Educational inequalities in high- vs. low-preventable health conditions: Exploring the fundamental cause theory

Håvard T. Rydland[a],[*], Erling F. Solheim[b], Terje A. Eikemo[a]

[a] *Department of Sociology and Political Science, Centre for Global Health Inequalities Research (CHAIN), Norwegian University of Science and Technology (NTNU), Trondheim, Norway*
[b] *Department of Social Sciences, UiT the Arctic University of Norway, Norway*

A B S T R A C T

Aim: To explore variations in educational gradients or gaps between high- and low-preventable health conditions.
Background: This is one of the first European studies to test whether the association between socioeconomic status and morbidity is stronger for 10 high- than three low-preventable health conditions, by gender across 20 countries.
Data and methods: The 2014 European Social Survey included questions on 11 health conditions experienced over the last 12 months, cancer at any age, and symptoms of depression during the last week. We include respondents from 20 countries (N_{men} = 12,073; N_{women} = 13,488) aged 25 to 69. We estimated age-adjusted educational gradients on 13 conditions using logistic or OLS-regression stratified by country and gender, and high- and low-preventable pooled conditions variables on pooled country samples.
Results: Both among men and women the proportion of educational gaps were larger for the high-preventable than the low-preventable conditions in most countries, supporting the Fundamental Cause Theory (FCT) hypothesis. However, there was large variations in the number of significant associations across countries and between genders. In the pooled conditions and countries analysis, no associations were significant among the low-preventable conditions. For the high-preventable conditions there was a weak significant educational gap among men, and a weak but nevertheless more distinctive and complete sigificant educational gradient among women.
Conclusion: In a first explorative comparative European analysis we found support for the FCT hypothesis. Thus, the FCT can be used on morbidity data classified as low- versus high-preventable. We recommend extending this framework with institutional theories to explain within- and between-country health inequalities.

1. Introduction

Since the 1980s social inequalities in health have been well documented both within and between countries in Europe and North-America. Despite changes to social structures and disease patterns, expansion of health care and welfare services, and general improvements in standards of living and quality of life, these inequalities have persisted and, in some countries, even widened. A range of theories has sought to explain what has often been labeled a paradox – that such inequalities continue to exist despite the developments listed above (Mackenbach, 2012).

In a 1995 paper, Link and Phelan (1995) proposed a general theory to explain these persisting disparities, labeled the theory of fundamental causes (FCT). The FCT suggests that social inequality is the

fundamental cause of disease and mortality, with multiple time- and context-variant mechanisms affecting multiple proximate risk factors, generating multiple health outcomes. One way of testing this theory has been to compare mortality by preventability, with the assumption that with higher preventability follows larger health inequalities.

Using data from the 'Social determinants of health' module of the 2014/15 European Social Survey (ESS, 2014) that included 10 high- and three low-preventable health conditions, this article aims, as a novel empirical contribution to the FCT literature, to explore variations in educational gradients or gaps between health conditions classified as high- or low-preventable by gender across countries, as well as conducting a pooled countries analysis of pooled low- and high-preventable conditions in relation to education and gender. We consider this an explorative, first European analysis, which can be followed up in

various directions in future research using the same or similar data.

1.1. Background

Attempts to explain social inequalities in health have included a materialist theory, with an emphasis on inequalities generated by structure; a psychosocial theory, that emphasizes relative deprivation, and a behavioral-cultural theory, focusing on individual health agency and inequalities generated by consumption patterns (Elstad, 2000). These explanations all relate to the theoretical perspective of health determinants, defined by Elstad (2000, p. 29) as "factors or conditions which are presumed to have a general influence on people's health, their longevity, and their level of ill health", and the determinants' uneven distribution along the social structure. Another explanation utilizes a life course perspective, where biological and social experiences from an early age and throughout the life course causes health inequalities among adults (Mackenbach, 2012). The physical environment, social structures, and individual behavior could further mediate these experiences, and the ways socio-economic status (SES) affects health over the life course can be through latent, cumulative, or more complex pathways (Quesnel-Vallée and Jenkins, 2009).

Link and Phelan (1995) considered contemporary research on health inequalities as moving from merely describing social patterns of disease towards attempting to understand the mechanisms that link social conditions to health. Consequently, they argued for a move away from disease-proximate risk factors and towards contextualizing health risk: "investigators must (1) use an interpretive framework to understand why people come to be exposed to risk or protective factors and (2) determine the social conditions under which individual risk factors are related to disease" (Link and Phelan, 1995, pp. 83–84). Money, knowledge, power, prestige and social connections were proposed as key, flexible resources – associated with variables such as SES, social networks, stigmatization, ethnicity, and gender – that could help individuals avoid multiple health risks and promote good health. Inequalities in possessing these resources were considered to be a fundamental cause of inequalities in multiple disease outcomes across time and space – putting people at risk of risks, irrespective of the aforementioned societal changes (Link and Phelan, 1995). With that, they implied that these measures of social position – SES, gender, ethnicity, and social capital – thus had an independent, causal link to inequalities in health outcomes rather than merely being a "confounding variable" or "placeholder" for yet undiscovered proximate factors (Lutfey and Freese, 2005; Phelan et al., 2004).

1.1.1. Critiques and further developments of the FCT

Freese and Lutfey (2011, 2005) have demonstrated how the FCT assumes individual "health-directed human agency"; if inequalities in flexible resources is to be manifested as inequalities in health outcomes, the theory assumes that agents purposely apply these resources to "garner health advantage" (Link and Phelan, 2002, p. 732). Freese and Lutfey (2011, p. 72) claimed that an agency-centered theory "does not provide a satisfactory explanation of how the fundamental relationship between SES and health is preserved", and suggested spillovers within social groups, habitus, and institutions' contribution to health inequalities as potential directions for future research. This description of the FCT as a general theory with little potential for specific explanations was echoed by Mackenbach (2012), whereas Beckfield et al. (2013) have argued that there is an unexploited potential of institutional features in comparative health inequality research. Empirical research investigating the association between health inequalities and country-level characteristics such as welfare state regimes, overall social expenditure, and other indicators of welfare institutions and social policy have supported their claim (cf. Álvarez-Gálvez and Jaime-Castillo, 2018; Dahl and van der Wel, 2013; Eikemo et al., 2008a, 2008b; van der Wel et al., 2011). Consequently, Beckfield et al. (2015) have proposed a theoretical framework aiming to explain how "the same

individual- or household-level causes vary in their effects across institutional settings". This framework is made up by the processes of redistribution (channeling resources), compression (setting lower and upper bounds for the social determinants of health), mediation (intervening on the social determinants), and imbrication (reinforcing or cross-cutting policies).

An implication of the FCT is that the benefits from our increasing ability to control disease and death have been distributed according to the mentioned vital, flexible resources (Phelan and Link, 2005). Social inequalities in health should therefore be more prominent in cases where these resources actually matter, i.e. for diseases and causes of death where there is a possibility of prevention and cure, e.g. through health behavior or accessing relevant health care services or technologies (Link and Phelan, 2010). The next sections present examples of research investigating how social inequalities in health may vary with preventability, including studies of both mortality and morbidity.

1.1.2. Health inequalities, preventability, and mortality

In 2004, Phelan et al. tested the FCT by comparing educational gradients in mortality rates across causes of death associated with high or low degree of preventability. Their results supported the FCT; the educational gradients were stronger for preventable than for non-preventable causes of death. Similar results supporting the FCT have been reported by Phelan and Link (2005), Masters et al. (2012, 2015), Hummer and Lariscy (2011), Meara (2008), and Mackenbach et al. (2015). Mackenbach (2017) provided a more comprehensive study of several aspects of the FCT. Using harmonized mortality data, covering most of 20 national or regional populations from 1980 to 2010, they found that mortality declined faster among the highly educated, in particular for preventable causes of death. However, some findings contradicted their expectations: when mortality increased, it did in general not increase less for the higher educated, and multilevel analyses showed that the degree of income inequality had no significant effect on mortality differences.

