BMJ Open

Socioeconomic inequalities in functional somatic symptoms by social and material conditions at four life course periods in Sweden: a decomposition analysis

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To cite: San Sebastian M, Hammarström A, Gustafsson PE. Socioeconomic inequalities in functional somatic symptoms by social and material conditions at four life course periods in Sweden: a decomposition analysis. *BMJ Open* 2015;**5**:e006581. doi:10.1136/bmjopen-2014-006581

► Prepublication history for this paper is available online. To view these files please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2014-006581).

Received 9 September 2014
Revised 10 June 2015
Accepted 13 June 2015

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ABSTRACT

Objective: Socioeconomic inequalities in health are deemed a worldwide public health problem, but current research is lacking on key points including determinants of socioeconomic differences in health, and not the least variations of these determinants over the life course. Using a 26-year prospective Swedish community-based cohort, we aim at decomposing socioeconomic inequalities in functional somatic symptoms by social and material life circumstances, at 4 periods of the life course.

Design: Repeated cross-sectional study.

Setting: Participants came from the Northern Swedish Cohort (n=1001), who completed questionnaires about occupational class, social and material living conditions, and symptoms at ages 16, 21, 30 and 42. Socioeconomic inequalities were estimated and decomposed using the Blinder-Oaxaca decomposition analysis.

Results: Inequalities in symptoms between blue-collar and white-collar socioeconomic groups increased along the life course in the sample. In the decomposition analysis, a high proportion of the gap between socioeconomic groups could be explained by social and material living conditions at ages 16 (84% explained), 30 (45%) and 42 (68%), but not at age 21. Specific social (parental illness at age 16 and violence at ages 30 and 42) and material (parental unemployment at age 16, and own unemployment and financial strain at ages 30 and 42) factors contributed jointly to the health gaps.

Conclusions: Socioeconomic inequalities in functional somatic symptoms increased along the life course in this Swedish cohort. A considerable portion of the social gaps in health was explained by concurrent social and material conditions, and the importance of specific adversities was dependent on the life course stage. Our findings suggest that socioeconomic inequalities in functional somatic symptoms may be reduced by addressing both social and material living conditions of disadvantaged families, and also that the life course stage needs to be taken into consideration.

Strengths and limitations of this study

- This study contributes to the literature by taking a life course approach to social and material explanations to socioeconomic inequalities in health using prospective data from adolescence to adulthood in Sweden.
- The use of the Oaxaca-type decomposition analysis enables direct estimation and quantification of the socioeconomic gap in health, and also of the contribution of specific determinants to the gap.
- Since social and material adversities may cluster and interact in complex causal patterns, it may be difficult to pinpoint the relative importance of specific adversities included in the model, and also opens up to the possibility of omitted confounders.
- The findings suggest that interventions aiming at reducing socioeconomic inequalities in health may benefit from adopting a comprehensive life course approach to health inequalities.

INTRODUCTION

Socioeconomic inequalities in various forms of health are recognised as a global public health problem,[1] and are present across the life course—from birth,[2 3] childhood,[4 5] adolescence,[6 7] adulthood[8 9] and up into old age.[10 11] This observation calls for a life course perspective on health inequalities, as emphasised, for example, in recent WHO reports,[1 9] a venture that includes not only showing that health inequalities exists, but also attempting to identify which factors explain them.

Explanations of socioeconomic inequalities in health have mostly focused on social and material factors,[12] which together have been found to account for a portion of health inequalities.[13–17] Whereas a considerable body of research focusing on social determinants of health has adopted a life course approach,[18–19] most research on determinants of health inequalities has been carried out on adults and lacks a consideration of

the life course. Thus, the degree to which similar or different determinants operate across the life course[20] is largely unknown.

