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Abstract

Background: Our aim is a wide-ranging analysis of the determinants of health inequalities, which scrutinizes the propositions of the main theoretical approaches (materialist or neo-materialist approach, cultural and behavioural approaches, psychosocial explanations, the life-course perspective and the newer capability approach) within one model thereby offering insights into their relative explanatory power.

Methods: Using Fields's (2004) regression techniques we decompose total variance into its factors and thereby generate insights about the contribution of specific variables (and approaches) to explain health inequalities in Germany. Moreover, we stratify our sample by age and compare the contribution of each of the factors (constituting the different approaches) in four age groups.

Data: The data is taken from the 2006 wave of the German Socioeconomic Panel (GSOEP). The GSOEP is a representative longitudinal study of private households and their members above the age of 16, which was started in 1984 and originally consisted of 12 000 individuals. We use the physical health scores derived from the 2006 GSOEP data wave as the dependent variable in our analysis. The scores are derived using an algorithm presented by Anderson et al., which is based on the 2004 GSOEP data wave as the norm sample. Furthermore, we use a comprehensive set of covariates capturing information on demographics, socio-economic background, life-style, social capital, self-assessed stress levels, feelings of national belonging, insurance status and regional levels of pollution, crime, noise and provision of health care to test the relative weight of the theoretical explanations.

Results: Overall, we find that understanding the mechanisms of health inequalities crucially depends on taking a holistic perspective on individual's health. Socio-economic factors, working conditions and lifestyle independently, interacted and compounded explain variation in health in specific age-groups in our analysis. Studies which take a reductionist approach and do not allow for the possibility that health inequalities are generated by a complex co-action of many factors may forego insightful findings.

1 Introduction

There is no shortage of empirical evidence illustrating the existence of health inequalities in various countries (Mackenbach et al. 2008; van Doorslaer and Koolman 2004). Moreover, an association between socio-economic position and health inequalities is well established (Mackenbach 2006; 1999; Smith 1999). Nevertheless, the underlying mechanisms determining health inequalities are still poorly understood (van Kippersluis et al. 2009). One reason is that convincing studies linking theoretical conceptualization and empirical work on the determinants of health inequalities are widely lacking (Bauer et al. 2008).

On the conceptual level, analyses of health inequalities often build on one or several of the following theoretical approaches: the materialist or neo-materialist approach, cultural and behavioural approaches, psycho-social explanations or on the life-course perspective. However, the theoretically most elaborate of these approaches often suffer from a lack of convincing empirical evidence, problems of operationalization or methodological limitations of the supporting studies (Wagstaff and van Doorslaer 2000). On the other side, the methodologically most advanced studies, mainly micro-econometric models, often pay little attention to the full set of theoretical approaches available for the explanation of health inequalities and fail to clearly outline the underlying theoretical assumptions. As a consequence research has generated little progress towards a satisfactory explanatory model for the determinants of health inequalities.

In this article we intend to bridge the gap between advanced theoretical modelling and micro-econometric investigations by conducting an analysis of the determinants of health inequalities, which scrutinizes the propositions of the main theoretical approaches empirically within one model and thereby offers insights into their relative explanatory power and their interplay. We focus exclusively on inequalities in physical health as it has been shown that the roots and origins of other dimensions of health inequalities such as mental health are of different nature (Rogers and Pilgrim 2003). It would be beyond the scope of the paper to discuss those additionally.

Our analysis takes advantage of a comprehensive set of variables providing occupational, material, psychological, behavioural and environmental information on a rep-

resentative sample of individuals from four age groups. We find that understanding the underlying mechanisms of health inequalities crucially depends on taking a holistic perspective on individual's health. Socio-economic factors, working conditions and lifestyle independently and (especially) interacted explain variation in health in specific age-groups. Our analysis suggests that studies focusing on narrow set of socio-economic variables produce biased results. Econometric modelling hence needs to be informed by a broad set of theoretical perspectives and must consider interactions and compound effects of different sets of variables.

We conduct our analysis based on data from the 2006 wave of the German Socio-economic Panel (GSOEP), which provides us with a wide range of variables.

Given our aim to scrutinize various sets of explanatory variables with very different statistical properties, we chose to depart from the standard concentration index approach (van Doorslaer et al. 1997; van Doorslaer and Koolman 2004) in health economics, which only allows considering rank-based independent variables. Alternatively, we use Fields's (2004) regression techniques that decompose the proportion of explained variance into its factors and thereby allow us to generate insights about the contribution of various variables to explain health inequalities and their interplay. Moreover, we stratify our sample by age and compare the proportion of explained and total variance across factors for various age groups. Thereby we complement recent descriptive work by Dorling and Mitchell (2007) and Kippersluis et al. (2009), who report preliminary evidence that the determinants of health inequalities differ by age and change over the life-course.

Furthermore, we complement previous work on health inequalities in Germany, which scrutinized health inequality from epidemiologist perspectives within the framework of large comparative European research projects (Cavelaars et al. 1998a; Cavelaars et al. 1998b; Kunst and Mackenbach 1994; Mackenbach et al. 2008; von dem Knesebeck et al. 2006) and income related health inequalities using approaches derived from health economics (Bambra et al. 2009; van Doorslaer et al. 2004) as well discussing particularities of health inequalities within Germany (Breckenkamp et al. 2007; Nolte and McKee 2004). While these investigations suggest a socio-economic gradient in health inequalities in Germany as in other European countries (Mielck 2008), the empirical evidence is limited so far and based on (somewhat outdated)

data sets from the 1990s. Moreover it fails to provide insights about underlying mechanisms.

The rest of the paper is organized as follows. Section II presents the main theoretical approaches offering insights about the determinants of health inequalities. Section III introduces Fields (2004) regression and decomposition approach. Section IV outlines the characteristics of the GSOEP and the dependent variable in our model. In section V we present descriptive statistics and discuss the results of the regressions and of the decomposition analysis. Section VI outlines conclusions and implications for future research and public policy. Our sample only comprises working female and male of age 16 and older. We narrowed our focus on the working population in order to a) test various theoretical explanations which explicitly draw on mechanisms based in working life and b) reduce potential endogeneity arising from people who have left the working population following health problems. Van Doorslaer et al. (2004) repeatedly found that changes in the labour force status account for the highest proportion of income-related inequality in health in OECD countries and therefore suggested that the relationship between labour force and the dependent variable health status might suffer from reverse causation bias.

2 Theoretical approaches

In the following we give a brief account of the main theoretical approaches used to explain health inequalities. There is clearly some overlap between these approaches. We therefore focus on the basic perspectives and the different conceptions about underlying mechanisms generating health inequalities.

The ***materialist*** approach explains health inequalities through the differences of individuals' socio-economic positions in social hierarchy. The basic intuition is that different positions in various dimensions of socio-economic stratification are linked to specific sets of resources, privileges and environments conducive or hostile to health, which in turn determine individual health and differ widely across socio-economic groups. With its focus on hierarchy and structure in socio-economic dimensions this approach follows Weberian traditions and is conceptually well developed (Lahelma et

al. 2008; Liberatos et al. 1988; Lynch et al. 2000). To capture the various dimensions of social hierarchy determined by the state of the material world, the concept of socio-economic position (SEP) has been developed (Galobardes et al. 2006). Most recent approaches understand SEP as a multidimensional concept (Laaksonen et al. 2005) best represented by indicators such as education, occupation and sector of employment, employment status, income and house ownership. Various studies showed that the contribution of these variables are partially independent of each other (Daly et al. 2002; Lahelma et al. 2004) and that different mediating factors may obscure the impact of single variable approaches (Bartley et al. 1999; Sacker et al. 2001). To structure the debate, Bartley (2004) introduced the term social position to refer to class and status as distinguished from measures of material living standards including income and ownership of goods. In the tradition of Marx and Weber, social classes are characterized by typical employment conditions and relationships which define the individuals' location within the system of authority and the degree of autonomy at work (Marshall et al. 1988). Unlike social class, the concept of status crucially comprises the notion of a ranking of individuals which may either be based on a general population survey or directly observed by researchers such that those at the bottom enjoy less favourable conditions compared to those at the top end (Cambridge-Scale).

