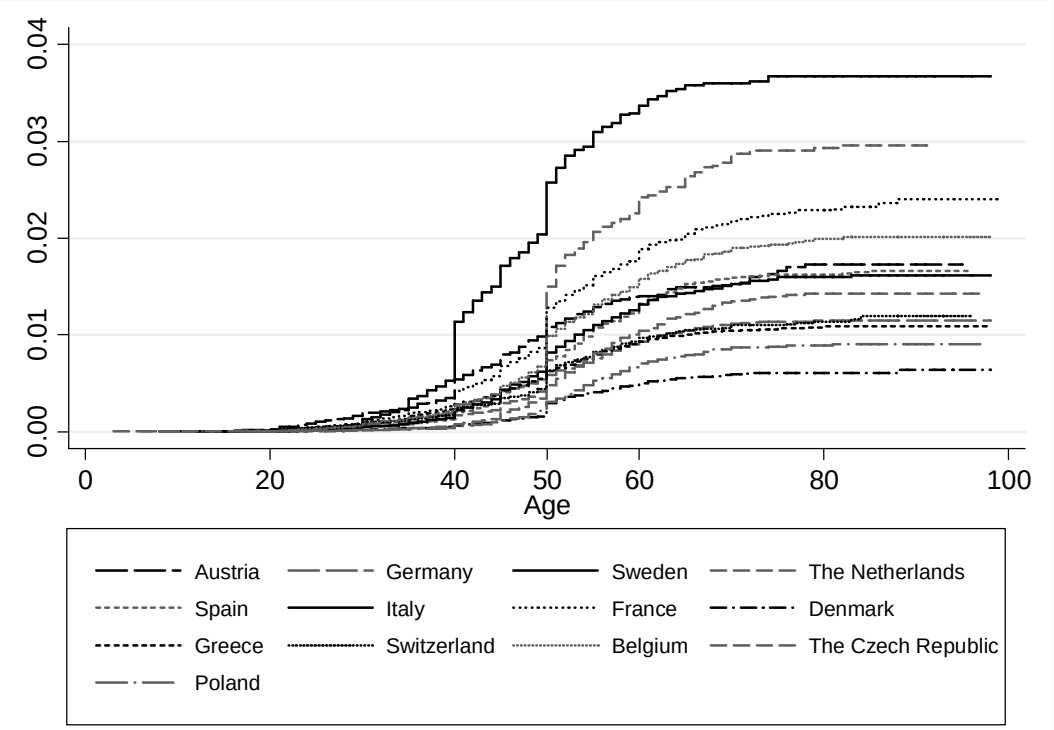
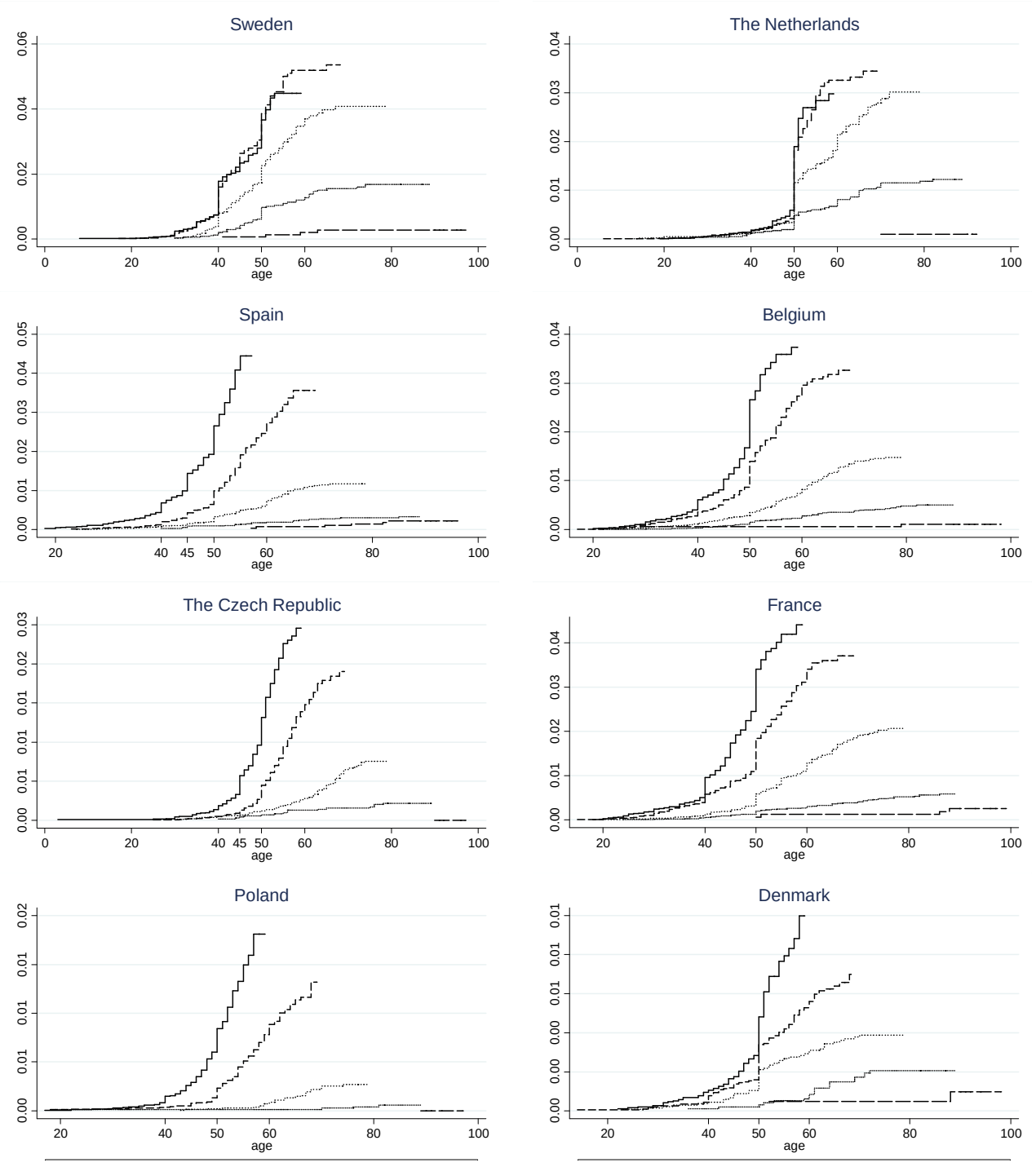


Figure 1: Cumulative hazard function for mammography screening initiation per country (Nelson-Aalen estimates)

To find out whether these age trajectories differ according to birth cohorts, we turn to the country-specific figures (Figure 2a-m). For all countries, women in younger birth cohorts have a higher cumulative hazard and are thus more likely to commence regular screening at some age (log-rank, $p<0.001$ for all countries). For the three youngest cohorts in particular, the hazard for screening increases at the same rate and a notable increase is observed at the age of 50, except for Austria, Greece, Germany, and Poland. This suggest that there are no 'true' age- effects, so that age is not a crucial factor that is taken into consideration when deciding about screening. Rather this points to broader period-effects, especially because features of national screening programs can again be

linked to these exceptions and also to a great extent to the large country-variation in the overall take-up of screening.



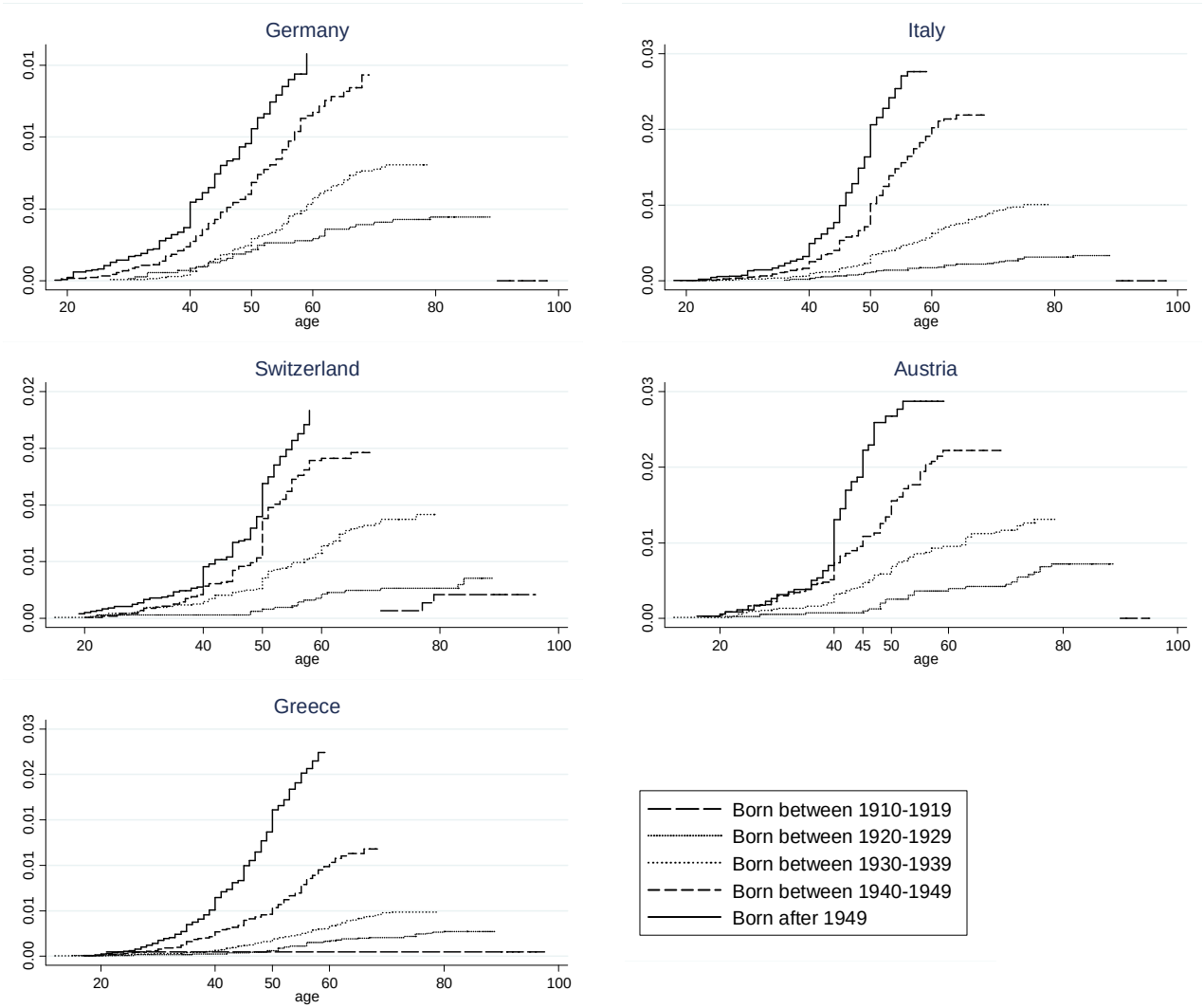


Figure 2 (a-m): Country-specific cumulative hazard function for mammography screening initiation per 10-year birth cohort (Nelson-Aalen estimates)

In Austria and Greece, an organized program is absent, while the implementation in Poland (2007) was too close to the data collection in 2008-2009 to be reflected in the figures. Similarly, in Germany, the roll-out of the national screening program started in 2005, but it was completed only in 2009 (Biesheuvel, Weigel, & Heindel, 2011). In Denmark, the national program only commenced in December 2007, but here an increase at the age of 50 is still notable. This can be explained by regional programs, which have covered 20% of Danish women aged between 50 and 69 since 1991 (Olsen et al., 2003). In Austria, a spontaneous screening program for women aged 35 years or above started in Tyrol in 1993. Here, screening is free of charge for women from the age of 40 (Oberaigner et al., 2010). The sharp increase in screening at the age of 40 for women born after 1949 in Austria is probably a reflection of this program or the example it has set. An increase at 45 years of age is found for Spanish and Czech women born after 1949. Some Spanish regions start offering screening

to women aged 45 (Luengo-Matos, Polo-Santos, & Saz-Parkinson, 2006) and the national program in the Czech Republic includes women from the age of 45 onwards.