Socioeconomic gradients in preventable mortality have also been documented in Spanish (Zapata Moya, Buffel, Navarro Yáñez and Bracke, 2015), Australian (Piers et al., 2007), Korean (Song and Byeon, 2000), and Swedish (Westerling et al., 1996) populations. Some contradictory findings have also been reported: Hem et al. (2009) found approximately the same patterns of educational differences for both preventable and non-preventable causes of death in Norway, and Mustard et al. (2010) found similar mortality differences between occupational groups for causes of death both amenable and not amenable to medical care in Canada. Gadeyne et al. (2017) studied educational gaps in breast cancer among women in 18 European countries. They detected a negative association between education and breast cancer mortality among young women, and a positive association among older women. The FCT proposes that when more knowledge, medical insight, and treatments of a health condition becomes available, a negative association between SES and the condition emerges; in this case meaning that higher educated women in recent decades have made better use of developments in breast cancer detection, prevention, and treatment.

1.1.3. Health inequalities, preventability, and morbidity

Mackenbach (2012) has described the FCT as a general theory to explain health inequalities in mortality as well as morbidity. One study that investigated preventable disease rather than mortality is Bränström et al. (2016). Swedish survey data containing information on sexual orientation was linked with registry data on inpatient and outpatient health care use from 2001 to 2011, which was classified as high- and low-preventable using ICD-codes from Phelan and colleagues' (2004) rating. Their results indicated support for the FCT, showing that sexual minorities had a higher risk of experiencing high-preventable diseases. Comparisons with alternative classifications showed some convergence for the male population, but differences in the approach to classification

made direct comparisons difficult (Bränström et al., 2016).

Chang and Lauderdale (2009) examined the relationship between income and cholesterol level after a new and expensive treatment had been implemented. They found that an initially positive association was reversed when new medication became available. When health-related conditions changed, high-SES individuals gained a health advantage, and the conditions in question became more predictable and manageable.

A rare comparative study on the association between SES and high- versus low-preventable health conditions found support for the FCT for the USA but not the Canadian population, which also supports the hypothesis that national policies and social inequality in general affects the association between SES and health conditions (Willson, 2009). However, the study included only two health conditions – cardiovascular disease and cancer, with the latter classified as a relatively less preventable disease compared to the former. Moreover, SES was measured as income quintiles, and men and women were pooled together.

To sum up, previous research studying the associations between health inequalities and preventability that suggests support for the FCT has mostly focused on SES and mortality, i.e. measures such as income and education and high- and low-preventable causes of death. Similar research using morbidity data has been inconclusive. However, it is unclear whether the lack of strong support for the FCT is due to the health conditions being studied, how SES has been operationalized, or what country populations that have been studied. Consequently, there is a need for studies that include a range of health conditions across countries that differ institutionally and utilizing harmonized measurements and data collection methodology across countries. Furthermore, as FCT also refers to fundamental social structures such as gender and ethnicity, connected mechanisms should also be theorized and studied empirically within a cross-country institutional framework (see e.g. Beckfield et al., 2015). Nevertheless, before embarking on such a theoretical and empirical task, a first explorative analysis should be undertaken as to reveal to what extent there actually are any systematic within and between cross-country variations in the association between core fundamental causes, such as socioeconomic status and gender, and a range of low- and high-preventable conditions.

1.2. Research question and novelties

Our main hypothesis is that educational gradients or gaps are more likely to appear among health conditions classified as high-preventable. Furthermore, we want to explore whether there are patterns of educational gradients or gaps for clusters of countries and by gender. In an analysis using pooled conditions variables and pooled country samples, we will further test whether an educational gap or gradient among men is different from the gap or gradient among women, i.e. if there is an interaction between education and gender.

Our study adds several novelties to the existing literature: It is a first explorative and comparative European analysis using educational attainment as a harmonized measurement of SES; it includes three low-preventable and 10 high-preventable measures of morbidity rather than cause of mortality; the analysis includes 20 countries, has an explicit focus on gender, and the results are visualized to reveal not only the size of any gaps or gradients, but also the level and variation of prevalence across countries. We also do an analysis on pooled countries and high-preventable conditions to study how gender may interact with SES. Any positive results suggesting support for the FCT more generally, or patterns suggesting cross-country institutional similarities or gender differences, could be continued in a follow-up study using the same or similar data.

2. Data and methods

2.1. Data

We defined our population as men and women aged 25–69 years of age by the time of interview, assuming that most respondents had completed secondary or tertiary education by the age of 25. We included Israel and 19 European countries that took part in the European Social Survey Round 7 (ESS) collected in 2014/15. Country specific weights adjusted for both the probability of survey participation and sample skewness. (For more information about the survey methodology and the health module see ESS (2014) and Eikemo et al. (2016).)

2.2. Dependent variables

Morbidity was measured as 13 self-reported health conditions. The prevalence of these conditions based on the ESS 2014/15 health module has been reported in previous research, including prevalences in relation to region, education and occupational class (McNamara et al., 2017a, 2017b, 2017c; Thomson et al., 2017). What the present article adds to these analyses is a comparison between more and less high- and low-preventable conditions, a visualization of the prevalence and educational gradients, and a discussion integrating theories on social inequalities in health.

In the questionnaire, the respondents were asked: "Which of the health problems on this card have you had or experienced the last 12 months?" Listed on the card were heart or circulation problems; high blood pressure; breathing problems such as asthma attacks, wheezing, or whistling breathing; allergies; back or neck pain; muscular or joint pain in hand and arm; muscular or joint pain in foot or leg; problems related to your stomach or digestion; problems related to a skin condition; severe headaches; diabetes. For each condition, a variable was coded as "yes" equal to 1 and "no" equal to 0.

In another question the respondents were asked whether they had ever had cancer affecting any part of their body; leukaemia; malignant tumour; malignant lymphoma; melanoma, carcinoma, or other skin cancer, where the same coding was applied. Because of a questionnaire error, this variable was not included for the Czech Republic.

A battery consisting of eight questions was used to construct a version of the Center for Epidemiologic Studies Depression Scale (CES-D8), which measures symptoms of depression. Initially, the respondents were asked how much during the last week they had felt depressed; felt everything they did was an effort; slept restlessly; were happy; felt lonely; enjoyed life; felt sad; felt they could not get going. They could answer "None or almost none of the time", "Some of the time", "Most of the time", "All or almost all of the time" or "Don't know". The fourth and sixth items had reversed scales and were used to identify zero-variance respondents, that is, anyone who answered the same response alternative to all eight items despite the two reversed items. Zero-variance respondents were coded as item-missing. A mean score ranging from 1 to 4 was rescaled to cover the range 0–1 and calculated for those who had answered at least six items and were not zero-variance respondents.