Studies examining explanations to socioeconomic inequalities in health have traditionally employed conventional regression models.[13–17] Recent years have, however, seen the adoption of methods more apt for the question at hand, in the form of decomposition techniques. Oaxaca-type decomposition analysis[9 21] enables direct estimation and quantification of the socioeconomic gap in health, and also of the contribution specific determinants make to the gap. Decomposition techniques have previously been employed to other dimensions of inequality in relation to health, for example, ethnicity,[22 23] indigenous/non-indigenous,[24] gender[25] and insurance status.[26] However, although explanations to socioeconomic inequalities in health have been a topic under study and debate for decades,[12] to the best knowledge of the authors decomposition techniques have only been employed to address this question in a few studies, for example, concerning economic inequalities in different health outcomes in Iran[27–31] and in undernutrition in rural Indian children.[32]

The present study seeks to contribute to the literature by taking a life course approach to social and material explanations to socioeconomic inequalities in health and uses prospective data from adolescence to adulthood from Sweden, a country with historically low socioeconomic inequalities, but which have increased during the past decades.[33] We focus on functional somatic symptoms (FSS), a problem spectrum of bodily complaints which are not confidently explained by organic disorders, and which are relevant to study over the life course due to their frequency, and sometimes persistence, across the life course.[34–37] The aims of the study are to examine the distribution of FSS by socioeconomic status (SES) along the life course; and to decompose the extent to which social and material factors explain socioeconomic gap in symptoms at different life course periods, in a northern Swedish population of women and men.

METHODS

Sample and procedures

The Northern Swedish Cohort is based on all school leavers of the ninth grade, the final grade of the Swedish compulsory school system, in the municipality of Luleå, in the year 1981, at participant age 16 years; see Hammarström and Janlert[38] for details. The present report uses questionnaire data from the 1981 (age 16 years) survey as well as follow-up surveys in 1986 (age 21), 1995 (age 30) and 2007 (age 42). Of 1083 eligible individuals in 1981, 1080 participated, of whom n=1001 were retained in the 2007 survey (94% of those 1071 individuals of the original sample are still alive).

Owing to item non-response, the effective sample varies between n=834 (age 30) and n=926 (age 16), corresponding to 78–86% of the original cohort still alive (n=1071) and 83–93% of those participating in this part of the 2007 data collection (n=1001).

Measures

All measures are based on self-administered questionnaires completed by participants at ages 16, 21, 30 and 42 years. The questionnaires have had similar overall content across the ages, but they have been generally expanded in the later data collections, and have also been revised to make them appropriate for the respective ages.

Functional somatic symptoms

FSS was operationalised identically at ages 16, 21, 30 and 42: as the sum of 10 symptoms during the past 12 months:[39] *headache, migraine; other stomach ache*; *nausea; backache, hip pain, sciatica; fatigue; breathlessness; dizziness; overstrain* (all with three response options: no (=0); yes, light (=1); severe (=2)); *palpitations* (three response options: never (=0); sometimes (=1); often/always (=2)); and *sleeping difficulties* (four response options with the two highest collapsed into a single category: never (=0); sometimes (=1); often or always (=2)). As such, the FSS measure had a theoretical range of 0–20 at each age, and sample (observed) ranges of 0–16 (age 16), 0–17 (age 21), 0–16 (age 30) and 0–18 (age 42). Internal consistency was estimated at Cronbach α=0.70 (age 16 years), 0.70 (age 21), 0.74 (age 30) and 0.78 (age 42).

Adversities

Social and material adversities were operationalised from questionnaires at ages 16, 21, 30 and 42 years; see Gustafsson *et al*[40] for details of the operationalisations. Most items of the questionnaires originated from the Swedish Survey of Living Conditions[41] and the Level of Living Surveys.[42] In brief, the following adversities were included, all of which were binary or dichotomised as close as possible to the 80th centile (0=unexposed; 1=exposed):

Age 16: parental loss/separation (1=parents being divorced, or either parent deceased); residential instability (1=number of moves in one's lifetime >80th centile); parental illness (1=either parent suffering from physical or mental illness, or having alcohol problems); poor material standard of living (1=number of items in the family's possession <20th centile, from a list of 11 items, eg, car and colour TV); residential crowding (1=not having a own room); parental unemployment (1=either parent being unemployed).