The basic intuition of the **neo-materialist** perspective is similar to that of the traditional materialist approach: health inequalities emerge due to individuals' differential accumulation of exposures and experience that have their sources in the material world. However, the neo-materialist approach broadens the perspective on the dimensions, which need to be considered. Hence in addition to the common set of factors, the approach stresses the effects of environmental factors referring to the human, physical, health, social, and especially the public infrastructure, which are assumed to (co-) determine the private resources available for health production and to differ across the societal hierarchy (Lynch, Smith, Kaplan, & House 2000; Smith 1996). Recently, Clarkwest (2008) expanded the scope of variables to be scrutinized by materialist approaches by conceptually drawing attention to the potential impact of longevity-enhancing innovations on health inequalities and the determinants of their adoption in various health systems. While yet to be scrutinized empirically (Clarkwest 2008) and being challenged by various critical responses (Glymour 2008;

Zimmerman 2008), the article nicely illustrates the conceptual ability of the neo-materialist approach to incorporate health system and other environmental factors as explanatory variables.

Cultural and behavioural approaches explain health inequalities as effects of unequal distributions of personal, behavioural or preference patterns drawing mainly on insights from observational studies in psychology, sociology and anthropology. Some of these approaches implicitly assume that persons from lower socio-economic background are less endowed with certain types of personal characteristics such as coping strategies, intelligence or self-control (Bartley 2004; Bosma et al. 1999), which leads them to engage in risky life-styles such as drinking, smoking or unhealthy diet. Consequently, persons with less favourable personal traits are less healthy than persons with more favourable characteristics. As these models (often implicitly) also assume that person with less favourable health characteristics are also less successful in socio-economic terms, the observed association between health and socio-economic position emerges. Health inequalities are hence a consequence of the distribution of personal traits (Bartley 2004). Siegrist (1998; 2000) put forward an effort to combine the behavioural approach and psycho-social explanations arguing that when rewards from employment or other central social roles are threatened or being lost, persons become more vulnerable to addiction and other types of risky behaviour due to biological processes in the brain (Bartley 2004). His reasoning centrally involves the idea that a perceived lack of reciprocity at the workplace or similar central aspects of adult life triggers harmful stress.

Other variants of the cultural and behavioural approach stress that culture determines or frames behavioural choices, including decisions affecting health. Culture is here understood either as a set common rules and norms governing the behaviour of individuals or as set of behaviours occurring regularly in certain institutional arrangements within societies such as the workplace or the family (Bartley 2004). The latter approach often implicitly builds on the work of Bourdieu (1979), who developed the concept of habitus to explain the difference in life-styles. According to Bourdieu the socialization in specific societal environments generates certain frames of thinking, perception and values. Bourdieu summarize these via the concept of habitus, which in turn is expressed in daily life-style decisions, in partialities, the awareness of one owns body and consumption patterns. Differences in the access to cultural, economic

and social capital are suggested to be central for the class specific development of different habitus patterns. In line with Bordieu's notion of "habitus" is the widely found strong relationship of measures of education with health promoting behaviours in the sense that certain advantaged social groups may promote both, a high educational attainment and a healthy lifestyle. Consequently, Bartley (Bartley 2004) suggests considering measures of education as explanatory factors in the behavioural model.

Psycho-Social approaches explain health inequalities as a result of differences in the experience of social support, self-determination and stress during life time, which are hypothesized to be determined by the combination of different bundles relationships and responsibilities in family and work life and individual dispositions. These approaches argue that individuals from lower socioeconomic backgrounds experience more negative life events (White 2002), less social support (Elstad 1998), less autonomy at work (Marmot et al. 1997) and job security (Borg and Kristensen 2000) and live in communities with more hostile environments such as crime and low levels of social support (Ellaway and Macintyre 1996; Ellaway and Macintyre 1998) and therefore suffer from lower health levels. Various underlying mechanisms are assumed, but three main arguments can be distinguished. The direct model puts forward a rather determinist explanatory mechanism, which argues that stress triggers a sequence of events, which generate a specific disease. Alternatively it is argued that stress negatively affects health by reducing resilience and increasing vulnerability to illness (Kelly et al. 1997). Both models mainly build on the insights of biology and psychology and operate on the micro level.

In addition, there are several approaches which attempt to combine conceptual and empirical insights of different approaches to generate more holistic perspectives on the emergence and persistence of health inequalities. A well established approach is the ***life-course perspective***, which adds a temporal dimension and explains health inequalities as the result of differences in increasing and decreasing bundles of factors which influence health at different points of life (Smith et al. 2002). Health is hence no longer the result of current conditions and individuals life-style choices, but also from past living conditions and events (Krieger 2001). Health inequalities are explained by differences of the combined effects of materialist, behavioural and psychological factors over time (Sisson 2007). One can identify two main strands of explanatory models within the life-course camp.

Firstly, the a*ccumulation model* argues that exposure to advantageous or disadvantageous health events or environments cumulate over life time, which leads to higher or lower risks of developing chronic diseases (Hallqvist et al. 2004). This approach builds on insights from the clinical field and argues that the development of chronic disease can rarely be attributed to single factors, but has multiple causes. Hence health deterioration is a function of the accumulation of risks as generated by socio-economic disadvantages and health hazards, their intensity and duration over prior life time. Some authors stress that not the timing of health hazards or total numbers are crucial for health status but whether and how health hazards interact with each other (Bartley 2004).

The path-dependency model or the risk-chain approach builds on the insights from the accumulation model, but also accept that certain "critical junctures" may exist in life-time, which can set individuals on different tracks favourable or less favourable for health (Powers and Kuh 2006). Often time spent in uterus and early childhood are considered most important for health in adulthood. Hence, early life experience largely determined by the socio-economic background of the parents is hypothesized to centrally influence health at later stages of life (Kelly, Hertzman, & Daniels 1997). Health inequalities observed at a certain point of time within a certain cohort are explained as replicates of socio-economic and health inequalities in earlier cohorts, i.e. the cohort of the parents.

Capabilities approach

Recently, Peter Hall and Taylor (2009) put forward the *capabilities approach.* Attempting to generate a theoretically more elaborate model that builds on an explicit micro-level explanatory mechanism, they argue that individual health status is a function of individual's capabilities and life challenges over time. Capabilities and challenges are in turn determined by socio-economic position, social connectedness, emotional disposition, collective imaginaries (understood as cultural and societal norms), self-determination and stress. The model hypothesizes that differences in individual balances between capabilities and challenges generate the observed socio-economic gradient in health inequalities.

3 Decomposing explained variance in health using Fields's method

Research in decomposition of factors is rooted and driven by research applied to income inequality. In early studies, researchers simply calculated the level of inequality within defined sub-samples (usually social class or educational attainment) and between the means of each of the sub-samples using a number of standard measures including generalized entropy measures and Atkinson indices. The approach only allowed to decompose over discrete categories, even if continuous explanatory factors were plausible and therefore precluded multi-factor analyses (Murdoch and Sicular 2002). To overcome the shortcomings Shorrock (1982) developed a method that decomposes inequality by sources of factor components, rather than based on population groups. Specifically in the context of income inequality, he proposed to write inequality measures *I* as the weighted sum of incomes y from k different sources:

$$I(y) = \sum_i a_{ik}(y) y_{ik} \qquad [1]$$

where $a_{ik}(y)$ denote the weights for income source k. Dividing [1] over I(y), then gives the proportional contribution of income source *k* to overall inequality, denoted by $s_k = \frac{\sum_i a(y) y_{ik}}{I(y)}$. However, Shorrocks (1982) pointed out that this decomposition method yields an infinite number of potential decomposition rules. This is because the weights $a_{ik}(y)$ can be chosen in many ways, thus altering the proportional contribution of each factor. He therefore proposed additional restrictions on the choice of weights in order to reduce the number of potential decomposition rules (listed in the appendix). The two most important conditions are (i) that if all individuals have the same value in y for the k'th factor, then the contribution of this factor to inequality is zero, and (ii) if the distribution of y for factor k=1 is only a permutation of the distribution of y for factor k=2, and if k=1,2 are the only two components in the decomposition, then they receive the same share in the decomposition. Imposing these restrictions, he arrives at the unique decomposition rule:

$$s_k = \frac{\mathrm{cov}(y_k, y)}{\mathrm{var}(y)} \qquad [2]$$

Murdoch and Sicular (2002) and Fields (2004) subsequently extended Shorrocks approach to a regression based decomposition of inequality. They expressed household income as linear function of explanatory variables and used the regression coefficients to calculate the decomposition components for all variables in the model. The regression-based decomposition has the advantages that (1) it yields an exact allocation of contributions to the identified factors, (2) it provides measures of uncertainty around the values of *s* which are part of standard regression analysis and (3) it allows for the analysis of multiple factors.