We classified the self-reported conditions as 10 high- and three low-preventable conditions, a terminology adopted from Bränström et al. (2016). Our classification of conditions is based on Phelan et al. (2004), where two MDs independently rated the preventability of 96 causes of death, coded according to the ninth edition of the International Classification of Diseases (ICD9). First, the MDs rated the degree to which the causes were amenable to medical prevention, thereafter to which degree the incidents were preventable, and finally an overall rating from 1 ("virtually impossible to prevent death") to 5 ("virtually all deaths preventable") was assigned (Phelan et al., 2004). We compared this rating to the chronic conditions listed in the questionnaire and made a similar 1–5 rating of the conditions. Preventability of death was replaced with whether it is possible to prevent these health problems
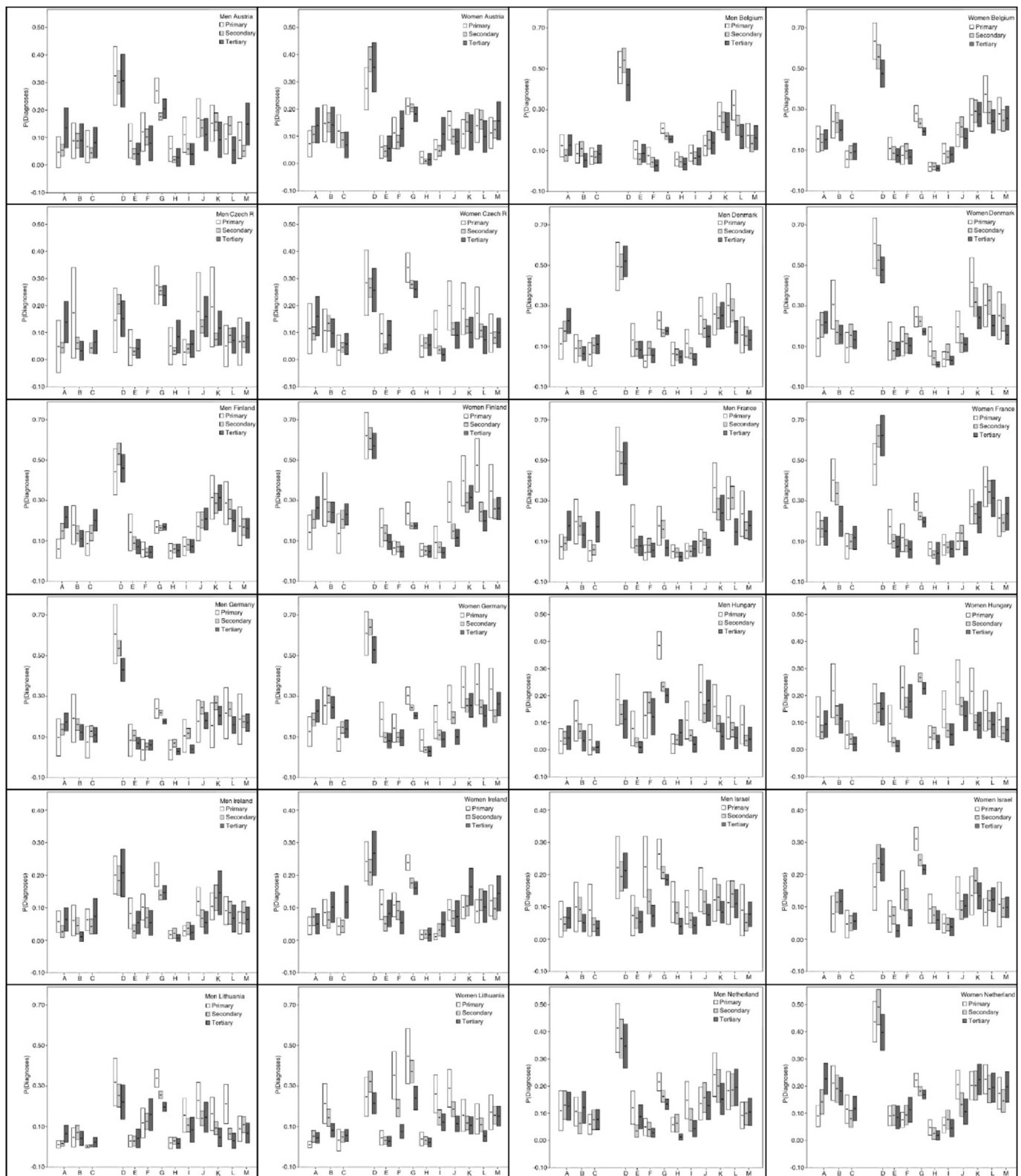
Fig. 1. Age-adjusted predicted probabilities by educational level among men and women for all countries and conditions.

from ever occurring. Where we could not find direct equivalents between the ICD9 causes of death and the 13 conditions, we searched the medical literature for empirical tests of the conditions' preventability. Consequently, the relationship between causes of death and chronic health problems are not 1:1; Phelan and colleagues' (2004) classification is more fine-grained than what is possible to do with the self-reported conditions in our data, but we believe that this transparent approach adds reliability to our analysis. The full ranking, with ICD equivalents and literature references, is included in the appendix (Table A.1).

These equivalents enabled us to divide the 13 conditions into 10 high-preventable (back or neck pain, breathing problems, cancer,

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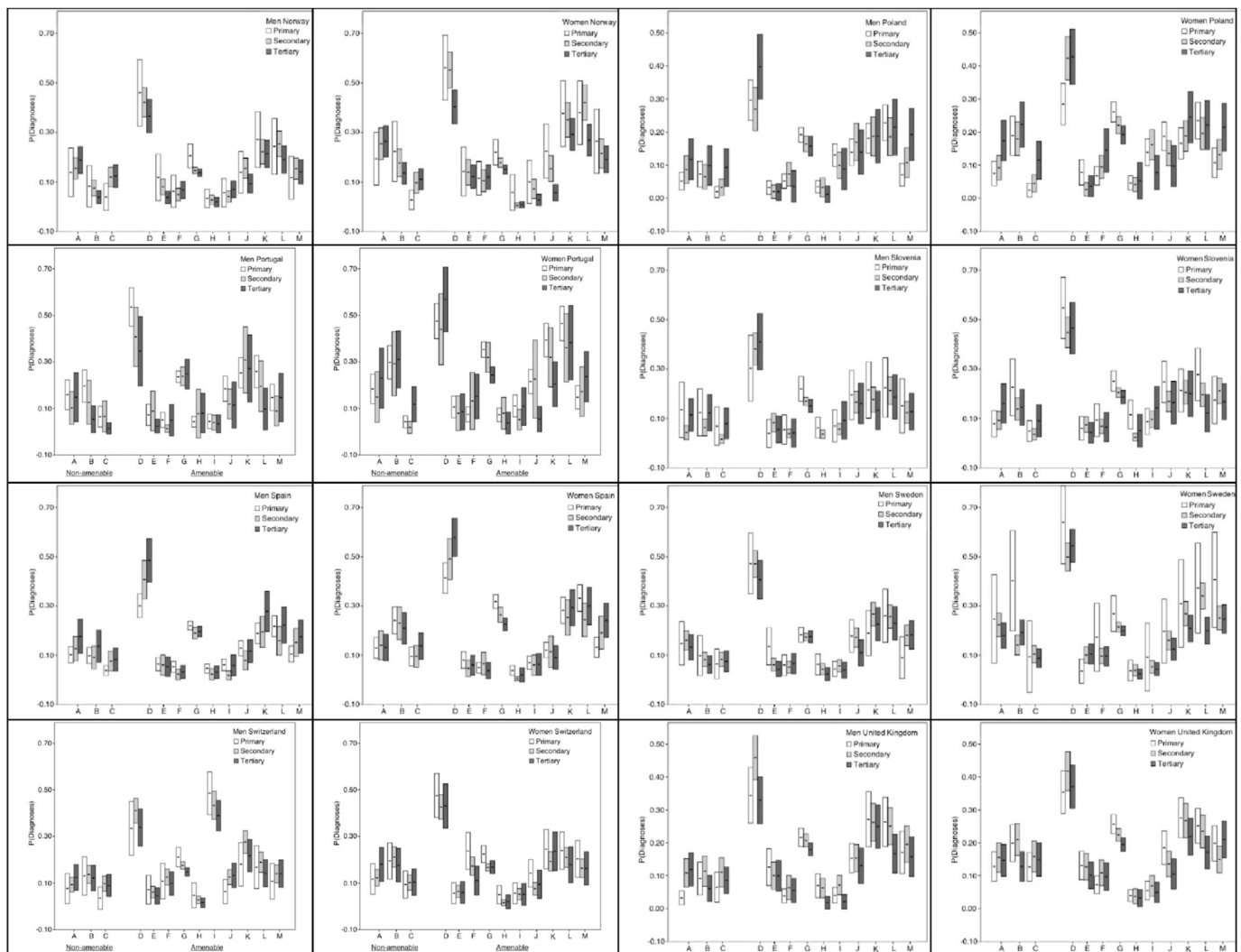
Note: A – Allergies, B – Headaches, C – Skin condition, D – Back or neck pain, E – Breathing problems, F – Cancer, G – Depression, H – Diabetes, I – Heart or circulation problem, J – High blood pressure, K – Muscular or joint pain in foot or leg, L – Muscular or joint pain in hand or arm, M – Stomach or digestion problems. A-C = low-preventable conditions, D-M = high-preventable conditions. Bars indicate 95% confidence intervals.

