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The Health Gradient in Europe

An empirical analysis of health inequalities in Europe and within thirteen European countries from 2002 to 2012

Master's thesis in Sociology

Trondheim, spring 2014

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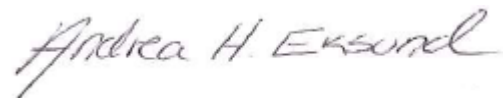Norwegian University of
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Acknowledgements

Abstract

During the last three decades there has been a growing research interest on socioeconomic health inequalities, but where most of the studies have been on individual health determinants. The aim of this paper will be to look at the contextual determinants of health since they often affect individual determinants. Studies done on health inequalities show that there are inequalities between different social groups no matter how these groups are divided (by education, social class, income, etc.), and that these inequalities are apparent in every country and society in Europe.

This thesis will look at the trends in social health inequalities between 2002 and 2012 in Europe and within thirteen European countries. Three potential contextual explanations were presented; the financial crisis, welfare state regimes and Wilkinson's income inequality hypothesis. Self-reported health is here the health indicator, while education is used as the indicator of socioeconomic position. Unemployment rates and the Gini-index are the two contextual variables used. The analyses are conducted through OLS-regression and multilevel modeling. The individual data used are collected from the European Social Survey, module 1 through 6, while the contextual variables are collected from the World Development Indicators, Pordata and Eurostat.

Two main findings were drawn from the results. The first is the persistency in inequalities in self-reported health in Europe as well as within most of the European countries during these ten years. The persistency, as well as the stability seen in most countries, can possibly be explained by the time it might take for changes in unemployment rates and the Gini-index to show significant results on health inequalities. This result might also be due to the small changes in the Gini-index, causing insignificant change in the distribution of power, relative deprivation and psychosocial stress, just as proposed by the income inequality hypothesis. The hypothesis is however having a hard time explaining the persistency in health inequalities between countries and welfare state regimes since the welfare states with the smallest income inequalities are not the ones with the smallest health inequalities. The stability in health inequalities in nine of the thirteen countries might also be explained by the welfare state regimes these countries belong to and the welfare benefits they have. According to the second finding the Netherlands and Spain have increasing health inequalities in 2010 and 2008 respectively, while Portugal and Slovenia have decreasing health inequalities in 2006 and 2008. For all four countries alterations in unemployment rates might explain these significant changes to some degree, even though they all seem to have different underlying factors having an effect (economy and welfare benefits i.e.).

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1. Introduction

1.1. Thesis topic

That socioeconomic position and health are related, creating social health inequalities is widely known. This can be documented to a greater or lesser extent for almost every country in Europe, in most age cohorts and for both men and women. It creates what is called a health gradient; the better social position individuals possess, the better their health will be (Helsedirektoratet, 2005). This is not only the case for developmental countries, but also in more affluent countries people who are less well-off have poorer health and lower life expectancy than others with better social position (Wilkinson & Marmot, 2003). These inequalities, both between and within countries, present a big challenge to the world. Globally the differences in life expectancy between countries are as high as 48 years, while the highest gap within a country is measured to be 20 years (Marmot, 2005). Studying trends in health inequalities and trying to locate the social determinants is important, especially since the inequalities are socially structured and therefore avoidable (Marmot, 2005). There are many trend studies motivated by the concern that socioeconomic health inequalities will increase due to unfavorable social and contextual developments. This has led governments to have reductions of health inequalities on their agenda. In order to evaluate such progress, monitoring trends in health inequalities will be important (Kunst et al., 2005). The aim of this thesis will be to look at health inequalities in Europe and within European countries between 2002 and 2012. It will then be possible to look for countries that stand out with either decreasing or increasing inequalities in self-reported health over time The European Social Survey (ESS) will be used to answer the research question

Have health inequalities in Europe and within European countries persisted from 2002 to 2012?

There are several theories that can help to understand how and why there are inequalities in health between different social classes and social positions. Some of them are aetiological approaches such as behavioral and cultural explanations, life course explanations, material explanations and psychosocial explanations, and others are social determinants that might take one or more of these aetiological approaches into account (Bartley, 2004). The approaches and determinants can either be individual, contextual, or a mix of both. Such

social determinants include stress, early life, social exclusion, work conditions, unemployment, social support and health related behavior. Other more contextual factors are taxations, old-age pensions, sickness or rehabilitation benefits, child or maternity benefits, unemployment benefits etc. (Marmot, 2005). Lahelma and Lundberg (2009) suggest that health inequalities results from contextual factors ranging from past and present social structures, ending up as individual determinants (such as living conditions, education and lifestyles). Individuals' lifestyles are embedded in social norms and their social network, as well as in general working and living conditions. These are again embedded in the socioeconomic and cultural environment of the wider society (Dahlgren & Whitehead, 2006). This thesis will therefore focus on the contextual determinants of socioeconomic health inequalities. Figure 1.1 displays how the contextual and individual determinants are connected.

Figure 1.1 Main factors of socioeconomic health inequalities, connecting contextual determinants and individual determinants (Dahlgren & Whitehead, 2006)

1.2. Social inequalities

Socioeconomic position (SEP) and health

Lower socioeconomic position is one of the most powerful single contributors to health morbidity and early mortality world-wide (Williams, 1998). Individuals with higher positions in the social hierarchy tend to have more prestige, power and freedom which increase their health (Dahlgren & Whitehead, 2006). In the 1960s there was a widespread belief that the health inequalities in western societies would disappear. This has however not happened, and there has been discussions as to whether the inequalities have increased or decreased (Kunst

et al., 2005). There are several ways to describe and measure socioeconomic conditions. Social stratification, social class, social or socioeconomic status (SES) and socioeconomic position (SEP) are all terms used. They are, however, often used interchangeably, despite their different theoretical backgrounds (Galobardes, Lynch, & Smith, 2007). Of all of these SEP is seen the best and most comprehensive term (Krieger, Williams, & Moss, 1997). It is a well-used concept in health research, and refers to the economic and social factors that influence individuals' or groups' positions within a society (Eikemo, 2009; Galobardes et al., 2007; Galobardes, Shaw, Lawlor, Lynch, & Smith, 2006; Krieger et al., 1997). This definition includes both actual resources (such as attained education and income level) and social status (prestige or rank) (Eikemo, 2009; Krieger et al., 1997). SEP will therefore be used throughout this paper, with the exception when elaborating for Wilkinson's income inequality hypothesis where socials status will be the term used. SEP encompasses different concepts with different historical and disciplinary origin. Many of these concepts have their origins in Marxism and Weberian traditions. Weber looked at how human agency actively created life chances through the ability to trade skills, education and other attributes for social advantages. Marx had a more structural approach and looked at how life chances were imposed at birth in different degrees as to which class individuals were born into (Galobardes et al., 2007).

According to Galobardes et al. (2007) there are three reasons or purposes as to why SEP is the best measurement of socioeconomic conditions. The first is that SEP is good at describing and monitoring the social distribution of a disease, and is this way able to look for changes over time and across different geographical areas and social groups. This information can be used to impact health policies, and then later see if the policies have been able to diminish health inequalities. The second purpose is to explain the causal mechanisms where SEP generates health inequalities. Examples are why affluent and educated women are more prone to get breast cancer, but why less affluent women with lower education have smaller survival rates. The third and last purpose has to do with statistically adjusting for socioeconomic circumstances where the main focus of interest is another exposure. There are several diseases and exposure of diseases that are socially patterned, so to be able to obtain the independent effect of the exposure one wants to look at, socioeconomic circumstances must be controlled for (Galobardes et al., 2007).

There are several indicators of SEP, and one cannot search for one that is the best. They all look at different aspects of socioeconomic stratification, but are all related to each other to some degree because they all measure aspects of underlying socioeconomic stratification

(Galobardes et al., 2007). Most of these indicators are on an individual level, but one must acknowledge that these indicators to some degree are determined by structural relations between groups within a society. The indicators mostly used in health research are education, income and occupation. Other indicators are unemployment, housing and overcrowding. This paper will look at self-reported health by using education as the indicator of SEP. The reason for this is that education can be a good indicator of both an adult's employment status and household income, as well as it is an indicator of the parent's SEP which influence early life (Galobardes et al., 2006).

Education as an indicator for socioeconomic position

Education as an indicator of SEP tries to capture the knowledge-related assets an individual possess. It captures as mentioned an individual's transition from his or her parents' SEP (received) to his or her own adulthood-SEP (obtained). This way it takes influences from both early life on adult health as well as the influence adulthood have on current and future health into account (Galobardes et al., 2007; Galobardes et al., 2006). Early-life ill health can limit a child's school attendance, which again might affect his or her school attainment later on. Childhood sickness can also predispose to adult disease, generating health selections and causing health inequalities (Galobardes et al., 2006). Higher education can help people to be more receptive to health information due to higher cognitive functions, and it can make them more able to access health care services and to communicate with them better. According to Galobardes et al. (2006) there is both a categorical and a continuous measure of education. The categorical measure divides the time of education into achievements, such as graduating from high school or college with a bachelor's degree, master's degree, PhD etc. The continuous variable assumes that every extra year of education will contribute to an individual's SEP, and that time spent in education has higher value than achievements.

According to Ross and Wu (1995) there are three explanations as to how education can influence population health and inequalities; work and economic conditions, social-psychological resources, and health lifestyle and behavior. The explanation of work and economic conditions looks at how educated people are less likely to get unemployed, they are more likely to have full-time jobs with work that for them is fulfilling and they tend to have high income and low economic hardship. According to the explanations of social-psychological resources, individuals with higher education have a higher sense of personal control, social support and have better economic resources. The last explanation looks at how

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educated individuals have healthier lifestyles compared to the less educated, how they are more likely to exercise, to drink less, to receive preventive medical care and how they are less likely to smoke (Ross & Wu, 1995). The last two can be associated with what Ross and Mirowsky (1999) calls the quantity model which is one out of three possible aspects of the influence education has. This model looks at how education leads to higher human capital, teach them cognitive skills, socialize them, give them personal control (which again may lead to health-enhancing behaviors) and increases their social support (through taught negotiating skills amongst others), improving health through decrease in depression, anxiety and psychosocial stress amongst others. Ross and Mirowsky concluded that this model is better to explain health inequalities than both the credential model, looking at how achieved degrees give better health, and the selectivity model, which looks at how selective schools can influence and reinforce habits, lifestyles and behaviors, and open doors for more lucrative positions through personal contacts (Ross & Mirowsky, 1999). Based on this and that achievements can be hard to compare between countries, continuous education is chosen as the SEP-indicator.

Measuring education through questionnaires is quite easy and strongly related to self-reported health (Heistaro, Jousilahti, Lahelma, Vartiainen, & Puska, 2001). It often gathers high response rates, and it is important and relevant to everyone, regardless of age. Measuring education can also feel less contentious for the informant compared to other SEP-indicators such as income and unemployment (Galobardes et al., 2006).

The history of health inequalities

In 1977, Sir Douglas Black set up the "Working Group on Inequalities in Health" to review the information on inequalities in health between different social groups. This was done to consider the possible causes behind these inequalities and for the implications of policy, as well as to suggest further research on the subject (Jenkin, 1982). This report was a milestone within research on health inequalities and led to an increase in published articles on the subject. The report showed that there were differences in mortality rates between different occupational groups, for both sexes and all ages. These inequalities can be seen in almost every cause of death (Black, Morris, Smith, & Townsend, 1982). This also includes self-reported health rates for long-standing illness where unskilled males and females scored twice and 2 ½ times higher than the more professional classes. Black and his team did not only show that there are inequalities in health per se, but also in the utilization of health services,

especially the preventing services. These results come from under-provision in working-class areas and both the financial as well as the psychological costs of attendance, which are not outweighed by the disruption of normal activities by sickness (Black et al., 1982). The Black Report looked at four arguments to explain health inequalities between social classes. Firstly, there is a possibility of measurement errors, meaning that the statistics were not reliable. Secondly there may be natural health selections, suggesting that it is an individual's health status itself that influence his or her social positioning. Thirdly, material deprivation (low income, poverty, poor housing conditions, pollution etc.) itself can shape individuals' health. And fourthly, cultural behaviors may belong to different social classes (smoking, poor diets, less exercise etc. in working-class groups) (Macionis & Plummer, 2008).

This report was not welcomed by the United Kingdom's government when it was published, but despite this it got major attention from both the UK and other countries (Smith, Bartley, & Blane, 1990). This was one of the first reports where health inequalities were addressed, and can in some ways be looked upon as the push researchers needed to start addressing health inequalities as a major social issue.

Self-reported health

The most well-known health definition comes from the World Health Organization (WHO):

> Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.
>
> (WHO, 1946; 2006:1) [1]

This definition emphasizes that "health is as much a social as a biological issue" (Macionis & Plummer, 2008). It is however not implicit that "health" has the same meaning and definition for every individual. The definition has been criticized for the past 60 years, partly due to its emphasis of the word "complete", which would leave most of the society unhealthy at all times (Huber et al., 2011). Another thing is that the demography of populations and types of diseases has changed considerably since 1948, where we have gone from acute to more chronic diseases. Both of these critiques make it hard to operationalize the definition, but it

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[1] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

still has not been modified to fit today's health questions. It is despite of this one of the best and most well-known definitions as of today.

Health is not a straight forward concept, and can be seen both objectively and subjectively. Looking at health objectively means looking at mortality rates in a country or area within a certain time period, or use the doctor's understanding of a patient's health (Eikemo, 2009). However, health is more than just death, and mortality rates do not give a good overview of how the disease burden in a country is. There are for instance health problems that will cause pain and suffering that are not fatal (Lundberg & Lahelma, 2001). Using an individual's own comprehension of his or her health is the subjective view of health, and is the one used in this thesis. The advantage of self-reported health compared to health indicators such as mortality and other measures of morbidity is that it covers both mental and physiological disabilities. It does not add limitations or guidelines on the answer of the respondent and it can be used to capture dimensions that cannot easily be captured by guided questions. It is comprehensive, inclusive and non-specific (Jylhä, 2009).

Self-reported health can be defined both negatively and as positively. The negative definition is where good health means complete freedom from diseases and illness, and the positive definition is where good health means physically fit enough to play the types of sports one likes, to be psychosocial well and to be emotional stable (Eikemo, 2009). The latter does also have stronger associations with more chronic, long lasting conditions compared to acute ones. The WHO definition is of the positive sort. Studies have shown that self-reported health can be a good predicting indicator of mortality (Heistaro et al., 2001; Kennedy, Kawachi, Glass, & Prothrow-Stith, 1998). It can be correlated with complex health indices, implicating the validity of self-reported health as a measure, as well as there has been found good test-retest reliability (Manderbacka, Lahelma, & Martikainen, 1998).

Comparing self-reported health between cultures and ages can to some degree be problematic. The understanding of what self-reported health is can be dissimilar for different populations and cultures because they provide different understandings for health evaluations (Jylhä, 2009; Jylhä, Guralnik, Ferrucci, Jokela, & Heikkinen, 1998). Italians evaluate their health more positively than the Finns for example, but more negatively than the French. One of the reasons might be that individuals from different cultures differ in their willingness to present themselves either in a positive or negative way. The differences between age may be due to the different understandings of one's health, where older individuals might compare

themselves only to others of their own age, and where younger individuals might compare themselves to a larger societal group (Heistaro et al., 2001). Health in old age can also be biased in that it is not random who gets old since individuals with higher SEP are often more healthy and live longer. These problems are hard to do anything with, but must be acknowledged when evaluating the results.

1.3. Previous research: Trends and explanations of health inequalities during the 21st century

In a historical perspective life expectancy and the possibility to live a healthier life has in most European countries increased and improved beyond what has been expected (Dahlgren & Whitehead, 2006). Despite this, the general trend show that health inequalities are increasing rather than decreasing as one would hope. The cause behind this is that individuals of lower SEP have a slower improvement in health compared to individuals with higher SEP. This means that the goal must be to reduce inequalities in health by raising the average health status for the population as a whole. According to Dahlgren and Whitehead (2006) it is important to consider the differences in general health trends between the western European countries and the Eastern European countries, such as the former Soviet Union, when studying social determinants of health inequalities.

Social inequalities are present in most, if not all, western European countries. These inequalities have according to Dahlgren and Whitehead (2006) increased over the past two decades, without any evidence to stop in the near future. There are on the other hand different results between mortality rates and self-reported health. Self-reported health is more often measured to show higher social inequalities than mortality rates, but they have during the 1980's and the 1990's also been more stable, even though self-reported health is said to predict mortality. An example of the amount of inequalities is a study comparing eleven western European countries, showing that the risk of self-reported health was one and a half to two and a half times greater for individuals with lower SEP compared to individuals with higher SEP (Dahlgren & Whitehead, 2006). The big difference between the western European countries and the central and eastern countries is life expectancy, where the life expectancy for the latter countries have decreased after going from a planned economy to a market economy in the 90's. Within the Russian Federation for example, the life expectancy amongst men declined by six years, and more than three years for women (Dahlgren & Whitehead, 2006). These negative mortality trends are highest among individuals, with lower SEP,

increasing the health inequalities between eastern and western European countries. In many of the eastern European countries there are also gender associated differences, where women come out the best. In Poland for example the excess risk of dying is more than double for individuals with lower SEP, but only for men, while it in Slovenia counts for both genders.

Contextual explanations of trends in inequalities in self-reported health

It has previously been mentioned that there are several theories and explanations that can help to understand how and why there are health inequalities between individuals belonging to different parts of the social hierarchy. Since looking at the effect of contextual determinants on inequalities in self-reported health in Europe between 2002 and 2012 is the aim of this thesis, there are some important contextual explanations concepts to consider. The first is the financial crisis that tripped the European economy in 2007/2008, and how countries responded to this based on the welfare state regimes they belong to, which is the second explanation concept. The third explanation concept is Wilkinson's income inequality hypothesis. This hypothesis looks at income inequality, relative deprivation, social cohesion and psychosocial stress as causes behind inequalities in self-reported health. The first two contextual explanations will be described in this section, while the income inequality hypothesis will be elaborated in chapter 2. Figure 1.2 is an expectation model connecting the financial crisis, welfare state regimes and the income inequality hypothesis to inequalities in self-reported health.
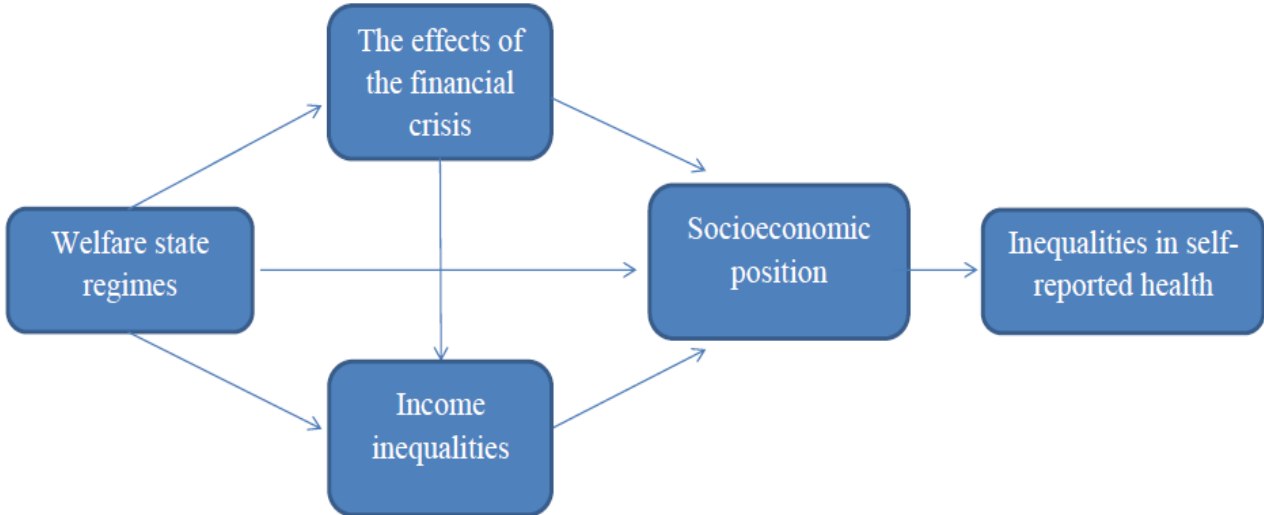
Figure 1.2 Expectation model connecting the core explanation concepts of financial crisis, welfare state regimes and the income inequality hypothesis to inequalities in self-reported health

The potential impact of the 2007/2008 financial crisis on health inequalities

In 2007/2008 a global financial crisis hit the European countries hard, some harder than others. Looking at the trends in health inequalities from 2002 up until 2012, with the financial crisis right in the middle of it, provides a good opportunity to naturally look for contextual determinants in health inequalities, without any researcher's involvement. The financial crisis led to massive economic difficulties in Europe, not only for undeveloped countries as it has mostly been during former financial crises, but also for developed countries. The financial crisis is the biggest economic crisis since the Great Depression. It all started with the collapse of the sub-prime mortgage market as early as the beginning of 2007 where homeowners had gotten loans in spite of their poor credit, who now struggled to make repayments because of high interests rates and decreasing property prices (Hodson & Quaglia, 2009). A major US sub-prime mortgage provider, New Century Financial Corporation, collapsed in April 2007, which quickly created problems for the US banking sector and then also the international financial system. Several European banks were affected by this since they incurred in large sub-prime losses. Some of the European banking models relied on assets and liabilities in foreign currencies, which left them highly exposed to the global financial crisis and with limited policy options (Hodson & Quaglia, 2009). This have all led to massive economic difficulties for companies, corporations and organizations throughout Europe, causing an increase in unemployment rates.

Many researchers have expressed some concern as to whether population health will decrease as a result of the economic downturn of 2007/2008, especially due to increasing unemployment rates (Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009). Increased rates of unexpected unemployment are known to cause increased amounts of mental problems, addiction problems, less healthy lifestyles, and poor disease management. Even though every country in Europe to some degree are affected by increasing unemployment, the countries most affected are according to Eurostat (2013) the Baltic countries, belonging to Eastern Europe, and Spain. The WHO (2009) themselves say that populations' stress level will most likely increase because of the crisis, and that it is firstly the poor and vulnerable who will suffer, which again might increase the health inequalities between the different social groups. There are on the other hand some researchers who have claimed that individuals in affluent countries experiencing an economic crisis and high unemployment rates will get better health because of more healthy choices such as less unhealthy food habits and spending more time doing health promoting activities (walking or biking instead of using the car, etc.)

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(Karanikolos et al., 2013; Stuckler et al., 2009). Since individuals from lower socioeconomic positions are more vulnerable to financial strains and unemployment, this might actually even decrease health inequalities. According to Stuckler et al. (2009) most research on increasing population health are rather sensitive to the indicators used to measure economic change. Much of the findings are either based on health related behavior or top- and downturns in GDP. There is however little correlation between GDP and life expectancy, especially among rich countries (Marmot, 2005; Stuckler et al., 2009). The poorest members in a society are the most sensitive to unemployment and could easily be missed by this. Being unemployed is not all about health related behavior, it is also about financial difficulties and how these might have an impact on population health and health inequalities in Europe through increased stress levels. Most research with a focus on the individual finds that an economic crisis will contribute to poorer health, poorer lifestyle in terms of the consumption of unhealthy food, smoking as a response to stress and an increased alcohol consumption, and poor disease management as a result of an overburdened health care system (Stuckler et al., 2009). Individuals with poorer SEP are as mentioned more vulnerable, creating health inequalities. Here it is possible to see how contextual determinants influence individual determinants. Because of these research findings it will be assumed that economic strains will increase health inequalities, but that there are inconclusive results will be born in mind.

This is not to say that reduction in GDP is not important for changes in health and inequalities during a financial crisis, it is just saying that it works secondary through or along with other indicators. In 2009 the Gross Domestic Product (GDP) fell in every European country of the European Union except for Poland, where the average decrease was 4.3 %, but where the losses ranged from a lower decrease of 1.9 % in Cyprus to a high decrease of 17.7 % in Latvia (Karanikolos et al., 2013). The most vulnerable are the population of countries facing large cuts in public budgets, in salaries and/or working hours and increasing unemployment due to layoffs and difficulties with finding work in a tense labor market. Unemployment rates, which is seen as one of the best indicators of economic strains, rose to a greater or lesser extent in most countries between 2008 and 2009 (Fallon & Lucas, 2002; Karanikolos et al., 2013; Stuckler et al., 2009). All of the above is particularly true for the unskilled workers who often are at the lower parts of the social hierarchy. Unemployment is associated with poorer health for the individuals affected, which can lead to both a decrease in population health and an increase in health inequalities. According to the WHO (2009) rising unemployment rates will increase population stress level, especially amongst the ones from lower socioeconomic

groups, which can lead to more chronic health problems. Job loss can contribute to mental health problems, addiction problems, less healthy lifestyles and poor disease management due to an overburdened health care system or delays in seeking help due to the concern of additional costs (Stuckler et al., 2009). Previous studies have also shown that fluctuations in employment is the economic indicator that is closest associated with short-term health changes, probably because of its economic value in households and stress related to housing income. Unemployment can lead to financial austerity in the household, families can lose their house and they can lose their insurances (if they need or have one), especially in countries of welfare state regimes with meager state welfare services. It is important to notice that different countries and welfare state regimes will vary in how sensitive their mortality rate and health rates are to economic crises on basis of their benefit programs. Weaker labor markets and poor social protection are important contributors to potential negative health effects and increasing health inequalities due to rising unemployment rates. Stuckler et al. (2009) use the Eastern European regime as an example.

As seen above there are many factors that can relate the financial crisis to health and inequality, where unemployment is one of the most important ones. The most vulnerable who will suffer first are mostly individuals with lower socioeconomic position. Because of this, the welfare state regimes the countries belong to and the state benefit programs they possess will probably be important factors for how big the health consequences will become.