Choosing a different path of reasoning (but also considering the restrictions of the choice of weights), Fields arrives at the same equation like Shorrocks (1982) in equation [2]. In the following we explain how Fields develops his decomposition method using variation in health as dependent variable: first, health is regressed on a range of explanatory using a standard least squares regression model of the form:

$$Y_i = \beta_0 + \sum_{k=1}^{K} X_k \beta_k + \varepsilon \qquad [3]$$

where Y_i is the health of individual i, X_k is a vector of variables $X_1, X_2, ...X_K$ thought to determine health (there are *k* = 1, 2, … *K* variables included in X_k) and β_k is a vector of coefficients $\beta_1, \beta_2 ... \beta_k$ pertaining to each variable *k*. ε is an error term with a mean value of zero and a variance of unity and β_0 is the intercept term. The estimated coefficients are denoted by

$(\hat{\beta}_0, \hat{\beta}_{1....} \hat{\beta}_K)$ and the residual term is given by $\hat{\varepsilon}_{ik} = Y_i - \hat{\beta}_0 - \sum_{k=1}^{K} X_{ik} \hat{\beta}_k, i = 1,..., n$

We then decompose explained variance in health using Fields (2004) method. We therefore let $s(X_k)$ denote the share of the variance in health attributable to the *k*th determinant holding all other determinants constant and the model R^2 is the proportion of variance explained by all determinants X_k taken together. To deduct the decomposition, Fields (2004) first takes the variance of the left and right hand sides of equation [3], which is written as

$$\sigma_y^2 = \sum_{k=1}^{K} \text{cov}\left[X_k \hat{\beta}_k, Y\right] + \text{cov}[\hat{\varepsilon}, Y] \quad [4]$$

Dividing [4] by the variance of *Y* then yields

$$1 = \frac{\sum_{k=1}^{K} \text{cov}\left[X_k \hat{\beta}_k, Y\right] + \text{cov}[\hat{\varepsilon}, Y]}{\sigma_y^2} = \sum_{K=1}^{K} s_k(X_k) + s(\hat{\varepsilon}) \quad [5]$$

The equation partitions the full variance of *Y* into the share that is explained by the covariance between each of the *X* factors and the *Y* values. Fields calls the proportions denoted by $s(X_k)$ "relative factor inequality weights". Note that $\frac{\sum_{k=1}^{K} \text{cov}\left[X_k \hat{\beta}_k, Y\right]}{\sigma_y^2} = \sum_{K=1}^{K} s_k(X_k)$ is the model R^2 . Dividing the individuals' *s* weights for each *k* by the model R^2 gives the share of each factor in the explained variation of the linear regression. Formally, this is given by

$$p_k(X_k) \equiv \frac{s_k(X_k)}{R^2{}_y} \equiv \frac{\text{cov}\left[X_k \hat{\beta}_k, Y\right]}{\sum_{k=1}^{K} \text{cov}\left[X_k \hat{\beta}_k, Y\right]} \quad [6]$$

Furthermore, Fields shows that under six decomposition conditions (listed in the appendix), the s-weights and p-weights are the same for any measure of dispersion that is continuous, symmetric, and take value zero when all Y are identical (namely the Gini Coefficient, Theil index, and Atkinson index).

Three points are important when interpreting the decomposition results: first, Fields approach decomposes the predicted value of *Y* rather than the actual value of *Y.* Thus, using Fields's approach, we quantify the relative importance of determinants of explained inequality in Y. Second, Fields (2004) himself pointed out that the weights

can take negative values[1]. Third, the Fields decomposition method differs from the regression-based Concentration Index (CI) approach, which is often used in Health Economics. The latter is most often used to decompose income-related inequality in health and not health itself into its sources. The direct decomposition of inequality in health in contrast allows us to estimate the direct impact of education on health – rather than (for instance) estimating the effect education of inequality in health that as only associated with variation in income.

4 Data

The Data is taken from the GSOEP, a representative longitudinal study of private households and their members above the age of 16, which was started in 1984 and originally consisted of 12 000 individuals. Each person in the sample is individually interviewed. In addition the household heads provide information on household related issue such as household income, housing and children under the age 16. Samples were generated randomly via multistage sampling (West Germany) and probability sampling (foreign and East German residents). Generally, the sub-samples and the total sample are considered to satisfactory degree representative. The GSOEP collects data on a broad range of thematic issues such as population and demography, education, training and qualification, earnings and income, health, basic orientation, and satisfaction specific aspects of life.

The dependent variable: physical health

Since 2002 the GSOEP surveys health status via the internationally accepted and applied SF-12v2, which is considered a brief, reliable measure of health. It is a short version of the SF-36v2 Health Survey and uses 12 questions to measure functional

[1] He explained this result as follows: the covariance between $X_k\hat{\beta}_k$ and Y can be expressed as $\text{cov}[X_k\hat{\beta}_k, Y] = \hat{\beta}_k \text{cov}[X_k, Y]$, and when we regress of Y on X_k we obtain the simple regression coefficient $\hat{\beta}_{X_kY} = \frac{\text{cov}[X_k, Y]}{\sigma^2}$. It follows that the p-weights can be written as $p(X_k) = \frac{\hat{\beta}_k \hat{\beta}_{X^k,Y}}{R^2}$. This implies that a negative value arises whenever the two beta coefficients have opposite sign i.e. whenever controlling for multiple factors within a regression framework would reverse the sign from the simple regression.

health and well-being from the patient's point of view, that allow generating scores for physical and mental health. [2] It is widely applied in large population health surveys.

The approach used in the GSEOP encompasses questions referring to eight subscales with either one or two items each (Anderson et al. 2007). As in the original SF-12v2 data, four subscales are used to generate the physical components summary scale, labelled physical health, and a mental health components summary scale, labelled mental health. These scale form the basis for calculating physical health scale scores via the algorithm presented by Anderson et al. (Anderson, Mühlbacher, Nübling, Schupp, & Wagner 2007). The physical component summary scores provide an overall assessment of physical health. They build on questions referring mainly to body functioning and evaluations of one's ability to perform physical activity. While all eight scales of the SF12v2 are used to score the physical component summary, the scales weighted positively in scoring are physical functioning, role limitations due to physical health, bodily pain, and general health perceptions.

In contrast to the standard algorithm for the SF-12v2, which is based on a US norm sample from 1998, the algorithm presented by Anderson et al., uses the 2004 GSOEP data wave as the norm sample. The later allows more adequate statements about deviations from the (German) norm population avoiding cross-cultural bias and benefits from its larger sample size of over 20 000 cases.

We use the physical health scores derived from the 2006 GSOEP data wave as the dependent variable in our analysis as the discourses on other dimensions of health, e.g. mental health, are very different (Rogers & Pilgrim 2003) and would require us to scrutinize an even greater variety of approaches.

In the following we briefly outline our main categories of explanatory variables. The former are informed by the theoretical approaches we identified in section II. As outlined, there is clearly some overlap between these approaches. Therefore, we try to reflect the basic perspectives and the differences in implicit or explicit underlying mechanisms generating health inequalities in our variables selection for each ap-

[2] The SOEP Version of the SF-12v2 deviates from the original SF-12v2 to some (but limited) degree with regard to formulation, order of questions and in general layout. For more specific information see Anderson et al. (2007: 172).

proach. This means that to a certain extent we generate arch-typical and stylized approaches. Nevertheless, we believe that we capture the main differences and found legitimate operationalizations.