Table 1: Mammography screening in 13 European countries

Characteristics of breast cancer screening policies				Number and % of regular screeners, based on SHARELIFE data	
	National/ regional program	Year of implementation of national program	Target age group	N	% regular screeners
Sweden	National	1986	40/50-69/74	748	89.8%
The Netherlands	National	1989	50-75	1066	84.9%
Spain	National	1990	45/50-64/69	1020	66.5%
Belgium	National	2001	50-69	1425	71.6%
The Czech Republic	National	2002	45-69	997	56.7%
France	National	2004	50-74	1216	77.4%
Germany	National	2005	50-69	920	48.2%
Poland	National	2007	50-69	944	40.1%
Denmark	National	2008	50-69	1068	29.3%
Italy	Regional	n.a.	45/50-69	1292	62.4%
Switzerland	Regional	n.a.	50-70	665	48.9%
Austria	No	n.a.	n.a.	425	64.7%
Greece	No	n.a.	n.a.	1538	47.5%

Next, countries differ largely in how high the cumulative hazards are across age (figure 1). This indicates that at all ages, the take-up of regular mammography screening differs strongly between European countries, which is also reflected in the general figures in table 1. The lowest proportion is found in Denmark (29.3%), while Swedish women are the most likely to engage in regular screening (89.8%). It is remarkable that these extremes are both in the Northern European region, which is generally considered as universally the best performing with regard to health, due to relatively generous and universal welfare provision (Huijts & Eikemo, 2009). However, this is not so surprising given the long-term implementation of a national screening program in Sweden, in contrast to Denmark (see table 1)).

After Sweden, The Netherlands has the longest running program and the second-highest proportion of regular screeners (84.9%). On the other hand, the least regular screeners are found in Denmark (29.3%), Poland (40.1%), Germany (48.2%), Greece (47.5%) and Switzerland (48.9%). A national program was implemented too closely to the SHARELIFE data collection for reflection in the figures of Denmark and Poland, while it is absent in the two latter countries. However, the absence of a national program does not necessarily entail that many women forgo mammography screenings as for example in Austria a large volume of opportunistic screening is notable (64.7%). In Italy, regional programs have taken off since 1985 (Bastos et al., 2010), so that in 2007 at least one pilot population-based program in all Italian regions has been realized (von Karsa et al., 2008). Accordingly, the share of women with regular screenings in Italy (62.4%) is similar to its neighboring

country Spain, where a national program was launched in 1990 (66.5%). Although Germany and France both had their national program only recently implemented in 2004, the number of regular screeners differs considerably (48.2% and 77.4% respectively). This could be associated with the long-standing practice since 1971 to offer yearly gynecological 'cancer early detection exams' to German women from the age of 30 onwards. Breasts are inspected and palpated by medical doctors who also give instructions for breast self-examination (Klug, Hetzer, & Blettner, 2005). Czech women rank sixth, with 56.7% undergoing regular screenings.

5.4.4. Discussion

The aim of this paper is to move the debate on age differences in mammography screening forward using data from SHARELIFE. This dataset contains unique information for 13 European countries, which is both longitudinal and population based. Several meaningful observations strongly suggest that age differences as reported in cross-sectional surveys are no 'true' effects of age but reflect period effects. Neither hypothesis with regard to age as a component of cost-benefit considerations of mammography screening seem to hold.

Overall, older birth cohorts engage less in screening in all the countries. However, when they do, they do not initiate screening at an considerably older age than younger cohorts. It is rather clear that the fewer uptake of mammography screening by older women over the course of their lives is inextricably bound up with the evolution in knowledge about breast cancer (see e.g. Fisher, Redmond, & Fisher, 2008) and the discussion and implementation of screening policies. The crucial role of screening policies is also reflected in the large country variation in screening as well in the observation that exceptions can be linked to features of national screening programs.

Even within the same European region, large country differences are notable in the take up of mammography screening. The World Health Survey (WHS) 2002 revealed similar results (Palencia et al., 2010), although the ranking of prevalence rates shows some differences. For five countries (Belgium, Denmark, Sweden, Greece, and the Czech Republic) proportions are lower in the WHS than in SHARELIFE, while for the other five countries with available data (France, Germany, Austria, Spain, and Italy), higher proportions are noted. For France, this might be related to the introduction of a national program (2004) between the data collections of the two surveys. However, in other countries such as Spain this might not be the case, given the early implementation of the program there in 1990. Instead, as suggested by Braillon (2011), cross-sectional data might overestimate the quality of the programs. The one other cross-national study that did not use data from SHARE

(Walsh et al., 2011), only scrutinized determinants of screening for a dichotomous grouping of countries based on opportunistic versus nationally organized programs. Our results suggest that important country-specific characteristics are thereby overlooked.

The SHARELIFE also questioned the reasons for not taking up mammography. These reasons differ strongly between countries (for numbers see Wübker, 2011; Wübker, 2013) and can again been linked to screening policies. Respondents stated that information was lacking and that screening was not affordable or available in countries without a national program (Austria and Greece) or only a recently implemented program (Germany and Poland). In countries with only regional coverage (Italy and Switzerland), respondents stated that they did not engage in screening because of a lack of information and financial means. In the Netherlands and Sweden, the two countries with the highest screening rates, none of the aforementioned perceived barriers were indicated. Instead, only the belief that screening is not necessary was found to be significantly related to not participating (Wübker, 2011).

The fact that age trajectories in screening appear relatively universal for all countries, despite the varying perceived 'costs' of screening, corroborates the contention that age differences are largely attributable to the period effects of national policies. These period effects are mirrored in cross-sectional studies that have reported lower screening rates above the age of 60 (Duport & Ancelle-Park, 2006) or 65 (Jusot et al., 2012; Wübker, 2012). Similarly, longitudinal studies such as that of Puddu and colleagues (2009), report important period effects in terms of an increase in screening over a three-year period among women aged 60 to 69.

Before turning to the conclusion, two limitations should be acknowledged. First, retrospective data may raise some concerns regarding recall bias. However, SHARE took this concern seriously. In addition to the measures to minimize bias at the time of data collection, quality checks were conducted on the respective data. Although more research is needed, strong consistency has already been found for personal events (Garrouste, 2011). The second limitation concerns the question wordings regarding mammography screening. It is impossible to discern fully whether women started mammography screening for preventive purposes only or for other reasons. Data limitations hinder us from discerning the motivations of women to commence screening. A family history of breast cancer is related to perceived risk of the disease, which in turn impacts on the commencement of mammography screening (Calvocoressi et al., 2004). However, the information on health history enables us to exclude women diagnosed with breast cancer.

This study illustrates the potential of applying a longitudinal perspective in cross-national comparative research on health. For both policy makers and researchers, timeliness deserves further

attention, even more so for preventive services that require already starting routine check-ups in childhood, such as dental care (Riley & Gilbert, 2005). In sum, cross-sectional age differences in mammography screening generally reflect the period effects of national screening policies. This leaves little room for economic theories about human health capital that ignore the institutional context of preventive health care provision.

5.5. A cross-national comparative study on the role of individual life course factors on mammography screening[11]

5.5.1. Introduction

Breast cancer is the most frequently diagnosed form of cancer among European women, totaling some 332,800 cases in 2008 and accounting for 30% of all cancer diagnoses in the EU-27 countries (Ferlay, Parkin, & Steliarova-Foucher, 2010). It is the leading cause of female death from cancer, with an estimated mortality rate of 16.7% (Jemal, 2011). Breast cancer will remain an important public health issue in the future, with more women likely to be affected due to the ageing population (Ferlay et al., 2007). As risk factors for breast cancer are either difficult to control (such as those linked with reproduction) or not well understood (Bonfill, Marzo, Pladevall, Marti, & Emparanza, 2001; Palencia et al., 2010), secondary prevention, through mammography screening, is relied on to detect breast cancer at an early stage in order to improve disease prognosis (Puddu, Demarest, & Tafforeau, 2009).

Most European countries have followed the recommendations by the European Union (OJ C 68E, 2004) and the World Health Organization (2013), and have introduced national screening programs (Bastos, Peleteiro, Gouveia, Coleman, & Lunet, 2010; von Karsa et al., 2008). Participation has increased, especially in countries with national population-based and longstanding programs (Bonfill et al., 2001; Spadea, Bellini, Kunst, Stirbu, & Costa, 2010), but it remains strongly inversely associated with socioeconomic position (SEP) in many European countries (Carrieri & Wuebker, 2013; Duport & Ancelle-Park, 2006; Jusot, Or, & Sirven, 2012; Lagerlund et al., 2002; Lorant, Boland, Humblet, & Deliege, 2002; Palencia et al., 2010; Puddu et al., 2009; Wübker, 2013; Zackrisson, Lindstrom, Moghaddassi, Andersson, & Janzon, 2007).