European welfare state regimes: the Ferrera classification

Most European countries today can be clustered into different welfare state regimes. To understand the contextual explanations on health both within as well as between the European countries, it is also important to understand the foundations of the welfare systems of these countries. Using welfare state regimes and how their social benefits works as guidance will make it easier to understand health inequalities both within and between countries. Belonging to a welfare state regime means that all the countries within it are similar in how they protect their populations through social provisions, emphasizing coherence within the regimes and the differences between them (Bambra & Eikemo, 2009). This counts for geographical proximity and cultural resemblance as well as similar welfare policies.

Esping-Andersen's welfare typology is one of the most well-known (Esping-Andersen, 1990). However, the theoretical and empirical value of *Three Worlds of Welfare Capitalism* has been criticized and debated to a larger extent (Arts & Gelissen, 2002; Bambra, 2006). Because of

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this there has been proposed other typologies, trying to address the characteristics and countries not taken into account by Esping-Andersen (Eikemo, Bambra, Judge, & Ringdal, 2008). This includes Leibfried, Castles and Mitchell, Kangas, Ragin, Ferrera, Bonoli, Karpi and Palme, Pitzurello, Navarro and Shi, Kaotto and Bambra (Bambra, 2007a). These typologies are all designed to address inequalities, but they do this in different ways (Eikemo, Bambra, et al., 2008; Esping-Andersen, 1990). Out of these it is Ferrera's four-fold typology that is the one highlighted as the most empirically accurate (Bambra, 2007b; Eikemo, Bambra, et al., 2008). Ferrera looks at the inequalities in how welfare is distributed among the population, and compared to Esping-Andersen he includes a fourth Southern European welfare state regime. These four regimes are the *Scandinavian welfare state regime* (Norway, Finland, Sweden and Denmark), the *Anglo-Saxon welfare state regime* (the UK and Ireland), the *Bismarckian welfare state regime* (Germany, Belgium, France, Luxembourg, Netherlands, Austria and Switzerland), and the *South-European welfare state regime* (Greece, Italy, Portugal and Spain) (Bambra & Eikemo, 2009; Ferrera, 1996).

The Scandinavian welfare states are the most universal with high population coverage. The countries are defined by income protection, generous social transfers and an interventionist state. The social security system is redistributive, creating social equality. Compared to the other welfare states regimes the Scandinavian welfare states promote equality of the highest standard (Bambra & Eikemo, 2009). The Anglo-Saxon regime can also be said to be characterized by universalism with their fixed benefit rates for everyone, but the state provisions are minimal with strict criteria. The ones who need it are being mean-tested and therefore stigmatized. They only guarantee the minimum of standard, and they are actively subsidizing private welfare schemes. This creates big differences between the poor and the ones who can afford private provision. The Bismarckian regime has welfare programs that are status differentiating, where benefits mostly are earning related and administered through employment. Some of the countries within this regime, especially Germany, have social insurances provided on the basis of the applier's contribution background in employment. If this contribution is small, they have to be means-tested to receive insurance benefits (Bambra & Eikemo, 2009). This helps maintaining the social patterns that already exists in these countries. The role of the market is marginalized, the redistributive impact is minimal, and family is emphasized. The last out of the four is the Southern European regime which is described as rudimentary. This regime has welfare provisions that consist of income maintenance schemes, ranging from meagre to generous, and their welfare system (especially

the health care system) have only limited or partial coverage (Bambra & Eikemo, 2009; Ferrera, 1996). Family bonds are in this regime important.

However, this does not cover all the European countries, and there is a new concern addressing the new Eastern European countries (former Soviet Union). The last regime is therefore the *Eastern European welfare state regime* which has gone from universalism due to communism to state policies somewhat similar to that of the Anglo-Saxon welfare state regime with more marketization and decentralization (Bambra & Eikemo, 2009). They have very limited health service provisions compared to other members of the European Union, and their health in general is relatively poor. This regime includes the former communist countries such as Hungary, Poland, Slovenia and the Czech Republic. Including the Eastern European regime is important, making it possible to see if these countries have changed since the end of the communist era, and if so how (Eikemo, 2009).

According to Eikemo, Huisman, Bambra, and Kunst (2008) the Scandinavian and the Anglo-Saxon welfare states have the best health out of the five regimes, followed by the Bismarckian countries, the Southern European countries and the Easter European countries. The Southern European regimes however have the biggest health inequalities, while the Bismarckian regimes are the one with the smallest health inequalities. The Scandinavian welfare states, despite their egalitarian state policies, are ranged with higher health inequalities than both the Anglo-Saxon and the Eastern European regime. It will therefore be interesting to see if these health inequalities have changed between 2002 and 2012.

1.4. The structure of the paper

The introduction has started with an overview of themes within socioeconomic position, health, inequalities and explanatory factors and concepts at the individual (stress, behavior, etc.) and contextual (financial crisis, welfare state regimes and income inequality) level. There has also been presented some previous research on the trends in health inequalities during the 21st century. Two contextual explanations concepts have already been presented, while Wilkinson's income inequality hypothesis will be explained in the following chapter. Chapter 3 presents the methodological choices made and why those choices were made, and it explains the operationalization of the data and material. The next chapter is the analysis and results, followed by a discussion of these results and conclusions in chapter 5 and 6.

2. Richard G. Wilkinson: The Income Inequality Hypothesis and Health Inequalities

Wilkinson's income inequality hypothesis (also called model of income inequality and social cohesion (Muntaner & Lynch, 1999)) is as mentioned a contextual explanation concept that will be used to look at the cause behind and the trends in health inequalities. The income inequality hypothesis presents a possible epidemiological shift from where health inequalities were based on infectious disease due to absolute material deprivation, to where health problems to a greater or lesser extent now are caused by psychosocial stress factors, which again will cause diseases such as cancer and different cardiovascular diseases (Wilkinson, 1996). According to his hypothesis egalitarian societies have smaller health inequalities compared to less egalitarian societies, and what he explains this with is relative deprivation and social capital. Even though his hypothesis is based on the psychosocial explanation model, he does not claim that material factors in life does not have anything to say when it comes to health inequalities, but he does claim that if they do have an effect, this effect will be secondary through psychosocial factors. This section will start by explaining the theory behind Wilkinson's income inequality hypothesis and its mechanism, where a closer look into the epidemiological transition, relative income and relative deprivation, the psychosocial risk factors and social capital will be taken. Following there will be a discussion about how the income inequality hypothesis can help explain the mechanism behind the trends in health inequalities in Europe and within the European countries based on their welfare state regimes.

2.1. Epidemiological transition: from material to psychosocial explanations of health inequalities

According to Wilkinson's hypothesis life expectancy is dramatically improved in egalitarian countries where income differences are small. He claims that the social links between inequality and health draws the attention to social factors rather than material factors to be the independent determinants on health inequalities in affluent countries. The reason for this is that during the twentieth century, the affluent countries reached a crucial stage in economic development where living standards now are adequate to ensure good material standards for all and where the economic development have lifted populations out of absolute material needs (Wilkinson, 1996, 2005). Health inequalities are no longer due to absolute physiological material deprivation, but relative deprivation, leading to a change from

infectious diseases due to material deprivation, to diseases such as cancer and cardiovascular problems caused by psychosocial stress (Wilkinson, 1994, 1996, 1997b).

2.2. Relative income and relative deprivation

Wilkinson's hypothesis is based on household income rather than Gross Domestic Product Per Capita (GDP_{PC}). The reason for this is that there is a relationship between health inequalities and household income within developed countries, but looking at the relationship between the GDP_{PC} and mortality rates (which he use as a health indicator) among the 25-30 richest countries in the world, there is no relationship (Marmot & Wilkinson, 2001; Wilkinson, 1997b). According to Wilkinson (1994, 1996), life expectancy rises with the GDP_{PC} up until it reaches around $5000 per capita (data from 1990). This is probably why life expectancy rises rapidly with an increase in GDP_{PC} in poorer countries, while in richer countries they level off. After this, neither GNP_{PC} nor GDP_{PC} is associated with little or no increase in life expectancy (Wilkinson, 1994, 1996). It is not the wealthiest countries that has the longest life expectancy, but the countries with the smallest income differences and the smallest percent of the population in relative poverty, leading them to be more egalitarian. One could think that this is because the lower parts of the social hierarchy are closing in on the higher parts, but this is not the case since life expectancy in general is increasing the most for individuals with higher social status.

According to Wilkinson (1996) it is logical to interpret the levelling off of the life expectancy curve with increasing GDP_{PC} as a result of the attainment among the majority of the population to have at least a minimum of real material standard of living, above where further increase no longer is the key to additional increase in health. This implies that there is a marked contrast between the relationship among socioeconomic status and health within a country as opposed to between countries (Wilkinson, 1994). This is where Wilkinson links relative levels of income to health inequalities instead of absolute levels of income into his income inequality hypothesis. The strong relationship between income distribution and mortality rates in developed countries confirms this. It is when the income distribution is uneven, and individuals will compare their relative position to others that psychosocial stress will take its toll and create health inequalities between social groups (Wilkinson, 1996). It is no longer the differences in absolute material standards, but individuals' position within the society that matters, which means that it is the relative income and the relative deprivation compared to others that can affect their health (Wilkinson, 1996).

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Wilkinson's hypothesis focuses mostly on affluent countries and the effects of relative income. Narrower differences in income can be associated with population health in two ways: 1) in societies with narrower income differences the quality of the social structure might imply that population health is better in all social layers, and 2) average health, life expectancy and health inequalities might increase or decrease as the health of people in the lower poorer classes improves or deteriorates with changes in their relative poverty (Wilkinson, 1996). The question now is if the income inequality changes, will the health inequality change as well or will the health only change across the social hierarchy in a linear way? There has been a lot of discussion around this, whether the health will get better or worse for the entire population in general (linear), maintaining the inequalities, or if it will change mostly for the ones with lowest social status (curve linear). According to the hypothesis it is not clear whether the health of the ones who are better-off also change as income differences decrease or increase, but it is clear that changes in absolute income differences do not lead to big changes in the health of the rich (Wilkinson, 1996). This will substantially offset the changes in the health of the poor, which may indicate a curve linear relationship, implying that changes in income inequality can lead to changes in health inequalities.

What the income inequality hypothesis implies so far is that egalitarian societies where income inequalities are smaller have less relative deprivation among their population, which again will lead to smaller health inequalities. The hypothesis suggests relative deprivation across larger areas since residential segregation leads to homogeneous neighborhoods etc., which means that in smaller areas the social hierarchy is lost (Wilkinson, 1999). Some areas have higher unemployment rates compared to other areas for example, where the income inequality would be small, but where everyone would suffer relative deprivation compared to the larger society (Wilkinson, 1997a). Mortality rates as a health indicator has been the hypothesis' main focus, but also other indicators such as self-reported health and illness were greatest in countries whose income differences were highest, leading to higher health inequalities (Wilkinson, 1996). A research by Subramanian and Kawachi supports that Wilkinson's income inequality hypothesis also can be applied to self-reported health (Elstad & Dahl, 2009).

2.3. Psychosocial explanations to health inequalities

Since Wilkinson bases his hypothesis on *relative* income and deprivation, he concentrates on the psychological and social pathways this might lead to. The fact that health seems to be more influenced by differences in income rather than by average level of income indicates that there are cognitive processes of social comparison that are involved (Wilkinson, 1994). Today there are a great deal of epidemiological and experimental evidence that confirms psychosocial involvement in health, both in morbidity and mortality (Wilkinson, 1996). The key to the biological effects, such as cardiovascular disease, ulcers, cancer, etc. is as mentioned chronic stress caused by psychosocial risk factors. The effect of the income distribution implies that social meanings and implications for social position are more important than direct physical effects caused by material standards to explain the effect of income on health (Wilkinson, 1994). This does not mean that the hypothesis is trying to remove material living standards, such as bad housing and air pollution, as plausible effects on health inequalities, it just implies that they are mediated through social positioning, and that the poorest ones in a society might suffer from both psychosocial effects as well as material ones. The income inequality hypothesis claims that there are three aspects of the relationship between socioeconomic status and health that can explain the psychosocial effects: 1) there is not only a difference between the rich and the poor, but with every step climbed on the socioeconomic ladder, the better health individuals will have, creating a health gradient, 2) despite a rise in real income among most workers, which led them above absolute material deprivation, there has been an increase in mortality disadvantages of blue collar workers and their families in several countries, and 3) even in the least affluent of the developed countries in the world, the absolute living standard among the poorest is remarkably high (Wilkinson, 1994).

One of the clearest indications that relative deprivation affects health through psychosocial pathways is according to the income inequality hypothesis the effects of unemployment (Wilkinson, 1996). The question then becomes, are the unemployed less healthy because unemployment damages health, or are they unemployed due to their health? Proving either one of these can be hard, but evidence from factory closure-studies has shown that unselected unemployment is health damaging. Another interesting thing is that the same studies showed that the deterioration in health does not start after the individuals become unemployed, but before due to the stress caused by announced redundancies (Wilkinson, 1996). Individuals

with lower social status are the ones who are most vulnerable, causing health inequalities through psychosocial stress due to work insecurity and the anticipation of unemployment. The amount of control at work individuals possess is also an important factor since it is an indicator of their position within the social system. Lack of social support from managers and colleagues, fast pace, heavy workloads and hard pressure can all be health damaging (Wilkinson, 1996). Having little control is probably due to having a superior commander telling the subordinates what to do and when to do it, leaving them at the bottom of the work-hierarchy with a strong feeling of subordination. Housing insecurity is another interesting factor that affects health through psychosocial channels, which might also have a lot to do with unemployment risk and financial factors (Wilkinson, 1994). Housing insecurities can range from council plans to difficulty in keeping up with rent or mortgage payments. In many ways, money is the key to having control both at work and at home. The more money, the greater the options, the more choices, and the easier one's problems might be resolved, creating inequalities between social groups. Unemployment or work insecurity as well as housing insecurity can all be seen as circumstances of financial insecurity where personal control is lost, causing psychosocial stress. This again can make individuals more prone to colds, influenza, ulcers, high blood pressure etc., due to relative deprivation and a weakened immune system.

One of the many ways psychosocial risk factors might affect health is through health damaging behavior, which is also related to self-reported health and can reflect internal locus of control (Heistaro et al., 2001; Wilkinson, 1996). There are many different kinds of health-related behavior that might be triggered by psychosocial stress. Smoking is one of the most increased health damaging behaviors during long lasting stress. This despite how much it costs, which can indicate that, in case of unemployment for example, the relative deprivation and psychosocial stress is the cause behind it, rather than absolute financial deprivation. Previous research suggests that there is no socioeconomic gradient in the desire of giving up smoking, but there is a gradient in the success rate of giving it up. The reason for this is explained by that giving up smoking is easier for individuals with high self-esteem, who feel optimistic about their life, and who feel in control (Wilkinson, 1996). But if things are going bad, and prospects looks pretty hopeless, such as in the case of involuntary unemployment, people are more prone to fall back into old habits and regard smoking as the only way of relaxation and luxury. Smoking is regarded as a marker of socioeconomic stress, but there are also other processes that might affect other forms of behavior that can harm health.

Epidemiological evidence suggests that the years which saw the most rapid increase in relative income inequality and poverty during the second half of the twentieth century, also saw the most rapid increase in smoking among the poorest quarter of the population (Wilkinson, 1996). There are many ways to respond to stress and unhappiness. It can lead to an increase in the consumption of comfort food, which are often unhealthy, leading to more obesity, and an increase in the use of alcohol and various drugs (both prescribed and illegal) (Wilkinson, 1996). A theory as of the reason for all this, especially the consumption of comfort food, is that an increase in unemployment and insecurity may lead to a decrease in physical activity among discouraged people who are stuck at home, eating and drinking for comfort. Alcohol for example has always been used for relaxation, as something that will make people more disinhibited and to counter stress easier. Alcohol, drug use and smoking are all psychoactive and works neurologically on the body, but also food consumption can protect the body from stress (Wilkinson, 1996). High cholesterol level for example is found to be associated with lower risk of injuries and suicides. The psychosocial perspective suggests an explanation for the social distribution of health risk behavior, and most psychosocial factors that are health damaging are unfortunately more common among people in the lower parts of the social hierarchy, creating social differences in health (Wilkinson, 1994, 1996).

2.4. Social capital: social status, social affiliation and social cohesion

According to Putnam (2001), social capital is embodied in collective norms and the value of social networks, and the inclinations to do things for each other that may arise from these social networks. It is the collection of the actual or potential resources that is linked to possession of social networks, and it is in this way a membership in a social group (Bourdieu & Wacquant, 1992). Wilkinson mediates through the income inequality hypothesis that social capital and social cohesion are some of the most important areas of social inequality, and the hypothesis focus especially on psychosocial risk factors as caused by an individual's social status and social affiliation. Social status is as mentioned not only linked to health through the physical effects of material exposure, but also to which position an individual has in the social hierarchy. It is about experiences of superior and dominant status versus inferior and subordinate status, the feelings of stigmatization and exclusion for those at the lowest part of the hierarchy, and how this works as an additional stressor itself. Former studies with animals, both in captive (where they can experimentally manipulate changes in social status) and in the wild, have shown that there is a link between low social status and chronic stress, which can also be associated with humans (Wilkinson, 1999). Social status is as mentioned also linked to

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status at work, leading to a feeling of subordination both at work and in the society as a whole, which again can influence his or her health through different psychosocial pathways (Wilkinson, 2006b). This subordination to others, caused by relative deprivation, can lead to limitations in personal autonomy, making people compare themselves to others (both at work and in general), causing stress related problems, such as anxiety, due to fear of being less successful, less attractive, less intelligent and less socially inferior (Wilkinson, 1999). Wealth, education and therefore higher social status are looked upon markers of ability and success, and poverty and lower social status are seen as failure and inadequacy.

With social status everything comes down to power, coercion and access to resources without the need of others, something individuals from low-status groups to a larger degree do not possess. In contrast to this, friendship and social affiliation is about mutuality, sharing, reciprocity, and the recognition of each other's needs. The quality of such social relations can vary between societies, but also within a society, possibly leading to inequalities in social trust (Wilkinson, 1999). Social support from others may help people in how they respond to stressful life events as it can be stress revealing, and the amount of friends they have, confiding relationships and how involved they are in community life is very predictive for their health (Wilkinson, 2006a). Social status and social affiliation are probably some of the most powerful influences on chronic stress that is known, which then can influence population health and health inequalities (Wilkinson, 1999, 2006a). Unfortunately it is often individuals with the lowest social status who are less likely to have big social networks, having higher mortality and morbidity rates (Wilkinson, 1994). The higher social status individuals possess, the bigger their social networks are, the more social support they will have, and the better their health will be (Wilkinson, 1996). What the hypothesis argues is that individuals with lower social status have weaker and smaller social relations compared to individuals with higher social status, leading them to be more vulnerable to psychosocial stress due to increasing income inequalities and increasing unemployment rates, which again can decrease their social network.

Social status and social affiliation does not only work separately as opposing risk factors, but they also work together as they move inversely in societies, creating social cohesion within the society, which is another important psychosocial risk factor (Wilkinson, 2006a). On one hand the goal of the hypothesis is to show the strengths where community life, local associations, and friendship patters seem to be related to health due to their reflection of individuals' social ease and their confidence. On the other hand it wants to show to which

extent social contacts in societies with big inequalities can provoke anxiety, feelings of inadequacy, negative social comparisons, etc. Wilkinson's idea of social cohesion used in the income inequality hypothesis stems from Emilé Durkheim who claimed that interdependence and shared values, references and the feeling of belonging creates cohesion (Elstad & Dahl, 2009). In egalitarian societies there is a greater scope for assisting and supporting each other, learning from each other and for bringing each other the benefits of cooperation (Wilkinson, 2006a). Societies with social disintegration, where groups and individuals do not have a sense of social belonging, will have poor social capital and social cohesion. Low social cohesion leads to lack of trust in each other and fewer institutions where the individuals will take part in joint efforts for the common good. Health inequalities are here explained as a result from income inequality among the populations, leading to differences in social status, social affiliation and social cohesion (Wilkinson, 1999). Where income differences are smaller the individuals experience less hostility and more hospitality, they feel more secure and relates more to others, causing less psychosocial stress. High income inequality leads to bigger social distance and poorer cohesion between the population, and differences in material resources that will prevent the feeling of equality and equity. Social cohesion probably works both as an expression of individuals' underlying confidence, as well as the social environment working and feeding back to the individuals to increase or decrease their confidence, trust in others and inclusion.

What Wilkinson is trying to point out through his income inequality hypothesis is that if income inequalities widen, then the relative deprivation will increase, leading to poorer social capital and social cohesion within the society. This again will decrease the population health and increase the health inequalities due to psychosocial stress, and especially for the low-status groups who are the most vulnerable. In more egalitarian societies the population tend to have better social affiliation and to be more socially cohesive leading them to trust each other more, and therefore have smaller health inequalities. What matters is the sense of where we are in the social hierarchy, the social affiliation we possess and social cohesion.

> What the epidemiological evidence is perhaps telling us is that what sociologists have said is the great gateway through which we are socialized and subject to social influence is also the gateway through which society gets under the skin to affect health.
>
> (Wilkinson, 2006a:722)

2.5. How can Wilkinson's income inequality hypothesis explain trends in health inequalities in Europe and within European countries?

The first question now becomes, can Wilkinson's income inequality hypothesis be applied to explain trends in health inequalities in Europe between 2002 and 2012, and if so, how? It is confirmed that individuals in the lower-status groups are the ones who are most vulnerable to changes in the social structure, such as alterations in unemployment rates (Karasek & Theorell, 1990), which then will increase income inequality. This is not to say that individuals with higher social status are not exposed at all, just that the ones with lower social status are most vulnerable. It has earlier been presented that there has been an increase in unemployment rates in most European countries to a greater or lesser extent during this ten year time period (Eurostat, 2013). This will therefore form the basis of this discussion, but one must acknowledge that there during these years might also have been a decrease in unemployment rates, turning the results around.

According to Pharr, Moonie, and Bungum (2012) people who are unemployed tend to have higher levels of anxiety, depression, chronic diseases (such as cardiovascular disease, hypertension and musculoskeletal disorders) and early mortality due to psychosocial stress. They are also more frequently hospitalized due to poor mental health compared to individuals who are employed. All of this corresponds to some of what Wilkinson is trying to prove with his hypothesis. Much of this is because involuntary unemployment is often seen as a disruptive event, related to sudden financial problems. Studies have shown that the risk of depression for individuals who had to borrow money was twice as big as for those who did not have to borrow money, due to the humiliation and the stress factor behind it, creating a feeling of deprivation (Bartley, 1994). Bartley supports Wilkinson's hypothesis in that in most modern welfare states the threat of starvation and material deprivation is no longer thought of as a danger of sudden and involuntary unemployment. In this way, also he looks at relative income and deprivation as indicators for health and health inequalities, rather than absolute material standards, indicating that population health and health inequalities will either increase or decrease according to the changes in unemployment rates.

According to Karasek and Theorell (1990) how insecure individuals feel about their work has to do with the amount of control they feel they have, which again is related to their position in the social hierarchy, just as the income inequality hypothesis implied. In cases of an unstable economic market for example, a company that is in a slow period will probably have to lay

off many of their employees, usually the ones with the least important work and lowest social status. If the company then suddenly gets a work-boom, then their few employees will have to work extra hard, but still with the uncertainty of being let go if a new downturn comes along. The few who are left will most likely become competitive towards each other, asking themselves the question, "who will be next?". All of this will in the end contribute to an even more decreased sense of control and an increase in psychosocial stress (Karasek & Theorell, 1990). Several studies have confirmed that job insecurity is related to both higher mortality and morbidity (self-rated and psychological), where stress is the main factor (Ferrie, Shipley, Marmot, Stansfeld, & Smith, 1995; Kinnunen, Mauno, Natti, & Happonen, 1999; Kuhnert, Sims, & Lahey, 1989; Orpen, 1994). According to Mattiasson, Lindgärde, Nilsson, and Theorell (1990), the fear of getting unemployed and the psychosocial stress that it causes can increase the serum cholesterol concentration, which again might lead to cardiovascular disease and early death.

Jahoda (1982) and Jahoda, Lazarsfeld, and Zeisel (1971) suggests there are other consequences than economic bereavement that is threatening to health due to unemployment. These are the non-financial benefits of being employed, which is called "the latent consequences of employment". The latent consequences are time structure, self-esteem and self-worth, goals, intentions, and social interaction with others. It is associated with social networks, status and identity, collective actions and physical activities, which can relate to Wilkinson's hypothesis where he discuss the importance of health related behavior and social capital and cohesion in the forms of social status and social affiliation. These latent consequences are not directly linked to employment, making it important to point out the difference between involuntary and voluntary employment (Pharr et al., 2012). There have been some controversial findings as to whether individuals who are voluntary unemployed have poorer health than the ones who are employed. It is however claimed that individuals who have chosen to be unemployed have just as good mental health as the employed. If an unemployed person lacks good social relations and social affiliation, he or she might be more disposed to mental or physical health disorders, which may again lead to a shortened life (Andersen, 2010; Jahoda, 1982; Jahoda et al., 1971). Social support has a direct and an indirect buffer-effect on health. The direct effect has a positive health result no matter the social relationship or life strains. The indirect effect helps the individual with his or her coping skills which again will help reduce stress level (Dalgard & Sørensen, 2012). According to Kawachi, Kennedy, Lochner, and Prothrow-Stith (1997) there is a gap between

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those at the higher level in the social hierarchy and the ones at the lower level when it comes to investments in social networks, where the latter ones are less investing. They say that such social inequalities, leading to poorer social capital and social cohesion, are the pathways where income inequality exerts its effects on mortality rates in the population. It has also been found that rising income inequality and relative deprivation is a significant predictor for declining trust in others due to poor social cohesion in the society as a whole, and that declining trust makes people less engaging in the community, just as Wilkinson implied with his hypothesis. Living in a community that possess little social capital and poor social cohesion can be deleterious even though you yourself have a lot of it (Kawachi et al., 1997). Like Wilkinson, Kawachi et al. (1997) looks at income inequality as something antecedent to the relationship between mortality and social capital. As mentioned earlier, individuals with lower social status do often have smaller social networks and therefore less social participation (Kroll & Lampert, 2011). This makes individuals with lower social status more vulnerable to psychosocial stress due to lack of social relations if they are being let go from their work compared to if an individual from higher social class is being let go. Individuals with lower social status tend to live in the same areas, they are more vulnerable to unemployment due to social ranking and lack of control at work, and since unemployment tend to lead to less social interactions, this will probably cause poorer social cohesion compared to individuals from higher social groups. This again will probably lead to poorer health and increasing health inequalities. The individuals from higher social statuses tend to have more control over their work, and they do often have bigger social networks and better cohesion if something was to happen.