Materialist approach

To assess the explanatory power of the materialist approach, we include measures of household income after taxes in quintiles, wealth, social class, social status and self-evaluated working conditions in the equation. Wealth is measured using two binary variables on whether the person owns an apartment or house and whether the person holds financial assets or not. To measures the impact of the level of wealth, we also include two continuous variables, one for the monetary value of the property and one increasing in the value of financial assets. Social class is measured using the Erikson-Goldthorpe schema which employs the concept of skill to classify society according to occupations that can be easily monitored and occupations that deprive the employer of direct control. Thus, society is classified in seven, not strictly hierarchical occupational groups: I. higher professionals, administrators and officials, proprietors and managers in large firms II. lower level professionals, administrators and officials; higher level technicians; managers of small firms; non-manual supervisors III. Higher and lower level routine non-manual workers IV. Small proprietors and small employers and self-employed V. Lower level technicians and manual supervisors VI. skilled manual workers and VII. semi- and unskilled manual workers and agricultural and primary production workers. The hierarchical social status measure is based on a representative survey, which shows how different occupations are ranked in people's mind in terms of prestige. Working conditions are captured via a binary variable taking a value of one if the individual works in poor conditions.

Neo-materialist

The supplementary neo-materialist perspective is captured using ordinal five-category measures on self-assessed pollution, noise and crime ranging from no-impact to very strong impact and a binary variable on whether there is strong social coherence in the neighbourhood or not. Furthermore, we attempt to describe infra-structural conditions by two binary variables which take a value of one if the individual needs more than twenty minutes to arrive at the nearest public transport or doctor's

practice respectively and self-assessed kilometre-distance to the nearest big city. Differences brought about by health care system are assumed to be associated with the individual's mandatory, voluntary or private health insurance arrangement.

Cultural-behavioural approach

The conceptualization of the basic behavioural approach is straightforward. We include four arguably reliable life-style variables from the 2006 GSOEP wave in the model, namely whether the individual never, occasionally or often exercises, whether the individual is a smoker or not, whether the individual regularly drinks hard liquor, and whether the individual is obese or underweight as compared to normal weight. Siegrist's (1998; 2000) suggestion that adverse behavioural choices are triggered by differential experiences of reciprocity is conceptualized using interaction terms between the lifestyle variables smoking and alcohol and a binary variable which takes a value of one if the individual does not believe that her effort at the workplace is adequately rewarded in terms of direct appreciation or in terms of pay. In doing so, we intend to capture harmful consumption patterns not detected by the lifestyle variables. To embrace Bordieu's notion of culturally framed behaviours, we further include interactions between alcohol and tobacco consumption and a binary variable on low educational attainment (lower or including mid-vocation training) in the model.

Education is a widely used measure of socio-economic position but education is also known to be associated with culturally framed behaviour. We acknowledge that the boundaries between the approaches are not clear cut and therefore prefer to discuss the impact of education separately from the material and the behavioural perspective.

Psychosocial-approach

The psycho-social approach focuses on the argument that a lack of social support and the nature of living conditions directly or indirectly cause bad health. We include two binary variables which take a value of one if the person has nobody to confide in or nobody, who supports her career to model a lack of social support. We further use an ordinal variable increasing in perceived job security to approximate secure living conditions and include an ordinal variable, which captures the degree to which job allows autonomous working.

Capability-approach

The capability-approach is rather elusive and therefore difficult to conceptualize. In our understanding an individual is endowed with resources which can be used to deal with life challenges. The discrepancy between the magnitude of resources enabling capability to deal with negative life events and the sum of challenges then decides on the individual's ability to sustain good health. To capture the distance between resources and challenges, we calculate individual scores for resources and challenges and then subtract the latter from the first. Following Hall and colleagues' conceptualization our resource score is computed by adding up the variables social status (transformed in a five-category ordinal scale using quintiles), supportive confidantes (two binary variables), trust in democracy (binary variables on whether the person belongs to the top 50% trustful citizens), and an ordinal variable capturing if the person deals well with stress on a seven-category scale. The challenge score is constructed using the binary variables "poor working conditions", "lack of advancement-chances", "lack of job-security", and an ordinal variable increasing in a "lack of autonomy" at work on a five-point scale.

Personal information

To control for the personal circumstances and working arrangement of each individual, we further include information on age (linear age, age square and age cube), marital status, the number of children living in the household, whether the respondent has immigrant status and whether the individual works part-time in the model.

Modelling

We only include working individuals over 16 years of age in our analysis. Excluding by age and labour market status reduces the sample to 11 388. Of these individuals, 11 067 have a valid physical health score. After dropping the observations with missing values in the explanatory variables, 4290 individuals in our final sample are female and 4607 are male. To allow for the possibility that items are not missing at random we include dummy variables for all missing values of the covariates.

Previous research suggests that the determinants of health are different for males and females across age groups (Arber and Cooper 1999). We therefore stratify the

analysis by gender. Furthermore, the life-course approach suggests that different explanatory factors bear differential weight or peak at different points over the life-course. We adopt the life-courses' approach notion, that each age or phase of life exposes individual health to specific challenges and stratify our cross-section data in four age groups, namely young (16-35], middle-aged one (35-45], middle-age two (45-55] and senior (55-65][3]. Nevertheless, we are aware that only using different waves of panel-data truly allows investigating differential or accumulating impact of factors over a person's life-course. Our stratification strategy therefore supposedly captures some age-specific but also some generation-specific effects.

Each of the eight models is estimated using ordinary least square with robust standard errors. We start with a full set of explanatory variables and stepwise remove variables under a significance level of alpha < .1 from the model. The individual significance of single variables is assessed using a t-test. The combined significance of variables composed of several dummy indicators (marital status, household income, education, social class, health insurance status, financial and property wealth) investigated using an F-test. The explained variance of the reduced models is then decomposed in factors.

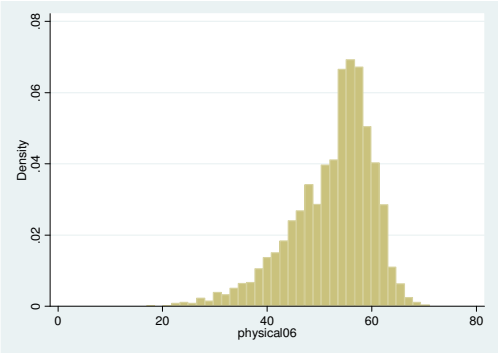
5 Results

Descriptive statistics

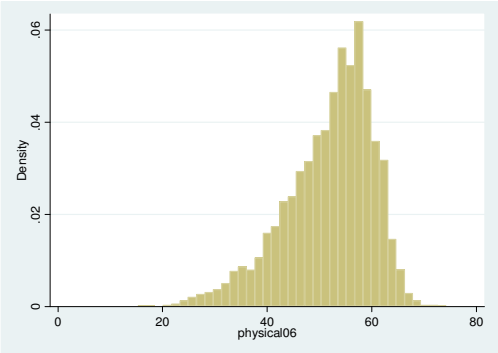
Graph 1 and Graph 2 show the slightly left skewed distributions of the dependent variable physical health for women and men respectively. Men report on average better physical health than women and the distribution of their scores is also less skewed to the left compared to the distribution of female physical health scores.

Graph 1. *Distribution of physical health scores - women*

[3] We believe that the working population over age of 65 represents a selected sample of (very) healthy individuals. To avoid any distortions in the analysis, we decided to use the official retirement age as cut-off for the last age group.



