

## RESEARCH REPORT

## Influence of material and behavioural factors on occupational class differences in health

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*J Epidemiol Community Health* 2005;59:163–169. doi: 10.1136/jech.2003.019323

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Accepted for publication  
20 April 2004

**Objective:** To examine material and behavioural factors as explanations for occupational class differences in health, while taking into account the interrelations between these two groups of factors.

**Methods:** Data from cross sectional surveys among middle aged women and men employed by the City of Helsinki (n = 6062, response rate 68%) were used. The contribution of four material and seven behavioural factors to occupational class differences in self rated health was examined by logistic regression techniques. After examining the contribution of each material and behavioural factor individually these were combined into two groups, whose independent and shared effects on occupational class differences in health were examined.

**Results:** In women, each material factor reduced the association between occupational class and health, while only financial difficulties and financial satisfaction were statistically significant in men. Smoking, dietary habits, and relative body weight were the strongest behavioural factors explaining the association in both women and men. When grouped, both material and behavioural factors explained a large part of occupational class differences in health. The direct effect of material factors was larger than their effect through behavioural factors, and the effect of behavioural factors depending on material factors was about half of their independent effect.

**Conclusions:** Material and behavioural factors explained more than a half of occupational class differences in self rated health among women and one third among men. The effects of material and behavioural factors were mostly independent of each other, although some part of their contribution was shared, especially in women.

Those with lower socioeconomic position generally experience higher rates of morbidity and mortality than those with higher socioeconomic position.<sup>1,2</sup> Several factors have been suggested to be potential explanations for this association, but interrelations between these factors and their relative importance remain largely unknown. In the 1980s material and behavioural factors were brought up as the main explanations for socioeconomic differences in health.<sup>3,4</sup> The explanation referring to material factors suggests that differences in material conditions, such as income, housing conditions and employment, lie behind socioeconomic differences in health. The behavioural explanation refers to health behaviours like smoking, dietary habits, and physical activity, which often are more unhealthy in lower socioeconomic groups and may therefore explain why these groups suffer poorer health. More recently, further explanations relating for example to early life exposure,<sup>5</sup> psychosocial factors,<sup>6</sup> and macrosocial environment<sup>7,8</sup> have been proposed, but by no means have they overthrown the material and behavioural explanations.

The mechanisms how material conditions influence health have been subject to much debate.<sup>4,9</sup> While behavioural factors provide a competing explanation for material factors, they also offer a major pathway through which the effect of material factors may go.<sup>9,10</sup> Material resources may permit more active participation in some healthy behaviours, for example taking part in some physical activities or buying healthy foods. Furthermore, some unhealthy behaviours, like smoking or excessive drinking, may be means of adaptation to unfavourable material circumstances. Material and behavioural explanations are therefore interconnected. To some extent the effect of material factors may go indirectly through behavioural factors, and unhealthy behaviours may partly result from living in poorer material circumstances. Examining interrelations between material and behavioural

factors may provide valuable information about the mechanisms through which these factors influence health.

Few studies have simultaneously examined the contribution of material and behavioural factors as explanations for socioeconomic differences in health, and even fewer have considered the potential indirect effect of material factors through behavioural factors.<sup>11–13</sup> In this study we use data from women and men employed by the City of Helsinki to examine the material and behavioural factors as potential mediators in explaining the association between occupational class and health, while taking into account the interrelations between these two groups of factors.

The specific study questions are:

- What is the importance of individual material and behavioural factors in explaining the association between occupational class and health?
- What are the total effects of material and behavioural factors in explaining this association?
- Is the contribution of these factors similar across all occupational classes and between women and men?
- To what extent does the contribution of material factors go through behavioural factors, and what part of the effect of behavioural factors is independent of material factors?