In this paper, we do not enter into the commonly-voiced discussion about the *measurement* of preventive health care inequalities. Instead, we try to gain a better *understanding* of how socioeconomic inequalities in preventive health care use develop over the life course. Socialization into healthy behaviors starts when children observe and learn from their parents' relevant attitudes, beliefs, and values (Cardol et al., 2005; Uhlenberg & Mueller, 2003). Socialization continues throughout adult life when, for example, partners try to influence each other's health behavior (Lewis et al., 2006). Health sociologists have argued that from childhood, individuals accumulate 'cultural health capital', a form of cultural capital in Bourdieu's view (Bourdieu, 1986), which is used

[11] Missinne, S. & Bracke P. Revise and Resubmit to *Health Policy*

to lead healthy lives (Abel & Frohlich, 2012; Shim, 2010). Two studies provide initial empirical support for this theoretical contention. In Belgium, preventive health care habits in childhood, as a proxy for cultural health capital, seem to be a predictor for mammography screening many years later in life, even after controlling for conventional measurements of childhood and adulthood socioeconomic position (Missinne, Neels, & Bracke, 2014). This childhood advantage or disadvantage further accumulates at the marriage level, when the partners' preventive health habits in childhood seem to impact – independently of the aforementioned factors – on women's probability of engaging in mammography screening (Missinne, Colman, & Bracke, 2013). Therefore, despite the implementation of a national screening program in Belgium since 2001 offering free mammography screening to women aged between 50 and 69, childhood disadvantages seem to have lingering effects on adulthood preventive health behavior.

Life course researchers recommend expanding the scope from national studies, the results of which can be challenged as being too context specific, into international comparative studies (Billari, 2009; Blane, Netuveli, & Stone, 2007). A cross-national comparative approach can yield further insights into how mammography screening practices are embedded within the institutional context of a country's health care system and mammography screening policies, particularly in light of the large variation in the organizational characteristics of screening programs in Europe (Bastos et al., 2010; Spadea et al., 2010; von Karsa et al., 2008). Although a cross-national comparative approach is well established in health (e.g. Mackenbach, 2012) and health care research (e.g. Devaux, 2013), it is still relatively uncommon in preventive health care research (Jusot et al., 2012). To date, only seven studies have addressed cross-national differences concerning socioeconomic inequalities in mammography screening practices in Europe. All seven focused on SEP in adulthood and can largely be divided into three groups according to the empirical strategy used. First, there are three studies that included separate analyses per European country (Carrieri & Wuebker, 2013; Palencia et al., 2010; Stirbu, Kunst, Mielck, & Mackenbach, 2007). They show that adulthood socioeconomic inequalities persist, but are generally lower in countries with national screening programs than in countries with opportunistic screening. Second, Walsh et al. (2011) reached the same conclusion in their study, but acknowledged that dividing the EU-15 countries into two samples (opportunistic versus population-based programs) might be an overly crude distinction. Last, in three studies the total European sample was investigated using multilevel analysis to find out whether general macro-level indicators – such as gross domestic product (GDP), public health expenditure, or the number of physicians – can explain cross-national variation in screening practices. They show that none of these factors seem to do so (Jusot et al., 2012; Sirven & Or, 2011; Wübker, 2012). Of these, Wübker (2013) also looked at macro-level indicators more directly linked to mammography screening, such as the number of radiologists and mammography units, but these also could not explain cross-

national variation. Instead, it is the characteristics of mammography screening policies that contribute to the large variation between countries regarding screening participation, both in terms of organizational characteristics (e.g. the type of screening program and age range covered) and in the reasons for not taking up mammography by women for whom screening is recommended (50-69 years) (WHO, 2013). European women in different countries seem to differ greatly in their view on the necessity of screening, with higher benefits perceived in countries with a comprehensive program.

One important limitation of these existing cross-national comparative studies is their cross-sectional design, which does not allow investigation of the origins of mammography screening inequalities. It would be particularly interesting to investigate in what other European countries apart from Belgium, childhood experiences can be related to health behavior in later life. A further limitation is that cross-sectional studies cannot take into account substantial variation in the temporal order of the implementation of mammography screening programs in different European countries. For example in Sweden and the Netherlands, national screening programs were already established in the 1980s, while programs in other European countries, such as Poland (2007) and Denmark (2008) have just taken off. The retrospective data of the Survey of Health and Ageing (SHARELIFE, 2008-2009) now provides life course data that is fully comparable across 13 European countries. This enables us to follow the recent and promising trend to move from cross-sectional toward longitudinal designs in cross-national research (Welkenhuysen-Gybels & Billiet, 2002). By performing separate longitudinal analyses for each of the 13 countries, we aim to gain detailed insights into the dynamics of each country.

5.5.2. Data and methods

5.5.2.1. Data

We use data from the Survey on Health, Ageing and Retirement (SHARE), which is a multi-disciplinary and cross-national panel survey on health, SES, and social and family networks. Details about the sampling procedure can be found elsewhere (Borsch-Supan et al., 2013), but generally it consists of probability samples, drawn from population registers or multistage sampling. The third wave, termed SHARELIFE (2008-2009), was designed to complement existing data by adding retrospective life histories. Among other items, retrospective information was collected about preventive healthcare use during the life course. All our data is taken from the SHARELIFE, except for information about wealth, education, and diagnosed breast cancer, which are taken from the previous waves.

To improve recall when collecting retrospective data, a Life History Calendar (LHC) was used in the survey (Schröder, 2011). This method relies on the hierarchical structure of autobiographical memory and uses salient events, such as marriage or the birth of a child, as anchors for recalling other events (Belli, 1998). In addition, a list of prominent external events for every year was incorporated in the LHC (in Belgium, for example, the 1958 Brussels World's Fair and the 1999 dioxin affair), which can help respondents to determine the date of personal events. Particular efforts were made to reduce attrition and attain high retention rates (Blom & Schröder, 2011). Except for the wealth measurement, for which we use a multiple imputation procedure, there are low rates of missing data for both independent and dependent variables (accumulated percentage = 7.9) and these observations are deleted list-wise. Because of the focus on preventive mammography screening, women diagnosed with breast cancer during their lives are excluded from the sample (N = 270; 2%). The final sample of 12,958 European women provides longitudinal data on the commencement of breast cancer screening between 1975 and 2009. The reason for starting from 1975 is that before then, no notable large-scale screening initiatives had been taken in the 13 European countries. Women enter the risk set for screening initiation at the age of 35 and are censored at the age of 69.

5.5.2.2. Measurements

Mammography screening initiation

Our dependent variable, the timing of regular mammography screening, is retrieved from the question "In which year did you start having mammograms regularly?" This was given to all women who had answered yes to the question "Have you ever had mammograms regularly over the course of several years?" Women who did not undergo screening were censored at the time of data collection during SHARELIFE. It is important to note that the dependent variable encompasses both the regularity and the timeliness of screening. Both aspects are of crucial importance to its effectiveness (Bloom, 1994; WHO, 2013), but are generally ignored.

Childhood characteristics

The analysis incorporates three indicators for childhood characteristics.

Economic capital during childhood is assessed by the *occupation of the main household breadwinner* when the subject was 10 years old, employing the International Standard Classification of Occupations (ISCO-88). In line with Dumont (2006), six categories are created: white-collar high skilled (reference category); white-collar low skilled; blue-collar high skilled; blue-collar low skilled; armed forces; and missing information or no main breadwinner.

The *number of books in the parental household*, again refers to the respondent at the age of 10 and is used to capture cultural capital in childhood. In social science literature, this is considered a powerful

proxy for the educational, social, and economic background in early life. Respondents with none or very few books (0) are contrasted with those who had at least enough books to fill one shelf (1).

Childhood preventive health care use is employed as an indicator for cultural health capital accumulation in early life. It is assessed by including information on regular dental check-ups during childhood (0 = no; 1 = yes). About 50% of all respondents indicated having had regular check-ups as a child, but figures vary widely, from 12 % in Spain to 87 % in Sweden (see Table 1).

Adulthood characteristics

The *level of education* is assessed using four categories based on the modified ISCED-97 (International Standard Classification of Education). The first category (reference category) includes respondents who did not complete primary education or completed primary education at most. The other categories are lower secondary, upper secondary, and tertiary education.

Wealth refers to the respondents' position at the time of interview in the first or second wave of the SHARE. This is used as a proxy for lifelong wealth, as no time-varying information on wealth or income is available. The SHARE team created the wealth measurement by combining detailed information from the first or second wave, including the value of the main residence (if owned and minus any mortgage), the value of any other real estate, and any share of businesses and cars. Missing values for this measurement were imputed to recreate a distribution of the missing value (for details see 41).

Period and cohort effects

We follow common strategy by including cohort effects using the *year of birth* of the women. Next, we carefully considered the operationalization of *period effects*. Given that countries or regions vary widely in terms of the time when screening programs took off – if at all – we define the period effects so that they reflect changes in the country's policy regarding mammography screening (see Table 2 for details). For example, the first initiatives in Belgium were taken in 1975 by the national government to develop a program concerning breast cancer. The first round of screening was administered from 1989 to 1992 in the provinces of Antwerp and Limburg. Further, in 2001 the Belgian government started a population-based screening program, targeting all women aged between 50 and 69, and offering free mammography screening every two years (Van Oyen & Verellen, 1994; VAZG, 2010). For five countries (the Czech Republic, France, Poland, Denmark, and Germany), we needed to adapt the start of the third defined period, because multicollinearity with

the next variable led to convergence problems. Their start was set to 2003, which reflects the year in which the EU recommended the establishment of screening programs (von Karsa et al., 2008).

A time-varying dichotomy is included, to indicate whether a woman was *eligible for a screening programme* in the countries that had administered such a program before the collection of the SHARELIFE data. Since the SHARE data includes the NUTS level (Nomenclature of Territorial Units for Statistics) of the place of residence, we can also account for the regional variation in screening policy characteristics for Sweden and Spain. Women are given a score of 1 for the time intervals when they were at the eligible age for screening (from 40, 45, or 50 up to 64, 65, 67, or 69 depending on the region or country) during the period in which a screening programme was administered in their region of residence. This is not possible for Switzerland (Bastos et al., 2010) and Italy (Foca et al., 2013), for which the region identifier was not provided at the level of screening initiatives (NUTS 3 level).