Fig. 1. (*continued*)

depression, diabetes, heart or circulation problem, high blood pressure, muscular or joint pain in foot or leg, muscular or joint pain in hand or arm, stomach or digestion related) and three low-preventable (allergies, severe headaches, skin condition related) conditions.

2.3. Independent variables

Age is measured as a continuous variable ranging from 25 to 69 years. National responses to educational qualifications were coded by the ESS-team following the ISCED2011 criteria, increasing the harmonization of educational levels across countries. We recoded this variable into a set of dummy variables: no education or primary education completed; completed secondary level degree; completed a tertiary level degree or higher (reference category).

2.4. Analysis

To estimate our models, we used binary logistic regression for all dichotomous dependent variables and OLS-regression for the continuous depression scale. After estimating the regression parameters, we calculated predicted probabilities for each of the three educational level categories with 95% confidence intervals, for men and women in each country respectively. Age was set 'as observed' in the calculations. The predicted probabilities and confidence level scores were used to plot figures summarizing the results. Because the prevalence of each condition can vary much across countries the Y-axis range is not identical across all countries. We therefore allowed the range to vary between countries while keeping it similar for men and women within countries. While the sample size was the same across regressions for each respective male or female country sample (given the item-missing of either age or educational level), the analytical samples used in each respective regression varied given each dependent variable's item-

missing. For simplicity, we present only the descriptive statistics for each variable by gender and country and not for every analytical sample (see Table A.2).

For a pooled country-samples and pooled conditions analysis we created two new dependent variables that measure whether the person has one or more low-preventable conditions (1) or not (0), or one or more of ten high-preventable conditions (1) or not (0), and we extended our model with age and education to also include 19 country dummies. For 'depression' to be included among the high-preventable conditions, we made a cut-off at > 0.33 on the depression scale. This equals a mean score above 'some of the time' on the eight original CES-D8 items.

The statistical software STATA 14.2 with the add-on package *SPost* 13 was used in all analyses (STATA; Long and Freese, 2014). The command *mgen* was used to save analytically calculated predicted probabilities with upper and lower bounds for the confidence intervals. The figures presenting the saved estimates were created using IBM SPSS version 24 and the program Paintbrush.

3. Results

The unadjusted prevalence of each condition varied between countries (see Tables A.3 and A.4). For example, 39% of the total sample reported back or neck pain, ranging from 15% among Hungarian men to 50% among German women. Diabetes was the condition with the overall lowest prevalence: ranging from 1% of Norwegian women to 8% of Israeli men (5% in the total sample). On average, 22% of male respondents and 32% of female respondents had experienced one or several of the low-preventable conditions, while the respective figures were 58% and 61% for the high-preventable conditions. This could indicate a stronger presence of comorbidity among the high-preventable conditions. Although an interesting finding, we will not follow it up in this article.

3.1. Stratified conditions and country samples

Results from the 518 regressions are displayed graphically in Fig. 1 as 13 conditions listed as low- or high-preventable by country and gender. The prevalence levels of the different conditions are indicated by their predicted probability, "P(Diagnosis)".

As the boxes depicting confidence intervals show, few conditions had a significant tripartite monotonous social gradient, i.e. significant differences between primary, secondary, and tertiary education for each condition that goes in one direction. However, results become clearer if we instead focus on educational gaps rather than gradients, i.e. between the primary and tertiary educational level. Appendix Tables A.5 and A.6 give an overview of significant educational gaps by country and condition for men and women respectively.

Among men, we found significant gaps in the positive direction for 8 of the 60 regression analyses of low-preventable conditions (13%) and for 47 of the 199 regression analyses of high-preventable conditions (24%). For the full male sample, 9/10 high-preventable conditions had significant gaps. Among women, the corresponding numbers were 6/60 (10%), 64/199 (32%), and 8/10 conditions for the full sample. There were positive significant educational gaps for the same conditions among both men and women in the same country in 27/199 analyses of high-preventable conditions, and both genders-same country negative gaps in 2/60 analyses of low-predictable conditions. In addition, we observe that for men and women respectively there were eight and nine significant gaps in the negative direction among the 60 low-preventable regressions, but only three and six significant gaps respectively in the negative direction among the 199 high-preventable regressions. However, it should also be noticed that in the majority of high-preventable regressions, the null-hypothesis of no significant educational gap in the positive direction could not be rejected.

Depression stood out as the condition with the most significant educational gaps, evident in 16 and 19 countries for men and women

respectively. Apart from depression, heart or circulation problems among men and high blood pressure among women were conditions with frequent gaps, along with muscular or joint pain in hand or arm for both genders. Back or neck pain and stomach or digestion related problems were the high-preventable conditions showing the least number of educational gaps.

When adding up the number of significant educational gaps in each country, Hungary has the highest occurrence of significant educational gaps in high-preventable conditions among men, with 5. Denmark and Germany stood out among women with significant gaps among 6 of the 10 high-preventable conditions. When comparing the proportion of significant high- vs. low-preventable educational gaps within countries, i.e. dividing the number of significant gaps in the positive direction on the total number of high- and low-preventable conditions respectively within each country, we found that for men, 14 of 20 countries had a higher proportion of significant educational gaps among high-preventable conditions. Belgium, Czech Republic, Israel, Norway, Poland, and United Kingdom showed a higher proportion of significant educational gaps among the low-preventable conditions. For women, the corresponding figure was 17/20 countries, with France, Sweden, and the United Kingdom having an inverted relationship between the condition categories. Moreover, when summarizing how often there was an educational gap in the positive direction for any given diagnosis for both men and women within the same country, we find that except for depression, few statistically significant gaps in the positive direction are common to both men and women within the 20 countries.

3.2. Pooled conditions and pooled country samples

To further examine the FCT in a more simplified way, we pooled the chronic condition variables into two categories, low- (conditions A-C) and high- (conditions D-M) preventable conditions, creating two new variables that we regressed on education and age. This allows us to study the association between education and the low- and high-preventable conditions in a way that is easier to interpret, including whether we may trace any similarities across countries and to test the interaction between gender and education in a pooled countries analysis.

On average 22% of men and 33% of women had experienced at least one of three low-preventable conditions, ranging from 8% of Lithuanian men to 45% of Finnish women. Similar average numbers for the high-preventable conditions were 58% and 62%, ranging from 34% of Hungarian men to 77% of French women. First, we did gender- and country-specific regressions with these pooled conditions dependent variables, and in general there were more educational gaps in the expected direction for high-preventable conditions, again supporting the FCT hypothesis (Table A.7).

Some countries' results contribute to reinforce the patterns we observed when first adding up the significant results in Tables A.5 and A.6: Hungary showed strong, significant educational gaps for the high-preventable conditions for both men (OR = 3.55, p < 0.05) and women (OR = 3.81, p < 0.001), while Germany showed strong, significant positive associations for women only (OR = 2.97, p < 0.05). For other countries, the results from this analysis diverged from the stratified one. For example, Denmark did not have any significant associations for neither men nor women. Other notable findings were the significant educational gaps found for the high-preventable conditions among Norwegian (OR = 3.86, p < 0.05) and Finnish women (OR = 2.65, p < 0.10), and Lithuanian men (OR = 3.89, p < 0.05) and women (OR = 5.20, p < 0.001).