## METHODS

## Data

The Helsinki health study<sup>14</sup> combines several sources of data to examine socioeconomic determinants of health and wellbeing among middle aged employees of the City of Helsinki. This substudy used data from two separate cross sectional baseline surveys conducted in 2000 and 2001. The City of Helsinki has nearly 40 000 employees. A questionnaire

was sent to each employee of 40, 45, 50, 55, or 60 years of age. The response rate was 68% in both years. After excluding 181 respondents with missing information on occupational class or health status, the data include 4852 women and 1210 men. These numbers reflect the proportion of women and men employed by the city, and the respondents represent the target population reasonably well in terms of sociodemographic characteristics.<sup>15</sup>

### Occupational class

Occupational class was used as the indicator of socioeconomic position. Occupational class was divided into four hierarchical categories: managers and professionals, semi-professionals, routine non-manuals, and manual workers.

### Health status

Health status was assessed by self rated health. Self rated health is known to correlate with more complex, multi-item measures of general health<sup>16</sup> and to predict subsequent disease and mortality.<sup>17</sup> The participants were asked to rate their health on a five point scale with the following response alternatives: "excellent", "very good", "good", "fair", and "poor". The two last alternatives were combined to indicate less than good health. Overall, 27% of women and 29% of men reported less than good health.

### Material factors

The respondents were asked to report their household income during a typical month, excluding taxes and including any welfare benefits received. Household income was divided into four groups ranging from less than 1260 to over 4200 euros per month. *Housing tenure*, a commonly used indicator of wealth and affluence,<sup>18</sup> was divided into four categories: owner occupier, free market renter, renter from the employer (the City of Helsinki), and other. *Financial difficulties* were asked by two questions: "How often do you have enough money to buy the food or clothing you or your family need?", and "How much difficulty do you have in meeting the payment of bills?" Responses to these two questions were combined into one summary indicator with four categories describing the degree of financial difficulties. *Financial satisfaction* was assessed by asking satisfaction with one's standard of living. Originally seven response alternatives, ranging from very satisfied to very dissatisfied, were collapsed into three groups.

### Behavioural factors

*Smoking* status was divided into four categories on the basis of past and present regular smoking: never smokers, ex-smokers, current moderate smokers, and current heavy smokers (>20 cigarettes per day).

Alcohol consumption was measured by three indicators. Volume of *alcohol use* was estimated by calculating the sum of reported weekly drinks of beer, cider, wine, and spirits, and the resulting sum was divided into quartiles. Frequency of *heavy drinking* was measured by asking how often the respondent consumed six or more glasses of alcoholic beverages on one occasion. The response alternatives were collapsed into four groups, ranging from never to weekly or more often. *Drinking problems* were assessed by the CAGE questionnaire.<sup>19</sup> A summary index was calculated, combining those with three or four positive answers.

*Physical activity* was assessed by the time spent in physical activities of intensity corresponding to walking, vigorous walking to jogging, jogging, and running. Each of the four questions with five response alternatives were weighted by increasing intensity of the activity to calculate metabolic equivalent tasks.<sup>20</sup> The total activity score was divided into four groups ranging from less than 11.5 to over 37.5 metabolic equivalent task hours per week.

Healthfulness of *dietary habits* was measured by compliance with the Finnish national dietary guidelines.<sup>21</sup> A summary index consisting of six items was constructed: eating fresh fruits or berries daily, eating fresh vegetables daily, eating dark bread (rye bread) daily, eating fish at least twice a week, using margarine on bread, and using vegetable oil in cooking and baking. Respondents with 0–2 and 5–6 points were combined in one category because of a small number of respondents in these categories.

*Relative body weight* was measured in terms of body mass index (BMI), classified into four categories: underweight (BMI<20 kg/m<sup>2</sup>), normal weight (20–24.9 kg/m<sup>2</sup>), overweight (25–29.9 kg/m<sup>2</sup>), and obesity (≥30 kg/m<sup>2</sup>).

### Statistical analyses

Logistic regression analysis was used to examine the effects of material and behavioural factors on occupational class differences in health. Managers and professionals were used as the reference category to which the lower classes were compared. Furthermore, as an overall measure of the association we computed an inequality index that summarises the class gradient into a single value.<sup>22–23</sup> This measure was obtained from logistic regression analysis by estimating a continuous regression coefficient, and it corresponds to the average change in less than good health for one step down in the occupational hierarchy.