Graph 2. *Distribution of physical health scores - men*



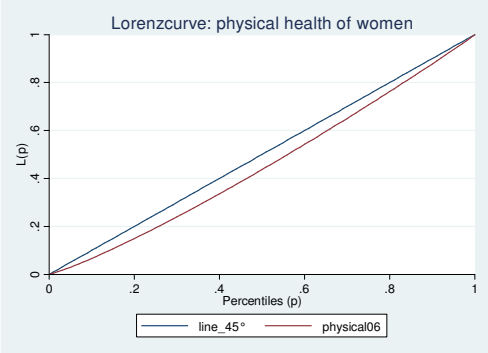
The level of inequality in physical health is descriptively quantified using two commonly used measures the Gini Coefficient and the Theil entropy index. The Gini and Theil entropy measure illustrate that inequality in health increases with age. This is true for both, men and women, while the level of inequality is generally higher among female (as also suggested by the plotted distributions of physical health in Graph 1 and Graph 2.

Table 1. *Inequality in physical health by age and sex*

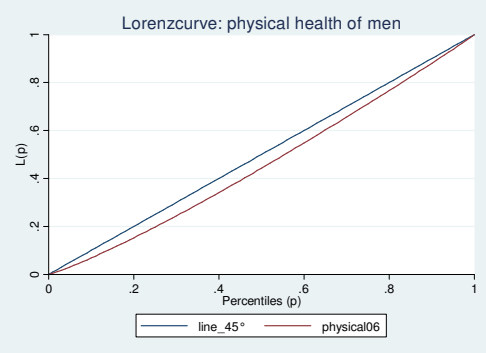
	Gini	Theil entropy	Gini	Theil entropy
	Male		*Female*	
16 to 34 years	0.0571	0.0060	0.1262	0.0689
35 to 44 years	0.0736	0.0098	0.1427	0.0784
45 to 54 years	0.0868	0.0132	0.1685	0.0933
Over 55 years	0.0969	0.0162	0.1953	0.1107

Furthermore, the Theil index, which is more sensitive to inequality at the top of the distribution, has lower values indicating lower inequality among the healthier individuals. The Lorenz curve visualizes these findings.

Graph 3. *Lorenz curves for women*



Graph 4. *Lorenz curves for men*



The summary statistics on the binary and continuous variables that enter the regression analyses as regressors can be found in the appendix.

Decomposition results

Following the brief description of the inequality in physical health, we decompose inequality by its sources using regression techniques; separate results are presented for men and women and each age group. The coefficients of the underlying regression models for women and men used in the decomposition can be found in the appendix.

Women

In Table 2, we report the shows the percentage contribution of each factor to the total sum of squares, i.e., the sum of the *s* weights per factor of each of the competing approaches. An empty cell indicates factors that did not significantly explain health inequalities in the respective age groups[4].

Table 2. *Decomposition results by factors for women*

	16 to 35 years	**36 to 44 years**	**45 to 55 years**	**56 to 65 years**
Personal information				
Age	8.70E-03	0.02072	0.01702	0.0161
Marital status	6.14E-03	6.14E-03		4.30E-03
Behavioural approach				
Smoking status	6.38E-03	-	-	0.010627
Exercising	0.005352	0.006115	0.011191	1.56E-02
Weight problems	0.048527	2.24E-02	-	3.34E-02
Smoking and a lack of recognition at the workplace	-	-	-	0.004665
Education	0.010619	0.00749	0.009953	1.56E-02
Materialist approach				
Household income	9.01E-03	6.69E-03	1.87E-02	0.006456
Social class	-	7.29E-03	-	0.013555
Financial assets (binary)	-	5.48E-03	-	0.00862
Poor working conditions				1.35E-02
Neo-material perspective				
Noise	0.003464	-	0.003541	-
Psycho-social perspective				
Degree of autonomy at work	-	0.019504	-	-
Nobody supports career	-	0.000663	-	-
Capability approach	-	0.037204	3.14E-02	6.33E-02
Observations	1152	1259	1272	607
R square	0.0982	0.1229	0.0918	0.2057

[4] The variables "consumption of hard liqueur" (alone standing or interacted with education, low income or a lack of recognition), prestige, health insurance status, all infrastructural variables, all information on immigration status, part-time work and house-owner-ship and variables describing psycho-social dimensions other than autonomy at work did not have any explanatory power and were therefore dropped from the underlying regression model. The reference individual is married, of normal weight, does not exercise and smoke, has a low level of educational attainment, low autonomy at work and is in the highest social class and income quintile.

For the sake of clarity, we included the interaction between a lack of reciprocity at the workplace and smoking under the behavioural approach. Overall, behavioural factors are most influential in the youngest and oldest age group – however, different factors bear different weights in the respective generations. While smoking is only relevant in young women, exercise is important in all age groups (and its impact is increasing in age). Weight problems in young women explain almost five percent of the overall variation in physical health in the youngest age group and gain again similar relevance in 55 to 65 years old. Smoking and a lack of recognition at the workplace contributes less than 0.4% to the overall variation.

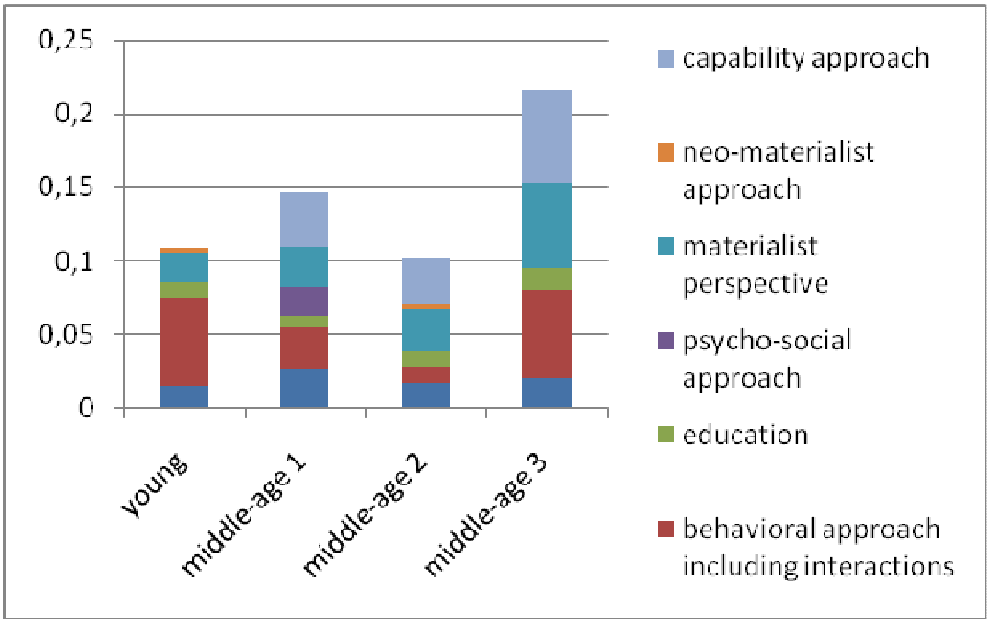
The factors summarized under the material perspective have most explanatory power in the second and last age group. Household income is the only factor that is significant in all generations. However, considering the impact of factors, it is interesting to note that household income bears low explanatory power compared to the factor social class. This might suggest that the mode of work significantly contributes to producing health inequalities. Wealth and working conditions play a prominent role in the older age group. The importance of education is increasing over age groups by trend but is slightly higher in the young generation.

The neo-material perspective is represented by noise and psychosocial factors, by the degree of autonomy at work, and social support. The factors are sporadically significant in different age groups.

Interestingly, the capability-score i.e. the distance between capabilities and resources is a very strong explanatory factor which increases in age.

The relative importance of the approaches in the four age groups is visualized in Graph 5. The height of the bar indicates the overall explained sum of square. It ranges between 10 and 22 percent.

Graph 5. *Relative importance of different approaches to explain health inequalities - women*



At the peak of professional careers the overall explanatory power of the model for women declines. There might be factors outside employment relations, potentially family relations or biological factors that centrally drive health in the 35 to 45 age-group, which we did not include in our equation. Nevertheless, the most obvious personal information (marital status and the number of children in the household) are considered in the model.