Age 21: residential instability during the past 3 years (1=number of moves in the past 3 years >80th centile); illness of a close one (1=close one seriously or chronically ill during the past 3 years); death of a close one (1=during the past 3 years); low cash margin (1=inability to raise 5000SEK within a week); low income (1=monthly income <20th centile); unemployment (1=currently unemployed).

Age 30 and 42: separation/divorce (1=during the last year (age 30) or during the past 12 years (age 42)); illness of a close one (1=close one seriously or chronically ill during the last year (age 30) or the past 5 years (age 42)); death of a close one (1=during the last year (age 30) or the past 5 years (age 42)); social isolation (1=total score <20th centile from four items from the Availability of Social Integration (AVSI) scale of the Interview Schedule of Social Interaction(ISSI) questionnaire[43]); low decision latitude (1=total score <20th centile from six items from the Swedish Demand-Control Questionnaire (DCQ)[44]); exposure to threat/violence (1=either personal prosecution or sexual harassment at work, or exposed to physical violence or threats of violence during the last year); low cash margin (1=inability to raise 13 000SEK (age 30) or 15 000SEK (age 42) within a week); financial strain (how often the respondent was forced, due to financial reasons, to abstain from activities >80th centile, from a list of 11); unemployment (1=currently unemployed); spousal unemployment (1=spouse being unemployed during the past 5 years (age 30) or currently unemployed (age 42)).

Socioeconomic status

SES at ages 21, 30 and 42 was operationalised by own occupation according to the classification scheme of Statistics Sweden, and dichotomised into manual workers (=low SES) versus non-manual employees and self-employed (=high SES). At age 16, parental occupation was used and dichotomised similarly as both parents belonging to manual worker class (low) versus at least one parent belonging to white-collar/self-employed class (high). For parents (age 16) and participants (age 42) not working, the last held occupation was considered. The last held occupation was not recorded at ages 21 and 30, and at these ages highest educational attainment was instead used as a proxy for individuals not in gainful employment, with university-preparatory high school or university coded as high and vocational high school or less coded as low SES.

Data analysis

Missing data

Owing to item non-response, data on the total sample (n=1001) were incomplete, and the effective sample size varied between n=926 (age 16), n=916 (age 21), n=834 (age 30) and n=917 (age 42). The lower participation at age 30 was due to a lower proportion of individuals responding to all items of the FSS index (n=902). In logistic regression models, overall missingness, defined as missing at one or more surveys, was significantly predicted by separation/loss at age 16 (OR (95% CI)=1.6 (1.2 to 2.1)) and by low SES at age 30 (1.5 (1.2 to 2.0), but not by any other variables at any age. Missingness at each survey was predicted by low SES (1.9 (1.2 to 3.3)) and parental separation/loss (5.7 (3.4 to 9.4) at age 16, no variables at age 21, FSS (0.9 (0.8 to 1.0)) and male gender (1.4 (1.0 to 2.0)) at age 30, and FSS (0.9 (0.8 to 1.0)) at age 42.

Main analyses

Descriptive statistics of the health outcome and the different variables by SES were carried out. The t test for the mean FSS and the χ^2 test for proportions to assess statistical differences were also applied.

Main analyses comprised decomposition of the high-low SES gap in FSS. Oaxaca decomposition analysis[19] explains the gap in the means of an outcome variable between two groups (ie, low and high SES). This technique enables us to disentangle and quantify the part of the health gap explained by group differences in the distribution of health determinants on the one hand, and the part explained by differences in the effects of these determinants on the other. The first, the explained component, reflects differences in observable characteristics between groups. The latter, the unexplained component, captures the part of the gap that remains unexplained after the health determinants are taken into account; it is seen as an indication of unequal treatment (discrimination) of the SES groups, and/or also differences in omitted determinants of health. Decomposition estimates can be negative or positive; negative estimates indicate that the variable in question contributes to the inequality in the direction which runs counter to the overall inequality. Thus, a positive sign indicates that the gap in the variables favours the most advantaged group (high SES in our case).[45] Estimates were obtained with the Oaxaca command in Stata. The pooled and detail options were specified. The pooled option uses the coefficients from a pooled model over both groups (including a group indicator) as the reference coefficients. The detail option computes the individual contributions of the predictors to the components of the decomposition.[46]