The effect of each material and behavioural factor on occupational class differences in health was first examined individually. Odds ratios from models including one material or behavioural factor at a time were compared with the base model including only the potential confounders (age, marital status, parental status). Percentage reduction in occupational class differences in health attributable to each material and behavioural factor was calculated as in previous studies<sup>11–24</sup>:  $(OR(\text{base model}) - (OR(\text{base model} + \text{material or behavioural factor}) - 1) \times 100$ .

Preliminary analyses showed that all material and behavioural factors except heavy drinking in men were associated with health. Furthermore, all material and behavioural factors except the three indicators of alcohol consumption in men and heavy drinking in women were unequally distributed across social classes. Those material and behavioural factors that in the individual analyses significantly ( $p < 0.10$ ) reduced occupational class differences in health were selected for the second phase of the analysis. Three models were fitted, the first including material factors, the second including behavioural factors, and the third including all statistically significant factors from both groups. Percentage reductions were calculated as described above. Independent and shared effects of material and behavioural factors were then calculated from these three models. The independent effect of behavioural factors was obtained by reducing the effect of material factors from the total effect of both material and behavioural factors. Reducing this independent effect of behavioural factors from their total effect gave the effect of behavioural factors that was dependent on unfavourable material conditions. This effect represents the shared effect of material and behavioural factors, and therefore it equals the indirect effect of material factors through behavioural factors. The direct effect of material factors, including the non-behavioural pathways through which material factors may be related health, was finally calculated by reducing the indirect effect of material factors from their total effect.

### RESULTS

In both women and men, the prevalence of less than good health was twice as common among manual workers as among managers and professionals (table 1). In women,

semi-professionals had the same level of health with managers and professionals, and in men there were no occupational class differences in health between semi-professionals and routine non-manuals.

Table 2 shows the contribution of individual material and behavioural factors to the occupational class differences in health among women. For semi-professionals the percentage reduction was not calculated because their health did not differ from that of the reference category. Each material factor clearly reduced the association between occupational class and health. Among the behavioural factors, smoking and relative body weight most strongly reduced occupational class differences in health, while dietary habits and alcohol use had smaller effects.

In men, financial difficulties and financial satisfaction reduced occupational class differences in health (table 3). Instead, household income and housing tenure did not have statistically significant effects. Among the behavioural factors, smoking, dietary habits, and relative body weight reduced the association between occupational class and health most clearly. In addition, drinking problems and physical activity had modest effects.

Material and behavioural factors were then combined into two groups to examine their total effects. In women, material factors had slightly stronger effect on occupational class differences in health than behavioural factors (table 4). Together material and behavioural factors explained 57% of occupational class differences in health. In all occupational classes, the direct effect of material factors was larger than their indirect effect through behavioural factors. The independent effect of behavioural factors was also larger than their effect depending on material factors, except for routine non-manuals among whom these effects were equally strong.

In men, the total effects of material and behavioural factors in explaining occupational class differences in health were equally strong, but clearly weaker than in women (table 5). The effects of these factors were especially modest among semi-professionals. Together material and behavioural factors explained more than one third of the association between occupational class and health. The direct effect of material factors was larger than their indirect effect, and the effect of behavioural factors depending on material factors was about half of their independent effect.

## DISCUSSION

This study examined material and behavioural factors as explanations for occupational class differences in self rated health among middle aged employed women and men. Both material and behavioural factors contributed substantially to the explanation of these differences. Together these two groups of factors explained more than a half of occupational class differences in health among women and one third among men.

When examined individually, each material factor reduced the association between occupational class and health in women. In men, financial difficulties and financial satisfaction reduced the association, while household income and

housing tenure did not have statistically significant effects. Financial difficulties and financial satisfaction are more subjective measures of material resources than income and housing tenure, describing also experienced economic situation. It has been suggested that the experience of relative deprivation may cause poor health, either directly through biological mechanisms or indirectly by provoking unhealthy behaviours.<sup>25-26</sup> However, whether such an experience can exist without any real material differences has been questioned.<sup>27</sup> It is therefore possible that some unmeasured material factors explain the associations we observed between financial difficulties and financial satisfaction and health in men.