Next, we pooled all countries together into one sample and extended the model containing age and education with a set of country dummy variables, gender, and the interaction term between gender and education. This analysis allows us to test whether the fundamental cause of socioeconomic inequality is different for men and women in relation to high- and low-preventable conditions.
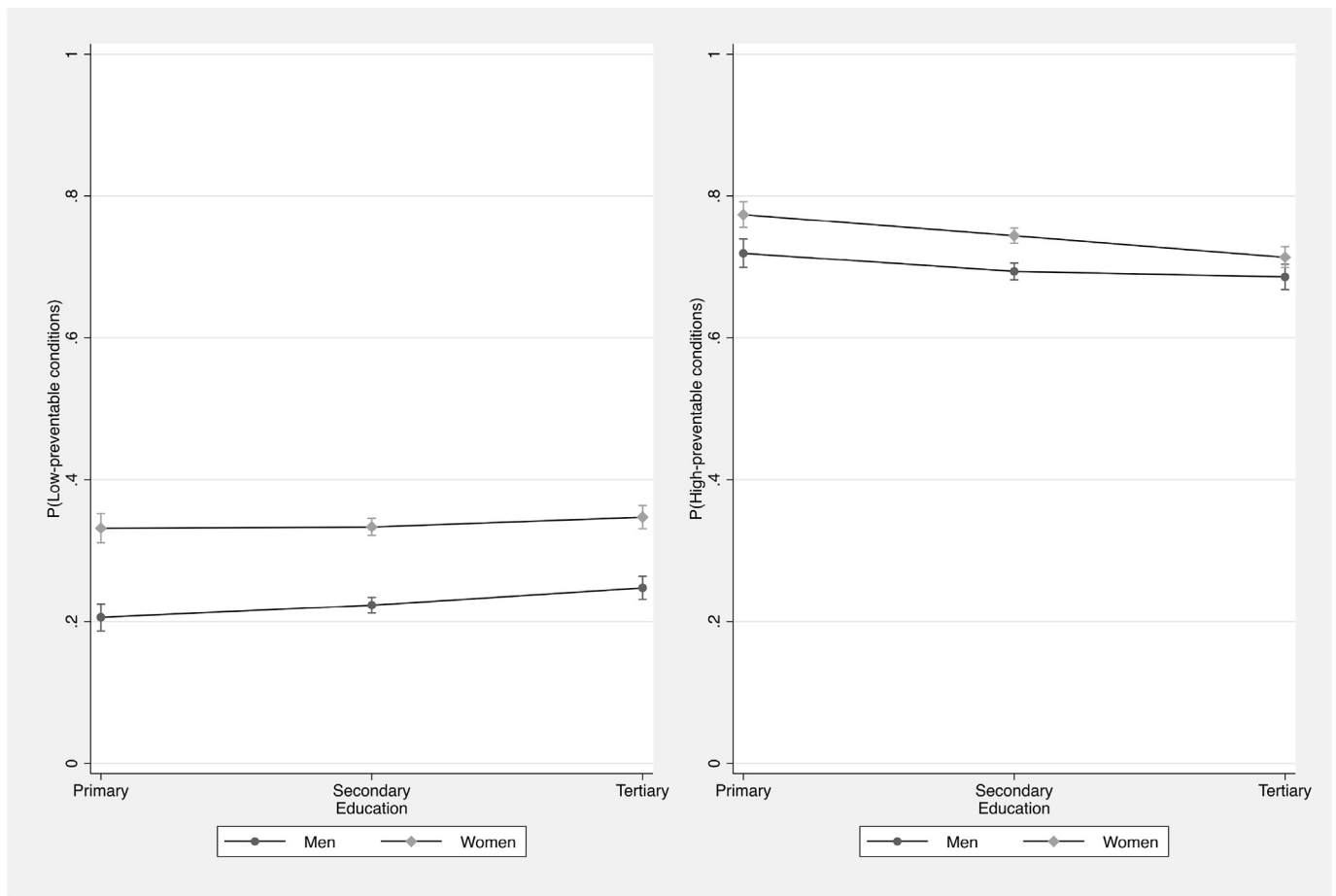
Fig. 2. Age-adjusted predicted probabilities for pooled condition and country variables with education-gender interaction.

In both regressions the interaction term was statistically non-significant ($p > 0.20$). However, when we present the results as predicted probabilities in Fig. 2 (keeping the age and country dummy variables 'as observed'), the visualization reveals a weak interaction between gender and education for the high-preventable conditions.

For the low-preventable conditions we see a weak increase by educational level among men but not women, with the predicted outcomes for men and women running almost parallel and women being significantly more likely than men to have a low-preventable condition at all educational levels. This result supports the expectation that there is no positive significant association between education and low-preventable conditions. For the high-preventable conditions women had a somewhat higher prevalence than men among those with primary or secondary education, but not tertiary education. Furthermore, the probability difference between primary and tertiary educated men is significant, but very small – less than one percentage point. Among women, we observe a significant probability drop of approximately three percentage points between the primary and tertiary educated, leading to the levelling of gender differences in high-preventable conditions at the highest educational level.

4. Discussion

Our main hypothesis was supported for both men and women by our empirical analysis in our first overall assessment of the statistically significant educational gaps shown in Fig. 1. High-preventable conditions had more educational gaps than low-preventable conditions, and this gap was also significant in analyses of pooled conditions variables and pooled country samples, indicating that for conditions where our ability to prevent is comparatively high, resources associated with

education can be beneficial.

When summarizing regression results across countries and conditions, we found a larger proportion of statistically significant educational gaps in the positive direction among the high-preventable conditions, and a larger proportion of 'negative' educational gaps among the low-preventable conditions, which both lend support to the FCT hypothesis. However, we also observe that in the majority of high-preventable regressions the null-hypothesis of no significant educational gap in the positive direction could not be rejected. Furthermore, despite an overall aggregate support for the FCT hypothesis when summarizing the proportion of significant educational gaps for all countries and conditions, there are nine countries where the hypothesis is not supported among neither men nor women. These two findings call into question the strength of SES as a fundamental cause across a wide range of high-preventable conditions. Moreover, this summary shows that at the country level there is stronger support for the hypothesis among the female than among the male country populations. Hence, this summary suggests that SES as a fundamental cause does not create similar health inequalities for men and women within countries. This point will be revisited in section 4.2.

Pooling all conditions and placing them in one of two categories provided an overview, at the potential cost of nuance. Though we have a pattern where educational gaps were more frequent among the high-preventable conditions, few gaps are significant for all countries and conditions, and the strength of the association between education and preventable morbidity vary between countries and genders.

In the discussion chapter, we take an exploratory approach and interpret specific findings more in depth. Relevant condition-, country-, and gender-specific findings will be compared to previous research. Lastly, we will discuss methodological limitations.

4.1. Health conditions

In studies stratifying by specific conditions or causes of death, inequalities have been particularly pronounced for cardiovascular disease and related risk factors (cf. Hummer and Lariscy (2011); Masters et al. (2012); Meara et al. (2008); Zapata Moya et al. (2015)), classified by Mackenbach et al. (2015) as amenable to behavior change. This is to some degree reflected in our stratified analyses, with six countries showing significant educational gaps for heart or circulation problems among both genders and eleven countries showing high blood pressure among women. Depression is the condition where most countries show significant educational gradients; 16 countries among men and 19 among women. Here, it is worth noting a methodological point: the overall mean score on the depression scale is relatively low, meaning there is little 'depression' in the sample. Thus, we here rather study variation and educational gaps in relatively good 'well-being' across all populations. Educational inequalities were also found in Zapata-Moya and colleagues' (2015) study using a (self-reported) dichotomous depression variable, with pronounced gender differences in women's disfavor among the lower educated.