Men

Table 3 shows the explained variance in physical health decomposed by its sources[5]. The explanatory power of materialist factors is relatively low compared to the impact of behavioural variables. At young age, it is especially consumption of addictive sub-

[5] The variables "consumption of hard liqueur" interacted with education, low income or a lack of recognition, prestige, the information on individual wealth, health insurance status, all infrastructural variables, all information on immigration status, part-time work and house-owner-ship and the binary indicator on the autonomy at work were dropped from the regression analysis. The reference individual is married, of normal weight, does not exercise and smoke, has a low level of educational attainment, and is in the highest social class and income quintile.

stances combined with low educational attainment or a lack of recognition which drives inequalities. These factors lose their importance in older generations and are replaced by a growing relevance of weight problems and exercising. Alternatively, taking a generational rather than an age group perspective the pattern could also suggest that stress and education will be more important in explaining health inequalities in coming generations. Education significantly explains variation in physical health in men between the age of 35 and 55 years i.e. in men fully involved in the working life. Eyeballing the category of the materialist approach, we see that multiple factors contribute to health inequalities at young age while the main drivers in older generations are financial assets and the social class, not household income. The neomaterialist and psycho-social perspective does hardly have any weight in the analysis. However, the explanatory power of the capability score is again astonishingly constant at high. It increases over the age groups but exhibits its strongest influence in 45 to 55 year olds.

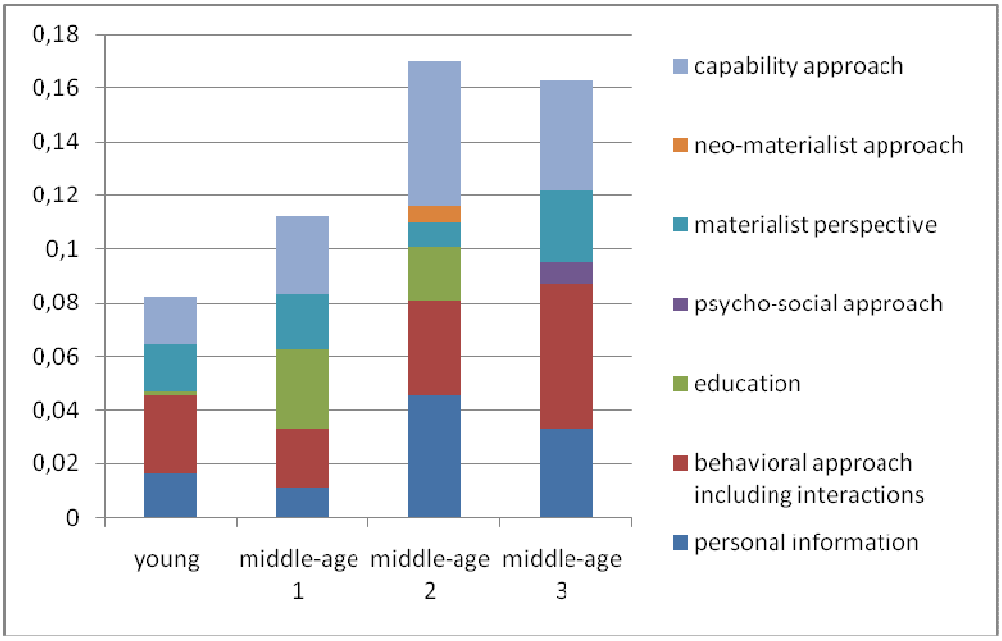
Table 3. *Decomposition results by factors for men*

	16 to 35 years	**36 to 44 years**	**45 to 55 years**	**56 to 65 years**
Personal information				
Age	0.016284	0.003679	0.026103	0.026103
Marital Status	-	0.006585	0.012694	0.006865
Children in Household	-	0.001081	0.00698	
Behavioural approach				
Smoking Status	0.006221	-	0.007989	-
Consumption of hard liqueur	0.005637	0.001231	-	-
Consumption of hard liqueur and a lack of recognition at the workplace	-	-	0.003275	-
Smoking and a lack of recognition at the workplace	-	0.003275	-	-
Smoking and a lack of recognition at the workplace	9.31E-03	-	-	-
Smoking and low Educational Attainment	0.008292	-	-	-
Exercising	-	0.006912	0.014243	0.01688
Weight problems	0.010358	0.012881	0.037192	-
Education	0.001229	0.029678	0.019766	-
Materialist approach				
Social Class	0.0167916	0.004026	-	0.019733
Household Income	0.00101	-	-	-
Financial assets (binary)	0.007493	0.009108	0.006534	-
Poor working conditions	0.008943	-	-	-

Neo-material perspective	-	-	-	-
Degree of Exposure to Noise	-	-	0.006106	-
Psycho-social perspective	-	-	-	-
Nobody supports career	-	-	0.008214	-
Capability approach	0.017562	0.028775	0.054215	4.09E-02
Observation	1038	1418	1260	891
R squares	0.0699	0.1120	0.1701	0.1531

Graph 6 shows the contributing factors by approach.

Graph 6. *Relative importance of different approaches to explain health inequalities - men*



6 Discussion

Following our modelling approach we first discuss results that hold generally across models. We then separately scrutinize results for women and men.

We find that health inequalities depend at an increasing rate on the independent and especially the interacted, compound effect of socio-economic factors, working conditions and lifestyle in specific age-groups.

Regarding the materialist perspective, we find that the impact of socioeconomic position increases over the age-groups suggesting that long-term exposure to adverse employment situations, few material holdings and a low level of skill and knowledge eventually affects individual health. However, while household income and financial assets become only important in older employees, the social hierarchy and education are important throughout all ages. The significant interaction terms between detrimental lifestyle choices and low income or a lack of reciprocity at the work place further suggest that struggles in the social hierarchy may trigger compensating consumption of addictive substances.

The strong association between weight problems and health inequality is a new trend that deserves to be taken serious. The obesity prevalence will supposedly drive a wedge between slim and healthy people and severely overweight sick individuals. This dynamic might then lead to further differences in SEP.

The importance of interaction/ compound effects is elaborately captured by the capability score which considers the individual's socioeconomic, social and psychological resources in relation to its exposure to life challenges. The high explanatory power of this single variable impressively illustrates that health does not only depend on independent factors but their complex, compound potential to sustain good health in difficult and stressful situations over time. The resource-challenge score links these multidimensional social and economic disparities successfully to health inequalities. The independent effects of psychosocial and neo-material variables are only important in specific age groups.

Results for women

The relevance of the included single explanatory factors greatly differs across age groups. Hence only the broad set of variables building on very different theoretical approaches allows us to capture the determinants of health inequalities for different age groups. These results also suggest that studies that do not account for a large set of variables will produce biased results. For women with 35 years of age or over, the capability approach becomes increasingly important in explaining health inequalities. One could hence argue that the distance between resources and challenges begins to gain significance at an age when job competition is central for future positions in the social hierarchy and material hedging. However, the significance of the capability score peaks in the oldest age group. One interpretation for this finding could be that individuals become increasingly vulnerable or less motivated to exhibit a healthy life style or both when they face a high disparity over a long time /in old age.

The factors that constitute socioeconomic position bear differential importance in different age groups. While social hierarchy and education are important determinants of health for young female, the importance of actual household income and also financial assets increases with age. This might be because material holdings can be effectively used to enhance/ sustain good health as the body defences decline and more investments in health are needed.

Finally, the high contribution of weight problems to inequality in young females should be noted. Interestingly, the effect is less pronounced in the older age groups.

Results for men

As in women, there are three main drivers of inequality: socioeconomic position, lifestyle, and the balance between capabilities and life-challenges. Strikingly, the relative explanatory power of resource-challenge distances equals or is even higher compared to the impact of factors constituting the behavioural and the material approach. This is especially true for males between 35 and 55 years of age when the professional career is competitive and supposedly most physically and mentally demanding.

However, the impact of lifestyle is also a key driver in producing health inequalities in men. Interestingly, the decomposition reveals a mixed picture with respect to the overall and relative significance of lifestyle factors over the four generations: while smoking and stress-induced life-style choices are only prominent in the young generation, obesity and exercise increasingly drive health inequalities at older age. Especially the importance of obesity in this inequality analysis deserves some attention considering the high prevalence among German men. Overall, the clear cut difference between the generations might reflect random differences in the sample, age-specific life-style changes in frail individuals[6] or a generation-specific consumption pattern which might also be visible in following generations.