All of the above implicates that the higher a country's unemployment rates are and the bigger their income inequality is the bigger are the health inequalities. This means that Wilkinson's income inequality hypothesis seems adequate to explain contextual changes causing health inequalities within countries through psychosocial pathways. There are however still some more questions to be asked and answered: How do the different countries handle the effects of unemployment and income inequality? And on basis of this, do the health inequalities change within and between countries? According to previous research (Bambra & Eikemo, 2009; Eikemo, Bambra, et al., 2008; Lahelma & Lundberg, 2009) and to Wilkinson's income inequality hypothesis it can seem as it is the countries of the most egalitarian regimes with the best social protection that can restrain health inequalities caused by increasing unemployment rates the best. Here one must however acknowledge the difference between egalitarian

welfare state regimes and egalitarian countries. Even though egalitarian countries usually are a part of egalitarian regimes, and vice versa, one must recognize that there might be some ambiguities. Welfare states where they can protect a decent living standard for individuals effected by unemployment will work as a buffer against increasing health inequalities (Lahelma & Lundberg, 2009). It is the differences in social protection that is offered to the unemployed that could be an important factor in the relationship between relative poverty and unemployment, which might create bigger health inequalities through income inequality. In the next section the countries will be represented by the welfare state regime they belong to. The welfare state regimes will be ranked after how their benefit programs can protect the population health, linking them to relative income and health inequalities (Bambra & Eikemo, 2009).

The Scandinavian welfare states are the most egalitarian of all the European regimes with their universal welfare system and social transfers, and are therefore more capable of handling low-status individuals and especially the ones who get unemployed, both economically and health related. Their health coverage is good, which means that everyone who needs it have the opportunity to ask for help, related both to psychosocial stress and the results of it. The financial crisis was mentioned earlier as a great way to look at contextual change in a natural environment, and in this way see how contextual factors can change the trends in health and health inequalities. An example of how the Scandinavian welfare states responded to the financial crisis is Denmark, who decided to protect their health budget and reduced the rate of salary increase for their health professional, but increased the user chargers for some health services (Karanikolos et al., 2013). Even though the social system and the welfare benefits are good, unemployment can make people feel less worth and they might look at themselves as failures, which can lead to psychosocial stress. The social cohesion in societies within the Scandinavian regime is on the basis of Wilkinson's hypothesis good, but the individuals who get unemployed will still not have as much as they used to, which can to some level cause relative deprivation where they compare their old life to the new one, as well as to others. The social network of the involuntary unemployed might decrease to some extent. On the basis of everything above it can seem as changes in contextual factors such as unemployment and relative income inequalities in the countries within the Scandinavian regime will most likely either increase or decrease population health and health inequalities to some degree, depending on whether the changes are positive or negative.

The next is the Bismarckian regime. Here the key component of provision is social insurances based on employment. The social inequalities are here being maintained or increased since the unemployed are given provision through insurances, based on their contribution to the work force, this especially in Germany. A person with full contribution record will receive full unemployment insurance benefit in case of involuntary unemployment, but with only partial contribution the person will receive a means-tested insurance benefit (Bambra & Eikemo, 2009). This implies that individuals in the latter category will suffer severe income loss, causing higher relative deprivation, compared to oneself and others, and higher psychosocial stress. The ones with less contribution to the work force is most likely at the lower parts of the social hierarchy, and will therefore be having smaller social networks to begin with. This again may lead to more psychosocial stress after a job loss compared to the ones with more contributions. An example of how Bismarckian countries handled the economic changes during the financial crisis is the Netherlands who removed some services from the benefit packages, including physiotherapy and some mental health services, (Karanikolos et al., 2013). Psychosocial stress can cause both muscular tensions and mental health problems, and unemployed individuals might then not afford physiotherapy or psychiatric help, which can cause even more stress. This can possibly increase psychosocial stress in certain social groups, leading to decreased population health and an increase in social health inequalities, because of increasing income inequalities, decrease in individuals' social networks and a decrease in the social cohesion of the society.

Following is the Anglo-Saxon regime with minimal state welfare provisions. Because of their strict entitlement criteria and their means-testing, unemployed individuals who have to apply for this kind of state provision are often stigmatized, which itself can lead to psychosocial stress. In the UK for example, the applier need to fulfil the minimum National Insurance contribution requirement within two years prior to the unemployment to get the unemployment benefits of maximum 6 months (Bambra & Eikemo, 2009). Most people do not meet this criterion, making them reliant to the means-tested benefits. During the financial crisis for example, Ireland reduced the salaries for their health professionals, while England froze them (Karanikolos et al., 2013). This is an example of where individuals higher up on the socioeconomic ladder might also be affected by contextual determinants to some degree, even though the once lower down still are the most vulnerable. According to this changes in unemployment will either increase or decrease health inequalities according to rising or sinking unemployment rates. Where there are increasing unemployment rates the ones who

can afford the private welfare schemes will range the highest, and where the means-tested will range the lowest. In such cases, since the means-tested will only get the minimum, they will probably earn less than they used to, and relative income and deprivation will increase. Based on this it can be assumed that the ones being let go of their work might get a decreasing social network as well, leading to even more psychosocial stress. All of the above might lead to a decrease in public health and an increase in health inequalities.

The fourth is the Southern European regime. Here the key component of provision is social insurances, and welfare services that only provide partial or limited coverage. This means that the ones with higher income can afford maintenance schemes of higher quality, and the ones with lower social status and lower income, will probably have maintenance schemes of lower quality, if they can afford one in the first place, leading them to be more unprotected in case of unemployment. Unemployment might also lead them to lose their insurance in general, causing more psychosocial stress. Since the Southern European regime's welfare system, and especially health care system, only provides limited or partial coverage, a lot of unemployed individuals do not get the benefits they need in form of both economic and health related help. The individuals of lower social status are also here more vulnerable to unemployment, and the fact that they need social insurance to get more than limited coverage will likely cause more psychosocial stress. That countries such as Portugal decreased the extent of coverage by increasing the user charges when faced with financial difficulties (Karanikolos et al., 2013), will likely result in a decrease in population health and an increase in health inequalities. Also here the population with low social status will most likely have smaller social networks, which will decrease if they lose hours of work, or in the worst case gets unemployed. This again may cause social distrust and the social cohesion in the society might get poorer, but their family ties might however work as a buffer to some degree. In cases like this, income inequality, relative deprivation and psychosocial stress might rise for the population with lower social status. Since the welfare services only provide partial health coverage to those without insurance, which in some countries have declined after the financial crisis for instance, and since the maintenance schemes are based on income, this might lead to an increase in health inequalities within the Southern European countries.

The last is the Eastern European regime. These welfare states have now limited welfare services after they went from the universalism of a Communist welfare state. For low status individuals here there is not very much help to get if they get unemployed and if they do not have insurances. The social inequalities between the individuals with different social statuses

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are big, and this is the least egalitarian regime of them all. Income inequalities will most likely rise as the ones with no insurance get little or no help and the health inequalities will then rise due to psychosocial stress caused by relative deprivation. Slovenia is an example from this regime that also increased the user charges for some health services, making it harder for the unemployed and the ones with low income to seek help (Karanikolos et al., 2013). For the poorest of the population even material and absolute deprivation might have an impact on health. Since there are such big inequalities in the benefits given out either by insurance or by the state, the health inequalities will probably rise when unemployment rates and income inequality do.

Wilkinson's income inequality hypothesis might be applied to explain trends in inequalities in self-reported health in Europe based on contextual changes such as unemployment. The more egalitarian the welfare state regimes and the countries within it are, the less likely it is that income inequality will increase to a greater extent due to increasing unemployment rates, and the less likely it is that the health inequality will increase. For the individuals who do lose their work, it is believed that relative deprivation, compared to themselves and others, and the psychosocial stress as a result of it, will be the biggest cause of decreasing population health, which might lead to an increase in health inequalities to a smaller or greater degree. It is also believed that for the poorest within the least egalitarian regimes, material deprivation may also have an effect, as well as relative deprivation. These differences in how the countries support their population health through social benefits might also increase the health inequalities between the countries in case of major structural change throughout Europe. What one must recognize here is that this theoretical discussion is mostly based on the assumption that the unemployment rates are increasing. One must keep in mind that there might be some decreasing unemployment rates between 2002 and 2012 which might turn these theoretical results around, decreasing inequalities in self-reported health.

2.6. Summary

This chapter has focused on Wilkinson's income inequality hypothesis and how and if his hypothesis can help find the answers as to why health inequalities might not be constant in time and space. It seems as most of Wilkinson's income inequality hypothesis can be theoretically applied to explain population health and health inequalities in different European countries, where the most egalitarian societies have the best population health and the smallest health inequalities, even after an increase in unemployment. The ideas of relative

deprivation and social capital seems to fit most of the European welfare state regimes, perhaps except for the countries in the Eastern European regime where material standards might also have some impact. There was also an implication where his hypothesis could not be confirmed to explain health related behavior caused by unemployment due to inconsistent findings in previous research. It is also important to bear in mind that this section of the paper is not an empirical study, making the "results" assumptions based on a hypothesis and previous research.

The income inequality hypothesis implies that there will be changes in health inequalities according to whether unemployment rates rises or decreases. Previous literature argues that between 2002 and 2012 there will be an increase in unemployment, which according to the income inequality hypothesis will cause an increase in income inequality and therefore increasing health inequalities. This will be the case for all the countries and welfare state regimes, to a greater or lesser degree. The Scandinavian welfare states are the most egalitarian with the smallest changes in relative income inequalities and deprivation due to changes in unemployment, and therefore the lowest alteration in population health and health inequalities. The runner up are the Bismarckian welfare states where the social support is mostly based on earlier contribution to the work force, maintaining or increasing the relative income inequalities, deprivation and most likely health inequalities to a certain degree in times where unemployment is increasing. The next are the Anglo-Saxon welfare states where the population health most likely will decrease and the health inequalities will increase due to strict, stigmatizing, minimum welfare policies in the case of increasing unemployment rates. The fourth are the Southern European welfare states where they use social insurances, which most low-social status- or unemployed individuals cannot afford, and where the state only provides limited coverage, and where the health inequalities will increase to a greater extent. The very last are the Eastern European welfare states where they have limited welfare services. The unemployed will not get much help from the state, causing increasing income inequalities, decreasing population health and an increase in health inequalities to a much greater extent.

3. Data- and Method Choices

In the following chapter there are two aspects of the thesis that will be elaborated. This is first the treatment and collection of the data and then the methodological approach. There will be done two separate regression analyses to answer the research question: one looking at the trends in self-reported health within European countries, and one looking at the trends in Europe as a whole. Regression analysis becomes a relevant tool when one believes that there is a theoretical grounding for why one variable have an effect on another. The first analyses, looking at the trends within the countries, will be based on an Ordinary Least Square (OLS) regression with individual data collected from the European Social Survey (ESS), module 1 through 6. Every module of ESS is here used to look for the possible trends in inequalities in self-reported health. The next analysis will be based on multilevel modeling with the same individual data as the OLS-regression, in addition to contextual data collected from World Development Indicators (2002-2012), Eurostat (n.d) and Pordata (n.d.). The data for the multilevel analysis are divided into three levels: the individual level, the country/year level and the country level. The first level consists of individual variables such as education (SEP), feeling about household income, gender, age, etc., and the second level are the contextual-level variables such as unemployment rates and the Gini-index. All the levels are nested within each other, making it possible to run a multilevel analysis. The intents and purposes of the OLS- and multilevel modeling methods are in most cases identical in terms of how the models are build and how the coefficients are interpreted. The difference is that the latter allows us to see how individuals are affected by their contextual situations and contextual factors as well as individual ones. This model is therefore a bit more complex, and since much of the same things apply for both analyses, multilevel modeling will therefore be elaborated more than the OLS-regression.

3.1. The European Social Survey

The European Social Survey (ESS) is an international survey that has been conducted every second year since 2001. The modules were fielded in 2002, 2004, 2006, 2008 and 2010, and the last one in 2012 (module 6, published in 2013). ESS measures behaviors, beliefs and attitudes in diverse populations around Europe. Their goal is to chart changes and stability in the social structure and in social, political and cultural attitudes (European Social Survey, n.d-a). ESS is a useful tool for studying changes over time, both within and between countries,

making it a good dataset for longitudinal research questions. The data collected from ESS are anonymous and published for use by the Norwegian Social Science Data Services (NSD)[2].

Every module has one core module containing twelve broad topics, forming one half of an hour-long interview, and a rotating module consisting of modules designed in cooperation with academic specialists (European Social Survey, n.d-b). The core-module aims to monitor changes and continuity within a range of social variables. Self-reported health is part of the core-module and is therefore represented in all six modules. ESS is made so that the possible effects of societal events, such as the financial crisis talked about earlier, can be monitored as changes in attitudes and perception, either in the short or the long term. It is funded from a combination of sources, such as the European Commission, the European Science Foundation and different national academic funding bodies. The countries and years they have attended ESS are shown in Table 3.1. One important thing to remember is that the data are also collected the year previous to its publication year.

The quality of the ESS-dataset

Reliability is a complex topic since high reliability is an assumption for high validity, and that there in most cases will to some extent be measurement errors. The aim for the ESS-team is to achieve high methodological standards and strive for a way to optimally compare data collected across European countries. Maximizing reliability and validity in the questionnaires is their main goal, this way creating a high quality questionnaire that is able to compare countries, cultures and time periods (European Social Survey, n.d-c). The data are based on face-to-face interviews by professionals as well as questionnaires. Having these face-to-face interviews does often give higher response rates under controlled circumstances than telephone or postal interviews. The disadvantage is that the respondents might then encourage in bias based on social desirability. For a questionnaire to be used, the questions and concepts have to be strictly operationalized, which will help achieving high reliability and validity of the questions. To help predicting the quality of the questions asked, the ESS-team do a pilot-test as well as they use the Survey Quality Predictor (SQP)[3] (European Social Survey, n.d-c).

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[2]The European Social Survey and NSD are not responsible for the analysis and the results presented in this paper (ESS Round 1: European Social Survey Round 1 Data, 2002; ESS Round 2: European Social Survey Round 2 Data, 2004; ESS Round 3: European Social Survey Round 3 Data, 2006; ESS Round 4: European Social Survey Round 4 Data, 2008; ESS Round 5: European Social Survey Round 5 Data, 2010; ESS Round 6: European Social Survey Round 6 Data, 2012).

[3] SQP allows researchers create questions with high quality prediction. For each question the researcher provide some information about the characteristics of the question. This way a quality prediction can be made based on

On top of this there is also made a supplementary questionnaire. This supplementary questionnaire and the main questionnaire together make it possible to estimate the validity and reliability of a limited set of measures which can help us in the work of correcting for measurement errors. All of the above helps making the questionnaire as reliable and valid as possible.

The samples collected from ESS must be representative for every individual above 15 years of age within a country. The respondents are selected through strict random probability methods and cannot be quota sampled. Each and every country must have at least 1500 participants per survey (a minimum of 800 for countries with less than 2 million residents) (European Social Survey, n.d-d). Since ESS' goal is to see how different European countries have developed and changed in their beliefs, behaviors and attitudes, it is important that the respondents get the questionnaire in their own languages. To deal with the possibility that translating the questionnaire from one language to another might change the meaning of the questions, the ESS-team checks the questionnaire in a coding program in SQP to see how the comparability of the questions are across countries. This helps avoiding differences in the quality of the questionnaire (European Social Survey, n.d-e).

The conclusion is that the ESS-dataset can be seen as both reliable and valid with high quality since such big measures are taken to preserve the quality of the data collected. The same questions are used in several waves, and the questions with low quality are either removed or altered. The data are anonymous, protecting the respondent's identity, which can be quite useful, especially since the interviews are face-to-face.

3.2. Sample

The sample is collected to fit the research question the best possible way. The aim is to include as many countries as possible, and the only sample criterion is that the countries attending in this analysis must have been part of all the ESS-modules. This has to do with the aim of the thesis; to look at the trends in health inequalities in Europe and within European countries between 2002 and 2012.

Originally ESS contains data from 30 European countries, including Turkey, Israel and the Russian Federation. According to Table 3.1 the sample selection resulted in sixteen countries.

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these characteristics by using Multitrait Multimethod (MTMM) data and analysis that are previously done by the ESS for example, but also other surveys in different countries (Survey Quality Prediction, n.d).

Despite this, only thirteen countries could be analyzed. The reason is that data for France and Hungary in module 6 are not yet released, and that there were missing Gini-index values for Switzerland. Switzerland is missing Gini-indices from both 2002 and 2004 which is the reason why they are excluded from the analysis. Europe will in this thesis therefore be represented by the thirteen countries seen in Table 3.1. The final sample contains 129 887 respondents from thirteen countries and six modules, this after respondents between fifteen and 24 years old were filtered out. Because education here is the indicator for SEP, keeping the respondents between these ages could be insufficient since there are many individuals between the ages of fifteen and 24 still in school. This will be discussed further down.

Table 3.1 The participating European countries ranked by regime and the modules they have taken part

Country	Total N	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
Scandinavia	*36 684*						
Denmark*	8 033	●	●	●	●	●	●
Finland*	10 451	●	●	●	●	●	●
Iceland	-		●				●
Norway*	8 812	●	●	●	●	●	●
Sweden*	9 388	●	●	●	●	●	●
Anglo-Saxon	*22 952*						
Ireland*	11 139	●	●	●	●	●	●
United Kingdom*	11 813	●	●	●	●	●	●
Bismarckian	*34 285*						
Austria	-	●	●	●		○	○
Belgium*	8 899	●	●	●	●	●	●
France	-	●	●	●	●	●	○
Germany*	14 844	●	●	●	●	●	●
Luxembourg	-	●	●				
Netherlands*	10 542	●	●	●	●	●	●
Switzerland	-	●	●	●	●	●	●
Southern-Europe	*20 515*						
Croatia	-				●	●	
Cyprus	-			●	●	●	●
Greece	-	●	●		●	●	
Italy	-	●	●				○
Portugal*	10 887	●	●	●	●	●	●
Spain *	9 628				●	●	
Eastern-Europe	*15 451*						
Albania	-						○
Bulgaria	-			●	●	●	●
Czech Republic	-	●	●		●	●	●
Estonia	-		●	●	●	●	●
Hungary	-	●	●	●	●	●	○
Israel	-	●			●	●	●
Kosovo	-						●
Latvia	-			●	●		
Lithuania	-				●	●	○
Poland*	8 539	●	●	●	●	●	●
Russian Federation	-			●	●	●	●
Romania	-			●	●		
Slovakia	-		●	●	●	●	●
Slovenia*	6 912	●	●	●	●	●	●
Turkey	-		●		●		
Ukraine	-		●	●	●	●	○
Total N	129 887	21 571	20 955	21 314	21 952	21 520	22 575

*Countries used in this thesis, a total of thirteen.

○ Participating countries, but data not yet released.

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Design weight and population weight

Researchers in general as well as the ESS-team recommend weighting the data in the analysis to accomplish the most accurate estimates as possible. By weighting the data the sample will become more representative for the population as a whole since not everyone has the same chances to participate in the survey (Eikemo, 2012; European Social Survey, n.d-f). On the basis of this varying selection probability, there will most likely be some regions and/or households that will be either underrepresented or overrepresented in the study. These biases are usually minor, but they can be adjusted. Weighing data material means that some respondents are added more or less weight. This is what design weight is for. Another weight is the population weight which adjusts for higher or smaller sample sizes between countries. Even though the countries have different population sizes, their sample sizes are usually about the same. If the data are not adjusted for population weight, the small countries will be overrepresented on the behalf of the bigger countries (European Social Survey, n.d-f). The population weight is only to be used when operating with two or more countries in the same analysis, and is therefore only used in the pooled analysis, together with design weight. In the separate analyses, only the design weight is used.

3.3. Variables

Dependent variable: self-reported health

Self-reported health is a measure of how individuals themselves are experiencing their own health. The respondents are given the question "*how is your general health? Would you say it is 1 very good, 2 good, 3 fair, 4 bad, 5 very bad, 8 don't know,* (ESS Round 1: European Social Survey Round 1 Data, 2002; ESS Round 2: European Social Survey Round 2 Data, 2004; ESS Round 3: European Social Survey Round 3 Data, 2006; ESS Round 4: European Social Survey Round 4 Data, 2008; ESS Round 5: European Social Survey Round 5 Data, 2010; ESS Round 6: European Social Survey Round 6 Data, 2012). As seen above, the variable is ranked from positive to negative. This can be confusing when interpreting the results, especially since most of the independent variables goes from negative to positive. The variable is therefore turned around, going from negative to positive.

The definition of health and why self-reported health is preferred is already discussed in the introduction. Self-reported health as measurement has as mentioned its pros and cons. It can be hard to compare between cultures and age cohorts since the meaning and the understanding

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of health can be different, and the researcher has no control over these assessments. It is however a good measure since it looks at an individual's *own* feelings of health, both mental and physiological, without any limitations or guidelines. In the ESS dataset there are two health variables; *self-reported health* and *how hampered you are in your daily activities due to longstanding illness, disability, infirmity or mental health problems.* The latter is aiming more towards not being able to do what one wants on a daily basis, while self-reported health has more to do with how individuals feel about their health in general. Some people might for example be disabled and still see themselves with general good health even though they are not able to carry out all the activities they would like to, and others can also be able to carry out the activities they would like, but not be in very good health. Self-reported health is here chosen because of its subjective understanding, which can be both physical as well as psychological.

In both normal regression (OLS and logistic) and multilevel modeling there is an assumption that the dependent variable should be normally distributed. Figure 8.1 displays the normal distribution of self-reported health, all modules pooled together. The figure shows that self-reported health is a bit negatively skewed, but not so much that it is inoperable. According to Table 3.2 and to Figure 8.3 the mean difference between the ESS-modules are not large, but there has been a small decline in self-reported health between 2002 and 2006 before it rose a bit in 2008. There is on the other hand a small decline between 2008 and 2010 before it rises again in 2012, where it reaches its highest. That the changes in total mean of health between the years do not change much does however not mean that these changes are not significant, and it does not say anything about the health inequalities measured by education neither in Europe in general nor within the countries. Figure 3.1 shows that there is an incline in health per educational year, before it becomes a bit more unpredictable around 30 years of education. According to appendix Figure 8.2, describing self-reported health by country and ESS-modules, there are differences between the countries in self-reported health. There are also some differences within them by year, but these changes are not so evident. Figure 8.3 and Figure 8.4 shows self-reported health by ESS-module itself (to easier see the difference between the years) and self-reported health by gender. These figures do not display major changes or inequalities. It is however important to remember that these figures do not show how the health inequalities have changed, only the self-reported health per se.

Table 3.2 Descriptive statistics for self-reported health

Module, year	Mean	Std. deviation	Valid N
Module 1, 2002	3.77	0.91	21 571
Module 2, 2004	3.76	0.91	20 955
Module 3, 2006	3.74	0.91	21 314
Module 4, 2008	3.77	0.90	21 952
Module 5, 2010	3.76	0.91	21 520
Module 6, 2012	3.79	0.90	22 575
All modules	3.76	0.91	129 887
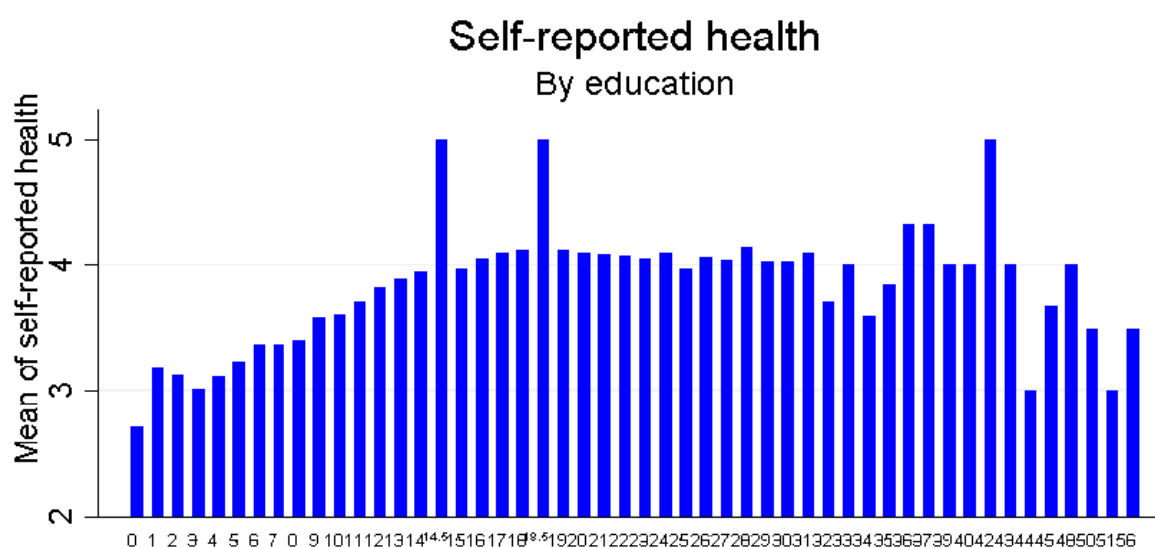
Figure 3.1 Self-reported health by education

Independent variables

The independent variables are being divided between individual level 1 variables and contextual level 2 variables. The most important level 1 variable is *education*, indicating an individual's SEP, and is therefore the variable that can detect inequalities in self-reported health. This is followed by the income and work variables *feeling about household income*

and *how much control you have at your work*, and the two social support variables *how often you socially meet with friends, relatives or coworkers* and do *you have anyone to discuss personal matters with*. There will also be two demographical variables for gender and age in the analyses. The individual variables, with the exception of education, will work as explanatory control variables. Following the individual level 1 variables, the contextual level 2 variables *unemployment rates* and the *Gini-index* will be controlled for.