5.5.2.3. Analytical strategy

We perform event-history analyses in two steps for the 13 countries separately to gain detailed insights into the life course predictors of mammography screening in each country. First, we explore the bivariate effects of each of the indicators graphically by means of Kaplan-Meier estimates. This procedure uses the actual observed event times to describe the distribution of event occurrence. A log-rank test assesses whether these cumulative hazards differ significantly. Second, discrete time hazard models are employed, because the timing for mammography screening is measured in years (Allison, 1984; Singer & Willett, 2003). These models use a complementary log-log link function. As a result, the exponentiated parameter estimates can be interpreted as hazard ratios, comparing the risk of commencing mammography screening in the group examined, with that of the reference category. The baseline hazard was specified in each country by a quadratic effect of time elapsed since the age of 35 and a categorical specification to account for increased hazards at several ages. The latter was determined for each country after visual inspection and likelihood ratio tests for model fit, which included comparison with the general specification. In this step, we also took into account the issue of unobserved heterogeneity, which might affect the commencement of mammography screening. The fully flexible specification of the baseline hazard already reduces the bias in the non-frailty model (S.P. Jenkins, 1997). However, as a further step, frailty or random-effects models are often used, which introduce a random parameter to reduce the effects of unobserved heterogeneity (Zorn, 2000). In this case, person-years of observation are nested in individuals, allowing us to specify a random term at the individual level. Most researchers use a parametric distribution for the random term, of which Gamma and Normal (Gaussian) distribution

are the most popular (Jenkins, 2005). Because there is little theoretical guidance concerning the choice between the two, we started from a normally distributed random term and checked whether a Gamma distribution led to deviating results. As this was not the case, we only report the results from the models with a normally distributed random term. We also confine the reporting to the full models, in which childhood and adulthood conditions are jointly estimated. However, we also calculated models in which these were considered separately. These are informative for the mechanisms at play and will be referred to when describing the results (full details are available on request). All the analyses were carried out in Stata 11. For the sensitivity analyses concerning the gamma distributed error term, the supplementary pgmhaz8 package (S.P. Jenkins, 1997) was used.

5.5.3. Results

The descriptive profiles of women regarding childhood and adult characteristics are presented in Table 1 for each country. The number of women who started regular mammography screening varies widely between countries, from 30% in Denmark to 90% in Sweden. To scrutinize the within-country variation, we first calculated the bivariate associations with each of the predictors in every country (results not reported). A log-rank test indicated that mammography screening is significantly associated with childhood socioeconomic conditions in most countries. This includes the ISCO-88 code of the main breadwinner's job (the was not the case in Sweden, the Netherlands, Spain, Denmark, Italy, Switzerland, and Austria) and the presence of books (not so in Denmark), as well as other conventionally considered adulthood socioeconomic factors such as education and wealth (not so in Sweden, Denmark, Switzerland, and Austria). In the same way as for education, preventive health behavior earlier in life seem to be a significant predictor of mammography screening in later life in each of the 13 countries

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Table 1. Descriptive characteristics of European women in the SHARELIFE samples (2008-2009)

	Sweden	The Netherlands	Spain	Belgium	The Czech Republic	France	Poland	Denmark	Germany	Italy	Switzerland	Austria	Greece
	N = 735	**N = 1025**	**N = 1003**	**N = 1392**	**N = 967**	**N = 1170**	**N = 925**	**N = 1042**	**N = 896**	**N = 1282**	**N = 647**	**N = 416**	**N = 1458**
Regular mammography screening?													
Yes	90%	85%	67%	72%	58%	77%	41%	30%	48%	62%	49%	64%	48%
No	10%	15%	33%	28%	42%	23%	59%	70%	52%	38%	51%	36%	52%
Childhood characteristics													
ISCO of male breadwinner													
White-collar high skilled	19%	20%	7%	14%	13%	16%	5%	17%	12%	5%	18%	12%	5%
White-collar low skilled	13%	14%	10%	12%	15%	11%	5%	13%	22%	11%	20%	15%	14%
Blue-collar high skilled	46%	42%	43%	33%	49%	45%	74%	45%	46%	46%	48%	47%	62%
Blue-collar low skilled	17%	18%	36%	35%	18%	22%	11%	23%	14%	33%	11%	18%	14%
Armed forces	2%	2%	1%	2%	2%	3%	1%	0%	1%	2%	1%	1%	1%
Missing or no breadwinner	4%	5%	2%	4%	4%	3%	3%	2%	4%	3%	2%	7%	3%
Presence of books													
None or very few	19%	28%	63%	44%	15%	46%	61%	21%	31%	74%	30%	45%	61%
At least one shelf	81%	72%	37%	56%	85%	54%	39%	79%	69%	26%	70%	55%	39%
Cultural health capital													
Regular childhood dental check-ups													
Yes	87%	76%	12%	42%	85%	46%	38%	76%	58%	18%	72%	59%	21%
No	13%	24%	88%	58%	15%	54%	62%	24%	42%	82%	28%	41%	79%

(Table 1 continued)

Adulthood SEP measurements													
Education													
Primary or less	28%	13%	68%	26%	22%	41%	49%	16%	1%	58%	14%	25%	52%
Lower secondary	17%	45%	18%	24%	33%	10%	0%	10%	20%	18%	23%	16%	9%
Higher secondary	18%	23%	7%	25%	35%	28%	40%	33%	52%	17%	39%	41%	24%
Tertiary	36%	20%	6%	24%	10%	20%	10%	40%	26%	8%	23%	17%	15%
Wealth													
Below 50% of median	32%	37%	20%	24%	30%	29%	35%	31%	41%	29%	42%	39%	24%
50-80% of median	12%	7%	20%	15%	11%	13%	11%	11%	5%	16%	4%	7%	16%
80-120% of median	11%	15%	20%	21%	15%	17%	9%	13%	9%	15%	11%	9%	17%
120% or more of median	45%	42%	40%	39%	45%	41%	44%	44%	45%	39%	43%	45%	43%
Age at time of interview (mean)	67.5	65.3	68.1	66.8	65.5	66.8	64.3	65.1	65.9	66.3	65.8	68.1	64.6

Table 2. Evolution of mammography screening programs in Europe from 1975 onward

	Start of second period	Notable turning point(s)	Start of third period	Notable turning point(s)	References
Sweden	1986	Start of implementation of national program	1998	National coverage achieved	(Schopper & de Wolf, 2009)
The Netherlands	1989	Start of implementation of national program	1998	National coverage achieved	(Schopper & de Wolf, 2009)
Spain	1990	Start of implementation of national program	2001	National coverage achieved	(Schopper & de Wolf, 2009)
Belgium	1989	First regional pilot programs	2001	Start of implementation of national program	(Van Oyen & Verellen, 1994; VAZG, 2010)
The Czech Republic	1993	Establishment of the Czech Republic	2002*	Start of implementation of national program	(Bastos et al., 2010; Breast Cancer Screening Programme in the Czech Republic, 2014)
France	1989	First regional pilot programs	2004*	Start of implementation of national program	(Bastos et al., 2010; Wait & Allemand, 1996)
Germany	1990	Mammography defined as a health policy priority	2005*	Start of implementation of national program	(Bastos et al., 2010; Biesheuvel, Weigel, & Heindel, 2011; Warmerdam et al., 1997)
Poland	1991	First regional pilot programs	2007*	Start of implementation of national program	(Bastos et al., 2010; Wypych & Zejda, 2006)
Denmark	1990	First regional pilot programs	2008*	Start of implementation of national program	(Schopper & de Wolf, 2009; Shapiro et al., 1998)
Italy	1990	First regional pilot programs	1996*	Nationally agreed protocol for mammography screening	(Barchielli et al., 2005; Foca et al., 2013; Schopper & de Wolf, 2009)
Switzerland	1993	First regional pilot programs	1999	Extension of regional initiatives	(Bastos et al., 2010; Zwahlen, Bopp, & Probst-Hensch, 2004)
Austria	1993	First regional pilot programs	2003	Implementation of European Union quality requirements	(Bastos et al., 2010; Frede, 2005)
Greece	1988	First regional pilot programs	N.A.	N.A.	(Garas et al., 1994)

*had to be set to 2003 due to convergence problems
N.A. = not applicable

Do these associations persist in the multivariate analyses, in which cohort and period effects are also taken into account? Crucial effects from education emerge in six countries: Belgium, France, Poland, Italy, Switzerland, and Greece. Except for Switzerland (where an inverse effect of education is found), higher-educated women in these countries have a greater hazard than the lower educated of ever commencing regular mammography screening. For example, in France, the hazard of screening is 1.54 times greater for tertiary-educated women than for the least educated (Table 3). In two countries (the Netherlands and the Czech Republic), educational differences emerge when only the adulthood factors are considered (step-wise analysis not shown). Unequal use of screening related to financial means is apparent in seven of the countries (Spain, Belgium, the Czech Republic, France, Poland, Germany, and Italy), where women whose wealth is below 50% of the country's median have a significantly lower hazard of screening compared with more wealthy women. However, in

contrast to education, hazards do not always increase monotonically (for Belgium, Poland, and Germany).

The association with childhood preventive health behaviour is of particular interest in this study. In as many as nine of the countries, women who regularly had dental check-ups as a child are far more likely to ever start screening later in life. The increased probability for these women ranges from 1.28 times higher in Belgium and France to 2.18 times higher in the Czech Republic. These results suggest that the accumulation of cultural health capital starts in childhood, when parents transmit values and accompany their children in preventive health care engagements. In a substantial number of European countries, this childhood advantage seems to remain throughout the life course independent of people's adult socioeconomic position. In three of the four countries lacking an effect of childhood preventive health behaviour, educational inequalities are also absent (Sweden, the Netherlands, and Germany), while in Austria the effect becomes insignificant after adulthood SEP is introduced (step-wise analysis not shown). One concern that can be raised is whether country differences in dental care supply might contribute to these effects. The SHARELIFE also examined the reasons for foregoing regular dental care over the life course and the resulting information suggests this fear is not warranted. On average, only 5% of the women pointed to the unavailability of dental care services. There is no large variation between most of the countries, although the number is notably higher in Greece (12.6%) and Poland (13.5%).

What is the effect of national screening programs and of the time when they are implemented? The observation that there are no socioeconomic inequalities in Sweden and the Netherlands, which have the most longstanding and far-reaching screening programs, suggests that national programs can counter childhood as well as adulthood disadvantages. Their impact is also reflected in the observation that being an appropriate age to qualify for the national screening programs in Sweden and the Netherlands yields strong, significant effects. Such a strong effect is also observable for Germany. However, we should remain cautious when making statements about the precise impact of screening policies. Unfortunately, we have no information about the motivations for starting screening. In addition, this data limitation also makes it impossible to disentangle fully the effects of the screening programme from the effects of periodical change. However, this is not to say that no clear indications of a large evolution over time are found. On the contrary, in 10 of the 13 countries, the hazard of ever starting mammography screening regularly is greater (cohort effects) for every year by which a woman is born later. Six countries show (very) strong period effects, with higher hazards of screening in more recent periods except for Denmark where the inverse is true. Taken together, these period and cohort effects stress the importance of taking a longitudinal approach when studying mammography screening practices.