Decomposition analyses were performed separately for each age (16, 21, 30 and 42 years), with gender and adversities at each age serving as decomposing factors of the concurrent SES gap in FSS (high SES as the reference). Independent variables that did not contribute at all to the health gap (coefficients=0.00) in initial models were excluded, and only the final model is presented in the Results section. Estimates are reported as absolute contribution, corresponding to the portion of the gap that can be independently attributed to each factor, or in the case of total explained part, the estimate reported represents the portion explained by all factors together; and relative contribution, corresponding to the absolute contribution of each factor divided by the total explained part, or in the case of total relative contribution, the total explained portion divided by the total (explained and unexplained) gap.

Given that our previous research has shown significant socioeconomic differences in health between men and women,[3 9 40] analyses were also performed stratified by gender.

RESULTS

See table 1 for descriptive statistics. Those of low SES generally reported higher frequency of most adversities

Table 1 Social, material and health characteristics of the study sample for low and high socioeconomic status (SES) at different life ages (%)

Variable	Age 16 (n=991)		Age 21 (n=988)		Age 30 (n=980)		Age 42 (n=1001)	
	Low SES (n=376)	High SES (n=611)	Low SES (n=621)	High SES (n=364)	Low SES (n=421)	High SES (n=551)	Low SES (n=346)	High SES (n=646)
Gender (men)	53.99	50.90	56.2*	45.6	55.82*	49.18	56.94*	49.54
Social adversities								
Residential instability	20.74	19.15	21.90	18.68	–	–	–	–
Illness (parental/close one)	37.78*	27.21	26.23	31.11	22.56	20.85	47.08*	40.53
Death of close one	–	–	27.85	26.46	17.36	18.96	39.77	36.18
Separation (parental/own)	30.32*	17.84	–	–	8.45	7.52	38.89*	32.08
Social isolation	–	–	–	–	18.91*	9.42	17.29*	12.58
Violence/threat	–	–	–	–	18.07*	11.33	17.68*	11.61
Low decision latitude	–	–	–	–	40.57*	13.11	41.67*	13.12
Material adversities								
Unemployment (parental/own)	19.33*	7.72	8.99	6.58	14.39*	6.35	15.19*	3.53
Spousal unemployment	–	–	–	–	41.58*	25.88	10.32*	3.83
Poor material standard	35.90*	25.20	–	–	–	–	–	–
Residential crowding	11.70*	4.91	–	–	–	–	–	–
Low income	–	–	11.31*	29.38	–	–	–	–
Low cash margin	–	–	32.58*	18.96	34.20*	12.68	18.68*	5.58
Financial strain	–	–	–	–	29.50*	17.49	29.33*	17.41
Functional somatic symptoms†	3.49 (2.59)	3.27 (2.57)	3.01 (2.66)*	2.50 (2.21)	4.14 (2.99)*	3.40 (2.85)	4.82 (3.56)*	3.93 (3.12)

*p<0.05 (χ^2 test, t test for health outcome).
†Mean and SD in brackets.

at all ages, except at age 21. The health gap between socioeconomic groups was small and non-significant at age 16, but demonstrable at age 21 and numerically increasing with age.

In order to explain these health gaps, decomposition analyses were run for each of the four ages. The health gap at age 16 was small and non-significant and decomposition at this age should therefore be interpreted cautiously. Decomposition of the health gap at age 16 by adversities explained 84% of the small and non-significant gap, which was accounted for largely by ill parents and, to a lesser but non-significant degree, by parental unemployment. At age 21, the total explained estimate was negative and thus the indicated adversities together contributed to a reduced inequality, which was mostly explained by gender—women being better off socioeconomically but reporting more symptoms. At ages 30 and 42, financial strain and exposure to violence were the most important factors, and at age 42 also unemployment. Together, these factors explained 45% of the gap at age 30 and 67% at age 42 (see table 2).