Individual variables

The variable for year can be seen as both a level 1 variable as well as a level 2 variable since the second level is constructed by year. Level 2 is however not constructed on the basis of the ESS-modules, but the years of the contextual variables. The same applies for *countries*. It is therefore decided to treat the *ESS-module* as a level 1 variable in both the OLS regression analysis as well as the multilevel analysis, and *countries* as level 1 variables in the multilevel analysis. The ESS-module will be dummy coded into six dummies, and will be called ESS_{year}.

In the ESS dataset there are two variables for education. The first one is *highest level of education* and the other is based on the *amount of years completed education*. The latter one is chosen for the purpose of this thesis. Completion of level of education will be different between countries, making it somewhat harder to compare them. Not everyone completes their educational degree, but they still have some extra years of education which helps improving their cognitive skills. As mentioned earlier, Ross and Mirowsky (1999) concluded that the quantity model, explaining education by years of completion, is a better measure of education compared to the credential model which looks at educational achievement. They reasoned this by that time in education is more important than both achievements and selectivity due to the development of life shaping capacities every extra year of education can give, not by achieving a degree. Their conclusion is that the more years of education an individual has, the better his or her health is. This is also the results expected in the analyses.

As seen in Table 3.3 the lowest level of years in school is 0 and the highest is 56, with a mean of 12.31 which is approximately a high school education. It is important to take into consideration that there are some extreme values here. It is doubtful that anyone used 56 years on their education, which can imply that the question asked might cause some misunderstandings, maybe to how old they were when finishing their education, etc. Keeping these cases was still chosen to be the best alternative since the large sample size, especially at the more anticipated end of the scale, hopefully will decrease the problems this can lead to.

There are 101 cases with more than 30 years of education which is a small amount out of 129 887 cases (0.08% to be exact). According to Figure 3.1 the ones with highest/extreme education seems to have a more unpredictable self-related health mean compared to the ones with low or "normal" amount of education and it is therefore believed that these cases will not have a significant impact on the results. This should however be kept in mind when looking at the results in case these cases are influential. Figure 3.2 below shows how education is distributed by self-reported health. From the figure it is possible to see that the better health the higher is the mean year of education. Appendix Table 8.1 displays the descriptive statistics for all the independent variables for each module of ESS. The table shows that the mean of education decreases between 2002 and 2004 before it again starts to steadily increase. This indicates that form 2004 and onward the population of these thirteen European countries gets higher education, and it will therefore be interesting to see if this increase in education has affected self-reported health and on health inequalities. Figure 8.5 and Figure 8.6 shows education by country and year graphically to be able to see if there are any differences between and within the countries, and education by gender to see if there are any gender differences. There does seem to be some differences between the countries in education as well as within them over the years. The differences between the genders do however not seem very big.
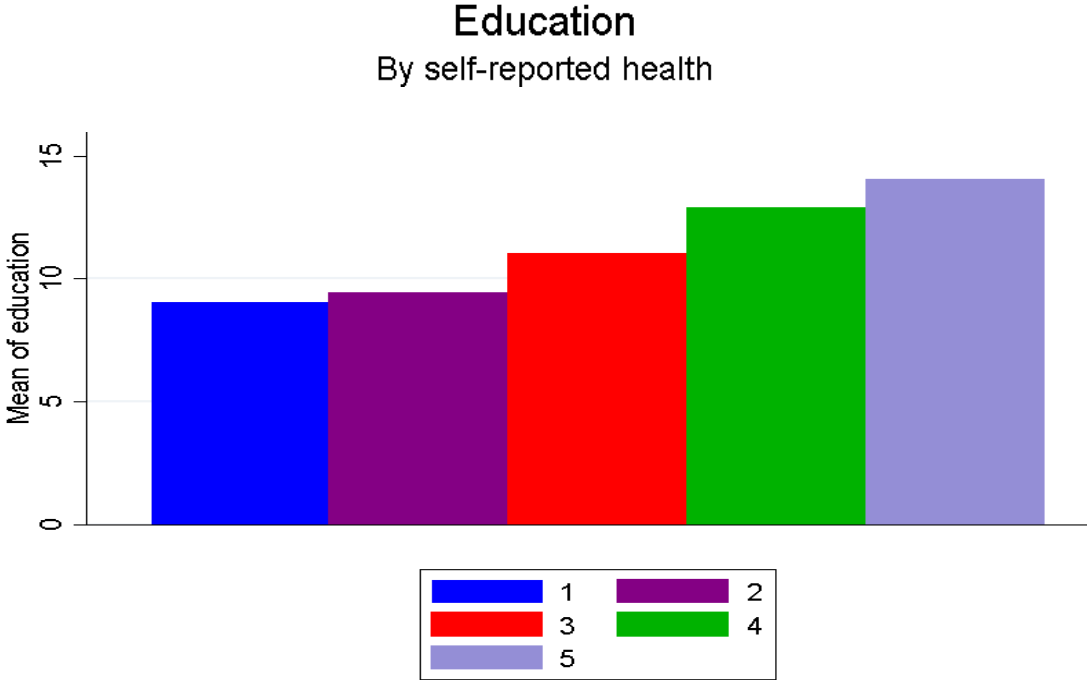
Figure 3.2 Education by self-reported health

There are two household income variables in the ESS dataset. In the first one the respondent is given a showcard with income cohorts and letters representing each cohort. They are then asked to add up the income from all sources in the household and explain which letter describes their household's total net income best. This showcard was changed in ESS-module 4 (2008), creating two different income measures. The second variable is the *feeling about household income nowadays*. This is a variable that is ranked from 1 (*living comfortably on present income*) through 4 (*finding it very difficult on present income*) (ESS Round 1: European Social Survey Round 1 Data, 2002; ESS Round 2: European Social Survey Round 2 Data, 2004; ESS Round 3: European Social Survey Round 3 Data, 2006; ESS Round 4: European Social Survey Round 4 Data, 2008; ESS Round 5: European Social Survey Round 5 Data, 2010; ESS Round 6: European Social Survey Round 6 Data, 2012). Due to the former variable's alteration and the latter one's subjective aim, *feeling about household income* is the variable chosen for the analysis. Some individuals do better on less than others, which makes this the best variable for the purpose of looking at inequalities in self-reported health. The variable is a good individual control variable for the Gini-index explained later. It is expected that the poorer the feeling about household income is the worse self-reported health will be. *Feeling about household income* is an ordinal categorical variable with only four categories. It was therefore decided to dummy code the variable into the four dummy variables *finding it very difficult on present income, finding it difficult on present income, coping on present income* and *living comfortably on present income*. The original variable went from positive to negative, and was therefore turned around before the dummy coding to make it easier to interpret in the descriptive Table 3.3 and in Table 8.1. According to Table 3.3 the mean of *feeling about household income* is 3.11, which represents coping on present income. According to Table 8.1 there has been a steady decline from 2002 until 2012, with the exception for the small increase between 2004 and 2006. Between 2008 and 2012 there was a decline of 0.06.

The next variable is *how much the management at your work allows you to decide how your own daily work is organized.* This variable was changed after the first module to *how much the management at your work allow/allowed you to decide how your own daily work is/was organized* (ESS Round 1: European Social Survey Round 1 Data, 2002; ESS Round 2: European Social Survey Round 2 Data, 2004; ESS Round 3: European Social Survey Round 3 Data, 2006; ESS Round 4: European Social Survey Round 4 Data, 2008; ESS Round 5: European Social Survey Round 5 Data, 2010; ESS Round 6: European Social Survey Round 6

Data, 2012). Both variables had a scale from 0, no influence, to 10, complete control. The only difference is that from 2004 and on the variable contains the past tense as well as the present. The variables are merged to one variable indicating the control you have/had at your work. The past tense that is added in the question in module 2 may cause different understandings of the question, and the merging must be taken into account when discussing the results. It is expected that the more control one have at work, the better the self-reported health is. According to Table 3.3 the mean is 5.73, indicating a medium to higher medium sense of control at work. Table 8.1 in the appendix show that there is a rather big increase from 2002 until 2004, which can be caused by the alteration of the question. The mean from Table 3.3 seems to be affected by this which is a limitation. The control you feel you have/had at work decreased between 2008 and 2010 before it rose again in 2012.

The next individual variable is *how often you socially meet with friends, relatives or colleagues*. The variable is ranked 1 *never, 2 less than once a month, 3 once a month, 4 several times a month, 5 once a week, 6 several times a week* and *7 every day*. Since this variable has more than five categories it can be seen as a continuous variable. Social interactions outside of work are important indicators when looking at health inequalities since social networks are shown to be SEP-related and to have a positive effect on self-reported health. Good social interactions and relationships are as mentioned associated with lower mortality of cardiovascular disease, mental problems and mortality in general (Berkman & Glass, 2000; Eng, Rimm, Fitzmaurice, & Kawachi, 2002; Seeman, 1996; Wilkinson, 1996). *How often you meet with others* will here be an indicator of social support. Social support is the individuals' experience that someone cares, that someone loves them, and that they are appreciated and belonging to a social network of equal commitment (Dalgard & Sørensen, 2012). The variable can be criticized for not considering social networks as both positive and negative, and that it is more objective than subjective. That is the reason why the dichotomous variable *do you have anyone with whom you can discuss intimate and personal matters with* is also added as a measure of social support. This variable was altered in module 6 and changed to *how many people with whom you can discuss intimate and personal matters.* The latter variable ranked from 0 to 6, representing between zero and ten or more individuals to discuss personal matters with. The variables were merged, coding everything from one to ten or more individuals to discuss personal matters with as 1, and none to discuss intimate matters with as 0. Since the questions are asked differently this can cause some analytical limitations that has

to be considered. It is expected that individuals with lower SEP have less social support, and therefore worse self-reported health.

In Table 3.3 the mean for *how often you socially meet with friends* is 4.96, representing once a week. The mean increases between 2002 and 2006 but keeps declining from there and onwards according to Table 8.1. Between 2006 and 2012 there is a decline of 0.16. The cause of this is not clear, but one possibility is that job loss cause people to socialize less, not wanting to talk with others. *Anyone to discuss personal matters with* has a mean of 0.92. This means that most individuals have at least one other person to talk to about personal matters. According to Table 8.1 this is the case for every year, with a mean of 0.91 for all of them except 2012 which has the highest mean of 0.96. This tells us that even though individuals interact less with others in 2012 than earlier, they more often feel they have someone to talk to if needed. This sudden increase between all previous years and 2012 can be caused by the merging of the two variables and the way the question in module 6 was asked. This must be taken into account in the results.

Another variable that could be interesting to use as an indicator for social support is marital status. The variable *legal marital status* indicates that one is either married, divorced, living in a civil partnership etc. The problem is that this variable is not equal for each ESS-module. In the first two modules the variable only contains marriage, separation divorce, widowed and never married, in the two next it also contains its own categories for civil partnership (if your partnership is dissolved, your partner died, etc. as well) and in the last two modules the separation, divorce and widowed categories for both legal married status and civil union (which it is called in these modules) are aggregated. This makes it hard to make one aggregated variable out of these three that is stable and not too complex.

The last two variables are gender and age, and works as control variables more than as explanatory control variables. Gender is a categorical dummy variable and is therefore recoded so that men equals 0 and women equal 1. Table 3.3 below shows almost an equal distribution between women and men. Age is a calculated variable, reaching from 14 to 123 years old. Since the SEP-indicator here is education and many individuals are not done with their education until they are in their mid-20s, everyone between fifteen and 24 years of age are excluded from the analysis. Looking at the frequency table the oldest respondent is 123 years old, which is highly unlikely, and this respondent is therefore also excluded from the dataset. This contains all together 19 776 respondents. The expectation is that the older an

individual is, the poorer his or her self-reported health will be. Age is here coded into six dummies: 25-40, 41-55, 56-70, 71-85 and 86-105. This leaves us with an age variable with a total average of 51.75. By coding age into cohorts instead of keeping it as a continuous variable makes it easier to look at the possible variances between the different ages. Good and poor health is something that affects age groups differently, despite their different understandings of what health is. The advantage of using cohorts is that every cohort has its unique experience of events or they experience them differently which helps taking the age differences in health and education mentioned in the introduction into account.

Table 3.3 Descriptive statistics of independent variables, years combined

Variables	Mean	Std. deviation	Min.	Max.
Level 1 variables				
Education	12.31	4.52	0	56
Feelings about household income	3.11	0.81	1	4
Socially meet with friends	4.96	1.52	1	7
Anyone to discuss personal matters with (yes=0, no =1)	0.92	0.28	0	1
Control at work	5.73	3.80	0	10
Gender (men = 0, women = 1)	0.53	0.50	0	1
Age	51.75	16.15	25	105
Level 2 variables				
Unemployment	7.86	4.13	2.6	25
Gini-index	28.73	4.07	22	37.8
Valid N				129 887

Contextual variables

The contextual level 2 variables used in this paper are *unemployment rates* and the *Gini-index*. The unemployment rates are collected from World Development Indicators (2002-2012) and show the total percent of the labor force that is without a job but who are seeking employment. It is expected that self-reported health will decrease in countries with increasing unemployment rates, especially for the most vulnerable, causing an increase in health inequalities. For countries with a decrease in unemployment rates, it is expected to have

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increased self-reported health. The unemployment rate is an important indicator that has both economic and social dimensions. In case of economic downturns for example it will take some time before the unemployment rates will start to increase, as well as it might take some time before it starts to decrease after the economy starts to pick up again. The reason for the latter has to do with employers being cautious about hiring again. According to Table 3.3 the average unemployment rate is 7.83 %, where the lowest is 2.6 % and the highest is 25.0 %. Appendix Table 8.1 shows that there is a rather big increase in unemployment rates between 2008 and 2010, and still increasing in 2012. From the maximum value one can see that there is a decrease up until 2008 when it suddenly rises from 11.3 to 20.1 in 2010 and to 25.0 in 2012. According to previous research and Wilkinson's income inequality hypothesis, this can indicate a decrease in health inequalities up towards the time between 2008 and 2010 when it suddenly started rising again.

There are as mentioned some limitations with using unemployment rates in analyses. There might be different definitions of what unemployment really is between the different countries and nations, and also age. Youth are the ones with the highest risk of getting or staying unemployed, which is a limitation here since everyone between fifteen and 24 were filtered out. Historically women have been more affected by unemployment but by the end of 2002 the gap had narrowed to 1.5 percentage points and held constant up until 2007 (Eurostat, 2013). By 2008 the rates converged, and by 2009 the unemployment rates for men was actually higher than women's, but this did not stick for long, and by the end of 2012 they remained close at 10.7 % for men and 10.8 % for women (Eurostat, 2013). Table 8.2 in the appendix shows how the unemployment rates have changed for each country by year. According to these numbers there are no countries having either a steadily increase or a steadily decrease in unemployment rates between 2002 and 2012. Every country does however show an increase in unemployment rates between 2008 and 2010, with the exception of Germany. It is safe to assume that these increases are a consequence of the financial crisis. Eight of the thirteen countries do also show an increase in unemployment rates between 2002 and 2012. The unemployment rates by country and ESS-module is shown graphically in Figure 8.7.

The next variable is the Gini-index which is a distribution measure of income or consumption expenditure among households and/or individuals. It is an income inequality measure within a country, looking at how the distribution might deviate from a perfectly equal distribution (World Development Indicators, i.d). The coefficient is calculated from the Lorenz curve

where cumulative family income is plotted against the number of families, from poor to rich. The more equal the income distribution between the rich and the poor is, the lower is the Gini-index and the closer the Lorenz curve is to 45. A perfect distribution would have a Gini of 0 and a Lorenz curve of 45. The more unequal the distribution is, the closer the Gini is to 100 (or 1) (Central Intelligence Agency, n.d). The advantage of the Gini-index as a measure of income inequality is that neither the size of the economy nor the population size matters, making it possible to compare the income inequality over time as well as between countries. It is expected that low Gini-index will give better self-reported health and smaller health inequalities.

The Gini-index is here collected from Eurostat (n.d) and Pordata (n.d.). For 2002 and 2004 there were some countries lacking data, which is the reason why the mean of the previous and latter indexes are used. In the cases where this was not possible the indexes from 2001, 2003 or 2005 were used in the 2002/2004-modules. The first way was preferred since using the former or latter index can give more misleading results compared to using the mean which is a statistical measure. This is without a doubt a big limitation. Switzerland lacked Gini-indexes from 2001 and up until 2007 which is the reason why they were excluded from the analysis.

The pooled mean is 28.73, with a minimum of 22 and a maximum of 37.8. According to Table 8.1 there are no great increases or decreases of the Gini-index throughout the years, but there is actually a small decrease in 2010 and 2012. The Gini-index for each country and year is shown in Table 8.2 and graphically in Figure 8.8. Some countries are more affected by economical change compared to others, where their Gini might be increasing while others are more stable or decreasing, causing the mean to stay more or less the same as seen in Table 8.2.

3.4.   Absolute and relative inequalities[4]

The discussion around absolute and relative inequalities became an issue after one of the first and biggest breakthroughs in research comparing health inequalities between countries came,

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[4] An example of this is that there are large relative social differences in lung cancer, even higher than heart disease. In a population of 100.000 people, with a heart disease rate of 2 percent and a lung cancer rate of 0.4 percent and with two social groups (the more and less favored). Since heart disease is so common, there could be 900 more deaths in a favored social group compared to a 1000 in a less favorable group. This will give a relative difference of 10 percent between the social groups and an absolute difference of 100 deaths. With lung cancer there are 200 deaths in the favored group and 250 in the less favored group. This gives us a relative difference of 20 percent, but an absolute difference of only 50 lives saved. In health planning terms, it can be more pressing to prevent an absolute difference of 100 deaths which is only 10 percent, rather than an absolute difference of 50, even though this is 20 percent (Bartley, 2004:40).

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fifteen years after the Black-report (Mackenbach, Kunst, Cavelaars, Groenhof, & Geurts, 1997). Looking at absolute differences in health means looking at the exact difference between two health measurements (for example between two different years, countries etc.). Relative health inequalities on the other hand are looking at the ratio or the percentage between the two measurement groups. It is therefore possible for the absolute differences to be large at the same time as the relative differences are small (Bartley, 2004). Relative health inequalities should therefore be interpreted together with estimates of absolute effects (Eikemo, Skalická, & Avendano, 2009). The results in this analysis will mostly be based on relative differences in self-reported health which is a great limitation. Because of this it is important to interpret these results with care, knowing that the estimates might be prone to systematic errors (Vågerö & Erikson, 1997).

3.5. OLS-regression analysis for countries separated

To be able to see how the trends within the countries have altered, an OLS-regression must be conducted. The reason why an OLS-regression is chosen instead of a multilevel model is that it is recommended to have at least 30 groups on level 2 when conducting a multilevel analysis (or between 10 and 100 depending on who you cite) (Hox, 2010; Strabac, 2012). This analysis would only have 6 groups on level 2 (one for each year), and the danger of conducting ecological fallacy would increase. Ecological fallacy means interpreting the data and forming conclusions on the wrong level, and must also be considered when using multilevel modeling (Hox, 2010; Kreft & De Leeuw, 1998). OLS-regression analysis is a way to find the line that fits the data the best, meaning that the line either goes through or as close to as many of the data points as possible (Field, 2009). The best line is the one that makes sum of the quadrated range the smallest possible. This regression line is a prediction of the relationship between the independent variables and self-reported health, as well as it contains predicted values of self-reported health for given values of an independent variable. The unstandardized coefficient (b) shows the changes in the dependent variable when the independent variable change with one unit, when all the other variables are held constant (Ringdal, 2007). This means that the b-coefficient here shows how much self-reported health will decrease or increase for every one unit change in the independent variables, controlled for the effects of the other independent variables when they are set at zero. In this paper b represents the first number in every column.

The testing of the significance in OLS-regression, as well as in multilevel modeling, is based on p-values, calculated from statistical t-values (Hamilton, 1992). According to Strabac (2012), in analyses with many units it should be discussed whether a 0.05 significance level is low enough. A large sample size can make even weak coefficients become significant on a 0.05 level. In these OLS-regression analyses, the sample size vary between 6 912 (Slovenia) and 14 855 (Germany). The sample sizes are big, but not so big that a strict 0.01 significance-level would be necessary. In the OLS-regression analyses, the significant-level will therefore be 0.05.

3.6. Multilevel modeling: design and approach

Design

Multilevel modeling considers the society's different hierarchical structure. Here individuals, social groups and social contexts are all a part of a hierarchical system where they can be seen as separate levels as well as joined together (Hox, 2010). Individual variables might be influenced by contextual variables, influencing self-reported health indirectly, and are therefore nested within countries as well as years. Multilevel models correct for statistical dependency in the data and can be seen as a generalization of OLS-regression analysis to deal with the problems and complexities that are implied by estimating models with more than one level (Ringdal, n.d).

The goal is here to look at the relationship between individuals and the society, at how they together and separate influence self-reported health. A multilevel model makes it possible to compare different countries and years to look at how the trends of health inequalities might have evolved. A reason why it is helpful to look at both the contextual levels as well as the individual level in relation to each other is that observations that are given in the same time and space are likely to be similar compared to observations that are not (Kreft & De Leeuw, 1998). If the individual level self-reported health variable is influenced by variables on either country-level or year/country-level, such as changes in unemployment rates, the observations are not independent from other contexts, and multilevel modeling is preferred.

Shortly explained, the primary assumption for multilevel models is that there is a hierarchical structure of the data, where units are nested within each other. Conducting an OLS-regression when operating with hierarchical variables can give underestimated standard errors of the coefficients, and it does not take the different levels into account. This will increase the

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chances of type 1 errors, conducting an ecological fallacy (Hox, 2010; Kreft & De Leeuw, 1998; Strabac, 2012). This multilevel analysis consists as mentioned of three levels; level 1 is individual variables, level 2 are the year/country variables and level 3 are country-variables. A graphical representation of this can be seen in appendix Figure 8.9.

The sample size is in multilevel modeling as in most other analysis approaches important since the bigger the sample size, the more accurate the estimates will be (Hox, 2010). There have been some ambiguities as to what a researcher should look for in a sample. Hox (2010) suggests that one should have at least 30 units on level 2 with 30 individuals within each unit (900 in total), and 50 units with 20 individuals if there is a cross-level interaction being made. Strabac (2012) on the other hand, argues that the optimal number of units on level 2 should be 100, but that everything between 10 and 100 can be applied as long as one is aware of the limitations and statistical problems that might occur the lower the amount of groups one has. In this analysis there are only 13 units on level 3, which is right by the lower limit of what can be acceptable. This analysis does however have a "middle" level 2 (country/year) with 78 units. According to Maas and Hox (2005) more than 50 units on level 2 will lead to fewer statistical fallacies, and the more units, the fewer fallacies will occur. 78 units on level 2 are therefore seen as enough for a multilevel analysis to be conducted. The more units on each level, the more accurate the standard errors become[5]. The estimator used in multilevel modeling is Maximum Likelihood (ML) which estimate the parameter estimates and maximizes the probability to find the sample data that we have actually found. The advantage with ML is that it is robust and that it produces estimates that are asymptotic effective and consistent (Hox, 2010).

Both SPSS and STATA will here be used to process the data. SPSS is an analytical software program that is great for less advanced analysis, such as OLS-regression and recoding variables. STATA is on the other hand more advanced and better at performing multilevel analysis. Strabac (2012) recommends that effects on level 2 and 3 with a p-value as high as 0.1 deserves a discussion. The reason for this is that level 2 and 3-variables need strong units to get significant on a 0.05-level. This analysis has 78 units on level 2 and 13 on level 3, and the critical value of the significant level will therefore be 0.1. For the individual variables in the multilevel analysis the significance level will be 0.01. The reason why this has changed

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[5] Level 1 consists of 129 887 units.

since the OLS-regression is that the individual variables here have 129 887 units and even weak coefficients can therefore become significant.

Approach

There are two different ways to perform a multilevel analysis; a bottom-up approach and a top-down approach. Hox (2010) is recommending the use of the bottom-up approach, this way making the model as simple as possible. The bottom-up approach builds the model by starting with the simplest model, which here is the null-model, then adding the various types of variables step by step. The null-model consists only of the dependent self-reported health variable and makes it possible to calculate the intra correlation coefficient (ICC)[6] [7], letting us know if multilevel modeling is necessary. ICC is the variance of the different levels, divided on the total variance of the levels, and explains how much of the variance in self-reported health that can be found on the different levels. It is important to notice that the ICC is only based on a random-intercept-model (Kreft & De Leeuw, 1998). The equation of the null-model is

$$Y_{ijk} = \beta_0 + e_{ijk} + u_{0jk} + v_{0k}$$

where β is the intercept, e represents the level 1-residual, u represents the level 2-residual and v represents the level 3-residual (Hox, 2010). i will vary across the level 1- units, j will vary across the level 2-units, and k will vary across the level 3-units. In social science it is quite common that most of the total variance will be on the individual level (between 80 % and 95 %) (Strabac, 2012). The reason for this is that there are usually more determinants on the individual level compared to the country-level. According to Kreft and De Leeuw (1998) and Maas and Hox (2005) a low ICC can affect both the p-values as well as the estimates in the analysis. Ringdal (n.d) suggests a critical low value of 0.05. Anything lower would not be applicable in a multilevel analysis.