Table 3. Exponentiated coefficients (hazard ratios) of random-effects complementary log-log model of mammography screening initiation in 13 European countries (imputed data, SHARE). Specification of the baseline hazard is not reported

	Sweden	**The Netherlands**	**Spain**	**Belgium**	**The Czech Republic**	**France**	**Poland**	**Denmark**	**Germany**	**Italy**	**Switzerland**	**Austria**	**Greece**
Childhood characteristics													
ISCO of male breadwinner													
(ref. cat: white-collar high skilled)													
White-collar low skilled	0.891	0.954	1.045	1.321**	1.363	1.039	1.107	0.589**	1.225	0.901	0.760	0.594	0.640**
Blue-collar high skilled	1.172	0.917	1.064	1.199	1.165	1.107	1.032	0.817	1.016	1.081	0.655**	0.775	0.688**
Blue-collar low skilled	1.004	0.918	0.964	1.205	1.023	1.079	0.767	0.758	1.223	1.076	1.032	0.768	0.735
Armed forces	1.116	0.817	1.167	1.350	1.625	0.902	1.407	1.750	0.937	1.479	0.326	0.558	0.451*
Missing or no breadwinner	0.647	0.723*	1.524	0.842	0.942	1.423	1.160	0.556	0.601	0.813	1.259	1.268	0.758
Presence of books	1.108	1.037	1.123	1.095	1.673***	1.012	1.001	0.742*	1.130	1.042	1.137	1.168	0.824**
Cultural health capital													
Regular childhood dental check-ups	1.243	1.064	1.432***	1.279***	2.180***	1.282***	1.408**	1.401*	1.087	1.570***	1.467**	1.349	1.432***
Adulthood SEP measurements													
Education (Ref. cat: primary or less)													
Lower secondary	0.874	1.186	0.961	1.217*	1.142	1.291*	0.002	1.138	1.031	1.130	0.848	0.734	1.536***
Higher secondary	1.040	1.207	0.879	1.304**	1.174	1.369***	2.125***	1.074	1.237	1.206	0.504***	1.082	1.709***
Tertiary	1.063	1.014	0.976	1.576***	1.434	1.541***	2.792***	1.179	1.207	1.453**	0.717	0.894	2.567***

(Table 3 continued)

Wealth (ref. cat.: below 50%)													
50-80% of median	1.261	0.946	1.109	1.244*	1.830***	1.268*	1.797**	1.103	1.289	1.413**	1.124	0.926	0.982
80-120% of median	1.346	0.996	1.417**	1.285**	1.138	1.287**	1.502	1.118	1.470*	2.043***	1.148	1.062	0.897
120% or more of median	1.196	0.941	1.696***	1.260**	1.234	1.380***	1.354*	0.934	1.265*	2.302***	1.282	1.294	0.962
Period/cohort													
Year of birth	1.029*	0.978*	1.102***	1.074***	1.097***	1.095***	1.220***	1.098***	1.004	1.008	1.054***	1.067***	1.069***
Periods (ref. cat: 1st period)													
2nd period	0.824	1.444*	1.107	1.415**	1.958***	1.176	1.554	0.433***	2.156***	2.206***	1.215	1.028	1.013
3rd period	0.622	2.156***	0.731	1.150	1.420	0.854	1.177	0.302***	0.789	4.915***	0.946	0.500	
Susceptibility to screening	2.517***	2.184***	1.979***	1.130	1.899***	0.564**	0.802	1.719**	2.960**				

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5.5.4. Discussion and Conclusion

Our aim in this study is to highlight the supply side, which influences preventive healthcare use, as do frequently cited individual factors such as socioeconomic position (Andersen, 1995). In addition to comparing countries and the characteristics of their screening policies, we incorporate their evolution over time. The unique data of the SHARE, which is both longitudinal and fully comparable across 13 European countries, enables us to study the origins of socioeconomic inequalities in preventive health behaviors for the first time within different institutional contexts. Several important results are worth noting.

The promising results for cultural health capital theory seem not to be confined to the Belgian context (Missinne et al., 2013b; Missinne et al., 2014b). In nine of the countries examined, preventive health care use in childhood seems markedly to predict regular mammography screening later in life. This finding holds when taking conventional measurements of cultural capital and socioeconomic position into account. Health behaviours seem to be passed on from generation to generation, which might lead to the reproduction of cultural health capital and a strong social structuring of health behaviours over the life course. However, the results also support the life course contention that we should consider explicitly how people's life and health behaviours are embedded within the opportunity structure of the broader social, institutional, and historical context (Elder Jr., Johnson, & Crosnoe, 2003). The examples of Sweden and the Netherlands demonstrate that it is possible to reach a very large number of women through comprehensive screening policies, irrespective of their childhood and adulthood socioeconomic positions. However, the observation that childhood preventive behavior has no independent effect in Germany (where the screening program was implemented about two decades later) or in Austria (where no national program has been implemented to date) suggests that other factors are also at play. For example, in Austria we need to work out how the absence of a national program goes hand in hand with a relatively high take up of screening and a remarkably low proportion of women who consider that mammography screening is unnecessary (Wübker, 2013). It does not appear to be the case that public knowledge about the benefits of screening or the use of specific sources of health information is remarkably higher in Austria than in other European countries (Gigerenzer, Mata, & Frank, 2009).

About half of the countries show differences in mammography screening by educational level. In addition to a higher average income, education involves human capital and learned effectiveness that enable individuals to control their lives, including health (Mirowsky & Ross, 2003). It is exactly these features that are important for the development of cultural health capital. However, in the rest of the countries, people seem to be able to overcome such educational inequalities, which points again to

the situational nature of mammography screening. Indeed, a large effect of mammography screening policies has been reported previously (Wübker, 2013). In addition, the evolution that national screening policies have undergone over time is reflected in the results, which is in line with previous findings of Missinne and Bracke (2014). The three other cross-national comparative studies that employed country-specific analyses also produced results indicating that the effects of educational differences are not universal across all European countries, although there are some notable deviations in the countries concerned. These different results are not surprising in view of the correlation between childhood and adulthood characteristics and given the inclusion of income in the models. In most studies, income and educational differences are calculated separately, often only adjusting for age. Taken together, the findings suggest that policymakers should not focus only on tackling financial barriers to mammography screening. Indeed, the number of women who reported in the SHARELIFE that the lack of financial means was behind their decision not to engage in screening is very small (the maximum is 2.8% in Greece, 2.4% in Poland, and 2.0% in Germany. For details see Wübker (2013)).

Some limitations need to be kept in mind. The first concerns the precise estimation of the impact of screening policies. As in many other surveys, it is impossible to discern fully whether women started mammography screening for preventive purposes only or for other reasons, or whether it was opportunistic screening or as part of a screening program. However, the latter two often go hand in hand. In countries with a more comprehensive program, the perceived benefits of mammography are usually higher, leading to more screening in general (Wübker, 2013). With regard to the former factors, using information on health history we excluded from the sample women who had been diagnosed with breast cancer. Nevertheless, it would be very useful for future surveys to allow a distinction between diagnostic and preventive screening, and whether screening was prompted by a relevant initiative.

Second, there is also the issue of recall error concerning retrospective data. In addition to the previously-mentioned efforts taken to minimize this form of bias at the time of data collection, the quality of the data has also been checked subsequently (Schröder, 2011). Although additional quality checks on the SHARELIFE data are still needed, strong consistency has already been found for personal events (Garrouste, 2011) and childhood characteristics (Havari & Mazzonna, 2011).

Finally, we remain in the dark about which indicators are most suitable for capturing cultural health capital. However, we believe that the use of regular dental check-ups in childhood is a good candidate that has yielded conservative estimates, given that two different forms of health behaviors were linked over a long period of time. In addition, further research is needed to reveal country-specific mechanisms of the accumulation of cultural health capital and the role the health care

system and health policies play in this regard. As these are not easy to grasp in macro-level indicators (Wendt & Kohl, 2010), qualitative research might be particularly revealing for the complex processes involved.

6.Conclusion and Discussion

In this last part, the results of the different empirical papers are first integrated in a more general reflection. Second, the limitations of the empirical work are discussed, as well as how these give indications for future research questions. Last, I discuss the implications of this thesis for both the research community and for policymakers.

6.1. General results

6.1.1. Inequalities in preventive health care use are reproduced across generations

Medical sociologists contend that people's health lifestyle (Abel, 1991; Cockerham et al., 1997, Cockerham, 2005) and cultural health capital (Abel, 2008; Shim, 2010) are developed through lifelong socialization processes. Childhood can be an important first stage in the formation of preventive health behaviour. Bourdieu (1984) stresses that families are crucial in the production and reproduction of social inequalities from as early as the cradle. The results here suggest that parents do indeed pass on advantages to their children. The unequal accumulation of cultural health capital seems to take off in childhood when parents include their children in preventive health habits. The first empirical study estimates that Belgian women who went for regular dental check-ups with their parents have a hazard which is 1.38 times greater to start with regular mammography screening so many years later in life. These results are not confined to the Belgian context. In at least 8 of the 12 other European countries participating in the SHARELIFE (Spain, the Czech Republic, France, Poland, Denmark, Italy, Switzerland and Greece), similar lingering effects of childhood preventive health behaviour are found, independent of people's adult socioeconomic position. Furthermore, the second study shows that childhood is, in life course epidemiological terms, a 'critical period' for preventive health behaviour. For Belgium, childhood dental check-ups predict mammography screening independently from, and on top of, dental check-ups during the rest of adult life. The strength of the associations between health behaviour in childhood and in later life is striking, certainly in view of the fact that the two different forms of preventive health behaviour are associated. However, in four European countries, these childhood disadvantages are altered. In addition, the fourth study confirms that mammography screening policies do significantly affect screening practices.

The results support cultural health capital theorists (Abel, 2008; Shim, 2010) in their argument that cultural capital should be considered as specific to the field of health. If cultural capital in childhood affects preventive health care inequalities, it will be predicted by the cultural health capital indicator, preventive health behaviour in childhood, rather than the number of books, which is not field-specific. This is true for most countries. In the Czech Republic, both cultural capital indicators show significant positive effects, but the effect of cultural health capital is stronger than that of the number of books.

To assess the role of cultural capital in adult life, educational differences were examined. Independent from the childhood disadvantages just discussed, educational effects are reported in Belgium and a number of the other European countries. Education shares many features with cultural health capital that are important for preventive health behaviour, such as learned effectiveness and a proactive stance (Mirowsky & Ross 2003; Shim, 2010). Therefore, it can be expected that the cultural health capital indicator captures part of the effect of education, certainly when considering that cultural health capital in childhood is by itself very likely to be strongly determined by the parents' educational level.