In analyses stratified for gender (women in table 3 and men in table 4), the results were partly different. The numerical increase in the SES health gap over time was present in both genders, but was numerically greater in men at all ages. In the decomposition, a comparable pattern as in the total sample was seen in women and men at age 16 (a large proportion explained of a small gap) and age 21 (a little or negative contribution by the factors). At ages 30 and 42, the adversities together explained a very high portion of the smaller SES gap in women (>80%), with less explained of the larger gap in men (<40%). Financial strain emerged as an important independent contributor for both genders, while violence exposure was important for women, and at age 42, unemployment was a dominant explanatory factor for men.

DISCUSSION

By using decomposition analysis of socioeconomic inequality in FSS at four periods of the life course, this study can shed some light on the circumstances underlying health inequalities across the life course. First, health inequalities seemed to increase along the life course, as seen by initially no significant but later significant health gaps, as well as a numerical increase in the gap. Second, the social gap in health could be attributed to differences in social and material circumstances to a varying degree depending on the life course stage—majorly in adolescence (age 16), moderately in midlife (ages 30 and 42), but not in young adulthood (age 21). Third, certain adversities—both social and material—emerged as independent explanatory factors of the health gap at the different ages: parental illness and unemployment at age 16, financial limitations and violence exposure at ages 30 and 42, and at age 42 also unemployment. Fourth, while the overall patterns were similar in women and men, the health gap between socioeconomic groups was greater in men, but living conditions explained a greater portion of the health inequalities in women in midlife.

Although not tested, the numerical pattern of increased health inequalities over time, which was observed in the present sample, can be viewed both from a life course and a secular perspective. Increasing gaps could be a development across the life course, possibly related to social equalisation in adolescence by the buffering effect of school and peer context,[47] but could also be a reflection of the increased social inequalities[31] and inequalities in other forms of health[48–51] that Sweden has faced during the past decades. The substantive portion of the social gaps explained at ages 16, 30 and 42 indicate that living circumstances do indeed account for much of the socioeconomic inequalities in self-reported health in Sweden. While other possible factors, such as healthcare utilisation and health behaviours, were not considered, it is possible that these may also be important as downstream factors, and could also account for the larger unexplained portion in men's health gap.

Specific adversities also emerged as particularly important explanatory factors for the observed health gaps at specific life course periods. Parental illness is an established risk factor for youth mental problems,[52] including somatisation.[53] While the results should be interpreted cautiously in the light of the non-significant health gap, our findings at age 16 can speculatively be seen as one example of intergenerational transmission of health inequalities, and suggests that the well-being of parents of socioeconomically disadvantaged families is important not only for the health, as well as the equitable health, of their offspring.

While health inequalities were observed at age 21, the decomposition indicated that the adversities together worked towards reduced rather than increased health inequalities. Gender was the only significant explanatory factor, and as such the phenomenon is not so clearly explained by the adversities studied. Young adulthood is a period of transition, where the adversity of life circumstances may not be as apparent as during other ages. For example, a poor financial situation may paradoxically be an expression of a socioeconomically advantageous situation—ongoing university studies—which is common in Sweden during this period in life. Investigation of health inequalities during this stage of life may possibly require different approaches.

Financial strain and unemployment emerged as important for health gaps at ages 30 and 42, which are in accordance with material pathways.[13 14] Violence or threat also played a role, particularly in women, which is in line with the social distribution of stress and trauma[54] and its role in the development of the functional somatic problems.[55 56] Together, the results would suggest that interventions aiming at reducing socioeconomic inequalities in health complaints in midlife

Table 2 Decomposition of the socioeconomic status (SES) inequality in functional somatic symptoms (FSS) and the contribution of concurrent determinants at ages 16, 21, 30 and 42 years in the total sample