The next step will be to add the independent variables to the model. There are two different types of multilevel models, a "random intercept"-model and a "random slope"-model. A random intercept-model has an intercept on the Y-axis that is different for all three levels, while the variation component for the slope is held constant (Hox, 2010). This is always the first type of model conducted. It is conducted in blocks, building up the model to see how the

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[6] The ICC-formula for the country-level (level 3): $p_{land} = \frac{Var(v_{0jk})}{Var(v_{0jk}) + Var(u_{0jk}) + Var(e_{ijk})}$. The ICC-formula for country/year-level (level 2): $p_{år} = \frac{Var(u_{0jk})}{Var(v_{0jk}) + Var(u_{0jk}) + Var(e_{ijk})}$ (Hox, 2010:34).

[7] ICC is also known as Variance Partition Coefficient (VPC) (Strabac, 2012).

different variables affect self-reported health. The individual variables are added first, then the level 2-variables. The final model will be a model with all the significant individual- and contextual variables. A random slope-model is a model where the slope and the value of the regression coefficient for selected independent variables vary. This model is more complex and less stable than a random intercept-model, but can be used as long as the model is a significant improvement of the random intercept-model. It was decided not to run a random slope-model here due to the instability and complexity. Conducting a random slope-model would require a good and strong theoretical background as to why a random slope on a specific variable was needed.

4. Analyses and Results

4.1. Trends in self-reported health within countries, OLS-regression analysis

For OLS-regression analysis a bottom-up method is preferred. An option could have been to add categories of variables one by one. It was however decided to run three models for each country, and the reason is that if one and one category or variable was to be added, this would have led to a high amount models for the thirteen countries, where most of them did not have any relevance to the research question. The first model is the individual SEP-variable together with the demographical variables, income and work variables and social support, in the second model the ESS_{year} dummy variables are added, and in the third model the interaction between ESS_{year} and education is added. All models are shown in appendix Table 8.3 through Table 8.6. According to the tables the R^2 does not change a lot between the models, and model 1 is for all the countries the model with the highest explanation of variance. For all the countries there are only two of the model 3's that are more significant than model 2 on a 0.05 significance level, according to the Sig. F. Change. These countries are Portugal and Slovenia. Despite this, due to the aim of the paper looking for trends in health inequalities, model 3 will be the final models for the countries separated. Only the Netherlands, Portugal, Spain and Slovenia showed significant changes in inequalities in self-reported health throughout the ten years. These four countries are displayed in Table 4.1.

The equation for model 3 is:

$$Y_{ijk} = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \beta_8 X_{i8} + \beta_9 X_{i9} + \beta_{10} X_{i10} +$$
$$\beta_{11} X_{i11} + \beta_{12} X_{i12} + \beta_{13} X_{i13} + \beta_{14} X_{i14} + \beta_{15} X_{i15} + \beta_{16} X_{i16} + \beta_{17} X_{i17} + \beta_{18} X_{i1} X_{i13} + \beta_{19} X_{i1} X_{i14} +$$
$$\beta_{20} X_{i1} X_{i15} + \beta_{21} X_{i1} X_{i16} + \beta_{22} X_{i1} X_{i17} + e_i$$

where β_{1-12} are education and the explanatory control variables such as the demographic variables, the income and work variables and the social support variables, β_{13-17} are the ESS_{year} dummy-variables, and β_{18-22} are the interaction between education and $ESS_{year.}$

Table 4.1 OLS-regression analysis for the countries showing significant changes in inequalities in self-reported health between 2002 and 2012

	The Netherlands	Portugal	Spain	Slovenia
Intercept	3.01***	2.94***	3.26***	2.46***
Education	0.01*	0.03***	0.01***	0.04***
Gender (men = 0, women = 1)	-0.05***	-0.16***	-0.14***	-0.05**
Age (reference category: 25-40 years)				
41-55	-0.15***	-0.29***	-0.26***	-0.25***
56-70	-0.24***	-0.59***	-0.57***	-0.53***
71-85	-0.38***	-0.84***	-0.84***	-0.74***
86-105	-0.48***	-0.96***	-1.05***	-0.96***
Feeling about household income (reference category: very difficult)				
Difficult	0.23***	0.29***	0.10*	0.29***
Coping	0.50***	0.44***	0.26***	0.46***
Living comfortably	0.67***	0.55***	0.37***	0.67**
Socially meet with friends	0.04***	0.02***	0.05***	0.05***
Control at work	0.02***	(-)0.00	0.01**	0.00
Anyone to discuss personal matters with (no = 0, yes = 1)	0.13***	0.13***	0.14***	0.11***
ESS_{year}, (reference category: module 1, 2002)				
Module 2, 2004	-0.08	0.05	-0.08	-0.06
Module 3, 2006	-0.11	0.14**	-0.19**	-0.07
Module 4, 2008	-0.06	0.19***	-0.07	0.24**
Module 5, 2010	-0.29***	0.14**	-0.14*	0.19*
Module 6, 2012	-0.20**	0.25***	-0.10	0.19
Education*ESS_{year} (reference category: module 1, 2002)				
Module 2, 2004	(-)0.00	-0.01	0.00	0.01
Module 3, 2006	0.00	-0.03***	0.00	0.01
Module 4, 2008	0.00	-0.01*	0.01**	-0.02**
Module 5, 2010	0.01**	0.00	0.00	-0.01
Module 6, 2012	0.00	-0.01	0.00	0.00
R^2	0.1255	0.2926	0.2294	0.2636
N	10 542	10 887	9 628	6 912

*** p<0.01, ** p<0.05, *p<0.10

4.2. Trends in self-reported health between the countries: multilevel modeling and analysis

The null-model

The first aspect of running a multilevel analysis is as mentioned to check the null-model to see if there are substantial amounts of influence found on the contextual levels to run a multilevel analysis. The intercept for the null-model is 3.78, explaining the estimated mean value of self-reported health in the entire sample. The variance for the level 3-residual $Var(v_{0jk})$ is 0.059, the variance for the level 2-residual is 0.002, whiles the variance for the level 1-residual $Var(e_{ijk})$ is 0.79. This means that 5.9 % of the variance is on the country level, 0.20 % is on the country/year-level and 79.0 % are on the individual level. The numbers are shown in Table 4.2. It is as mentioned in chapter 3.6 common that most of the variance is on an individual level, but that the ICC for the contextual levels should be at least 0.05 for a multilevel model to be applicable. The ICC for the level 2-residuals is less than 0.05, indicating that a multilevel analysis should not be used. A multilevel analysis is on the other hand necessary because of the variance above 0.05 on level 3. Because this and the structure of the data envisage three levels, the analysis will be executed as planned. An option could be to run a sensitivity analysis without either level 2 or 3, but there would then be a danger of ecological fallacy which can cause an incorrect rejection of a significant relationship between the independent variables and self-reported health. Another explanation for these results can be that the time interval is not big enough, indicating that the differences within the countries in self-reported health between 2002 and 2012 are not significantly large. This does however not tell us anything about the possible differences in inequalities in self-reported health within the countries.

Table 4.2 Random-intercept null-model of self-reported health

Intercept coefficient	$Var(e_{ijk})$	$Var(u_{0jk})$	$Var(v_{0jk})$	-2LL	N
3.78*** (0.07)	0.79 (0.03)	0.002 (0.00)	0.06 (0.02)	32 2416.60	129 887

*** p<0.01, ** p<0.05, *p<0.1, standard error in parenthesis

The structure of the random-intercept model

The next step is to estimate a random-intercept model with all the individual levels. The models are built up with the individual SEP-variable first to see how it alone has an effect on self-reported health, before the demographic variables, the income and work variables and the social support variables are added in model 2. Model 3 consists of the ESS_{year} dummy variables to see if there are any underlying factors within the years having an effect, before the dummy variables for country are added in model 4. In the remaining three models the unemployment rates and the Gini index are added, as well as the interactions between ESS_{year} and education and between country and education. All the models can be seen in Table 8.7 and Table 8.8.

The first seven models say something about how the trends in self-reported health might have changed between 2002 and 2012 and if inequalities in self-reported health are different between the countries, but not how the health inequalities might have changed between countries over the years. For this it is needed a cross-level interaction effect of country*education*ESS_{year}. A problem that then arise is the many dummy varibales that will be created due to the amount of countries and years (13 countries*6 years = 78 dummy variables). Completing such a cross-level interaction will make the analysis a lot more complicated and the model will become less robust. To be able to run such an analysis the dummy variables for year must be used as a continuous variable. In these analyses however, the modules work more as categorical variables, and it is therefore hard to use them as continuous variables in an interaction effect. This analysis were on the basis of the information above not executed.

When running a multilevel anaysis there are no estimates for how much better one model is compared to another, but since multilevel models use ML as estimator it is possible to calculate a Likelihood Ratio-test (LR-test)[8], this way finding the best model fitted (Hox, 2010). Here it is possible to test one model up towards one or more of the previous models to see if there is a significant improvement. In this paper the models are tested against the best models so far in the analysis. The LR-test and the log-likelihood indicates how well the model fits the data (Hox, 2010). A reduction in LR shows that the model is an improvement from the other, and the significance value is found by looking up critical values for the chi-square (Strabac, 2012). According to the LR-test the best model here is model 7, shown in Table 4.3.

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[8] The equation for the LR-test: $\chi_H^2 = -2(log_e \ell_{K-H} - log_e \ell_K)$.

It is better than model 5 on a 0.01 significant level with a change in the LR-tests of 281.16, and 12 extra degrees of freedom.

The equation for the final model 7 is:

$$Y_{ijk} = \beta_0 + \beta_1 X_{ijk1} + \beta_2 X_{ijk2} + \beta_3 X_{ijk3} + \beta_4 X_{ijk4} + \beta_5 X_{ijk5} + \beta_6 X_{ijk6} + \beta_7 X_{ijk7} + \beta_8 X_{ijk8} + \beta_9 X_{ijk9} + \beta_{10} X_{ijk10} +$$
$$\beta_{11} X_{ijk11} + \beta_{12} X_{ijk12} + \beta_{13} X_{ijk13} + \beta_{14} X_{ijk14} + \beta_{15} X_{ijk15} + \beta_{16} X_{ijk16} + \beta_{17} X_{ijk17} + \beta_{18} X_{ijk18} + \beta_{19} X_{ijk19} + \beta_{20} X_{ijk20}$$
$$+ \beta_{21} X_{ijk21} + \beta_{22} X_{ijk22} + \beta_{23} X_{ijk23} + \beta_{24} X_{ijk24} + \beta_{25} X_{ijk25} + \beta_{26} X_{ijk26} + \beta_{27} X_{ijk27} + \beta_{28} X_{ijk28} + \beta_{29} X_{ijk29} + \beta_{30} Z_{jk1}$$
$$+ \beta_{31} Z_{jk2} + \beta_{32} X_{jk1} X_{ijk13} + \beta_{33} X_{jk1} X_{ijk14} + \beta_{34} X_{jk1} X_{ijk15} + \beta_{35} X_{jk1} X_{ijk16} + \beta_{36} X_{jk1} X_{ijk17} + \beta_{37} X_{jk1} X_{ijk18}$$
$$+ \beta_{38} X_{jk1} X_{ijk19} + \beta_{39} X_{jk1} X_{ijk20} + \beta_{40} X_{jk1} X_{ijk21} + \beta_{41} X_{jk1} X_{ijk22} + \beta_{42} X_{jk1} X_{ijk23} + \beta_{43} X_{jk1} X_{ijk24} + \beta_{44} X_{jk1} X_{ijk25}$$
$$+ \beta_{45} X_{jk1} X_{ijk26} + \beta_{46} X_{jk1} X_{ijk27} + \beta_{47} X_{jk1} X_{ijk28} + \beta_{48} X_{jk1} X_{ijk29} + e_{ijk} + u_{0jk} + v_{0k}$$

where β_{1-29} is the slope for the level-1 variables (X), β_{30-31} is the slope for the level-2 variables (Z), where β_{32-36} is the slope for the interaction variable between education and ESS_{year}, and where β_{37-48} is the slope for the interaction variable between education and country.

Table 4.3 The final random intercept model 7, with self-reported health as dependent variable

	Model 7
Intercept	3.49***
Level 1-variables	
Education	0.02***
Gender (men = 0, women = 1)	-0.04*
Age (reference category: 25-40 years)	
41-55	-0.25***
56-70	-0.48***
71-85	-0.70***
86-105	-0.85***
Feeling about household income (reference category: very difficult)	
Difficult	0.22***
Coping	0.46***
Living comfortably	0.65***
Control at work	0.01***
Socially meet with friends	0.04***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.12***
ESS_{year}, (reference category: module 1, 2002)	
Module 2, 2004	-0.06
Module 3, 2006	-0.02
Module 4, 2008	0.01
Module 5, 2010	-0.03
Module 6, 2012	0.02
Countries (reference category: Denmark)	
Finland	-0.34***
Norway	-0.19***
Sweden	0.02
Ireland	0.34***
United Kingdom	(-)0.00
Belgium	0.06***
Germany	-0.31***
The Netherlands	-0.02*
Portugal	-0.29***
Spain	-0.22***
Poland	-0.59***
Slovenia	-0.70***
Level 2-variables	
Unemployment	0.00
Gini-index	-0.01*

	Model 7
Interaction effects	
Education*ESS$_{year}$ (reference category: module 1, 2002)	
Module 2, 2004	0.00
Module 3, 2006	(-)0.00
Module 4, 2008	0.00
Module 5, 2010	0.00
Module 6, 2012	(-)0.00
Country*education (reference category: Denmark)	
Finland	0.01***
Norway	0.01***
Sweden	-0.005***
Ireland	-0.004***
United Kingdom	0.004***
Belgium	-0.01***
Germany	0.00
The Netherlands	-0.01***
Portugal	0.01***
Spain	0.00
Poland	0.03***
Slovenia	0.03***
Var(e_{ijk})	0.66 (0.03)
Var(u_{0jk})	0.00 (0.00)
Var(v_{0jk})	0.00 (0.00)
-2Log Likelihood	299130.44
Changes in -2LL	281.16***

*** p<0.01, ** p<0.05, *p<0.10, standard error in parenthesis. Model 7 is compared to model 5 in the appendix

4.3. Summary of results

Before going into a more theoretical discussion about the most important findings, a summary of the results are in order. Table 4.1 and Table 4.3 presented in the previous sections are the models explaining most of the research question, while the rest of the models are shown in appendix Table 8.3 through Table 8.8. The results of OLS-regression will be summarized first followed by the multilevel analysis.

Before the final results of the OLS-regression are presented it can quickly be said that model 3 displayed in Table 8.3 through Table 8.6 shows that most of the demographic- and explanatory control variables are significant in almost every country on a 0.05 significance

level. There are some disparities but since these variables do not have any relevance for the research question, they will not be examined further. The intercept indicate that the country with the best self-reported health is Ireland, while Slovenia has the poorest when controlled for all the variables. The education variable shows that within the ten year time period there are significant health inequalities within all the countries with the exception of the Netherlands. The reason why the Netherlands does not show such a significant effect can be explained by the interaction variable added in model 3, which then explains most of the educational effects seen on self-reported health. According to the results of the interaction effect there are only four countries where inequalities in self-reported health are significantly different from one year to another on a 0.05 level. These countries are the Netherlands, Portugal, Spain and Slovenia. For the Netherlands and Spain 2010 and 2008 respectively have greater effects on self-reported health than 2002, whereas it for Portugal and Slovenia 2006 and 2008 have smaller effects on self-reported health than 2002. What this means is that for the Netherlands and Spain the health inequalities are greater in 2010 and 2008, while they for Portugal and Slovenia are smaller in 2006 and 2008. There was not found any significant changes in inequalities in self-reported health between the years for the nine remaining countries.

In the final model in the multilevel analysis all individual explanatory control variables have a significant effect on self-reported health with the exception of gender (Table 4.3). For the country specific contextual variables unemployment and the Gini-index, only the Gini-index shows a significant effect on self-reported health on a 0.1 significance level where the higher the Gini-index within a country is, the poorer the self-reported health is. The education variable shows that by every extra year of education, self-reported health will increase by 0.02, indicating health inequalities in Europe, represented by these thirteen countries. Between the countries there are also significant differences in the amount of self-reported health, indicating that there are health inequalities between the countries.

To see how the trends in inequalities in self-reported health might have altered between 2002 and 2012 in Europe, there was conducted an interaction between ESS_{year} and education. These interactions did not show any significant results, indicating that there are no significant changes in inequalities in self-reported health. The interaction effect between education and countries looks for inequalities in self-reported health between countries based on the effect of education. What the interaction effect reveals is that in Finland, Norway, the UK, Portugal, Poland and Slovenia education has a stronger effect on self-reported health than in the

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reference category which indicate greater health inequalities, while in Sweden, Ireland, Belgium and the Netherlands education has a weaker effect, indicating smaller health inequalities.

By looking at these results it is possible to draw out two main findings relevant for the research question. The first is that inequalities in self-reported health appear to be quite persistent without major changes throughout the ten years between 2002 and 2012, both in Europe as well as within the majority of the thirteen countries. The second is that there are four countries, the Netherlands, Portugal, Spain and Slovenia that do show significant changes in inequalities in self-reported health. The discussions below will on the basis of these findings answer the research question and why there is such persistence in inequalities in self-reported health, as well as why the Netherlands, Portugal, Spain and Slovenia showed significant changes in inequalities in self-reported health during the respective years.

5. Discussion

The research question presented in the introduction was *"have health inequalities in Europe and within European countries persisted from 2002 to 2012?"*. The first out of two main findings from the results is that inequalities in self-reported health were persistent both within Europe as well as within the majority of the countries. This is the first out of two main findings that will be discussed in this chapter. The second finding is the four countries (the Netherlands, Portugal, Spain and Slovenia) that show significant changes in inequalities in self-reported health. This section will therefore try to answer why there is such a persistency in health inequalities in Europe and in the European countries, and why there are changes in health inequalities in the Netherlands, Portugal, Spain and Slovenia. In addition to the discussion of these two main findings this chapter does also consist of sections describing thesis limitations and suggestions for further research.

5.1.   The persistency in health inequalities between 2002 and 2012

That there is persistency in inequalities in self-reported health in the pooled analysis in Table 4.3 is not surprising when looking at the results in the separate OLS-regression analyses in Table 8.3 through Table 8.6. Health inequalities in Europe cannot change without the changes in health inequalities within the countries. The discussion of this first finding will therefore mostly focus on why health inequalities have stayed more or less persistent without any major changes throughout the ten years within most of the countries. By doing this it will also explain the persistency in inequalities in self-reported health in Europe. This persistency health inequalities is supported by previous research where inequalities in self-reported health has shown high degree of stability within European countries, and where mortality usually is the health-indicator showing the greatest changes in health inequalities (Dahlgren & Whitehead, 2006; Kunst et al., 2005). The results were still somewhat surprising, especially since the expectation was that alterations in unemployment rates and Gini-indices would change self-reported health among individuals with lower SEP.

The Netherlands is the only country that does not show any significant inequalities in self-reported health. This can be explained by the interaction variable added in model 3 where there is a small but significant increase in health inequalities in 2010 that then explains most of the health inequalities seen in the previous models. As to whether health inequalities were nonexistent the years with no significant increase is uncertain, but that the Netherlands and

the Bismarckian welfare state regime has the smallest health inequalities according to Table 8.3 through Table 8.6 is supported by Eikemo, Huisman, et al. (2008). The Netherlands introduced strategies to handle health inequalities already in the 1980's which can explain these small or insignificant health inequalities (Mackenbach & Bakker, 2003; Mackenbach & Stronks, 2002). As to why there was an increase in 2010 will be explained in section 5.2.

Even though contextual variables are not a part of the OLS-regression analyses due to the danger of conducting ecological fallacy, it is possible to compare the descriptive statistics for the contextual variables in Table 8.2 and the regression models in Table 8.3 through Table 8.6. By doing this it is possible to look for any potential correlations between the persistency in health inequalities and the contextual variables. Every country with the exception of Finland, Norway, Belgium Germany and Poland showed unemployment rates greater in 2010 and 2012 than in 2002, most likely due to the financial crisis. The income inequality hypothesis (Wilkinson, 1996) suggests that increasing unemployment rates within a country will lead to increased income inequalities, this way also increasing health inequalities. Since individuals with lower SEP are the most vulnerable to unemployment, this was believed to increase relative deprivation due to declining social status and decreasing social cohesion, causing psychosocial stress (Wilkinson, 1996). It was therefore surprising that the Gini-index showed no consistency in its alterations and that it does not seem to be any evident correlations between unemployment rates and the Gini-index between 2002 and 2012.

According to the multilevel analysis in Table 4.3 unemployment rates have no effect on self-reported health, while the Gini-index shows a small but significant effect where smaller income inequalities cause better self-reported health. This indicates that countries with smaller income inequalities have greater self-reported health. An explanation to these results might be that unemployment rates and Gini-indices have an effect on self-reported health only in some countries and/or during some years, this way displaying the weak or insignificant results. This does however not say anything about how these variables might affect health inequalities. If income inequalities affect health inequalities as proposed by the income inequality hypothesis (Wilkinson, 1996), then how come is there persistency in inequalities in self-reported health throughout the years? This can possibly be explained by that the changes in the Gini-index within the different countries might not be big enough to cause any significant change in inequalities self-reported health (Table 8.2 and Table 8.3 through Table 8.6). The income inequality hypothesis would describe these results by that small alterations in the Gini-index would not cause significant alterations in power and therefore not in relative

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deprivation and social cohesion of individuals with lower SEP, this way also not causing a significant increase of psychosocial stress (Wilkinson, 1996, 1999, 2006a, 2006b).

Looking at Table 8.3 through Table 8.6 the rank of the welfare state regimes according to their inequalities in self-reported health seems to be the Bismarckian welfare state regime, the Anglo-Saxon welfare state regime, the Scandinavian and the Southern European welfare state regimes and the Eastern European welfare state regime. These findings are partly supported by previous research (Eikemo, Huisman, et al., 2008). The health inequalities seen between the countries of these welfare state regimes are mostly significant, where Finland, Norway, the UK, Portugal, Poland and Slovenia shows significant greater inequalities in self-reported health, while Sweden, Ireland, Belgium and the Netherlands shows significant smaller inequalities (Table 4.3). According to the income inequality hypothesis smaller income inequalities cause smaller health inequalities within a country, but the countries and welfare state regimes with the lowest income inequalities are according to Table 8.2 not the countries with the smallest health inequalities. It does therefore seem as the welfare states with smaller income inequalities does not necessarily have smaller inequalities in power and prestige. Scandinavia for example is ranked as the welfare state regime with the smallest income inequalities. They are however ranked in the middle together with the Southern European welfare state regime according to their inequalities in self-reported health, which happens to have the greatest income inequalities. The income inequality hypothesis does therefore seem to contribute to the explanation of the persistency in health inequalities within the countries through the lack of changes in income inequalities causing small changes in psychosocial stress, but it is having a hard time explaining the difference in health inequalities between the countries and welfare state regimes. There might therefore be some underlying combining effects that this thesis does not control for. Wilkinson's income inequality hypothesis might therefore be more capable of explaining the differences in self-reported health between the countries and welfare state regimes (cf. the significant Gini-index in Table 4.3) than the difference between them in inequalities in self-reported health.

There are nine countries showing no significant change in inequalities in self-reported health during the ten years, and these are Denmark, Finland, Norway, Sweden, Ireland, the UK, Belgium, Germany and Poland. Four of them are Scandinavian, two are Bismarckian, two are Anglo-Saxon and one is Eastern-European. According to previous research and the actualization of the income inequality hypothesis in section 2.5, the ranking of the welfare state regimes best protecting their populations through social benefits is the Scandinavian, the

Bismarckian, the Anglo-Saxon, the Southern European and the Eastern European welfare state regime at last (Bambra & Eikemo, 2009). Even though this ranking does not correspond completely to the ranking of the countries and the welfare state regimes according to their inequalities in self-reported health discussed above, the stability in health inequalities can still possibly be explained by their social benefits, helping the least well-off due to unemployment or cutbacks, this way stabilizing the health inequalities. What is somewhat surprising is that Poland does not have any significant changes in health inequalities, despite an increase in unemployment rates after 2008. The Eastern European welfare states have the poorest health benefits of all the European welfare states (Eikemo, Bambra, et al., 2008), and it would therefore be expected to see an increase in health inequalities. That Poland does not show any significant changes in health inequalities after 2008 can possibly be explained by decreasing unemployment rates and Gini-indices between 2002/2004 and 2012, and the economic growth they experienced immediately prior to the increase in unemployment rates seen in 2010, economically strengthening the country (Reichardt, 2011). The reason why there were not any changes in health inequalities during the years of decreasing unemployment rates, an explanation might be that there was not enough time for these structural changes to affect individuals' self-reported health.