7 Conclusions

Overall, we find that understanding the mechanisms of health inequalities crucially depends on taking a holistic perspective on individual's health, ideally at different points in time. Socio-economic factors, working conditions and lifestyle independently, interacted and compounded explain variation in health in specific age-groups in our analysis. Studies which take a reductionist approach and do not allow for the possibility that health inequalities are generated by a complex co-action of many factors may forego insightful findings. In our analysis, this was especially true for modelling the distance between resources and challenges in life which mattered more in our analysis than previous work had suggested. In addition, we observed a strong association between weight problems and inequality in health in young females and older males. This finding alone is noteworthy considering the high and rising obesity and overweight rates in Germany.

[6] Frail individuals choose to quit smoking at young age while their robust peers stick to tobacco without a perceived deterioration in health.

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8 Appendix

1. Decomposition conditions

Six conditions (based on Shorrocks 1982, 1983 and Fields 2004) under which the s-weights and p-weights are the same for any measure of dispersion that is continuous, symmetric, and take value zero when all Y are identical (namely the Gini Coefficient, Theil index, and Atkinson index).

1. The inequality measure I(Y) is to be divided into K components, one for each regressors, denoted by $S_k = S_k(Y^1,...,Y^k;K)$
2. Each S_k is continuous in Y_k.
3. The amount of inequality accounted for by any one factor S_k does not depend on how the other factors are grouped i.e. $S_k(Y^1,...,Y^k;K) = S_k(Y^k,Y)$
4. The contribution of S_k sum to the overall amount of inequality
5. If P is any n * n permutation matrix, then $S(Y^kP,YP) = S(Y^k,Y)$. Further if all individuals i have the same value for the k'th factor, then the share of inequality accounted for by that factor is $S_k(\mu_k e,Y) = 0$ for μ_k.
6. Suppose the distribution of Y1 is only a permutation of Y2. If Y1 and Y2 are the only two components in the decomposition, then they should receive the same share in the decomposition.

2. Summary statistics for covariates

Table 1. *Summary statistics for men*

Male	**16 to 35 years**	**36 to 44 years**	**45-55 years**	**55 years and older**
Personal information				
Age	26.70 (5.127)	39.73 (2.79)	49.27 (2.84)	59.90 (4.44)
Married, separated	0.21%	2.21%	2.90%	2.96%
Single	74.19%	20.08%	7.47%	4.06%
Divorced	1.27%	7.13%	10.63%	8.81%
Widowed	0.07%	0.17%	0.52%	2.29%
Married, living together	24.26%	70.36%	78.48%	81.88%
Children living in Household	34.38%	64.04%	39.56%	08.47%
Behavioural approach Regular exercise 04	29.07%	25.17%	26.05%	25.59%
Occasional exercise 04	29.41%	34.67%	33.46%	31.19%
Smoking	40.42%	36.79%	35.59%	24.41%
Obese	8.89%	15.52%	20.84%	21.25%
Underweight	1.44%	0.34%	0.19%	0.25%
Regular consumption of hard liqueur	10.78%	0.79%	1.10%	1.69%
Smoking and low level of education	33.56%	23.30%	23.05%	12.81%
Smoking * lack of Recognition at the work place	26.38%	36.79%	23.02%	11.44%
Education				
No qualification	2.02%	0.51%	0.72%	0.77%
General elementary	18.70%	7.27%	8.25%	8.16%
Mid-vocational	52.66%	45.25%	45.09%	37.89%
Vocational	8.00%	7.21%	3.93%	2.15%
Higher vocational	4.26%	13.44	9.95%	10.05%
Higher degree	14.36%	26.32%	32.07%	40.98%
Materialist approach				
1st income quintile	13,056.61 (7,710.17)	16,047 (7351.6)	15,945.88 (7507.82)	12,576.88 (7999.547)
2nd income quintile	32,032.68 (4,001.038)	32,803 (4052.85)	32,787.09 (3904.39)	32,391.53 (3963.99)
3rd income quintile	46,422.04 (4,495.192)	46,243 (4458.38)	46,829.55 (4577.21)	47,547.76 (4287.275)
4th income quintile	63,406.36 (6,379.591)	64,153 (6166.71)	64,266.61 (6289.56)	65,178.31 (6470.122)
5th income quintile	102,185	107,200	114,246.3	125,808.9

	(48,842.48)	(33,486.01)	(48,723.55)	(92,624.47)
Poor working conditions	19.20%	28.45%	34.6%	25.06%
Social class I	1.62	9.25	11.37	14.87
Social class II	10.83	13.04	14.80	16.60
Social class III	3.79	4.44	3.28	4.48
Social class IV	0.54	0.15	0.08	7.94
Social class V	3.97	4.44	5.19	42.67
Social class VI	54.51	51.42	48.59	13.44
Social class VII	24.73	17.26	16.70	14.87
Prestige	57.60 (26.00)	64.98 (31.73)	65.80 (32.56)	75.58 (35.83)
Financial asset holder	42.49%	54.82%	57%	64.78%
Value of financial assets	5138.67 (18120)	13,728.9 (82,643.37)	19,518.3 (84,651)	43,626.8 (279,233.6)
Neomaterial approach				
Voluntary health insurance	8.30%	16.58%	18.86%	19.05%
Mandatory health insurance	67.26%	59.14%	54.39%	42.68%
More than 20 minute walk to nearest public transport	8.85%	12.78%	10.95%	12.45%
More than 20 minute walk to nearest GP practice	12.79%	11.38%	11.51%	13.69%
Crime level	1.928 (0.5453)	1.887 (0.5399)	1.8853 (0.516)	1.8777 (0.525)
Noise level	1.868 (0.5453)	1.847 (0.9137)	1.856 (0.8959)	1.8369 (0.907)
Pollution level	1.732 (0.8215)	1.713 (0.8184)	1.740 (0.804)	1.6511 (0.768)
Psychosocial approach				
Nobody supports career	23.42%	37.67%	46.52%	47.67%
Nobody to confide in	5.58%	4.36%	4.57%	5.42%
High time pressure at work	2.401 (0.8515)	2.546 (0.8482)	2.510 (0.8683)	2.2769 (0.8964)
No job security	17.63%	19.40%	21.07%	14.99%
High autonomy at work	2.4789 (1.039)	2.9931 (1.1017)	3.030 (1.1690)	3.288 (1.1753)

Table 2. *Summary statistics for women*

	16 to 35 years	**36 to 44 years**	**45-55 years**	**56-65 years**
Personal information				
Age	26.527 (4.87)	39.84 (2.81)	49.28 (2.82)	59.18 (3.91)
Married, separated	1.13%	3.24%	3.28%	1.96%
Single	67.87%	16.05%	6.88%	4.18%
Divorced	2.13%	12.94%	13.69%	12.27%
Married, living together	25.87%	67.77%	76.16	81.59%
Children living in Household	35.29%	68.44%	26.15%	2.2%
Behavioural approach Regular exercise 04	26.12%	30.94%	31.78%	28.92%
Occasional exercise 04	32.36%	32.22%	31.66%	32.44%
Smoking	34.18%	33.03%	29.48%	20.54%
Obese	7.19%	10.21%	15.47%	15.69%
Underweight	6.98%	2.46%	1.83%	0.59%
Regular consumption of hard liqueur	0.28%	0.19%	0.25%	0.45%
Smoking and low level of education	25.73%	24.14%	20.84%	12.77%
Smoking * lack of Recognition at the work place	22.27%	21.42%	18.48%	9.92%
Education				
No qualification	1%	0.78%	1.27%	1.19%
General elementary	15.27%	9.09%	8.92%	12.17%
Mid-vocational	46.89%	49.38%	47.23%	48.57%
Vocational	13.51%	9.41%	5.16%	2.39%
Higher vocational	6.60%	8.76%	7.52%	5.97%
Higher degree	16.73%	22.58%	29.89%	29.71%
Materialist approach				
1st income quintile	11,861 (7449.54)	11,861 (7449.54)	13,657 (7742.27)	11,556 (7,421.08)
2nd income quintile	32,210.4 (4285.76)	32,483.88 (3874.495)	32,640.79 (3934.83)	32,057.35 (4151.93)
3rd income quintile	45,831.77 (4316.05)	46,844.98 (4536.895)	46,957.6 (4329.25)	47,010 (4262.40)
4th income quintile	63,495.77 (6,492.74)	64,008.99 (6306.588)	64,698.61 (6345.57)	65,380.06 (6351.58)
5th income quintile	107,327 (37,401.11)	112,829.1 (73,026.94)	115,820.6 (53,110.9)	119,078.7 (78,936.56)
Poor working condi-	20.27%	26.04%	31.93%	22.87%