Age	**Age 16 (n=926)**		**Age 21 (n=916)**		**Age 30 (n=834)**		**Age 42 (n=915)**	
Mean FSS (low SES)	**3.46**		**3.01**		**4.23**		**4.89**	
Mean FSS (high SES)	**3.26**		**2.5**		**3.47**		**3.96**	
SES difference in FSS	**0.19 (−0.14 to 0.53)**		**0.51 (0.19 to 0.84)****		**0.76 (0.36 to 1.17)****		**0.94 (0.48 to 1.39)****	
	Absolute	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**
Explained								
Gender (reference: woman)	−0.01 (−0.05 to 0.03)	−6.25	−0.07 (−0.12 to −0.01)*	−63.64			−0.05 (−0.12 to 0.01)	−8.06
Separation (parental/own)	0.01 (−0.04 to 0.07)	6.25						
Residential instability			0.02 (−0.02 to 0.05)	18.18				
Unemployment (parental/own)	0.07 (−0.00 to 0.14)	43.75					0.16 (0.04 to 0.29)*	25.81
Illness (parental/close one)	0.09 (0.02 to 0.16)**	56.25	−0.04 (−0.09 to 0.02)	−36.36			0.06 (−0.00 to 0.12)	9.68
Death of close one							0.01 (−0.01 to 0.04)	1.61
Low cash margin			0.05 (−0.01 to 0.11)	45.45	0.08 (−0.04 to 0.19)	22.86	0.06 (−0.09 to 0.22)	9.68
Low income			−0.07 (−0.16 to 0.01)	−72.72				
Social isolation					0.02 (−0.03 to 0.06)	5.71	0.04 (−0.01 to 0.08)	6.45
Violence/threat					0.09 (0.01 to 0.17)*	25.71	0.10 (0.01 to 0.19)*	16.13
Low decision latitude							0.06 (−0.09 to 0.22)	9.68
Financial strain					0.17 (0.07 to 0.27)**	48.57	0.13 (0.04 to 0.22)**	20.97
Spouse unemployment							0.05 (−0.02 to 0.11)	8.06
Total	0.16 (0.04 to 0.28)**	84.2	−0.11 (−0.25 to 0.03)	−21.57	0.35 (0.17 to 0.52)**	44.87	0.62 (0.34 to 0.90)**	65.96
Unexplained								
Constant	0.01 (−1.08 to 1.10)	33.3	0.12 (−0.93 to 1.18)	19.04	0.36 (−0.12 to 0.84)	87.80	−1.12 (−0.2.68 to 0.44)	−350.0
Total	0.03 (−0.31 to 0.37)	15.8	0.63 (0.30 to 0.95)**	123.53	0.41 (0.01 to 0.82)*	53.94	0.32 (−0.12 to 0.76)	34.04

Estimates are absolute contribution and relative contribution† to the SES difference in FSS.
**p<0.01, *p<0.05.
†Percentages are calculated with explained partition of the SES difference in the denominator for the relative contribution of each variable, and with the total (explained and unexplained) SES difference in the denominator for the total relative contribution.

Table 3 Decomposition of the socioeconomic status (SES) inequality in functional somatic symptoms (FSS) and the contribution of concurrent determinants at ages 16, 21, 30 and 42 years in women