Mackenbach (2012) has also tried to explain the persistence of health inequalities in Europe through a hypothesis-generating presentation of some well-known health inequality theories. *Psychosocial theory* (including the income inequality hypothesis) is one of these explanation theories. According to Mackenbach this theory can explain the persistency of health inequalities through the lack of significant changes in inequalities in immaterial resources such as power and prestige. This corresponds somewhat to the explanation above, that there might not be any significant changes in health inequalities due to small alterations in the Gini-index, causing less change in relative deprivation and psychosocial stress. Mackenbach (2012) claims that this theory, and therefore also the income inequality hypothesis, may not be adequate to explain the persistency in health inequalities between countries and welfare state regimes, and he therefore supports the assumption made above. This has to do with that the most egalitarian countries and regimes are not necessarily the ones having the smallest inequalities in power and prestige, and therefore not the smallest heath inequalities. Another contextual explanation theory that is mentioned by Mackenbach (2012) is the *fundamental cause theory* proposed by Phelan and Link (2005). According to the fundamental cause theory social health inequalities will always be present in every society to a greater or lesser extent.

Health determinants will be detected, dealt with and eradicated, but by then new health determinants would have appeared. The ability to control diseases is advancing as new discoveries around health determinants are made, but the more resources, money, power, prestige and social connections individuals encompass, the more able they will be to access and benefit from this new knowledge (Phelan & Link, 2005). What is meant by this is that when health inequalities are believed to decrease due to recently gained knowledge by individuals with lower SEP, there will be other determinants creating health inequalities. The fundamental cause theory does not claim that health inequalities are absolute and stable over time as they might change and alter to some degree, but they will never go away.

The fundamental cause theory can therefore explain both the persistency and the stability in inequalities in self-reported health by claiming that there are other determinants that come into play compared to earlier. Health determinants do not need to disappear due to recently gained knowledge as there might also be indirect causes behind the results. Research done on unemployment for example, show that increasing unemployment rates might improve health through behavior (Karanikolos et al., 2013; Stuckler et al., 2009). Unemployment provides more sleep and leisure time which can increase health promoting activities such as spending more time exercising, drink less and eat less unhealthy food (due to reduced amount of money). Economic hardship in general has been associated with more walking or biking and less driving (Karanikolos et al., 2013; Stuckler et al., 2009). Exercise, even in small portions, is known to reduce depression and anxiety, this way moderate the sensitivity to stress. It will however take some time for these factors to cause significant changes in health inequalities which might be the reason why most of the countries show no significant change. It is however possible to turn this around. Looking at the welfare state regimes that show no significant changes at all during the ten years, most of them with the exception of Poland have welfare benefits that offer at least a minimum of standards. It is therefore a possibility that research presenting compulsive eating, heavy drinking and extensive smoking as results of unemployment can be more accurate to explain the stability in health inequalities (Heistaro et al., 2001; Wilkinson, 1996). The health damaging behavior is then possibly not due to acute economic difficulties, but to psychosocial stress caused by loss of control and relative deprivation towards oneself as well as to others. Such behavior is stress alleviating in the short term. In the long term however, they can and will be health damaging. That it can take some time for factors such as health related behavior to show significant effects on health

inequalities might be the reason why there seems to be no significant effect of unemployment rates on self-reported health in Europe during these ten years (Table 4.3).

The discussion above as to why there is persistency in Europe and in the European countries during the ten years points out some interesting things. First of all, unemployment rates seem to be able to explain both the persistency and the stability in health inequalities. This is due to the time it might take for the consequences of increasing unemployment rates such as health damaging behavior caused by stress, relative deprivation and loss of control, to show significant effects. Ten years might therefore not be long enough for significant changes in inequalities in self-reported health to appear. Since most of the countries that show stability in health inequalities are from welfare state regimes with good welfare benefits, this can also be an explanation as to why there were not seen any significant changes in health inequalities, despite increasing unemployment rates for some of the countries. Another possible explanation is that the Gini-index might not change enough during these years to cause a significant change in inequalities in self-reported health. This will cause smaller alterations in relative deprivation, social cohesion and psychosocial stress, and in the distribution of power and prestige. It does therefore seem as Wilkinson's income inequality hypothesis can explain the persistency in inequalities in self-reported health to some degree. However, the hypothesis does as mentioned earlier seem incapable of explaining the persistency in health inequalities between the countries and welfare state regimes since the welfare states with the smallest income inequalities are not the ones with the smallest health inequalities. The fundamental cause theory was therefore presented as an alternative theory. It is important to remember that not all of the discussion above is significantly proven but is based on previous research and descriptive statistics. If it was possible to add and control for contextual factors in a within-country analysis the results might have been different.

5.2. Changes in self-reported health in the Netherlands, Portugal, Spain and Slovenia between 2002 and 2012

The only countries showing any significant change in inequalities in self-reported health during the ten year time period were the Netherlands, Portugal, Spain and Slovenia. The Netherlands and Spain showed increased health inequalities in 2010 and 2008 respectively, while Portugal and Slovenia showed decreased inequalities in self-reported health in 2006 and 2008. Of these four countries one is Bismarckian, two are Southern European (showing opposite results) and one is Eastern European.

That the Southern European welfare states showed significant changes in inequalities in self-reported health might not be as surprising as a Bismarckian welfare state such as the Netherlands showing these results. This especially since the Netherlands has the smallest health inequalities of all the European countries. This has to do with the previous discussion that because of their welfare benefits the Scandinavian, the Bismarckian and the Anglo-Saxon welfare state regimes are the ones least prone to significant alterations in health inequalities due to structural changes in unemployment rates and in income inequalities. Then how come did the Netherlands show the same results as Spain? The two countries showed increasing health inequalities during two different years (2008 and 2010), but the increase in both can be assumed to be due to increasing unemployment rates and/or increasing Gini-indices (Table 8.2) caused by the financial crisis. A commonality between the two countries is that they were both experiencing economic growth and decreasing unemployment rates the years prior to the significant increase in health inequalities (Table 8.2) (Masselink & van den Noord, 2009; Neal & Garcia-Iglesias, 2012). It has already been discussed that it might take some time for contextual changes to show significant results on health inequalities, but sudden increase in unemployment rates can sometimes be associated with short-term health changes because of the economic value of the household and stress related to household income (Stuckler et al., 2009). The sudden increase in unemployment rates and/or Gini-indices can therefore come as a shock on the population. Individuals with lower SEP are the most vulnerable, and some of them might also know how it is to be unemployed, living without a fixed salary. This can then cause acute psychosocial stress due to relative deprivation, poorer social cohesion and social affiliation and different degrees of financial difficulties, which might explain why the increases in health inequalities were seen so quickly.

Why Spain showed increased inequalities in self-reported health in 2008 while the Netherlands showed these results in 2010, this can possibly be explained by a combination between the time of financial degeneration as well as the welfare state regimes the countries belong to. That the Spanish housing bubble burst in 2008, causing house values to drop extensively (Garcia-Herrero & Fernandez de Lis, 2008; Garriga, 2010), can have caused increased psychosocial stress among the ones losing their home due to unemployment or cutbacks. There did however not seem to be any evident correlation between the Gini-index and the increase in health inequalities seen in Spain. The Southern European welfare states have among the greatest inequalities in their welfare benefits of all the European welfare state regimes, and are therefore the least protective when the individuals experience unemployment

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and cutbacks. The Southern European welfare states have maintenance schemes that are sold by quality, and since the first to lose their work usually are the ones with lowest SEP, they are most likely the ones not having high quality maintenance schemes. The reason why the Netherlands did not experience increasing unemployment rates before 2008 can be explained by that the they first saw the signs of the crisis in the second quarter of 2008 (Masselink & van den Noord, 2009). The Netherlands had however also seen increased unemployment rates like this previously (between 2002 and 2004) without any significant increase in health inequalities. These results for the Netherlands might therefore be a combination of the lagged effects caused by the increase in the Gini-index in 2008 and the increase in unemployment rates in 2010 (Table 8.2). This will then increase the inequalities in power and prestige, which again will increase relative deprivation and psychosocial stress. The Bismarckian welfare state regime is known for its earning related welfare benefits, and the variations in these social benefits are not as big as they are in the Southern European welfare state regime. In cases of increasing unemployment rates these welfare benefits help maintain the existing social patterns (Bambra & Eikemo, 2009). It might therefore be more likely that it is acute psychosocial stress caused by relative deprivation and loss of control rather than financial difficulties causing the increase in health inequalities in the Netherlands. Despite good material standards, increasing unemployment rates might therefore have greater financial effects on health inequalities in Spain compared to the Netherlands.

The reason why the Netherlands showed increased health inequalities compared to Belgium and Germany who also belong to the Bismarckian welfare state regime, can possibly be explained by that Belgium and Germany rebounded their economy quickly after the downturn, maintaining unemployment rates and the Gini-indices without major changes (Euro Challenge, 2012a, 2012b) (Table 8.2). As opposed to this the Netherlands were more vulnerable when first met with the financial crisis compared to other European countries. Their global demands were plummeting, they had problems with balancing their bank sheets at there was a declining confidence and trust between producer and consumer (Masselink & van den Noord, 2009). It might also be that the Netherlands were more prone to increasing health inequalities due to contextual changes since they have the smallest health inequalities of all the European countries. This combined with the increase in the Gini-index and unemployment rates in 2008/2010, and the belief that they would weather out the financial crisis (Masselink & van den Noord, 2009) can possibly be the explanation as to why the

Netherlands showed significant increasing health inequalities compared to the other European countries showing no significant change.

What is interesting is that Portugal who also belongs to the Southern European welfare state regime, showed decreasing health inequalities in 2006. This significant result is somewhat surprising since Portugal had been in recession since 2000/2002 (Abreu, 2006), and that the unemployment rates in Portugal had been increasing throughout the ten years between 2002 and 2012 (Table 8.2). Despite this Portugal showed the opposite results of both Spain and the Netherlands. In the 1990's Portugal had a rising economy, but during the time period between 1999 and 2005 their economy went below the European average (Abreu, 2006; European Commision, 2006). The difference between Portugal, Spain and the Netherlands is that Portugal had been in recession for some years prior to 2006 where the significant decrease in health inequalities was seen. Spain and the Netherlands on the other hand showed a significant increase almost instantly. It is however unknown as to whether Portugal showed similar changes in health inequalities right after the recession due to the short time interval used. 2002 is here used as the reference category, which is also around the same time Portugal entered recession. It can therefore be that Portugal also saw an increase in health inequalities around 2002 that is not detected by these analyses, and that the decreasing result seen in 2006 then is the health inequalities returning to where it was prior to the recession.

According to Table 8.2 and Table 8.5 it does not seem to be any correlation between income inequality and the decreased inequalities in self-reported health within Portugal. Then how come did Portugal despite the increasing unemployment rates show decreasing and not increasing health inequalities? The decreasing health inequalities can possibly be explained by that individuals with higher SEP and therefore more money, power and social capital, invest time and resources into the growth of society (Levine, 1997). When the assumed economic growth did not continue as expected, these individuals might be in danger of losing money and even power, causing psychosocial stress and perhaps health damaging behavior, which in the long term will decrease health. They might have private investments or they might work for companies with investments which can lead to high work demands and work-related stress. It can therefore be that lagged consequences of economic recession in Portugal affected individuals with higher SEP through psychosocial stress, while it for Spain and the Netherlands were the opposite, where quick increases in health inequalities were caused by psychosocial stress among individuals with lower SEP. Even though individuals with high SEP most likely can afford good health care, increased psychosocial stress can increase health

damaging behavior, blood pressure and cardiovascular diseases which then will have an impact on their health in the long run. It has also been discussed whether increasing unemployment rates can cause health promoting behavior among individuals with lower SEP. The effects of possible decreasing health for individuals with higher SEP in combination with health gaining behavior among the individuals with lower SEP will probably not be immediate. This can explain the time it took for decreasing health inequalities to appear and the reason why these results were the opposite of both the Netherlands and Spain. Another possible explanation as to why the Netherlands and Portugal show opposite results is that the Bismarckian welfare state regime is one of the welfare state regimes with the greatest economy (Eikemo, Bambra, et al., 2008). It might be hypothesized that individuals with lower SEP from welfare states with greater economy might benefit more from an economic growth than individuals with lower SEP from welfare states with poorer economy such as Portugal. Individuals with lower SEP might then have gotten used to different living conditions during the economic growth, which can possibly cause different results when faced with growing unemployment rates and/or increasing Gini-indices. If this is the case is hard to say, but it can be an interesting thought to research further.

Slovenia who belongs to the Eastern European welfare state regime showed significant change in inequalities in self-reported health in 2008 just as Spain did, only that their health inequalities were decreasing. The reason why these countries showed different results can most likely be explained by that unemployment rates rose in Spain in 2008, while they decreased in Slovenia (Table 8.2). Since both countries belong to the welfare state regimes with the poorest social benefits (cf. the Eastern and Southern European welfare state regimes), they are also among the ones most prone to alterations in health inequalities due to changes in contextual determinants such as increasing or decreasing unemployment rates.

After the independence from Yugoslavia in the 1990's, and especially between 2000 and 2008, Slovenia had a major increase in GDP_{PC} (Stanojevic & Klaric, 2013; World Development Indicators, n.d.). The decrease in both unemployment rates and health inequalities can therefore be lagged results of the strong track record of economic management Slovenia has had since before the independence (Euro Challenge, 2012c). This can partly be seen in that unemployment rates kept decreasing between 2002 and 2008. It does however seem as this economic growth is mostly for the ones with already high SEP since the Gini-index keeps slowly increasing, with the exception of a small decrease in 2008 (Table 8.2). An explanation to the findings can therefore be that even though income

inequalities are increasing, decreasing unemployment rates works as a buffer against psychosocial stress due to decreasing relative deprivation, which will decrease health inequalities. Another possible explanation is that Slovenia joined the European Union in 2004 and was declared a developed country and joined the Organization for Economic Co-operation and Development (OECD) in 2007 (OECD, n.d.; WHO, 2007). Being a part of a membership may result in increased social affiliation and social cohesion, and it might be these factors combined with the economic growth and decreasing unemployment rates causing the significant decrease in health inequalities.

Even though Slovenia belong to the Eastern European welfare state regime which is associated with poor economy and poor welfare benefits, Slovenia has income inequalities and unemployment rates among the smallest out of all the European countries. Slovenia might therefore not be a country best representing Eastern Europe as a welfare state regime, despite them having the greatest health inequalities throughout the ten years (Table 8.3 through Table 8.6). The reason why there were seen decreasing inequalities in self-reported health for Slovenia and not for Poland even though they belong to the same welfare state regime, this might be explained by that Poland did not have the same amount of economical increase during the 1990's and at the beginning of the 2000's as Slovenia did (Reichardt, 2011). This can be recognized in that their unemployment rates were as high as 19.9 % in 2002 (Table 8.2). Slovenia has the greatest health inequalities of all the European countries and it might therefore be that they have the most to gain from decreasing unemployment rates, economic growth and increasing social cohesion through memberships in the EU and OECD. It is easier to increase poor self-reported health than already good self-reported health, decreasing the inequalities between individuals with lower and higher SEP. Since the Eastern European welfare state regime is known for its limited health service provisions, the decreasing unemployment rates will therefore most likely to a great extent increase self-reported health for the individuals getting employed.

The reason why the significant changes for the four countries were only seen during the respective years, this might vary to some degree. Portugal entered a new recession with rapid increasing unemployment rates in 2008/2010, and also Slovenia saw increasing unemployment rates the years after 2008, which might explain the loss of significant decrease in health inequalities. For the Netherlands the return to small or insignificant health inequalities might be due to their robust capacity to recover because of their flexible labor market and high participation rates (Masselink & van den Noord, 2009). For most of the

population the shock of economical decrease, both personal as well as societal, has probably settled and individuals have become more accustomed to their new life situation with help from the welfare benefits. For Spain it may be that fast increasing unemployment rates might increase social affiliation and social cohesion rather than social alienation. The Southern European welfare state regimes are more collectivistic than the rest of the European welfare state regimes, and family support is important (Bambra & Eikemo, 2009; MacDonald, 2010; Rhee, Uleman, & Lee, 1996). It can therefore be hypothesized that when the shock has settled, the social cohesion works as a buffer against the decreasing health and increasing health inequalities that unemployment rates are associated with. This can help explain the insignificant results seen in 2010 and 2012 for both Spain and Portugal.

It is important to remember that the discussion above is not significantly proven, but is based on previous research and descriptive statistics (Table 8.2) due to the impossibility to add unemployment rates and Gini-indices in the within-country analyses. From the discussion it seems as all of the changes in health inequalities can to some degree be explained by unemployment rates. Different countries might however have somewhat different underlying explanation factors or combination of explanation factors to explain these changes (Gini-indices, economy, welfare benefits i.e.).In the Netherlands it might be a combination between the increasing Gini-index and unemployment rates explaining the increase in health inequalities due to the shock of entering recession. This can possibly cause increased inequalities in power, which again can increase relative deprivation and psychosocial stress. One must however consider the results from the discussion above where income inequalities might explain the persistence in health inequalities within the countries and welfare state regimes, but not the persistence in the inequalities between them. For Spain it seems as a combination between poor and unequal welfare benefits for the ones getting unemployed and the shock of entering recession might increases psychosocial stress, which can then be the cause behind the increasing health inequalities. It was also discussed that psychosocial stress due to financial difficulties was greater in Spain than in the Netherlands. In Portugal it seems as the health inequalities might be decreasing due to increased psychosocial stress among individuals with higher SEP and increased health gaining behavior among individuals with lower SEP due to unemployment. In Slovenia decreasing unemployment rates seems directly linked to the decrease in health inequalities, perhaps in combination with the memberships in the EU and OECD, increasing social cohesion.

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5.3. Thesis limitations

It is necessary to emphasize that there are some theoretical and methodological limitations associated with this thesis. These limitations will be discussed accordingly, starting with the theoretical.

Theoretical limitations

Wilkinson's income inequality hypothesis has been criticized for many things, especially by Muntaner and Lynch (1999). First of all they criticize him for not taking all countries into account when talking about population health, only affluent countries. According to them, Wilkinson's thought of developing countries to become like developed countries when they reach a certain living standard, is proven wrong. He is also criticized for not taking class relations and class formations into account, only social status per se. Muntaner and Lynch (1999) also criticize him for not looking at the mechanisms behind income inequality, something they think is essential in models that address such inequalities. The income inequality hypothesis does only look at the income inequality itself, not what generates it. This is also linked to the critique of him not taking political determinants of income inequalities and health inequalities into account. By taking the different European welfare state regimes into consideration this is cared for to some degree, but this can also be looked at as a limitation.

Some limitations go exclusively on as to whether Wilkinson's hypothesis can be applied when looking at health and inequalities due to changes in unemployment. The hypothesis claims that unemployment leads to decreased health due to health damaging behavior, which can be inconsistent to previous research. Studies that have looked at changes in unemployment and health during economic crises for example, have found inconclusive results concerning whether unemployment can be health gaining or health straining. This makes Wilkinson's hypothesis not as adequate to explain how unemployment will affect health related behavior as one would hope. The fact that he looks at global health inequalities, while this paper is about European health inequalities is also something that has to be considered. According to the discussion above it seems as the income inequality hypothesis can contribute to the explanation of the persistency in health inequalities through psychosocial stress, but that it is having a hard time explaining the differences in health inequalities between the countries and welfare state regimes, which is a great limitation.

It is also important to acknowledge the critical debate that has been around the classification of welfare state regimes into typologies (Eikemo, Bambra, et al., 2008). Most of the typologies out there have limited focus on the differences between the welfare states belonging to the same welfare state regime. Even though the welfare states are categorized according to geographical proximity, cultural resemblance and similar welfare policies, this does not mean that they are identical. Another thing is that not all countries have been categorized into welfare state regimes in Ferrera's typology. In this thesis this counts for the Eastern European countries. Bambra and Eikemo (2009) introduced the Eastern European welfare state regime to Ferrera's typology, but it is still a limitation that this is not a part of the original typology. It might also be that Eastern European countries have developed differently since the 1990's after the dissolution of the Soviet Union, and that classifying these countries into the same welfare state regime might not be ideal. Slovenia did for example have the lowest income inequalities and some of the lowest unemployment rates in all of the countries used in these analyses. This was somewhat surprising since the assumption was that countries belonging to the Eastern European welfare state regime would probably have high income inequalities and especially high unemployment rates since this regime has the poorest economy of the welfare state regimes.

Methodological limitations

Like all regression analyses also OLS-regression and multilevel models have their limitations. The dependent variable should first of all be normal distributed. According to Figure 8.1 self-reported health is negatively skewed to some degree. This small amount of skewness will probably not cause too much of a problem for the analysis, but it is something that is worth mentioning. That the results are mostly showing relative inequalities is also a limitation since it is important to look at the absolute inequalities as well to get the full picture. It is therefore important to interpret these results with care, knowing that there might be some systematic errors. Another important factor for regression analyses is the casualty between the dependent variable and the independent variables. As to whether it is the independent variables that affect self-reported health or of it is self-reported health that affects the independent variables can sometimes be hard to tell. Examples are *education, feeling about household income* and *how often you socially meet with friends*. It is for example mentioned that childhood sickness can determine education later in life. Because of this it is important to have a strong theoretically foundation as to which way the casualty goes. It is however doubtful that individuals' health will affect a country's unemployment rate and Gini-index. Even so, one

should still keep in mind that some countries might have populations with relative good health which again can affect the unemployment rates and the income inequality. If this is the case there might be other extraneous factors causing the results seen in inequalities in self-reported health.

Even though most variables from the ESS-dataset that could be of significance for the analyses are used, there are still some variables that ought to be added. Marital status could have been a good explanatory control variable for social support, and the amount of household income could have been used as a more objective measure that can easier be operationalized and compared within and between populations, as opposed to *feeling about household income*. These variables are however less stable due to the changes done to them throughout the years. For both *how much the management at your work allow/allowed you to decide how your own daily work is/was organized* and the social support indicator *do you have anyone to discuss personal matters with* there had been done some changes throughout the years. For both of these variables it was possible to merge the different versions into one variable but this made the variables less stable and robust. This can possibly be seen in the sudden changes in the descriptive statistics in Table 8.1. It could also have been preferred to have the social support variable *how often you socially meet with friends, relatives or colleagues* dummy coded since the distance between the categories are not absolute (Eikemo, 2012). The missing Gini-indices for some of the years do also cause some constraints on the analysis. For most of them the average of the previous and latter year is used as a supplement, but this is still not ideal when considering the reliability of the analysis. Since the Gini-index changed so little for most countries during these years it is rather unlikely that this would have an influential effect, but it is still a major limitation.

Comparing countries and surveys can be a limitation itself since there are so many factors that can contaminate the comparison. The data collected might have been collected differently in the different countries and the questions might have somewhat different understandings, even though the ESS-team has gone to great measures to prevent this. Despite these limitations the ESS is seen as a great way to compare countries and to look for changes in behaviors, beliefs and attitudes (European Social Survey, n.d-a). A major concern with self-reported health is that the respondents do not see the Likert-scale of self-reported health as something that is absolute. It is a subjective measure and it can therefore be that individuals with the same true health have different reference levels to which they judge their health. According to Jylhä (2009) self-reported health might be culturally determined due to the cultural differences in

the willingness to present oneself either in a positive or negative way. In cases like this the researcher does not have any control over the respondent's assessment of the question. Some individuals might for example reference their health to others with the same sex, age, education or income (Jürges, 2007). According to Jürges especially older people have a tendency to have a better more positive view of their health. The usual decline in health as one gets older might therefore underestimate the true decline. Cultural differences in the understanding unemployment can also be present (World Development Indicators, 2002-2012). It is also not possible to know who are voluntary unemployed and who are involuntary unemployed by looking at countries' unemployment rates.

There might also be systematical differences in the sample according to different social groups such as SEP, age and education. The poorest individuals for example, such as the homeless, will most likely not be represented in the ESS-dataset despite the design weight added to the analyses. Secondly, older individuals did probably not have the same educational opportunities when they grew up since the education system was different back then, making it harder to compare education between different age cohorts. During the last three decades low education has become a stronger and more important risk factor for mortality, and most likely for self-reported health as well (Rognerud & Zahl, 2006). This implies that education thirty years or longer ago was a weaker determinant for an individual's adult SEP than it is today, and did therefore not have an effect on self-reported health as great. Another thing is that becoming old is not a coincidental or random thing, it is often associated with SEP in that the higher up in the social hierarchy individuals are situated, the longer their life expectancy will be (Marmot, 2005). It might therefore be an overrepresentation of older individuals with higher SEP and "good" health. An idea could have been to cut out everyone above the age of 85 years, this way trying to limit the validity problems this can lead to.

There are also some other limitations related to the education variable used. It was decided not to cut out the extreme values based on the assumption that cases above 30 years of education (which would have been a subjective cutoff point) would not have any influential effect since they only counted for 101 cases out of 129 887. Even though this was a small amount of cases it would probably have been better if these extreme and highly doubtful cases were deleted, this way certainly knowing that they did not influence the results in any way. Some of these extreme cases might have greater influence within some countries than in others in the separate analyses for instance, which was something that was not considered in chapter 3. Another thing is that even though Ross and Mirowsky (1999) concluded that the

selectivity model did not have any impact on health, it can be questioned as to whether the quality of education might still be important. It is highlighted that the individuals with higher SEP have better understandings of health related behavior. This health related knowledge, cognitive skills and analytical abilities can perhaps be related to the school's quality and ability to pass on this knowledge.

5.4. Suggestions for further research

Research on health inequalities is a relevant and important field within health science. The health inequalities are socially structured through different determinants and can therefore probably be prevented. According to Dahlgren and Whitehead (2006) there is only one way to decrease health inequalities caused by education and socioeconomic position, and this is through increasing the freedom and power among individuals with lower SEP. Higher SEP is usually associated with money, which itself gives these individuals more prestige, and therefore more freedom and power. It is therefore important to figure out how to increase the freedom and power for individuals with lower SEP so that they can accomplish the same amount of health as individuals with higher SEP. This cannot be done by the individuals alone since the individual determinants on self-reported health often are influenced by contextual determinants. It is therefore important to figure out which contextual determinants that are the most important explanation factors for health inequalities, then how they might influence individual determinants.