The results thus support the suggestion to assign substantial importance to cultural factors for preventive health care use, including education, as has been done in previous studies (Puddu et al. 2009; Stirbu et al., 2007). The results of the third empirical study should be considered in this regard. Although these results appear to oppose the other studies by concluding that it is not childhood but adulthood social position that matters for socialization into mammography screening practices, this is not necessarily the case. We need to bear in mind the different theoretical background of the indicator used (Bartley, 2003; Galobardes et al., 2006a, 2006b; Muntaner et al., 2003). The Diagonal Reference Models applied in the third empirical paper required a similar indicator of social position for childhood and adulthood to be used. The only candidate in this regard in the SHARELIFE is social class, assessed by the ISCO-88. On the one hand, this is somewhat unfortunate, given that the first study reveals strong independent effects from the cultural capital indicators rather than from social class in childhood. On the other hand, this indicator provides an ideal opportunity to illustrate the potential of social mobility theory and methodology. It is an interesting observation that, as is the case for health (Muntaner et al., 2010), the social class measurement might tap part of the social variations in preventive health care that are not captured by the measurements used in the other empirical studies. Although social class more clearly incorporates Bourdieu's relentlessly relational concept of social life (Korp, 2008; Wacquant, 2013), the results of the other studies suggest that cultural capital is crucial for the development of cultural

health capital and preventive health behaviour, which is not captured by the ISCO indicator in the third study.

6.1.2. Inequalities in preventive health care use accumulate at the marriage level

Guided by the life course principle of 'linked lives', the second study assesses the specific accumulation process of cultural health capital at the marriage level. Partners try to influence and regulate each other's health behaviour in order to keep their partner healthy (Lewis et al., 2006; Umberson, 1992). We focused on indirect learning processes by considering the influence of the preventive health care use of the partner. Similar to women, the accumulation of cultural health capital is likely to start early in a man's life. Since individuals' lives are already embedded in a life course trajectory when they marry, the life chances of both partners prior to marriage need to be considered. The second empirical study did this, and the results suggest that in addition to a woman's own preventive health behaviour in childhood, that of her partner impacts substantially on mammography screening in later life. More precisely, the hazard for mammography screening in later life is 25 per cent higher for Belgian women if their husband went for dental check-ups regularly as a child. Childhood (dis)advantages seem to further accumulate at the marriage level, which is in line with the cumulative (dis)advantage theory (Dannefer, 1987, 2003; DiPrete & Eirich, 2006; Merton, 1968; O'Rand, 1996). One of the driving mechanisms behind this is the well-documented tendency to marry someone with a similar educational background (Blackwell, 1998; Kalmijn, 1998; Smits et al., 2000). Subsequently, partners will encourage their children to lead a healthy life and thus transmit their accumulated cultural health capital to their children, which brings us back to the social reproduction process. The results of this study in Belgium stress the importance of the contextualization of preventive health care use within the family.

6.1.3. Mammography screening practices are embedded in historical time and place

The social reproduction and accumulation processes described above are not necessarily irreversible. As in previous studies (Jusot, Or, & Sirven, 2012; Palencia et al., 2010; Wübker, 2013), the fourth and fifth empirical papers clearly show that national context matters with regard to mammography screening. The fourth study combines a more explorative approach, along with a cross-national comparative approach, to reveal clear effects from mammography screening policies. Not only are national screening policies associated with the large variation between European countries in overall

screening participation, but deviations from overall patterns can also be directly linked to specific features of national screening programmes. In addition, the evolution in screening policies is strongly linked to screening practices, with more recent 10-year birth cohorts being more likely to commence screening. Because the age trajectories to initiate screening are very similar for each of these cohorts, strong period effects related to this evolution in screening policies are suggested. This implies that age-differences established in cross-sectional surveys reflect this evolution over time, rather than constituting 'true' age effects. Therefore, economic theories about human health capital (Grossman, 1972) that do not account for the institutional context of preventive health care provision are refuted in the case of mammography screening.

The last empirical paper returns to the accumulation processes of cultural health capital and shows clearly that these processes of socioeconomic inequalities over the life course should be situated within the broader opportunity structure of a specific country. The mechanisms behind mammography screening inequalities seem to differ across European countries, as any associations that are found with income and education, tend to vary. In addition, in 4 of the 13 European countries, childhood disadvantage no longer affects preventive health behaviour in later life. Therefore, the role of the government is crucial in the development and implementation of mammography screening policies, but also in that of an accessible health care system in general, in which independent effects could not be discerned. Research has already shown that Europeans are all very supportive of the role of government in organizing health care (Missinne, Meuleman, & Bracke, 2013).

6.2. Limitations and suggestions for further research

This thesis is a first attempt to apply the principles of the life course perspective to preventive health care inequalities, using an existing dataset. Unavoidably, there are several limitations I could not deal with in the empirical studies. In the next section, I will touch on the most prominent ones, and accordingly discuss some suggestions for how these can be tackled in future studies.

6.2.1. Self-reporting bias

The information about mammography screening is based on self-reporting, which can involve certain types of bias (Newell, Girgis, Sanson-Fisher, & Savolainen, 1999) and an overestimation of mammography screening in national surveys (Cronin et al., 2009; Rauscher, Johnson, Cho, & Walk, 2008; Renard et al., 2014). The use of mammography screening can be overestimated because of at least two forms of bias, namely recall bias and social desirability. First, recall bias can occur because respondents tend to remember an event as happening more recently than was actually the case (Renard et al., 2014). Therefore, the time frame of one or two years, often set in cross-sectional surveys to report mammography screening, can be captured wrongly by the respondents. Unlike cross-sectional surveys, the question about mammography screening in the SHARELIFE is part of a whole retrospective life interview. These are also challenged by recall bias, but the difference is that in the SHARELIFE, a great deal of effort has been taken specifically to improve recall, such as the use of the previously-mentioned Life History Calendar (ex-ante approach). The SHARELIFE also evaluates the quality of the data afterwards (ex-post approach) (Schröder, 2011). Although this has not yet been done for the specific item of mammography screening, strong consistency has already been found for personal events (Garrouste, 2011) and childhood conditions (Havari & Mazzonna, 2011). A comparison with administrative data to check the accuracy of the mammography item, as for example Renard et al. (2014) did, is less straightforward in view of the question wording of the SHARELIFE item and its explicit reference regarding regular adherence to mammography screening. However, Rauscher and colleagues (2008) concluded after a meta-analysis that the reporting accuracy of cancer screening histories did not differ according to socioeconomic position. Therefore, it is unlikely that recall bias will have substantially affected the results. Second, bias resulting from social desirability cannot be ruled out. If women are fully aware of the recommendations by national and international influential institutes, they might give a positive response to the item on mammography screening since they think it is viewed favourably (Renard et al., 2014).

6.2.2. Estimation of policy effects

There are several difficulties in the estimation of the exact impact of mammography screening policies. First, the focus is on the preventive use of mammography screening among asymptomatic women. However, it is not possible to completely distinguish this from diagnostic mammography. We have no information about the motives of women to start screening. However, we do know whether

respondents had been diagnosed with breast cancer during their lives. These women were excluded from the sample. In addition, the observation period is limited, so the initiation of mammography screening early in life is not included. Early initiation is only recommended for women who have a family history of breast cancer (Verleye et al., 2011), meaning that early mammograms are unlikely to have only a preventive character.

Second, it is difficult to disentangle the effect of screening policies from that of the wider institutional set up of a country, including its health care system. Several strategies have been employed to account for the institutional context in cross-national comparative studies on health. Welfare state regimes, based on Esping-Anderson's regime typology, have been linked to cross-national comparisons of health inequalities (Bambra, 2011; Eikemo, Bambra, Joyce, & Dahl, 2008). However, this typology is limited to the work-welfare nexus (Ferragina & Seeleib-Kaiser, 2011) and has been criticized for ignoring welfare service provision, rendering its application to the field of health care problematic (Alber, 1995; Missinne et al., 2013; Reibling, 2010). Accordingly, different typologies for health care systems have been developed (Reibling, 2010; Wendt, Frisina, & Rothgang, 2009), but European health care systems seem too divergent to fit into the ideal-type distinction between National Health Service (NHS) and Social Health Insurance (SHI) systems (Wendt et al., 2009). An alternative is to use the institutional characteristics of health care systems to capture the institutional setup. The role of several macro-level indicators for mammography screening have been assessed, such as gross domestic product (GDP), public health expenditure or the number of physicians, but none have proved able to explain cross-national variations in screening practices (Jusot et al., 2012; Sirven & Or, 2011; Wübker, 2013). Not even those that are directly linked to mammography screening, such as the number of radiologists and mammography units. Further, these indicators all aim to capture the input of what is termed the 'production process of health care services' (Kohl & Wendt, 2004). In the future, we need to work out how to include the 'output processes' of the health care system (services delivered, the quality of those services and subjective satisfaction with the system), which is a very complicated methodological challenge (Allin et al., 2007). As with many other studies, we do not have information about the actual quality of health services, which is regrettable because effective engagements with health care providers are crucial in the development of cultural health capital (Shim, 2010) and in the decision of whether to screen or not (Fabri & Remacle, 2009; Roussel & Deccache, 2011).

This thesis does not expand on the question of if and to what extent the introduction of screening programmes impacts on socioeconomic inequalities. Therefore, it does not provide an absolute empirical test of fundamental social cause theory, which would require the examination of historical patterns (Link, 2008; Phelan et al., 2004). Although the retrospective data provides a uniquely long

time frame, the number of women per birth cohort and country is too small to grasp how socioeconomic inequalities have changed over time. It might be interesting if future data collection includes questioning respondents explicitly about the reasons for forgoing preventive health care habits, as the SHARELIFE survey did. This information might help in understanding the role of screening policies and how their introduction or changing characteristics affect socioeconomic inequalities.

6.2.3. Large time span between childhood and mammography screening?

The empirical studies associate preventive health behaviour in childhood (assessed up to the age of 15) with mammography screening recommended from the age of 50 onwards, thereby leaving out a substantial part of the life course. It is essential to further scrutinize how health lifestyles and cultural health capital accumulation evolve over the life course. The results suggest that childhood is a critical period in the development of preventive health behaviour. They are in line with a fully path-dependent cumulative advantage process, which implies that socioeconomic conditions early in life have continuing influences on later life outcomes, even when a person's later socioeconomic position is accounted for (DiPrete & Eirich, 2006; Willson et al., 2007). It would be insightful to distinguish further between childhood and adolescence, as well as between different periods in adulthood. Further, the relationship between health lifestyles, the ageing process and forms of cultural and economic capital constitute an important research topic (Jones, Papacosta, Whincup, Wannamethee, & Morris, 2011). There are ample opportunities for future research, including applying the other notions of time that the life course perspective endorses, such as the concept of turning points. The SHARELIFE includes questions about four types of behavioural change of at least one year to improve health: increase in physical activity, change of diet, stopping smoking and reducing alcohol consumption. It would be interesting to find out whether these can be linked to distinct periods of happiness or stress in life, which the SHARELIFE survey also recorded.