Ages	**Age 16 (n=449)**		**Age 21 (n=438)**		**Age 30 (n=414)**		**Age 42 (n=435)**	
Mean FSS (low SES)	**3.75**		**3.43**		**4.53**		**5.41**	
Mean FSS (high SES)	**3.65**		**2.86**		**3.88**		**4.58**	
SES difference in FSS	**0.10 (−0.37 to 0.57)**		**0.57 (0.11 to 1.02)***		**0.65 (0.06 to 1.23)***		**0.83 (0.09 to 1.56)***	
	Absolute	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**
Explained								
Separation (parental/own)	0.04 (−0.03 to 0.12)	30.77					0.03 (−0.03 to 0.09)	3.03
Residential instability			0.01 (−0.02 to 0.05)	50.0				
Unemployment (parental/own)	0.03 (−0.07 to 0.13)	23.08					0.11 (−0.10 to 0.31)	11.11
Illness (parental/close one)	0.05 (−0.03 to 0.14)	38.46	−0.01 (−0.09 to 0.07)	−50.0			0.12 (−0.00 to 0.25)	12.12
Death of close one							0.10 (−0.02 to 0.21)	10.10
Low cash margin			0.07 (−0.05 to 0.18)	350.0	0.08 (−0.11 to 0.27)	14.81	0.10 (−0.11 to 0.32)	10.10
Low income			−0.04 (−0.11 to 0.02)	−200.0				
Social isolation					0.05 (−0.03 to 0.12)	9.26	0.09 (−0.02 to 0.20)	9.09
Violence/threat					0.15 (0.01 to 0.28)*	27.78	0.14 (−0.01 to 0.28)	14.14
Low decision latitude							0.11 (−0.07 to 0.29)	11.11
Financial strain					0.26 (0.08 to 0.44)**	48.15	0.16 (0.00 to 0.32)*	16.16
Spouse unemployment							0.04 (−0.04 to 0.13)	4.04
Total	0.13 (−0.02 to 0.27)	130.00	0.02 (−0.14 to 0.19)	3.51	0.54 (0.24 to 0.83)**	83.08	0.99 (0.55 to 1.43)**	119.28
Unexplained								
Constant	0.15 (−0.45 to 0.72)	500.0	0.23 (−0.37 to 0.84)	41.82	0.03 (−0.70 to 0.75)	27.27	−0.14 (−1.25 to 0.97)	−82.35
Total	−0.03 (−0.50 to 0.45)	−30.0	0.55 (0.10 to 1.0)*	96.49	0.11 (−0.47 to 0.69)	16.92	−0.17 (−0.87 to 0.54)	−20.48

Estimates are absolute contribution and relative contribution† to the SES difference in FSS.
**p<0.01, *p<0.05.
†Percentages are calculated with explained partition of the SES difference in the denominator for the relative contribution of each variable, and with the total (explained and unexplained) SES difference in the denominator for the total relative contribution.

Table 4 Decomposition of the socioeconomic status (SES) inequality in functional somatic symptoms (FSS) and the contribution of concurrent determinants at ages 16, 21, 30 and 42 years in men

Ages	**Age 16 (n=477)**		**Age 21 (n=478)**		**Age 30 (n=420)**		**Age 42 (n=480)**	
Mean FSS (low SES)	**3.20**		**2.69**		**3.96**		**4.50**	
Mean FSS (high SES)	**2.90**		**2.06**		**3.01**		**3.34**	
SES difference in FSS	**0.31 (−0.16 to 0.77)**		**0.63 (0.19 to 1.07)**		**0.95 (0.40 to 1.51)****		**1.16 (0.59 to 1.73)****	
	Absolute	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**	**Absolute**	**Relative (%)**
Explained								
Separation (parental/own)	−0.02 (−0.09 to 0.06)	−9.52					−0.01 (−0.04 to 0.22)	−2.44
Residential instability			0.06 (−0.02 to 0.13)	200				
Unemployment (parental/own)	0.10 (−0.01 to 0.20)	47.62					0.20 (0.03 to 0.37)*	48.78
Illness (parental/close one)	0.13 (0.02 to 0.25)*	61.90	−0.05 (−0.12 to 0.02)	−166.67			0.02 (−0.04 to 0.09)	4.87
Death of close one							0.00 (−0.01 to 0.02)	0
Low cash margin			0.04 (−0.02 to 0.10)	133.33	0.05 (−0.10 to 0.20)	35.71	0.01 (−0.07 to 0.10)	2.44
Low income			−0.08 (−0.26 to 0.10)	−266.66				
Social isolation					−0.04 (−0.12 to 0.03)	−28.57	0.00 (−0.04 to 0.04)	0
Violence/threat					0.04 (−0.06 to 0.14)	28.57	0.07 (−0.04 to 0.18)	17.07
Low decision latitude							−0.04 (−0.28 to 0.21)	−9.76
Financial strain					0.09 (−0.01 to 0.20)	64.29	0.11 (−0.00 to 0.23)*	26.83
Spouse unemployment							0.03 (−0.07 to 0.12)	7.32
Total	0.21 (0.05 to 0.38)*	67.74	−0.03 (−0.26 to 0.20)	−266.67	0.14 (−0.07 to 0.34)	14.73	0.41 (0.04 to 0.77)*	35.34
Unexplained								
Constant	0.34 (−0.22 to 0.91)	377.78	0.76 (0.15 to 1.37)*	115.15	0.67 (0.04 to 1.30)*	81.71	0.43 (−0.33 to 1.20)	57.33
Total	0.09 (−0.39 to 0.57)	20.03	0.66 (0.18 to 1.14)**	104.76	0.82 (0.25 to 1.37)**	86.32	0.75 (0.19 to 1.31)**	0.64.65