tions				
Social class I	3.38%	6.3%	6.9%	3.67%
Social class II	25.45%	23.7%	26.63%	28.98%
Social class III	17.10%	18.75%	18.27%	20.95%
Social class IV	23.26%			
Social class V	9.54%	19.23%	19.30%	19.59%
Social class VI	9.54%	14.53%	13.94%	9.12%
Social class VII	21.27%	17.48%	14.97%	17.69%
Prestige	64.68 (24.15)	65.06 (27.71)	66.65 (29.14)	68.9 (32.14)
Financial assets (0/1)	45.59%	51.01%	54.63%	59.52%
Value of financial assets	3753 (10,313.59)	8192,447 (25,138.83)	15,925.04 (46,945.23)	20,987.77 (49,099.35)
Neomaterial approach				
Voluntary social health insurance	7.39%	8.86%	8.74%	5.38%
Mandatory social health insurance	66.69%	65.40%	65.75%	58.58%
More than 20 minute walk to nearest public transport	8.72%	11.23%	11.63%	12.37%
More than 20 minute walk to nearest GP practice	11.56%	12.55%	11.18%	15.79%
Crime level	1.91 (0.53)	1.91 (0.52)	3.19 (1.44)	1.94 (0.53)
Noise level	1.84 (0.91)	1.86 (0.93)	1.88 (0.92)	1.81 (0.88)
Pollution level	1.72 (0.83)	1.73 (0.83)	1.73 (0.83)	1.66 (0.75)
Psychosocial approach				
Nobody supports career	21.26%	39.58%	46.51%	55.43%
Nobody to confide in	1.91%	3.14%	2.83%	5.13%
Time pressure at work	2.33 (0.87)	2.38 (0.85)	2.33 (0.89)	2.20 (0.94)
No job security	17.08%	15.65%	19.48%	12.95%
Autonomy at work	2.59 (0.88)	2.69 (0.96)	2.74 (1.04)	2.20 (1.07)

3. Regression results

We report the coefficient on each covariate and the significance level. An empty cell indicates factors that did not significantly explain health inequalities in the respective age groups.

Table 3. *Regression results for women*

	16 to 35 years	36 to 44 years	45 to 55 years	56 to 65 years
Personal information				
Age	-0.5950599	-30.63925	-52.7057	-6.50039
Age squared	0.0209517	0.7701109	1.020949	0.1101114
Age cube	-0.0003039	-0.0065055	-0.0066183	-0.0006422
Separate	-3.403671	0.9023848	-	3.223155
Single	0.3968551	-0.0125015	-	-0.2239692
Divorced	1.348475	0.3563657		2.005471
Behavioural approach Regular exercise 04	0.8290047	0.0867775	1.566581	1.963883
Occasional exercise 04	-0.0366264	-1.073342	0.1166204	0.698258
Smoking status	-1.129009	-	-	2.784133
Obese	-5.503727	-3.464632	-	-3.764912
Underweight	-1.397972	0.7348548	-	-1.786244
Smoking * lack of Recognition at the work place	-	-	-	-3.591679
Education General elementary	-2.203057	1.674247	2.930479	1.69998
Mid-vocational	-0.8428847	1.531086	3.882327	2.964576
Vocational	-0.2920076	0.7365556	1.171766	8.258558
Higher vocational	-0.8627103	0.6133647	3.44743	3.680609
Higher degree	0.4502635	-0.6327712	3.992809	2.772665
Materialist approach 1st income quintile	-1.05767	-1.842866	-	-0.8320097
2nd income quintile	-1.248872	-0.9606491	-	-0.9053646
3rd income quintile	-0.46488	-0.2027142	-	-0.6375301
4th income quintile	-0.7496369	-0.6315815	-	-2.284798
Poor working conditions	-	-	-	-1.842344
Social class I	-0.4914776	-0.8838684	0.0510021	-1.469283
Social class II	-6.157347	1.037572	-0.9625109	-0.2327696
Social class III	-0.4153141	0.9173593	-1.909964	-0.1056928
Social class V	63.69634	0.9390779	-2.095005	1.377222
Social class VI	-0.4914776	0.503872	-2.530905	0.7041274
Social class VII	-6.157347	457.2464	-1.927801	-3.018549
Financial assets (0/1)				1.687771
Neomaterial approach Noise	-0.4153141		-0.4545291	
Psychosocial approach Nobody supports	0.9173593	-	-	-

career				
High autonomy at work	0.9390779	-	-	-
Capability score	-	0.503872	0.4690897	0.6277092
Constant	63.69634	457.2464	955.1153	173.3426
Observations	1152	1259	1272	607
R square	0.0982	0.1229	0.0918	0.2057

Table 4. *Regression results for men*

	16 to 35 years	**36 to 44 years**	**45 to 55 years**	**56 to 65 years**
Personal information				
Age	1.348413	-13.64073	0.29307	10.58619
Age squared	-0.0387719	0.3420475	0.0094051	-0.1601463
Age cube	0.0002697	-0.0028814	-0.0002272	0.0007756
Separate	5.113356	2.125517	2.236959	-0.930363
Single	-0.6257328	1.628308	3.357193	1.523371
Divorced	0.9650744	0.9086495	0.621266	2.708181
Number of children	-	0.4402596	0.459069	
Behavioural approach				
Regular exercise 04	-	0.9504225	1.627362	2.073123
Occasional exercise 04	-	0.0446189	0.625209	0.749677
Consumption of hard liqueur	-4.23221	-1.790175	-1.497479	
Obesity	-	-1.637154	-11.75888	-3.711911
Underweight		-3.057946	-1.112031	1.52074
Smoking status	1.8528	-5.560784	0.073739	-
Smoking * lack of recognition	-1.430899	0.786976	-	-
Smoking * low educational level	-1.496972	1.938581	-	-
Education				
General elementary	0.4656703	1.09834	-1.140332	-
Mid-vocational	0.7000965	2.41279	0.2334688	-
Vocational	0.6813858	3.862083	-2.184881	-
Higher vocational	0.530554	-0.9981321	0.3175788	-
Higher degree	1.066394	-	1.077376	-
Materialist approach				
1st income quintile	1.013508	-	-0.5695692	-
2nd income quintile	0.2022313	-	0.5785811	-
3rd income quintile	0.1512906	-	37.91507	-
4th income quintile	0.4880134	-		-
Social class I		0.8234701	1.077376	-
Social class II	-0.4672312	0.2103151	-	-1.500719
Social class III	-3.477836	0.0265104	-	-3.491315
Social class IV	-1.11167	0.5389042	-	-1.960901
Social class V	-1.200137	-0.0044189	-	-2.046122
Social class VI	-1.468316	-1.040265	-	-2.075743
Social class VII	-0.1245178	0.4500181	-	-2.1039
Neomaterial approach	-	-	-0.5695692	-0.5939523

Noise				
Nobody supports career	-	-	-	-1.726628
Capability score	0.2829003	0.3291598	0.5785811	0.5462377
Constant	40.97776	230.7745	37.91507	-177.0533
Observation	1038	1418	1260	891
R squares	0.0699	0.1120	0.1701	0.1531

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