In the third empirical study, the process of social mobility was addressed, which is an important life event that might bring about a period of stress (Karvonen, Rimpela, & Rimpela, 1999). It became clear that more attention should be directed towards the temporal dimension of the socioeconomic position. As discussed, information is lacking with regard to the times when individuals moved up or down the social ladder. This is unfortunate, given that cumulative exposure models underline the role of the time spent in a certain advantaged or disadvantaged socioeconomic position (Willson et al., 2007), which can impact on the accumulation process of health risks (Hertzman & Power, 2004).

Similar processes can be at play for health behaviour, and social mobility effects might differ according to the amount of time spent in the different socioeconomic positions (Bartley & Plewis, 2007). In addition to such an intergenerational perspective on socioeconomic position and preventive health behaviour, intragenerational processes need to receive research attention. We need to shed further light on which conditions at what life stages contribute to the accumulation of different forms of capital, including cultural health capital. In this regard, it is important to consider the role of significant others and the duration of the relevant personal relationships. It has been argued, for example, that the longer a couple has lived together, the more time they have had to affect each other's health behaviour (Colman, Missinne, & Bracke, 2014b).

6.2.4. Other indicators of cultural health capital?

The SHARELIFE provides several unique measurements for an initial empirical testing of cultural health capital accumulation. The clearest indicator is the measurement of childhood dental check-ups. Fortunately, it appears to be robust for cohort effects and supply effects. This is not the case for the measurement of childhood illnesses. To think developmentally about health lifestyles and cultural health capital will require thorough consideration being given to other indicators that may be (more) suitable. Scholars have recognized that the measurement and operationalization of health lifestyles in the population is a challenging task (Abel, 1991; Cockerham, 2005), and Mollborn and colleagues (2014, p. 389) argue that "analytic strategies have tended to lag behind theoretical developments". Keeping the case of childhood illnesses in mind, attention should be directed towards the temporal contexts of all the indicators so that they capture what has theoretically been assumed. In addition, we will need to deal carefully with possible supply effects in the different countries when considering new indicators. Accounting for policy effects and institutional characteristics is quite a challenge, as discussed earlier. The SHARELIFE questionnaire provides an alternative to the inclusion of general indicators of the health care system, and it includes items about the reasons for forgoing care. The respondents who did not have regular dental check-ups during their life course, were asked to indicate whether this was because of financial reasons, time constraints, information barriers, not considering it necessary, because there was no place close to home to get dental check-ups or because it was unusual. This information suggests that supply effects are not the main determinants of preventive dental check-ups during childhood, however, we should remain cautious because we have no information about the accuracy of the responses. These items nevertheless make clear that, for example, infant vaccination – another SHARELIFE item – is not a good alternative indicator of cultural health capital. Almost all respondents had received vaccinations during childhood (94 per

cent) and the variation between countries is small, from 88.5 per cent in Spain to 99.4 per cent in Denmark. In Belgium, the figure is 93 per cent.

More qualitative studies, such as the ones by Grineski (2009) and Weaver et al. (2014) will be needed. They will provide additional insights into the underlying mechanisms that are possibly not captured by quantitative indicators and therefore will be helpful in the search for suitable indicators. Studies, both qualitative and quantitative, should give thought to the bidirectional relationship between cultural health capital and the quality of care. It is crucial to examine further empirically how engagements with healthcare providers are linked to the development of cultural health capital (Shim, 2010).

6.2.5. What about men?

By using the empirical example of mammography screening, the focus is unavoidably restricted to women. As previously discussed, the information about timing was a crucial element in the choice to use this form of preventive health behaviour. The SHARE does not provide an equally good alternative for men. The SHARELIFE data provides information about vision tests, blood pressure checks, blood tests for cholesterol and for blood sugar, but the preventive nature of these is less clear-cut. The drop-off questionnaires accompanying the data collection in wave one and wave two contain some items about preventive health habits, but do not entail the notions of timing and regularity, which are central to the arguments in this thesis. The question wording in the drop off questionnaire is similar to the ones in cross-sectional surveys, for which I have tried to formulate an alternative.

Although a restricted focus was helpful in this first attempt at developing a life course framework for preventive health care use, the gender dimension needs to be scrutinized further. After all, qualitative research has already indicated that men avoid health care as a way to enact hegemonic ideals of masculinity. In this way, they reinforce the strongly held cultural beliefs that men are more powerful and less vulnerable, so that caring for one's health is seen as a feminine trait (Courtenay, 2000; O'Brien, Hunt, & Hart 2005). This may be even more true for preventive health habits, given their more voluntary character compared with seeking health care for an acute health problem (Springer & Mouzon, 2011). A longitudinal, population-based study revealed that strong masculinity beliefs reduce the likelihood of engaging in preventive health care. Importantly, the researchers also added to the scant research on the relationship with socioeconomic position, and demonstrated that men who strongly endorse hegemonic masculinity beliefs do not benefit from higher education

(Springer & Mouzon, 2011). Although Cockerham et al. (1997) recognize that gender, in addition to social class circumstances, might affect lifestyle choices, health lifestyle theory and cultural health capital theory would benefit from further theorizing the role of gender. In particular, because there are indications that a gender component is involved in the reproduction process of health behaviours. Wickrama, Conger, Wallace and Elder Jr. (1999) have already shown that in two-parent families, the health-risk lifestyle of the sons is only influenced by the health-risk lifestyle of the father and that the same applies to mothers and their daughters. The intergenerational transmission process might be different for specific health risk behaviours, as no similar gender symmetry is found when the unique components of specific health risk behaviour are considered. Further, when considering the linked lives principle, it would be important to examine gender differences. The provision, receipt and consequences of the social learning processes that take place between partners can be different for men and women (Colman et al., 2014b; Umberson, 1992). Women more often take the initiative to change their partner's health habits (Umberson, 1992). They are better able to communicate about health habits and consequently are better able to influence a partner's health behaviour (Ray, Mertens, & Weisner, 2009).

6.3. Implications

6.3.1. For medical sociological theory and empirical research

The epidemiological transition towards chronic illness and pre-eminent health risks (Omran, 1971) has given a boost to medical sociology. With regard to chronic illnesses, health lifestyles and their related social factors are gaining prominence, with the result that social scientists are now studying issues of medicine they had previously excluded (Hinote & Wasserman, 2013; Link, 2008). Medical sociology itself has also undergone a fundamental transition. At its inception in the mid-20th century, much of the work in medical sociology was applied to practical problems rather than theoretical questions. However, the often-voiced critique that medical sociology is atheoretical no longer holds true (Williams, 1995; Cockerham, 2013). Quite the reverse, in fact, as the theoretical debate in medical sociology is now flourishing, exemplified by the book edited by William Cockerham (2013) and aptly titled *Medical Sociology on the Move, New Directions in Theory*. The aim of this thesis was to outline how the interdisciplinary approach of the life course perspective and its methodological translations, have opened new directions for medical sociological theory and empirical research on preventive health care inequalities. My empirical studies confirm the basis for the medical sociological quest to move beyond an individual-level conceptualization of health behaviour. Solely

agency-oriented paradigms do not allow us to understand the driving mechanisms behind the persistent social inequalities in preventive health care use. Instead, we need to further develop how the underlying distribution of material and non-material resources give rise to health behaviours that are shared by social group members (Abel, 1991, 2007, 2008; Abel & Frohlich, 2012; Abel, Fuhr, Bisegger, Rau, & the European Kidscreen Group, 2011; Cockerham, 1995, 2000, 2005, 2013; Cockerham et al., 1993, Cockerham et al.,1997; Frohlich et al., 2001; Veenstra, 2007; Veenstra & Burnett, 2014a; Williams, 1995). The life course perspective engenders new empirical research questions for doing this.

First of all, the life course perspective stresses the importance of taking a long-term and developmental view on cultural health capital and health lifestyles from early childhood onwards. The results here clearly show that for preventive health behaviour, there is no equal start in life. Social inequalities in preventive health care use seem to be reproduced across generations. The results thus suggest that from early childhood, parents pass on advantages to their children, including in terms of cultural health capital. According to Bourdieu (1986), the hereditary transmission of cultural capital is a subtle and well-hidden process, even more so than other forms of capital. Learning in early life will give rise to dispositions that are durable, habitual and might exist beyond conscious acts (R. Jenkins, 1992). This implies that not every use of available resources, including cultural health capital, is as conscious and rational as traditional models of health behaviour assume (Abel & Frohlich 2012; Shim, 2010).

However, this does not entail that health behaviour should be viewed as being entirely pre-determined from childhood, as the habitus only disposes us to do certain things, Bourdieu argues (R. Jenkins, 1992). Nevertheless, health sociologists have criticized Bourdieu's concept of habitus for leaving too little room for individual agency (Cockerham et al., 1997; Williams, 1995), although some contend that this critique is misguided by substantialist thinking (Veenstra & Burnett, 2014a, 2014b). Life course researchers stress that individuals' practices should be contextualized within their opportunity structure at a given place and time. In the case of mammography screening practices, the results clearly show that mammography screening policies have a large impact and that in some countries, childhood disadvantages can be overcome. I encourage researchers to scrutinize this reproduction process further. For example, what is the relative impact of the example set by parents or by openly discussing, promoting or sanctioning health behaviours? Does cultural health capital matter for all forms of preventive health behaviour and are their intergenerational transmission processes alike? What about the gender specificity of transmission processes? As argued, social mobility research can help to move the debate forwards, but this will require that an

appropriate indicator of socioeconomic position is used, which is similar in childhood to the periods in adulthood that are considered.

Research should also continue to study how inequalities further accumulate across the life course. A first avenue is to consider the role of additional 'linked lives'. As well as the partner, other significant members of a person's social network and their life course experiences are expected to influence an individual's preventive health behaviour. Involvement in social roles gives rise to the internalization of a sense of commitment, responsibility and the obligation to fulfil these social roles (Umberson, 1987). Therefore, involvement in social roles motivates people to be healthy and promotes healthy behaviour. This is in line with the interdependence theory (Kelley & Thibaut, 1978; Lewis et al., 2006), which suggests that engaging in an intimate relationship brings about a shift from a mainly self-centred motivation to a relationship motivation (Colman et al., 2014b). When considering the role of significant others, it will be essential to find out who is most important for what kind of preventive health behaviour, as the influence processes are not necessarily uniform across all preventive health behaviours (Christakis & Fowler, 2007). This brings us to the next point.