Estimates are absolute contribution and relative contribution† to the SES difference in FSS.
**p<0.01, *p<0.05.
†Percentages are calculated with explained partition of the SES difference in the denominator for the relative contribution of each variable, and with the total (explained and unexplained) SES difference in the denominator for the total relative contribution.

should target both the financial situation, for example, by unemployment benefits and equitable incomes, and reductions in violent and threatening environments, particularly for disadvantaged women,. Further research is needed on this though, for example, to investigate sources of threats and violence at home, work or public spaces.

Methodological considerations

The main strengths of the study are the prospective data spanning over 26 years, the low attrition rate and the novel analytical methods. Compared with a cross-sectional study, the prospective design means that many confounders are addressed by design, specifically those that would produce biased results in different age groups, solely because of the groups comprising different individuals who differ in many other respects than being of different ages.

With the exception of more frequent parental separation in those excluded due to item non-response, the characteristics of the included and excluded samples were in most respects similar, and only differed for specific variables at specific surveys. This indicates that the representativeness of the sample is imperfect, but it seems unlikely that the inferences would be substantially biased due to these scattered instances of systematic dropout. Since there is a lack of suitable sensitivity analysis procedures for decomposition analysis, such as multiple imputation, we are, however, unable to show the true impact of this imbalance. The health outcome (FSS) measures were slightly skewed, which would indicate a deviation from a parametric assumption. Therefore, the precise estimates should be interpreted with caution.

While we are aware that the SEP of the parents might not really represent that of the children, it is common in social epidemiology to use individual occupational measures to characterise the SEP of others connected to them.[57] All measures represent constructs commonly used in the literature; they have been used by us previously and, in the case of FSS, displayed acceptable internal consistency. However, at ages 21 and 30 years, there were missing cases for occupation, and for them education instead was used as a proxy to indicate SES. Moreover, none of the measures has been formally validated, and as such unknown levels of measurement bias and random error can bias the estimates. While the reported explanatory value of specific adversities in the analyses are independent from other factors, since social and material adversities may cluster and interact in complex causal patterns, it may be difficult to pinpoint the contribution of specific adversities in the analyses, and also opens up for the possibility of omitted confounders. Relatedly, certain adversities of potential significance, such as childhood abuse, were not available in the questionnaires. As such, the attribution of the gaps to specific adversities should be done with caution.

CONCLUSIONS

This study suggests that, in a Swedish cohort followed from adolescence to mid-adulthood, socioeconomic inequalities in FSS increased along the life course. Furthermore, we found that a considerable portion of the social gaps in health are explained by concurrent social and material conditions, and that the importance of specific adversities was partly dependent on the life course stage (eg, parental illness in adolescence), while other seemed to be crucial at several stages of the life course (eg, parental/own unemployment). All in all, the findings suggest that interventions aiming at reducing socioeconomic inequalities in health may benefit from adopting a comprehensive life course approach to health inequalities.

Contributors The study was conceived and designed by MSS and PEG. Both analysed the data and wrote the paper. AH commented on and contributed to each version of the manuscript.

Funding This work was supported by The Swedish Research Council Formas (grant number 259-2012-37); Umeå University (grant number 223-514-09); and The County Council of Västerbotten (grant number 355661).

Competing interests None declared.

Ethics approval Regional Ethical Review Board in Umeå.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement The Northern Swedish Cohort is conducted at Umeå University. Researchers interested in collaboration should get into contact with the principal investigator, AH.

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