4.2. Gender

Analyses were stratified by gender. Prevalence figures (Table A.3 and A.4) showed that more female than male respondents had experienced one or more health problems, which was as expected based on previous findings (cf. McNamara et al. (2017)). Regression results indicated similar patterns across genders when looking at the health problems separately, with a higher number of significant associations across countries, while the educational gap for the pooled high-preventable conditions variable was larger for women than for men (Table A.7). For the low-preventable conditions, results were similar across genders, except for an inverted gap among men when pooling condition and country samples.

As both our initial analyses and previous research had indicated gender differences in the association between high-preventable mortality/morbidity and SES (cf. Meara et al. (2008); Piers et al. (2007); Zapata Moya et al. (2015)), we wanted to test whether the effect of education was significantly different for women than for men. Our models including an interaction term between education and gender, showed that for low-preventable conditions, men and women did not benefit differently from education. However, results from the high-preventable conditions indicated that gender differences were levelled among the higher educated, indicating stronger support to the FCT hypothesis among women than among men. One interpretation could be that the resources associated with higher education were of greater benefit for women than for men, another that lacking these resources were more detrimental to women than to men, or, that men and women with equal socioeconomic positions nevertheless do not possess similar resources or opportunities to make use of their resources, such as obtaining equally good jobs despite similar qualifications within a gender segregated labor market. What specific resources and mechanisms could be of relevance here? Some of the explanations proposed in previous research have emphasized gender differences in the adoption of lifestyle traits, such as Meara et al. (2008) suggesting that a differential decline in smoking habits in the US, with sharper divergences among women, could explain the gender differences in their results. A similar trail of thought can be found in Mackenbach's (2017) discussion of the persisting small inequalities in all-cause mortality in Southern Europe; he highlights how the smoking patterns common in parts of Western Europe – gradually becoming a habit associated with low SES – has yet to reach Southern European countries like Italy and Spain.

4.3. Countries

Following standard social determinants of health explanations, like the 'rainbow' model of Dahlgren and Whitehead (1991), the social distributions of these conditions could be influenced by both human agency, living and working conditions, and institutional arrangements. While Willson's (2009) comparative study suggested an effect of national policies, more specifically the universal health care system and encompassing social policies in Canada, on preventable health inequalities, results from Mackenbach et al. (2015, 2017) were more ambiguous. Though inequalities were at lower levels in Northern, Southern, and continental than in Central-Eastern European countries, a measure of country-level inequality showed no significant effects. Expectations from these studies were partly supported by our results from analyses of stratified and pooled conditions, as Central-Eastern countries Hungary and Lithuania showed consistently large inequalities among men and women, compared to continental countries such as Austria and France. However, these estimates also displayed gender differences within countries. For example, in the Northern and continental countries Norway, Denmark, and Germany, there were large educational gaps among women and non-significant gaps among men.

The ambiguity of these results suggests complex mechanisms linking national policies to preventable health inequalities, with variations across conditions, countries, and gender. The FCT postulates that health-beneficial resources associated with SES, gender, ethnicity, and social capital may work through various mechanisms, and thus have changing impacts, in different contexts. An example from our findings is the variation between genders in educational inequalities for high- and low-preventable conditions. In an attempt to analyze this variation, we suggest that future research integrate an institutional perspective, e.g. the framework by Beckfield et al. (2015), with the fundamental cause perspective. A starting point could be to build our current model into a multilevel model with indicators of redistribution, compression, mediation, and imbrication as country-level variables, and explore their associations with the different health conditions – both independently and in cross-level interactions with education and gender.

4.4. Methodological limitations

Some reported conditions, such as cancer, included a range of diagnoses, making it difficult to determine its overall preventability. Preventability and amenability have for decades been issues in the epidemiological literature, with debates over definitions and boundaries between avoidable, preventable, and amenable disease; over the contribution of individual behavioral factors, primary and secondary health care, and medical technology and knowledge; and over whether certain diseases and causes of death are avoidable at all (Nolte and McKee, 2004). In a review of literature on amenable mortality, Nolte and McKee (2004, p. 52) suggested that findings using these classifications should be treated as indicators of concern and for future research rather than as confirmatory evidence. Within the health inequalities field, the Phelan et al. (2004) classification appears to have set precedent for preventability comparisons, as it has modelled several similar studies in the following years (cf. Bränström et al., 2016; Mackenbach et al., 2015; Mackenbach et al., 2017). In this article, the potential limitation of ambiguous classification is approached by maintaining an exploratory scope, not seeking to provide clear-cut answers about high- and low-preventable conditions, but to explore the data by condition, country, and gender, as a first step before undertaking more rigorous analyses. The high-preventable conditions differ greatly in potential causes and consequences but has in common that some degree of lifestyle adjustment or individual health agency may reduce the probability of experiencing the condition.

The link between educational attainment and health outcomes has been thoroughly established (Montez and Friedman, 2015). Educational status may be related to material health-beneficial resources such as fulfilling jobs and economic security (Montez and Friedman, 2015), or to more education-specific resources such as knowledge or ability to process information. An argument for measuring SES by education, as

opposed to other indicators, is because "It is a useful indicator if for no other reason than it is generally available for both sexes, excludes few members of the population, and is less subject to negative adult health selection" (Lynch and Kaplan, 2000, p. 22). The last part implies that one's level of educational attainment usually is unaffected by health outcomes measured at adult age (Mackenbach et al., 2015). In addition, educational attainment may indicate a more long-term location in the social structure, as opposed to potential shifts in occupational status and current income (Elstad, 2000). In addition to having an independent association with health outcomes, education may therefore be a precise proxy for SES, intercepting the effect of other SES measures on health.

The universality of education as an SES variable enables us to compare social gradients across countries and conditions, but when it comes to explaining the disease-specific mechanisms, the approach of treating education as merely a SES proxy may not be the most adequate strategy. Braveman et al. (2005) argue that "One size does not fit all"; meaning that researchers too often use different measures of SES interchangeably and with similar assumed associations with health outcomes. Education may work through different mechanisms and trigger different flexible resources when affecting social inequality in psychiatric, cardiovascular-related, or muscular conditions.

Furthermore, as most Western countries have experienced an expansion of educational systems in recent decades, education may mean different things for different generations, generating different pathways to health (Hayward et al., 2015). Educational attainment may thus not be a uniform measure of social stratification across age groups, countries or genders. However, to really study the age-cohort-period effect, longitudinal data would be necessary.

An important limitation of our study concerns the classification of health problems as high-or low-preventable. This exploration of the social gradient in high- and low-preventable self-reported morbidity is to our knowledge the first of its kind, and we argue that it exhibits a novel way of testing the theory – the mechanisms connecting social position to respectively morbidity and mortality may differ substantially. Health inequality research using survey data have been dominated by the use of global measures such as self-rated health. The utilization and classification of specific health problems in our analyses may represent an attempt to improve the validity of such analyses. The conditions listed in the ESS health module are not perfectly matching neither overall health nor strict medical classification measures such as the ICD. They may nevertheless give an accurate expression of a respondent's health status, as they can be seen as constituting a fusion of medical categories, individual feelings, and social conventions – corresponding to the health concepts of disease, illness, and sickness (cf. Hofmann, 2016).

Piers et al. (2007, p. 5) defined amenable conditions as "those [conditions] from which it is reasonable to expect death to be averted even after the condition has developed", while preventable conditions "typically include those for which there are effective means of preventing the condition from occurring", including e.g. lifestyle adjustments and legal measures. Following this argument, we found "preventable" to best describe the nature of the conditions in this paper. We wish to highlight the subjective aspect of this classification; one condition in the survey may contain a cluster of different diagnoses with different degrees of preventability.