More research is needed on both unemployment rates as well as income inequality as health determinants. Especially income inequality can be important since it seems to explain and contribute to the persistency in health inequalities, but that it is having a hard time explaining the differences between the countries. There might therefore be some other underlying and combining effects causing the health inequalities. The countries have all different economic, political and societal histories which might work as underlying explanation factors. A potential contextual determinant that was mentioned shortly in the discussion was individualism versus collectivism, which will then work as a cultural health determinant. This determinant might have an effect on inequalities in self-reported health between the countries or welfare state regimes, especially in the importance of social cohesion and social affiliation. GDP or other economic indicators are also contextual determinants that can be important to research further, despite previous research suggesting that GDP had no major effect (Marmot, 2005; Stuckler et al., 2009; Wilkinson, 1994, 1996). That more focus is needed on contextual

and especially on economic determinants is supported by Kunst et al. (2005), Navarro and Shi (2001) and Whitehead, Burström, and Diderichsen (2000). They believe that economic developments and socioeconomic policies will have great impact on the health of disadvantage population groups. It is also important to remember that contextual determinants such as the Gini-index, unemployment rates and perhaps GDP might be more important in some countries and during some years than in others. This shows the importance of trend analysis of different contextual determinants' effect on inequalities in self-reported health that goes back even further than ten years. Because of the possible differences in contextual explanation factors it might be better to detect the contextual determinants for each country before attempting to decrease health inequalities between them. Running a triple interaction effect between contextual variables, education (or other SEP-indicators) and either countries or years can be helpful to see how great the effect of different contextual factors is in the different countries or years. Conducting a random-slope model where either education or contextual variables are set as random can also be interesting since it then will be possible to see exactly how the random variables and the effects of to these variables alters between countries.

Health inequalities were as previously mentioned located and discussed for the first time in the 1980's and a lot has happened since then, but there is still a lack of comparable surveys that goes back 20-30 years. What the consequences of societal economic changes and increasing unemployment rates and income inequalities will have in the future remains uncertain. Continuing to look at the effect of contextual determinants on self-reported health in the future will therefore be important.

6. Main Conclusions

This thesis has explored the importance of contextual determinants on inequalities in self-reported health in Europe and within thirteen European countries between 2002 and 2012. Two main findings were drawn from the results and discussed above; the first was the persistency in inequalities in self-reported health both in Europe as well as within most of the European countries, and the second was that the Netherlands, Portugal, Spain and Slovenia showed significant changes in inequalities in self-reported health.

The persistency seen in self-reported health in Europe and in most of the European countries throughout these ten years can possibly be explained by the time it may take for the consequences of alterations in unemployment rates and Gini-indices to show significant results on health inequalities. It was also discussed that the Gini-index might not have changed enough to show any significant effect during these ten years. The stability in health inequalities seen in Denmark, Finland, Norway, Sweden, Ireland, the UK, Belgium, Germany and Poland might possibly be explained by the buffering or inhibiting effect of the welfare benefits the countries have, despite increasing unemployment rates. This is because all of these countries with the exception of Poland belong to welfare state regimes with at least a minimum of standards. Wilkinson's income inequality hypothesis seems to contribute to the explanation of the persistency in health inequalities between 2002 and 2012 in the European countries. The hypothesis is however having a hard time explaining the persistency in health inequalities between the countries and welfare state regimes. This is because the welfare states with the smallest income inequalities are not necessarily the ones with the smallest health inequalities. Since the income inequality hypothesis could not be positively confirmed, the fundamental cause theory was proposed as an alternative theory to explain the persistency in inequalities in self-reported health.

Most of the four countries that did show significant changes in inequalities in self-reported health seemed to be affected by unemployment rates to some degree, even though the effects of unemployment rates might be different and that there were some different underlying explanation factors (economy and welfare benefits i.e.). For the Netherlands it seems as a combination between increasing unemployment rates and income inequalities is causing the increase. This was explained by that the population of the Netherlands was not expecting an economic downturn with increasing unemployment rates and income inequalities which

increased relative deprivation and psychosocial stress among the individuals with lower SEP. Increasing unemployment rates seem also to be the explanation behind the increasing health inequalities seen in Spain. This increase was possibly explained by the unequal welfare benefits Spain has. It was therefore discussed as to whether psychosocial stress due to financial difficulties was greater in Spain than in the Netherlands who have better welfare benefits. For Portugal the decrease in health inequalities, despite an economic recession and increasing unemployment rates, might be explained by decreasing health among individuals with higher SEP rather than individuals with lower SEP. This can possibly be explained by a combination between investments done during the economic growth by individuals with higher SEP, causing psychosocial stress and health damaging behavior during the economic recession, and possible health gaining behavior among individuals with lower SEP due to increasing unemployment rates. And lastly, the decrease seen in Slovenia might be due to their growing economy and decreasing unemployment rates up towards 2008 in combination with possible increasing social cohesion and social affiliation because of their membership in the European Union and OECD.

On the basis of this it is possible to see that the understanding how health determinants within and between European countries and welfare state regimes works is a complicated matter. They all have different economic, political and societal histories which might work as underlying explanation factors. In the future it might therefore prove quite useful to take the similarities as well as the differences between the European welfare state regimes into account when doing research on health determinants. In addition to unemployment rates and income inequalities it has been proposed to look at economic factors such as GDP as potential health determinants, as well as individualism/collectivism which can be culturally determined and affect social cohesion, psychosocial stress and health inequalities. Ten years might not be enough time to really get a good look at the determinants causing health inequalities, and health researchers will therefore have an interesting time ahead when there are surveys that go back more than one decade.

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8. Appendices

8.1. Graphs
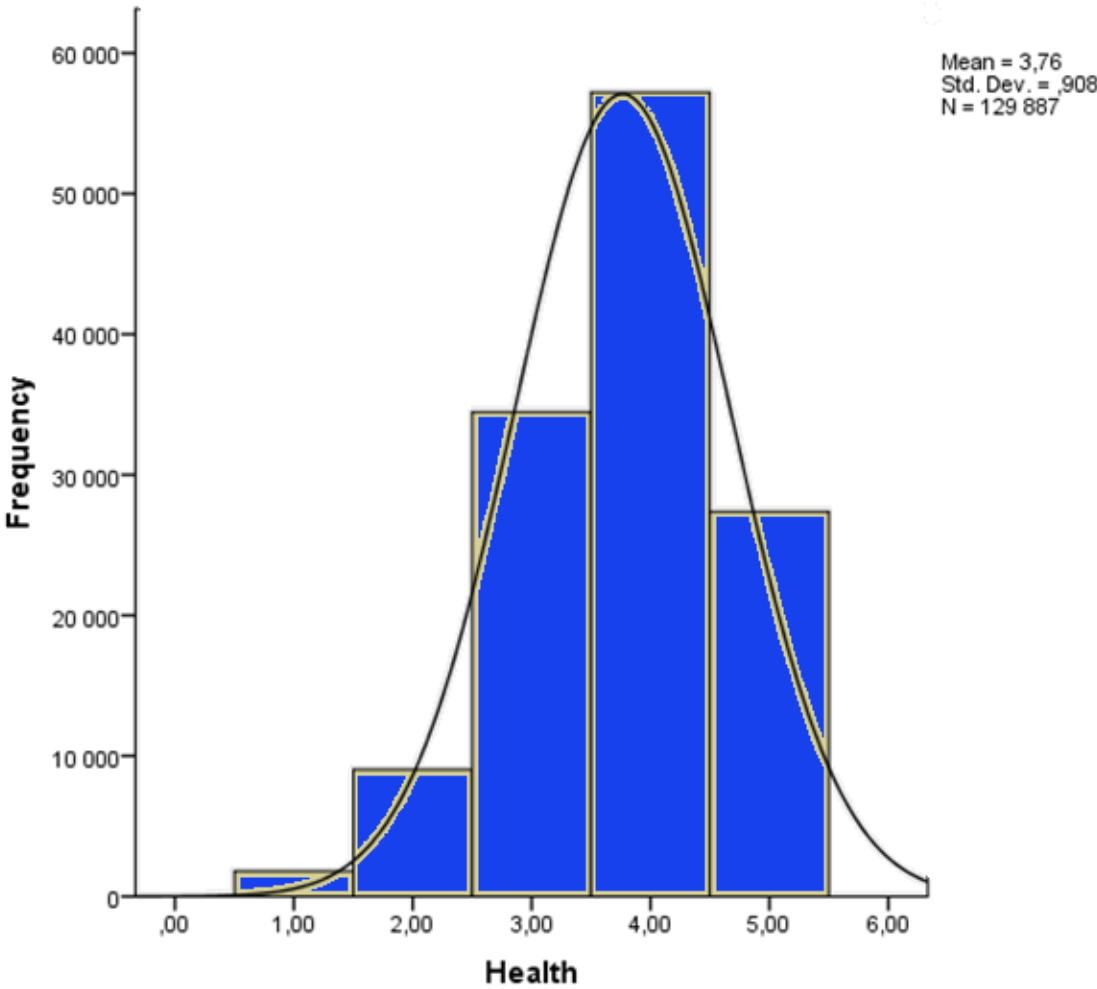
Figure 8.1 Normal distribution of the dependent variable, self-reported health
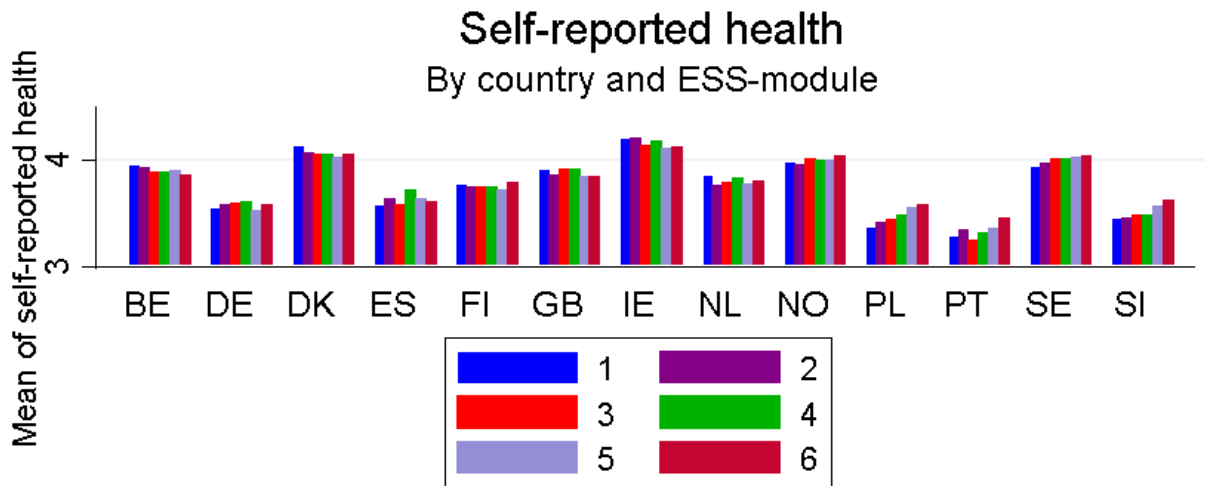
Figure 8.2 Self-reported health by country and ESS-module
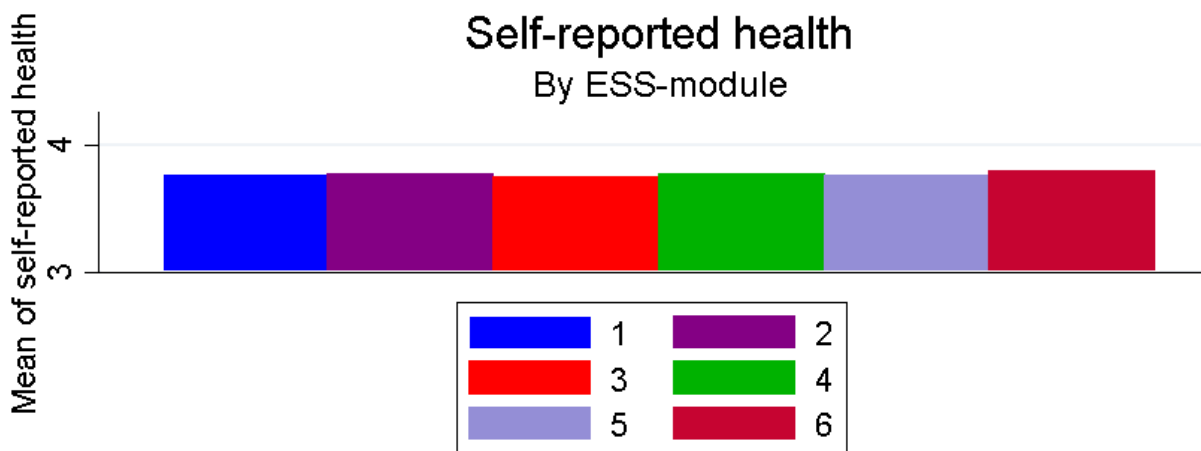
Figure 8.3 Self-reported health by ESS-module
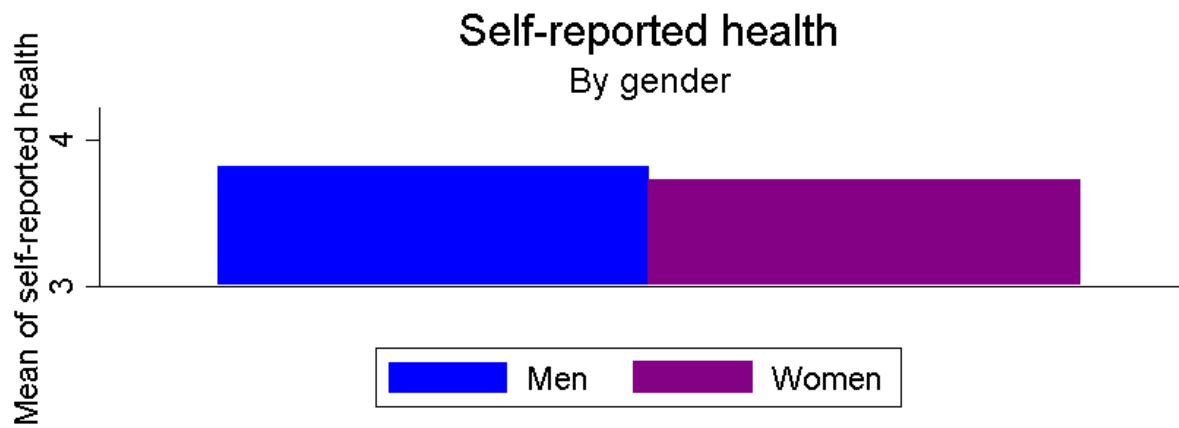
Figure 8.4 Self-reported health by gender
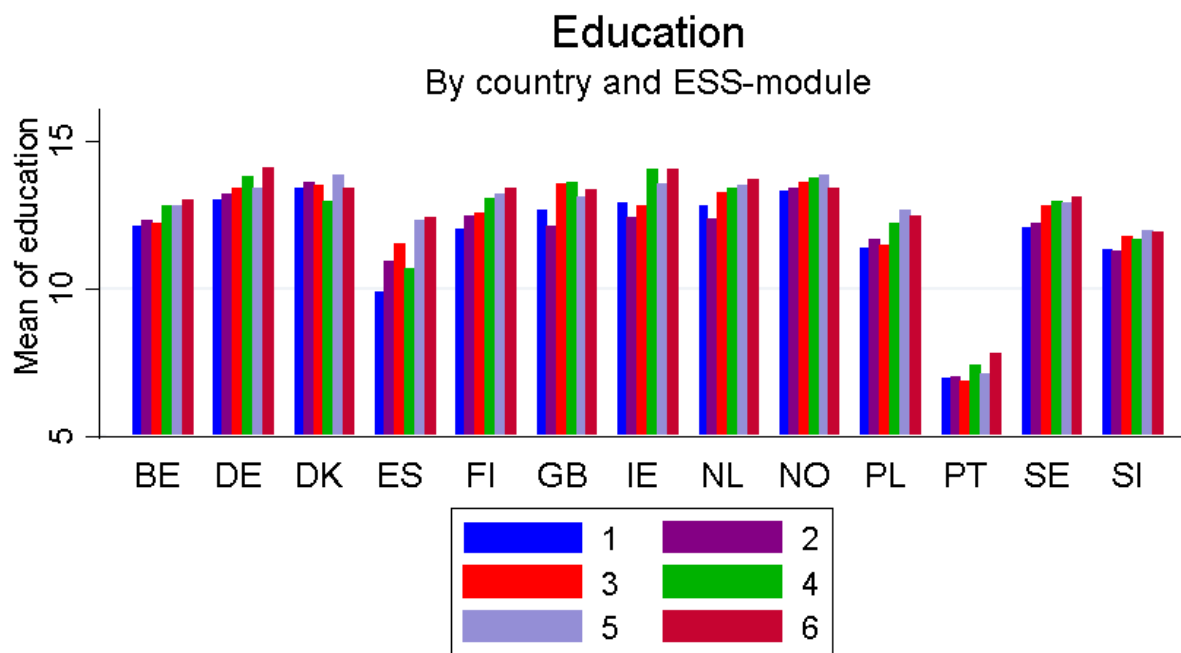
Figure 8.5 Education by country and ESS-module
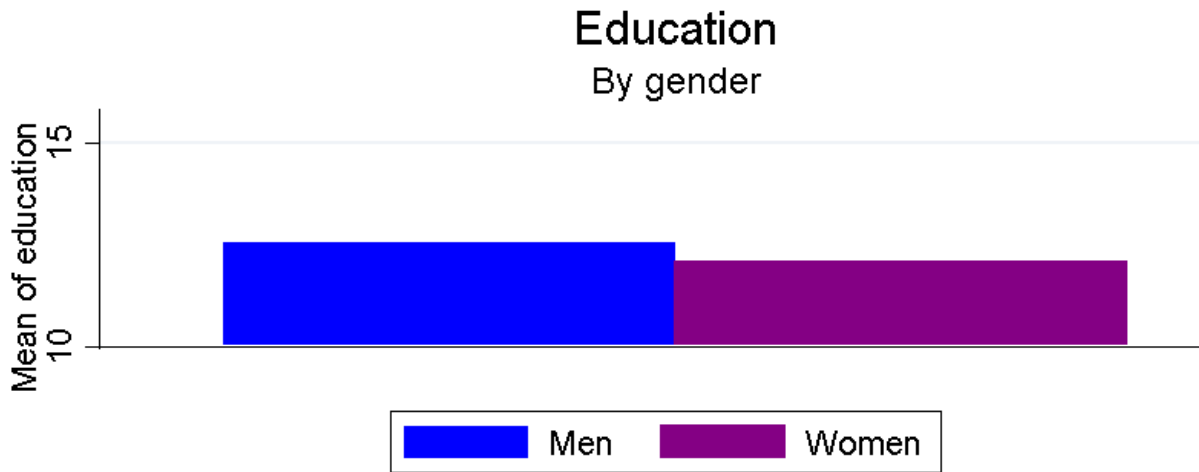
Figure 8.6 Education by gender
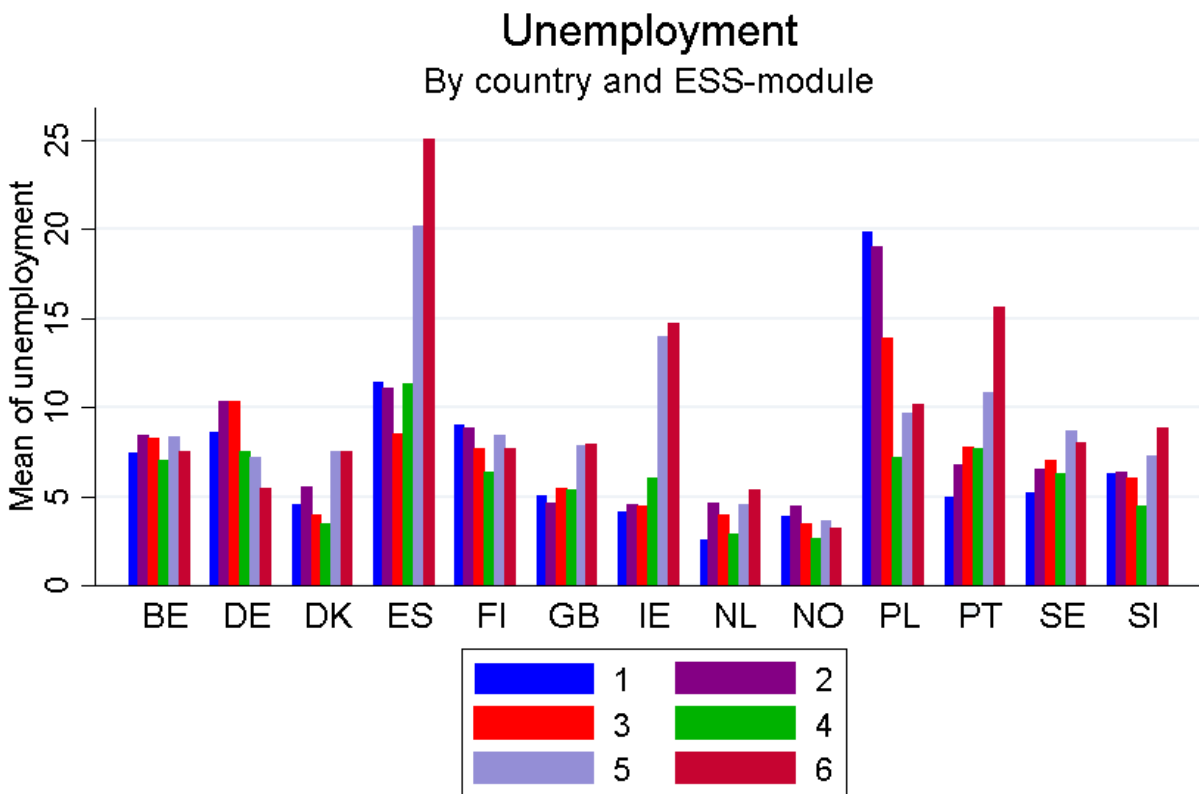
Figure 8.7 Unemployment by country and ESS-module

IV
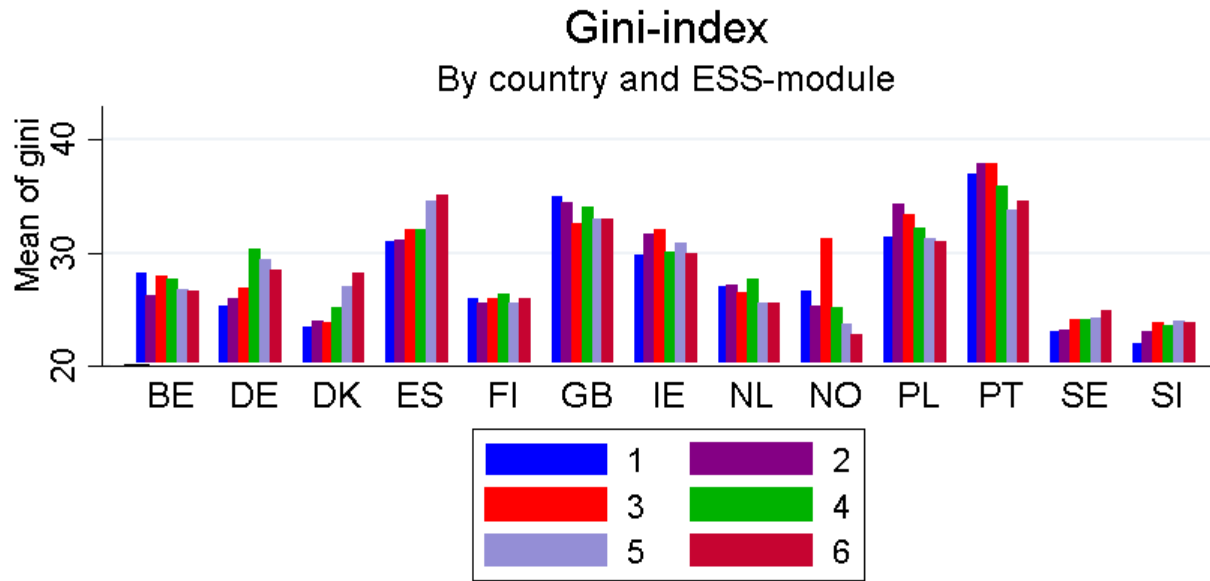
Figure 8.8 Gini-index by country and ESS-module

8.2.   Descriptive statistics

Table 8.1 Descriptive statistics for the independent variables, separated by year

| | Level 1 – individual | | | | | | | Level 2 – contextual | |
	Education	Thoughts about household income	Socially meet with friends	Anyone to discuss personal matters with	Control at work	Gender	Age	Unemployment	Gini-index
Module 1, 2002									
Mean	12.02	3.15	4.98	0.91	3.10	0.52	50.53	7.10	28.03
Std. deviation	4.24	0.78	1.51	0.29	3.88	0.50	15.82	4.34	4.17
Min.	0	1	1	0	0	0	25	2.6	22
Max.	40	4	7	1	10	1	102	19.9	37
Module 2, 2004									
Mean	11.89	3.13	4.97	0.91	6.08	0.54	50.96	7.64	28.45
Std. deviation	4.27	0.80	1.51	0.29	3.66	0.50	15.95	3.69	4.65
Min.	0	1	1	0	0	0	25	4.4	22.9
Max.	32	4	7	1	10	1	101	19	37.8
Module 3, 2006									
Mean	12.19	3.14	5.05	0.91	6.14	0.53	51.64	7.03	29.16
Std. deviation	4.65	0.80	1.52	0.29	3.55	0.50	16.21	2.75	4.24
Min.	0	1	1	0	0	0	25	3.4	23.7
Max.	56	4	7	1	10	1	101	13.8	37.7
Module 4, 2008									
Mean	12.38	3.12	4.96	0.91	6.33	0.53	52.06	6.26	29.21
Std. deviation	4.66	0.81	1.52	0.29	3.53	0.50	16.32	2.32	3.78
Min.	0	1	1	0	0	0	25	2.6	23.4
Max.	48	4	7	1	10	1	105	11.3	35.8
Module 5, 2010									
Mean	12.57	3.08	4.95	0.91	6.22	0.53	52.41	9.19	28.81
Std. deviation	4.62	0.83	1.52	0.29	3.60	0.50	16.25	4.02	3.66
Min.	0	1	1	0	0	0	25	3.6	23.6
Max.	50	4	7	1	10	1	101	20.1	34.4
Module 6, 2012									
Mean	12.79	3.06	4.89	0.96	6.45	0.52	52.82	9.86	28.68
Std. deviation	4.61	0.84	1.52	0.21	3.47	0.50	16.23	5.49	3.75
Min.	0	1	1	0	0	0	25	3.2	22.6
Max.	51	4	7	1	10	1	102	25	35