The results here support the contention that health lifestyles comprise an overall pattern (Cockerham, 2007), meaning that multiple (un)healthy behaviours co-occur (Cockerham, 2005; de Vries et al., 2008; Mirowsky & Ross, 2003). After all, very clear effects between two different forms of preventive health behaviours can be established. According to Bourdieu (1984), dispositions can be translated into the logic of another field without any deliberate pursuit of coherence or conscious concertation (Bourdieu, 1984). R. Jenkins (1992, p. 78) explains that dispositions have the capacity to "structure and create relevance in social contexts and fields other than those in which they were originally acquired and to which they are generatively most appropriate". In this way, social practices exhibit a stylistic coherence in the lifestyles of collectivities. On the other hand, Timmermans and Haas (2008) argue that medical sociological theory would benefit from studying the specificity of preventive health behaviours. Further, Cockerham (2007) highlights that in addition to a general component, the specific complexities of health practices should be recognized. The results show that it is indeed important to consider the specific characteristics of mammography screening practices and policies. When future research considers other forms of preventive health behaviour it will provide a comparison point, allowing us to improve our understanding of the specific versus the general component of a health lifestyle.

The life course perspective also points out that the timing of events matters. A timely initiation might be crucial in order for preventive health behaviours to be effective. The first study tested the hypothesis that socioeconomic inequalities can also be manifest in the timely onset in life of preventive health behaviours, but concluded that this was not the case for mammography screening

in Belgium. It seems that socioeconomic status affects the likelihood of ever having a mammogram, rather than the age when screening is commenced. Nevertheless, the timeliness of preventive health behaviours needs to be investigated further. A social gradient might exist in the timeliness of other forms of preventive health behaviour that begins far earlier in life, such as dental check-ups. Similarly, the aspect of the regularity of preventive health behaviour deserves further attention. Cross-sectional designs do not allow us to differentiate between the initiation of mammography screening and its regular take-up. Occasionally, studies address a few consecutive screenings (e.g. Pivot et al., 2008), but generally little is known so far about which factors impact on the maintenance of mammography screening over a longer period of time (Rauscher, Hawley & Earp, 2005).

The empirical studies underscore that decisions about preventive health practices are very much embedded within a certain historical time, national context and specific health policies. When interpreting the results of cross-sectional studies located in a single country, scholars should be cautious about generalizing the findings to other countries and time periods and should reflect on how these results can best be contextualized. Further in-depth study of the specific country situation is needed, together with more cross-national comparative studies to reveal the role of contextual factors on preventive health care inequalities. Importantly, the life course perspective points out that it can be revealing to include the evolution of contextual factors across time. A combination of a cross-national comparative approach with a longitudinal approach is most promising. To this end, we will need more longitudinal data on preventive health habits, which is comparable across a substantial number of countries. Collecting longitudinal data through retrospective questioning can be a valuable alternative to longitudinal panel studies, which bring with them a heavy burden in terms of time and money, and require a comprehensive strategy to minimize and compensate for sample attrition. A good starting point would be to take the example of the SHARE and add retrospective questions to existing cross-national comparative survey projects, such as the European Social Survey (ESS). The ESS has already included a module with retrospective questions on the timing of important life course events in its third round. A similar effort could be made to gather life course information about preventive health habits.

6.3.2. For policymakers

Policy initiatives need to be guided by well-founded theory (McQueen et al., 2007; Potvin, Gendron, Bilodeau, & Chabot, 2005; Rutten & Gelius, 2011). It has been argued that there is a lack of

adequate health promotion theory that can reconcile proponents of structuralist approaches and promoters of action theory, although both are genuine perspectives for health promotion practice (Rutten & Gelius, 2011). Incorporating insights from (medical) sociological theory into this longstanding structure-agency debate would be conducive to health promotion. Drawing on Weber and Giddens' structuration theory (1984), scholars point out that it is crucial to stop counterposing structure with agency, and instead to focus on their interplay (Abel & Frohlich, 2012; Cockerham, 2007; Frohlich et al., 2001). This idea of interaction between individual choice (agency) and structural constraints is crucial to move beyond a notion of agency as being equivalent to 'risk behaviour' as described earlier (Abel & Frohlich, 2012). Self-management and individual risk behaviour modification is still dominant in health policy (Ong et al., 2014). Abel (2007) argues that it is time for health promotion to focus on how health is produced every day and maintained over the life course, rather than focusing on the distribution of risks and illness. It is already well known that the production of health is strongly linked to the underlying social structures of society (Commission of Social Determinants of Health [CSDH], 2008; Mackenbach, 2012; Marmot, 2005; Phelan, Link, & Tehranifar, 2010), but we still do not know the precise mechanisms. The most direct objective of this thesis is to add to this understanding in the field of preventive health behaviour.

Criticism has been voiced against sociologists for over-emphasizing context, at the risk of inhibiting innovation (Ong, 2014, p. 226). However, this point is not discarded and from within the field, suggestions are being put forward to include theoretical perspectives that are more readily applicable to public health action, such as Amartya Sen's capability theory (Sen, 1985, 1993) and its derivative, the 'health capabilities' approach (Abel & Frohlich, 2012; Frohlich & Abel, 2014; Ruger, 2010; Weaver et al., 2014). The contribution of this thesis to the debate lies in highlighting the importance of taking a longer and contextualized view of individuals' lives, so that the role of childhood and accumulation processes over the life course, as well as contextual factors, are explicitly considered. The World Health Organization has recognized that the highest priority should be given to actions "that ensure a good start in life for every child" (Whitehead, Povall, & Loring, 2014, p. 16). Improving the conditions in early life has the potential to pay off throughout the rest of an individual's lifetime (Duncan, Ludwig, & Magnuson, 2007). The deeply rooted nature of social inequalities in preventive health behaviours entails that policy actions also lie very much outside the health care sector. Policies will have to change the social conditions in which people make their unhealthy choices (Baum & Fisher, 2014). Educational policy is and will stay crucial, as the years of formal education are a critical period in an individual's life with long-lasting consequences (Bartley, Blane, & Montgomery, 1997), including for the accumulation of cultural health capital (Abel, 2008; Shim, 2010). Applying the life course accumulation model to social policy, Blane, Netuveli and Stone (2007) contend that welfare states should aim to provide a springboard to repair the effects of

previous damage, as well as providing a safety net. To address the social determinants of health and health behaviour will require courage. Governments and international agencies are still tending towards behavioural change, because the neo-liberal ideology leaves little room to consider the important role of the social structure in shaping individuals' health behaviour (Baum & Fisher, 2014).

Contemporaneous with my work, Mollborn et al. (2014) endorse a similar intention to integrate early childhood into health lifestyle theory. The authors argue that "health lifestyles in the early life course has the potential to turn the typical approach to health behavior policies on its head" (p. 368). Interventions that target youngsters' health behaviour typically focus on influencing single actions, but the broader picture of an underlying lifestyle and associated identities should not be overlooked. Indeed, the results suggest that their health lifestyles comprise a general component. However, this does not imply that health lifestyles should necessarily been seen as being resistant to change. It is a hopeful observation that different forms of preventive health behaviour can be linked over the life course, which point to spillover effects of socialization into health behaviour. When policies are correctly focused, they can have far-reaching effects, even beyond the specific health behaviour being targeted.

6.3.3. For policy initiatives on mammography screening

Most European countries under study have instigated mammography screening policies based on a prevention strategy targeting the general population (Rose, 1985); in this case all women in a certain age group. However, it has been observed that some public health promotion interventions may inadvertently worsen social inequalities (Allebeck, 2008; Frohlich & Potvin, 2008, 2010; McLaren, McIntyre, & Kirkpatrick, 2010), so that strategies aimed at improving public health might not necessarily be compatible with the goal of reducing socioeconomic inequalities (Frohlich & Potvin, 2008). In line with the fundamental social cause theory (Link & Phelan, 1995; Phelan et al., 2004), it is possible that the better off will frequently benefit faster and to a greater extent (Frohlich & Potvin, 2008). Therefore, it has been argued that it might be useful to complement a population-based approach with policy initiatives that target what are termed 'vulnerable populations' (Frohlich & Potvin, 2008, 2010), although the precise way forward is still an ongoing discussion and might be dependent on the (preventive) health behaviour being considered (Frohlich & Potvin, 2010; McLaren et al., 2010).

The cross-national comparative studies show that social inequalities in mammography screening are mutable. The European countries investigated differ greatly in the characteristics and implementation phase of mammography screening policies. An international comparative study shows that European countries also differ greatly in the actual implementation of ten other domains of preventive interventions. Identifying and following best practice will allow countries to achieve substantial health gains (Mackenbach & McKee, 2013). For example, Belgium performs significantly worse on these health policies than its direct neighbour countries such as the Netherlands. A qualitative study shows that in the southern part of Belgium, 14 out of 18 women interviewed could not distinguish between mammography screening within the Belgian population-based screening programme and a full breast examination outside the programme (Roussel & Deccache, 2011). Therefore, there is room for an improved implementation of the screening programme.

Health care providers play a critical role in recommending mammography screening to age-eligible patients, in particular because mammography screening is a complicated topic. Not all women can correctly weigh up the benefits and harms of screening in order to make a well-informed decision about whether to take it up (Gigerenzer et al., 2009; Gummersbach et al., 2010). The role of a health care provider will only increase if there is general agreement that the decision to participate in screening should be individualized based on patients' risk profiles and preferences (Pace & Keating, 2014). Empirical evidence shows that women are inclined to follow their physician's recommendation for mammography screening (Meissner, Breen, Taubman, Vernon, & Graubard, 2007; O'Malley et al., 2001) and provider-targeted interventions to increase physician recommendations have already been proved successful in the United States (Mandelblatt & Yabroff, 1999). In this regard, it is important to consider that socioeconomic inequalities can also exist within health care interaction (Videau, Saliba-Serre, Paraponaris, & Ventelou, 2010; Willems, De Maesschalck, Deveugele, Derese, & De Maeseneer, 2005), including less frequent mammography screening recommendations for vulnerable women (O'Malley et al., 2001). In line with cultural health capital theory, awareness should be raised about the tacit knowledge that drives health care interactions (Grineski, 2009).

6.4. In sum

Moving towards a longitudinal approach that calls attention to the macro-structural processes underlying preventive health practices will require effort, both in terms of data collection and changes to perspectives. In addition, medical sociology will need to continue to be dynamic and adapt to changing conditions in society, but also to the changing and often contradictory knowledge

of how to lead a healthy life, something of which mammography screening is an emblematic example.

7. References

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