The preventability rating and classification of each independent health condition can most likely be debated. In order to communicate with the findings of Phelan et al. (2004) and subsequent studies, we found it vital that the two classifications were to some degree equivalent. However, some self-reported conditions were described as 'pain', which may be symptoms of several diseases. In those cases, we took a 'catch-all approach' and aimed to find medical diagnoses with numerous causes and symptoms, such as arthritis and migraine. Though this procedure may not be accurate for all self-reported pains, we argue that it provides a reliable measure of preventability.

By breaking the analyses down by gender, country, and conditions, some samples were small, weakening the power of statistical hypothesis testing. Nevertheless, using both the pooled and stratified data fits with this first study's exploratory scope, allowing us to discuss both general and specific explanations concerning high- and low-preventable conditions in European countries.

Another limitation concerns the nature of survey data; self-reported conditions may be suspected to diverge from clinical measurements. Dalstra et al. (2005) reviewed comparisons of self-reported health and clinical diagnoses. They found a high degree of accuracy; the few incidents of divergence were less educated people underreporting certain conditions, potentially causing an underestimation of the socioeconomic inequalities (Dalstra et al., 2005).

Prevalence and compositional effects also represent potential limitations: The proportion of respondents who had experienced the different health conditions or obtained primary, secondary and tertiary education varied between countries, which potentially could affect the regression analyses and estimations. Including weights in our models aimed at countering these effects.

A last limitation concerns representability, a general limitation regarding health survey data. The prevalence of conditions in our study population may be an imperfect representation of actual population prevalence, since response rates differed between countries, and only non-institutionalized respondents were included. We met the latter limitation in our analyses by limiting the upper age inclusion criteria to 69 years; with that aiming to exclude non-institutionalized elderly, whose health may not be representative for their respective populations. For further information on ESS strengths and limitations, see Eikemo et al. (2016).

5. Conclusion

This explorative analysis of educational inequalities for high- and low-preventable conditions supported the FCT hypothesis that social inequalities in health increase with our ability to detect, prevent, and cure disease. In our analyses we found more significant gaps among the high- than among the low-preventable conditions. Our analyses using pooled conditions variables yielded similar results, while also indicating that the health-beneficial resources associated with education are differently distributed between women and men.

Though most high-preventable conditions showed the expected educational gaps, our exploration of the country- and condition-stratified analyses detected substantial variation between conditions, countries, and genders. Previous findings highlighting specific conditions and country patterns – such as cardiovascular disease and Eastern-Central European countries – were to a certain degree reflected in our results. Variation across countries and conditions indicates that the SES-health associations are context-dependent, with a need for more context-specific explanations. The integration of an institutional perspective may therefore enhance future comparative research.

Ethics approval/Statement EA not required

Ethics approval.
From http://www.europeansocialsurvey.org/about/ethics.html on research ethics regarding the European Social Survey (ESS).
Research Ethics.
In accordance with the ESS ERIC Statutes (Article 23.3), the ESS ERIC subscribes to the Declaration on Professional Ethics of the International Statistical Institute.
The ESS ERIC Research Ethics Committee (REC) was established in 2015 and is chaired by Professor Lars Lyberg, Statistics Sweden (Chair of the Methods Advisory Board). Members include Professor Annelies Blom (University of Mannheim, Germany) and Professor Gordon Wills (National Institutes of Health, US).
The Research Ethics Committee reviews applications for studies for

which the ESS ERIC is directly responsible, that is, which it directly contracts.

If you have any problems, concerns or questions about an ESS ERIC study, please contact the Secretary to the ESS ERIC Research Ethics Committee (ess@city.ac.uk).

Acknowledgments

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2020.113145.

References

Álvarez-Gálvez, J., Jaime-Castillo, A.M., 2018. The impact of social expenditure on health inequalities in Europe. Soc. Sci. Med. 200, 9–18. https://doi.org/10.1016/j.socscimed.2018.01.006.

Beckfield, J., Bambra, C., Eikemo, T., Huijts, T., McNamara, C., Wendt, C., 2015. An institutional theory of welfare state effects on the distribution of population health. Soc. Theor. Health 13 (3-4), 227–244. https://doi.org/10.1057/sth.2015.19.

Beckfield, J., Olafsdottir, S., Sosnaud, B., 2013. Healthcare systems in comparative perspective: classification, convergence, institutions, inequalities, and five missed turns. Annu. Rev. Sociol. 39, 127–146. https://doi.org/10.1146/annurev-soc-071312-145609.

Braveman, P.A., Cubbin, C., Egerter, S., Chideya, S., Marchi, K.S., Metzler, M., Posner, S., 2005. Socioeconomic status in health research: one size does not fit all. J. Am. Med. Assoc. 294 (22), 2879–2888.

Bränström, R., Hatzenbuehler, M.L., Pachankis, J.E., Link, B.G., 2016. Sexual orientation disparities in preventable disease: a fundamental cause perspective. Am. J. Public Health 106 (6), 1109–1115. https://doi.org/10.2105/AJPH.2016.303051.

Chang, V.W., Lauderdale, D.S., 2009. Fundamental cause theory, technological innovation, and health disparities: the case of cholesterol in the era of statins. J. Health Soc. Behav. 50 (3), 245–260.

Dahl, E., van der Wel, K., 2013. Educational inequalities in health in European welfare states: a social expenditure approach. Soc. Sci. Med. 81, 60.

Dahlgren, G., Whitehead, M., 1991. Policies and Strategies to Promote Social Equity in Health. Institute for future studies, Stockholm.

Dalstra, J.A., Kunst, A.E., Borrell, C., Breeze, E., Cambois, E., Costa, G., ... Rasmussen, N.K., 2005. Socioeconomic differences in the prevalence of common chronic diseases: an overview of eight European countries. Int. J. Epidemiol. 34 (2), 316–326.

ESS7, 2014. Documentation report: The ESS data archive version 3.2. Norwegian Centre for Research Data, Bergen. https://www.europeansocialsurvey.org/docs/round7/survey/ESS7_data_documentation_report_e03_2.pdf. https://www.europeansocialsurvey.org/docs/round7/survey/ESS7_data_documentation_report_e03_2.pdf.

Eikemo, T.A., Bambra, C., Huijts, T., Fitzgerald, R., 2016. The first pan-European sociological health inequalities survey of the general population: the European social survey rotating module on the social determinants of health. Eur. Socio Rev. 137–153.

Eikemo, T.A., Bambra, C., Joyce, K., Dahl, E., 2008a. Welfare state regimes and income-related health inequalities: a comparison of 23 European countries. Eur. J. Publ. Health 18 (6), 593–599. https://doi.org/10.1093/eurpub/ckn092.

Eikemo, T.A., Huisman, M., Bambra, C., Kunst, A.E., 2008b. Health inequalities according to educational level in different welfare regimes: a comparison of 23 European countries. Sociol. Health Illness 30 (4), 565–582. https://doi.org/10.1111/j.1467-9566.2007.01073.x.

Elstad, J.I., 2000. Social Inequalities in Health and Their Explanations. In (Vol. 9/00). Oslo: Nova.

Freese, J., Lutfey, K., 2011. Fundamental causality: challenges of an animating concept for medical sociology. In: Handbook of the Sociology of Health, Illness, and Healing. Springer, pp. 67–81.

Gadeyne, S., Menvielle, G., Kulhanova, I., Bopp, M., Deboosere, P., Eikemo, T.A., et al., 2017. The turn of the gradient? Educational differences in breast cancer mortality in 18 European populations during the 2000s. Int. J. Canc. https://doi.org/10.1002/ijc.30685.