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Table 8.2 Unemployment rates and the Gini-index per country and year

Country	Unemployment rates	Gini-index
Scandinavia	*5.9*	*25.2*
Denmark 2002	4.6	23.4[1]
Denmark 2004	5.5	23.9
Denmark 2006	3.9	23.7
Denmark 2008	3.4	25.1
Denmark 2010	7.5	26.9
Denmark 2012	7.5	28.1
Denmark average	5.4	25.2
Finland 2002	9.0	26.0
Finland 2004	8.8	25.5
Finland 2006	7.6	25.9
Finland 2008	6.3	26.3
Finland 2010	8.4	25.4
Finland 2012	7.6	25.9
Finland average	7.9	25.8
Norway 2002	3.9	26.6[4]
Norway 2004	4.4	25.2
Norway 2006	3.4	31.1
Norway 2008	2.6	25.1
Norway 2010	3.6	23.6
Norway 2012	3.2	22.6
Norway average	3.6	25.8
Sweden 2002	5.2	23.0
Sweden 2004	6.5	23.0
Sweden 2006	7.0	24.0
Sweden 2008	6.2	24.0
Sweden 2010	8.6	24.1
Sweden 2012	8.0	24.8
Sweden average	6.8	23.8
Anglo-Saxon	*7.6*	*32.1*
Ireland 2002	4.2	29.8[1]
Ireland 2004	4.5	31.5
Ireland 2006	4.4	31.9
Ireland 2008	6.0	29.9
Ireland 2010	13.9	30.7
Ireland 2012	14.7	29.8[5]
Ireland average	8.6	30.6
United Kingdom 2002	5.1	35.0
United Kingdom 2004	4.6	34.3[2]
United Kingdom 2006	5.4	32.5
United Kingdom 2008	5.3	33.9
United Kingdom 2010	7.8	32.9
United Kingdom 2012	7.9	32.8
United Kingdom average	6.1	33.5
Bismarckian	*6.6*	*27.1*
Belgium 2002	7.5	28.2[1]
Belgium 2004	8.4	26.1
Belgium 2006	8.2	27.8

Country	Unemployment rates	Gini-index
Belgium 2008	7.0	27.5
Belgium 2010	8.3	26.6
Belgium 2012	7.5	26.5
Belgium average	7.8	27.1
Germany 2002	8.6	25.3[1]
Germany 2004	10.3	25.8[2]
Germany 2006	10.3	26.8
Germany 2008	7.5	30.2
Germany 2010	7.1	29.3
Germany 2012	5.4	28.3
Germany average	8.2	27.6
The Netherlands 2002	2.6	27.0
The Netherlands 2004	4.6	27.0[2]
The Netherlands 2006	3.9	26.4
The Netherlands 2008	2.8	27.6
The Netherlands 2010	4.5	25.5
The Netherlands 2012	5.3	25.4
The Netherlands average	3.9	26.5
Southern-Europe	*11.9*	*34.3*
Portugal 2002	5.0	37.0[3]
Portugal 2004	6.7	37.8
Portugal 2006	7.7	37.7
Portugal 2008	7.6	35.8
Portugal 2010	10.8	33.7
Portugal 2012	15.6	34.5
Portugal average	9.1	36.0
Spain 2002	11.4	31.0
Spain 2004	11.0	31.0
Spain 2006	8.5	31.9
Spain 2008	11.3	31.9
Spain 2010	20.1	34.4
Spain 2012	25.0	35.0
Spain average	14.6	32.6
Eastern-Europe	*10.0*	*27.7*
Poland 2002	19.9	31.4[1]
Poland 2004	19.0	34.2[2]
Poland 2006	13.8	33.3
Poland 2008	7.1	32.0
Poland 2010	9.6	31.1
Poland 2012	10.1	30.9
Poland average	13.4	32.1
Slovenia 2002	6.3	22.0
Slovenia 2004	6.3	22.9
Slovenia 2006	6.0	23.7
Slovenia 2008	4.4	23.4
Slovenia 2010	7.2	23.8
Slovenia 2012	8.8	23.7
Slovenia average	6.5	23.2

[1]2001/2003 mean, [2]2003/2005 mean, [3]2001, [4]2003, [5]2011.

VIII
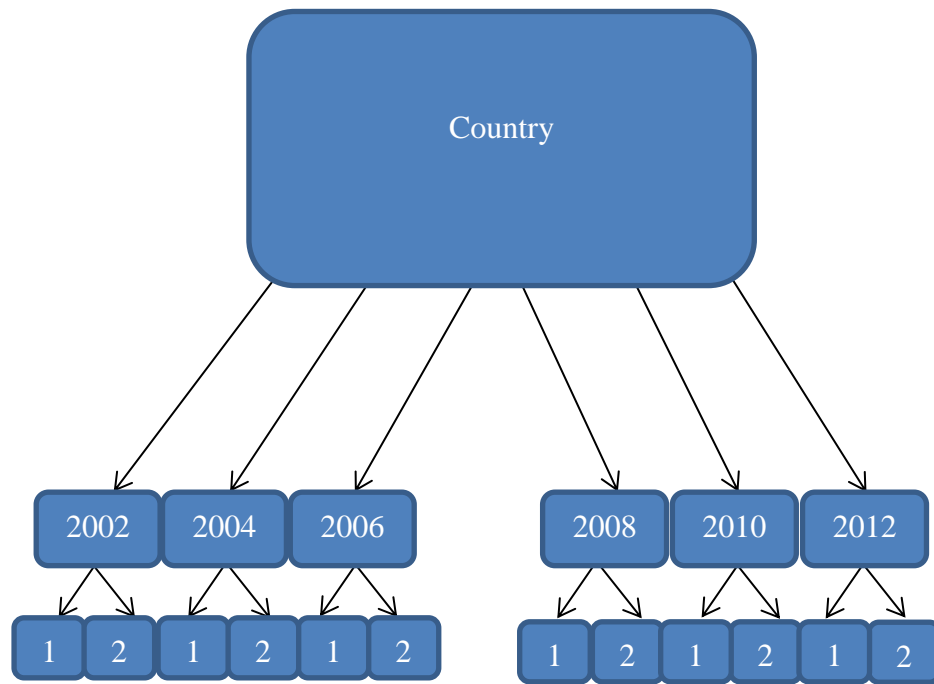
Figure 8.9 An illustration of the hierarchical structure of the data. Country on level 3, years and contextual variables on level 2, and individual variables on level 1

8.3. OLS-regression analysis and random intercept multilevel regression analysis

Table 8.3 OLS-regression models for Denmark, Finland, Norway and Sweden

	Denmark			Finland			Norway			Sweden		
	Model 1	Model 3	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	2.73***	2.82***	2.77***	2.91***	2.96***	2.91***	2.61***	2.64***	2.63***	2.94***	2.95***	2.94***
Education	0.02***	0.02***	0.02***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.02***	0.02***	0.02***
Gender (men = 0, women = 1)	-0.03	-0.03	-0.03	0.03**	0.03**	0.03**	-0.03*	-0.03*	-0.03**	-0.09***	-0.09***	-0.09***
Age (reference category: 25-40 years)												
41-55	-0.18***	-0.17***	-0.17***	-0.26***	-0.26***	-0.26***	-0.16***	-0.16***	-0.16***	-0.15***	-0.15***	-0.15***
56-70	-0.34***	-0.33***	-0.32***	-0.53***	-0.52***	-0.52***	-0.39***	-0.39***	-0.39***	-0.29***	-0.29***	-0.30***
71-85	-0.49***	-0.48***	-0.47***	-0.70***	-0.69***	-0.69***	-0.43***	-0.43***	-0.43***	-0.42***	-0.43***	-0.43***
86-105	-0.59***	-0.56***	-0.56***	-0.85***	-0.83***	-0.84***	-0.52***	-0.52***	-0.52***	-0.42***	-0.42***	-0.42***
Feeling about household income (reference category: very difficult)												
Difficult	0.49***	0.49***	0.49***	0.18***	0.18***	0.18***	0.23**	0.23**	0.23**	0.21**	0.21**	0.21**
Coping	0.73***	0.72***	0.73***	0.44***	0.43***	0.43***	0.57***	0.56***	0.56***	0.41***	0.41***	0.41***
Living comfortably	0.97***	0.96***	0.97***	0.60***	0.60***	0.60***	0.74***	0.73***	0.73***	0.63***	0.63***	0.63***
Control at work	0.02***	0.03***	0.03***	0.02***	0.02***	0.02***	0.02***	0.03***	0.03***	0.02***	0.02***	0.02***
Socially meet with friends	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.05***	0.05***	0.05***	0.04***	0.04***	0.04***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.14***	0.14***	0.14***	0.12***	0.11***	0.11***	0.16***	0.16***	0.16***	0.16***	0.15***	0.15***
ESS_{year} (reference category: module 1, 2002)												
Module 2, 2004		-0.14***	-0.22		-0.11***	-0.12		-0.12***	-0.21*		-0.03	(-)0.00
Module 3, 2006		-0.14***	0.00		-0.08***	0.01		-0.03	(-)0.00		0.00	-0.05

Module 4, 2008		-0.15***	-0.10		-0.12***	-0.06		-0.08**	-0.15		-0.02	0.06
Module 5, 2010		-0.19***	-0.12		-0.12***	-0.10		-0.06*	-0.03		0.01	0.02
Module 6, 2012		-0.14***	-0.12		-0.08***	0.01		-0.02	0.12		0.03	0.02
Education*ESS$_{year}$ (reference category: module 1, 2002)												
2004			0.01			0.00			0.01			(-)0.00
2006			-0.01			-0.01			(-)0.00			0.00
2008			(-)0.00			(-)0.00			0.01			-0.01
2010			(-)0.00			(-)0.00			(-)0.00			(-)0.00
2012			(-)0.00			-0.01			-0.01			0.00
R^2	0.1099	0.1134	0.1140	0.2206	0.2227	0.2230	0.1377	0.1397	0.1404	0.1199	0.1204	0.1206
Sig. F. Change	77.61	6.54***	1.00	250.24	5.81***	0.70	112.32	3.97***	1.26	104.88	1.15	0.40
N			8 033			10 451			8 812			9 388

*** p<0.01, ** p<0.05, *p<0.10

Table 8.4 OLS-regression models for Ireland, United Kingdom and Belgium

	Ireland			United Kingdom			Belgium		
	Model 1	Model 3	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	3.54***	3.47***	3.45***	2.99***	3.05***	3.10***	3.22***	3.27***	3.28***
Education	0.02***	0.02***	0.02***	0.02***	0.02***	0.02**	0.02***	0.02***	0.02***
Gender (men = 0, women = 1)	0.02	0.02	0.02	0.02	0.03	0.03	-0.04**	-0.03**	-0.03**
Age (reference category: 25-40 years)									
41-55	-0.14***	-0.14***	-0.14***	-0.21***	-0.21***	-0.21***	-0.23***	-0.23***	-0.23***
56-70	-0.35***	-0.35**	-0.35***	-0.45***	-0.44***	-0.44***	-0.38***	-0.37***	-0.37***
71-85	-0.57***	-0.58***	-0.57***	-0.59***	-0.59***	-0.59***	-0.56***	-0.55***	-0.55***
86-105	-0.59***	-0.60***	-0.59***	-0.79***	-0.77***	-0.77***	-0.54***	-0.52***	-0.52***
Feeling about household income (reference category: very difficult)									
Difficult	0.10**	0.10**	0.10**	0.28***	0.28***	0.28***	0.29***	0.29***	0.29***
Coping	0.25***	0.26***	0.25***	0.53***	0.52***	0.52***	0.47***	0.47***	0.47***
Living comfortably	0.38***	0.38***	0.38***	0.75***	0.74***	0.74***	0.62***	0.61***	0.61***
Control at work	0.01***	0.01***	0.01***	0.02***	0.03***	0.03***	0.01***	0.01***	0.01***
Socially meet with friends	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.03***	0.03***	0.03***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.26***	0.26***	0.27***	0.13***	0.13***	0.13***	0.04	0.04	0.04
ESS_{year} (reference category: module 1, 2002)									
Module 2, 2004		(-)0.00	0.03		-0.07**	-0.26**		-0.05*	-0.08
Module 3, 2006		-0.11***	0.08		-0.07**	-0.08		-0.07**	-0.07
Module 4, 2008		-0.04	0.04		-0.06*	-0.03		-0.08***	-0.10
Module 5, 2010		-0.01	-0.08		-0.09***	-0.14		-0.07***	-0.08
Module 6, 2012		-0.04	-0.10		-0.07**	-0.23		-0.10***	-0.14

Education*ESS$_{year}$ (reference category: module 1, 2002)									
2004			(-)0.00			0.01			0.00
2006			-0.02*			0.00			(-)0.00
2008			-0.01			(-)0.00			0.00
2010			0.01			0.00			0.00
2012			0.00			0.01			0.00
R^2	0.1243	0.1263	0.1272	0.1290	0.1298	0.1303	0.1472	0.1486	0.1486
Sig. F. Change	111.63	4.29***	1.77	122.23	1.85*	1.15	119.53	2.98**	0.07
N			11 139			11 813			8 899

*** p<0.01, ** p<0.05, *p<0.10

Table 8.5 OLS-regression models for Germany, Netherlands and Portugal

	Germany			The Netherlands			Portugal		
	Model 1	Model 3	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	2.86***	2.82***	2.74***	2.91***	2.96***	3.01***	3.05***	3.00***	2.94***
Education	0.02***	0.02***	0.02***	0.01***	0.01***	0.01*	0.03***	0.03***	0.03***
Gender (men = 0, women = 1)	-0.01	-0.01	-0.01	-0.05***	-0.05***	-0.05***	-0.16***	-0.16***	-0.16***
Age (reference category: 25-40 years)									
41-55	-0.26***	-0.26***	-0.26***	-0.15***	-0.15***	-0.15***	-0.27***	-0.28***	-0.29***
56-70	-0.47***	-0.47***	-0.47***	-0.25***	-0.24***	-0.24***	-0.57***	-0.59***	-0.59***
71-85	-0.71***	-0.71***	-0.71***	-0.39***	-0.38***	-0.38***	-0.80***	-0.84***	-0.84***
86-105	-0.88***	-0.89***	-0.89***	-0.49***	-0.47***	-0.48***	-0.92***	-0.95***	-0.96***
Feeling about household income (reference category: very difficult)									
Difficult	0.17***	0.17***	0.17***	0.24***	0.23***	0.23***	0.29***	0.28***	0.29***
Coping	0.48***	0.48***	0.48***	0.51***	0.50***	0.50***	0.42***	0.43***	0.44***
Living comfortably	0.66***	0.67***	0.67***	0.69***	0.67***	0.67***	0.50***	0.54***	0.55***
Control at work	0.01***	0.01**	0.01**	0.01***	0.02***	0.02***	0.00	(-)0.00	(-)0.00
Socially meet with friends	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.02***	0.02***	0.02***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.10**	0.10**	0.10**	0.12***	0.12***	0.13***	0.14***	0.13***	0.13***
ESS$_{year}$ (reference category: module 1, 2002)									
Module 2, 2004		0.04	0.10		-0.09***	-0.08		0.01	0.05
Module 3, 2006		0.08***	0.21**		-0.10***	-0.11		-0.03	0.14**
Module 4, 2008		0.05*	0.14		-0.06**	-0.06		0.12***	0.19***
Module 5, 2010		-0.02	0.08		-0.11***	-0.29***		0.16***	0.14**
Module 6, 2012		0.03	0.11		-0.07***	-0.20**		0.21***	0.25***

Education*ESS $Education*ESS_{year}$ (reference category: module 1, 2002)									
2004			(-)0.00			(-)0.00			-0.01
2006			-0.01			0.00			-0.03***
2008			-0.01			0.00			-0.01*
2010			-0.01			0.01**			0.00
2012			-0.01			0.01			-0.01
R^2	0.1467	0.1480	0.1482	0.1222	0.1245	0.1255	0.2805	0.2902	0.2926
Sig. F. Change	188.78	4.05***	0.51	106.23	4.74***	1.87*	290.79	21.70***	6.43***
N			14 844			10 542			10 887

*** $p<0.01$, ** $p<0.05$, *$p<0.10$

Table 8.6 OLS-regression models for Spain, Poland and Slovenia

	Spain			Poland			Slovenia		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	3.18***	3.22***	3.26***	2.74***	2.73***	2.74***	2.51***	2.48***	2.46***
Education	0.02***	0.02***	0.01***	0.04***	0.03***	0.03***	0.04***	0.04***	0.04***
Gender (men = 0, women = 1)	-0.14***	-0.14***	-0.14***	-0.09***	-0.09***	-0.09***	-0.05**	-0.05**	-0.05**
Age (reference category: 25-40 years)									
41-55	-0.27***	-0.26***	-0.26***	-0.37***	-0.37***	-0.37***	-0.25***	-0.25***	-0.25***
56-70	-0.57***	-0.57***	-0.57***	-0.68***	-0.69***	-0.69***	-0.51***	-0.53***	-0.53***
71-85	-0.85***	-0.84***	-0.84***	-0.94***	-0.95***	-0.95***	-0.73***	-0.74***	-0.74***
86-105	-1.06***	-1.06***	-1.05***	-1.08***	-1.12***	-1.14***	-0.93***	-0.96***	-0.96***
Feeling about household income (reference category: very difficult)									
Difficult	0.10*	0.10*	0.10*	0.35***	0.35***	0.35***	0.26***	0.28***	0.29***
Coping	0.27***	0.26***	0.26***	0.61***	0.60***	0.60***	0.43***	0.46***	0.46***
Living comfortably	0.38***	0.37***	0.37***	0.81***	0.80***	0.80***	0.63***	0.67***	0.67**
Control at work	0.00	0.01**	0.01**	0.00*	0.00	0.00	0.01***	0.00	0.00
Socially meet with friends	0.05***	0.05***	0.05***	0.03***	0.04***	0.04***	0.05***	0.05***	0.05***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.14***	0.14***	0.14***	0.10***	0.09***	0.09***	0.13***	0.11***	0.11***
ESS_{year} (reference category: module 1, 2002)									
Module 2, 2004		-0.08**	-0.08		-0.02	-0.12		0.00	-0.06
Module 3, 2006		-0.15***	-0.19**		0.03	-0.06		0.02	-0.07
Module 4, 2008		0.07**	-0.07		0.03	(-)0.00		0.03	0.24**
Module 5, 2010		-0.10***	-0.14*		0.08***	0.04		0.11***	0.19*
Module 6, 2012		-0.09**	-0.10		0.14***	0.30***		0.19***	0.19

Education*ESS$_{year}$ (reference category: module 1, 2002)									
2004			0.00			0.01			0.01
2006			0.00			0.01			0.01
2008			0.01**			0.00			-0.02**
2010			0.00			0.00			-0.01
2012			0.00			-0.01*			(-)0.00
R^2	0.2218	0.2286	0.2294	0.2995	0.3027	0.3035	0.2571	0.2624	0.2636
Sig. F. Change	205.40	15.44***	1.77	287.25	7.55***	1.88*	198.25	9.31***	2.41**
N			9 628			8 539			6 912

*** p<0.01, ** p<0.05, *p<0.10

Table 8.7 Random intercept models with self-reported health as dependent variable, model 1-4 out of 8

	Model 1	Model 2	Model 3	Model 4
Intercept	3.10***	3.03***	3.05***	3.19***
Level 1-variables				
Education	0.06***	0.02***	0.02***	0.02***
Gender (men = 0, women = 1)		-0.04	-0.04	-0.04
Age (reference category: 25-40 years)				
41-55		-0.26***	-0.26***	-0.26***
56-70		-0.49***	-0.49***	-0.49***
71-85		-0.71***	-0.71***	-0.71***
86-105		-0.86***	-0.86***	-0.86***
Feeling about household income (reference category: very difficult)				
Difficult		0.22***	0.22***	0.22***
Coping		0.47***	0.47***	0.47***
Living comfortably		0.65***	0.65***	0.65***
Control at work		0.01***	0.04***	0.04***
Socially meet with friends		0.04***	0.12***	0.12***
Anyone to discuss personal matters with (no = 0, yes = 1)		0.12***	0.01***	0.01***
ESS_{year}, (reference category: module 1, 2002)				
Module 2, 2004			-0.04**	-0.04**
Module 3, 2006			-0.04	-0.04
Module 4, 2008			3.42e-3	(-)0.00
Module 5, 2010			-0.02	-0.02
Module 6, 2012			0.01	0.01
Countries (reference category: Denmark)				
Finland				-0.18***
Norway				-0.09***
Sweden				-0.03***
Ireland				0.24***
United Kingdom				-0.04***
Belgium				-0.03***
Germany				-0.34***
The Netherlands				-0.19***
Portugal				-0.30***
Spain				-0.27***
Poland				-0.32***
Slovenia				-0.38***
$Var(e_{ijk})$	0.74 (0.03)	0.66 (0.03)	0.66 (0.03)	0.66 (0.03)
$Var(u_{0jk})$	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
$Var(v_{0jk})$	0.04 (0.01)	0.03 (0.01)	0.03 (0.01)	0.00 (0.00)
-2LL	31 4057.08	29 9500.02	29 9487.92	29 9419.22
Changes in -2LL	8 359.52***	14 557.06***	12.1**	68.7***

*** p<0.01, ** p<0.05, *p<0.10, standard error in parenthesis. Model 1 is measured against the null-model, model 2 against model 1, model 3 against model 2, and model 4 against model 3

Table 8.8 Random intercept models with self-reported health as dependent variable, model 5-8 out of 8

	Model 5	Model 6	Model 7
Intercept	3.46***	3.45***	3.49***
Level 1-variables			
Education	0.02***	0.02***	0.02***
Gender (men = 0, women = 1)	-0.04	-0.04	-0.04*
Age (reference category: 25-40 years)			
41-55	-0.26***	-0.26***	-0.25***
56-70	-0.49***	-0.49***	-0.48***
71-85	-0.71***	-0.71***	-0.70***
86-105	-0.86***	-0.86***	-0.85***
Feeling about household income (reference category: very difficult)			
Difficult	0.22***	0.22***	0.22***
Coping	0.47***	0.47***	0.46***
Living comfortably	0.65***	0.65***	0.65***
Control at work	0.01***	0.01***	0.01***
Socially meet with friends	0.04***	0.04***	0.04***
Anyone to discuss personal matters with (no = 0, yes = 1)	0.12***	0.12***	0.12***
ESS_{year}, (reference category: module 1, 2002)			
Module 2, 2004	-0.04*	-0.05	-0.06
Module 3, 2006	-0.03	-0.02	-0.02
Module 4, 2008	0.01	0.00	0.01
Module 5, 2010	-0.02	-0.03	-0.03
Module 6, 2012	0.01	0.02	0.02
Countries (reference category: Denmark)			
Finland	-0.17***	-0.17***	-0.34***
Norway	-0.08***	-0.08***	-0.19***
Sweden	-0.04***	-0.04***	0.02
Ireland	0.30***	0.30***	0.34***
United Kingdom	0.05	0.05	0.00
Belgium	-0.01	-0.01	0.06***
Germany	-0.32***	-0.32***	-0.31***
The Netherlands	-0.17***	-0.17***	-0.02*
Portugal	-0.19***	-0.19***	-0.29***
Spain	-0.20***	-0.20***	-0.22***
Poland	-0.25***	-0.25***	-0.59***
Slovenia	-0.40***	-0.40***	-0.70***
Level 2-variables			
Unemployment	0.00	0.00	0.00
Gini-index	-0.01*	-0.01*	-0.01*

	Model 5	Model 6	Model 7
Interaction effects			
Education*ESS_year (reference category: module 1, 2002)			
Module 2, 2004		0.00	0.00
Module 3, 2006		(-)0.00	(-)0.00
Module 4, 2008		0.00	0.00
Module 5, 2010		0.00	0.00
Module 6, 2012		(-)0.00	(-)0.00
Country*education (reference category: Denmark)			
Finland			0.01***
Norway			0.01***
Sweden			-0.005***
Ireland			-0.004***
United Kingdom			0.004***
Belgium			-0.01***
Germany			0.00
The Netherlands			-0.01***
Portugal			0.01***
Spain			0.00
Poland			0.03***
Slovenia			0.03***
Var(e_{ijk})	0.66 (0.03)	0.66 (0.03)	0.66 (0.03)
Var(u_{0jk})	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Var(v_{0jk})	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
-2LL	29 9411.60	29 9409.04	29 9130.44
Changes in -2LL	7.62**	2.56	281.16***

*** $p<0.01$, ** $p<0.05$, *$p<0.10$, standard error in parenthesis. Model 5 is tested against model 4 and model 6 and 7 against model 5

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