Hayward, M.D., Hummer, R.A., Sasson, I., 2015. Trends and group differences in the association between educational attainment and U.S. adult mortality: implications for understanding education's causal influence. Soc. Sci. Med. 127, 8–18. https://doi.org/10.1016/j.socscimed.2014.11.024.

Hem, C., Næss, Ø., Strand, B.H., 2009. Social inequalities in causes of death amenable to health care in Norway. Nor. Epidemiol. 17 (1).

Hofmann, B., 2016. Disease, illness, and sickness. In: The Routledge Companion to Philosophy of Medicine. Routledge.

Hummer, R.A., Lariscy, J.T., 2011. Educational attainment and adult mortality. In: International Handbook of Adult Mortality. Springer, pp. 241–261.

Link, B.G., Phelan, J., 1995. Social conditions as fundamental causes of disease. J. Health Soc. Behav. 80–94.

Link, B.G., Phelan, J., 2010. Social conditions as fundamental causes of health inequalities. In: Bird, C.E., Conrad, P., Fremont, A.M., Timmermans, S. (Eds.), Handbook of Medical Sociology. Vanderbilt University Press, Nashville, pp. 3–17.

Link, B.G., Phelan, J.C., 2002. McKeown and the idea that social conditions are fundamental causes of disease. Am. J. Public Health 92 (5), 730–732.

Long, J.S., Freese, J., 2014. Regression Models for Categorical Dependent Variables Using Stata, third ed. Stata Press, College Station, Tex.

Lutfey, K., Freese, J., 2005. Toward some fundamentals of fundamental causality: socioeconomic status and health in the routine clinic visit for diabetes1. Am. J. Sociol. 110 (5), 1326–1372.

Lynch, J.W., Kaplan, G.A., 2000. Socioeconomic position. In: Berkman, L.F., Kawachi, I. (Eds.), Social Epidemiology. Oxford University Press, New York, pp. 13–35.

Mackenbach, J.P., 2012. The persistence of health inequalities in modern welfare states: the explanation of a paradox. Soc. Sci. Med. 75 (4), 761–769.

Mackenbach, J.P., 2017. Nordic paradox, Southern miracle, Eastern disaster: persistence of inequalities in mortality in Europe. Eur. J. Publ. Health 27 (Suppl. 4), 14–17. https://doi.org/10.1093/eurpub/ckx160.

Mackenbach, J.P., Kulhánová, I., Bopp, M., Deboosere, P., Eikemo, T.A., Hoffmann, R., et al., 2015. Variations in the relation between education and cause-specific mortality in 19 European populations: a test of the "fundamental causes" theory of social inequalities in health. Soc. Sci. Med. 127, 51–62.

Mackenbach, J.P., Looman, C.W.N., Artnik, B., Bopp, M., Deboosere, P., Dibben, C., et al., 2017. 'Fundamental causes' of inequalities in mortality: an empirical test of the theory in 20 European populations. Sociol. Health Illness https://doi.org/10.1111/1467-9566.12562. n/a-n/a.

Masters, R.K., Hummer, R.A., Powers, D.A., 2012. Educational differences in US adult mortality a cohort perspective. Am. Socio. Rev. 77 (4), 548–572.

Masters, R.K., Link, B.G., Phelan, J.C., 2015. Trends in education gradients of 'preventable' mortality: a test of fundamental cause theory. Soc. Sci. Med. 127, 19–28.

McNamara, C.L., Balaj, M., Thomson, K.H., Eikemo, T.A., Bambra, C., 2017a. The contribution of housing and neighbourhood conditions to educational inequalities in non-communicable diseases in Europe: findings from the European Social Survey (2014) special module on the social determinants of health. Eur. J. Publ. Health 27 (Suppl. l_1), 102–106. https://doi.org/10.1093/eurpub/ckw224.

McNamara, C.L., Balaj, M., Thomson, K.H., Eikemo, T.A., Solheim, E.F., Bambra, C., 2017b. The socioeconomic distribution of non-communicable diseases in Europe: findings from the European Social Survey (2014) special module on the social determinants of health. Eur. J. Publ. Health 27 (Suppl. l_1), 22–26. https://doi.org/10.1093/eurpub/ckw222.

McNamara, C.L., Toch-Marquardt, M., Balaj, M., Reibling, N., Eikemo, T.A., Bambra, C., 2017c. Occupational inequalities in self-rated health and non-communicable diseases in different regions of Europe: findings from the European Social Survey (2014) special module on the social determinants of health. Eur. J. Publ. Health 27 (Suppl. l_1), 27–33. https://doi.org/10.1093/eurpub/ckw223.

Meara, E.R., Richards, S., Cutler, D.M., 2008. The gap gets bigger: changes in mortality and life expectancy, by education, 1981–2000. Health Aff. 27 (2), 350–360.

Montez, J.K., Friedman, E.M., 2015. Educational attainment and adult health: under what conditions is the association causal? Soc. Sci. Med. 127, 1–7. https://doi.org/10.1016/j.socscimed.2014.12.029.

Mustard, C.A., Bielecky, A., Etches, J., Wilkins, R., Tjepkema, M., Amick, B.C., et al., 2010. Avoidable mortality for causes amenable to medical care, by occupation in Canada, 1991-2001. Can. J. Public Health/Revue Canadienne de Sante'e Publique 500–506.

Nolte, E., McKee, M., 2004. Does health care save lives? Avoidable mortality revisited. The Nuffield Trust, London, UK.

Phelan, J.C., Link, B.G., 2005. Controlling disease and creating disparities: a fundamental cause perspective. J. Gerontol. B Psychol. Sci. Soc. Sci. 60 (Special Issue 2), S27–S33.

Phelan, J.C., Link, B.G., Diez-Roux, A., Kawachi, I., Levin, B., 2004. "Fundamental causes" of social inequalities in mortality: a test of the theory. J. Health Soc. Behav. 45 (3), 265–285.

Piers, L.S., Carson, N.J., Brown, K., Ansari, Z., 2007. Avoidable mortality in victoria between 1979 and 2001. Aust. N. Z. J. Publ. Health 31 (1), 5–12.

Quesnel-Vallée, A., Jenkins, T., 2009. Social policies and health inequalities. In: Cockerham, W.C. (Ed.), The New Blackwell Companion to Medical Sociology. Wiley-Blackwell, pp. 455–483.

Song, Y.-M., Byeon, J.J., 2000. Excess mortality from avoidable and non-avoidable causes in men of low socioeconomic status: a prospective study in Korea. J. Epidemiol. Community Health 54 (3), 166–172.

Thomson, K.H., Renneberg, A.-C., McNamara, C.L., Akhter, N., Reibling, N., Bambra, C., 2017. Regional inequalities in self-reported conditions and non-communicable diseases in European countries: findings from the European Social Survey (2014) special module on the social determinants of health. Eur. J. Publ. Health 27 (Suppl. l_1), 14–21. https://doi.org/10.1093/eurpub/ckw227.

van der Wel, K.A., Dahl, E., Thielen, K., 2011. Social inequalities in 'sickness': European welfare states and non-employment among the chronically ill. Soc. Sci. Med. 73 (11), 1608–1617.

Westerling, R., Gullberg, A., Rosén, M., 1996. Socioeconomic differences in 'avoidable' mortality in Sweden 1986–1990. Int. J. Epidemiol. 25 (3), 560–567.

Willson, A.E., 2009. 'Fundamental causes' of health disparities: a comparative analysis of Canada and the United States. Int. Sociol. *24* (1), 93–113. https://doi.org/10.1177/0268580908099155. Retrieved from.

Zapata Moya, A.R., Buffel, V., Navarro Yáñez, C.J., Bracke, P., 2015. Social inequality in morbidity, framed within the current economic crisis in Spain. Int. J. Equity Health 14 (1), 131. https://doi.org/10.1186/s12939-015-0217-4.