Among the behavioural factors, smoking, unhealthy diet, and relative body weight were the most important in explaining occupational class differences in health. These behaviours, which often are unhealthier in the lower social classes, are central risk factors for cardiovascular and other major chronic diseases.<sup>28-29</sup> Previous studies examining which behavioural factors explain socioeconomic differences in health have often found an important role for smoking, while the evidence for other behaviours has varied.<sup>30-31</sup>

Previous studies that have grouped several health behaviours together have generally been able to explain a large part of socioeconomic differences in health by these behaviours.<sup>32-33</sup> However, only a few studies have quantified the effect of material factors.<sup>30-34</sup> Recent studies have found the effect of material factors to be at least as large as that of behavioural factors.<sup>11-13</sup> Also we found that in women material factors explained slightly more of the occupational class differences in health than behavioural factors, whereas in men both groups of factors were equally important. Further analyses of the data showed that only about a fourth of the differences explained by material factors in women were attributable to income alone. However, our findings contradict some previous results suggesting that material factors would be more important for explaining socioeconomic differences in health among men than women, because health variations among women are shaped not only by their social, structural, and material position but also by their marital and parental roles.<sup>35-36</sup>

In women the contribution of material and behavioural factors was similar across all occupational classes. No initial health differences were seen between semi-professionals and the reference category of managers and professionals, but in routine non-manuals and manual workers the effects of material and behavioural factors were considerable. In men, the contributions of these factors were smaller in semi-professionals than in other occupational classes. Thereby, the adjustment of material and behavioural factors slightly changed the shape of the association between occupational class and health.

The direct effect of material factors was generally larger than their indirect effect through behavioural factors. The independent effect of behavioural factors was also larger than the shared effect, but about a third of the effect of behavioural factors depended on material factors. In routine

**Table 1** Prevalence of less than good health by occupational class (%)

Occupational class	Women		Men	
	Number	% in less than good health	Number	% in less than good health
Managers and professionals	1387	22	504	21
Semi-professionals	827	22	243	31
Routine non-manuals	2098	29	132	29
Manual workers	540	39	331	39

**Table 2** Socioeconomic differences in less than good health, adjusting for individual material and behavioural factors, women. Odds ratios (OR) with 95% confidence intervals (95% CI) and percentage reduction in odds ratios in reference to the base model (reduction %)

	Managers and professionals		Semi-professionals		Routine non-manuals		Manual workers		Overall effect†	
	OR	OR (95% CI)	Reduction %*	OR (95% CI)	Reduction %	OR (95% CI)	Reduction %	OR (95% CI)	Reduction %	p Value‡
Base model†	1.00	1.14 (0.92 to 1.42)	–	1.57 (1.33 to 1.84)	–	2.28 (1.83 to 2.85)	–	1.30 (1.22 to 1.39)	–	
Material factors										
Household income	1.00	1.03 (0.83 to 1.29)	–	1.32 (1.10 to 1.57)	44	1.86 (1.47 to 2.36)	33	1.21 (1.12 to 1.30)	30	<0.001
Housing tenure	1.00	1.11 (0.89 to 1.38)	–	1.47 (1.24 to 1.74)	17	2.11 (1.68 to 2.65)	14	1.26 (1.18 to 1.35)	12	0.009
Financial difficulties	1.00	1.11 (0.89 to 1.38)	–	1.42 (1.20 to 1.68)	26	2.03 (1.62 to 2.54)	20	1.24 (1.16 to 1.33)	19	<0.001
Financial satisfaction	1.00	1.09 (0.87 to 1.35)	–	1.39 (1.18 to 1.65)	31	1.98 (1.58 to 2.48)	24	1.23 (1.15 to 1.32)	22	<0.001
Behavioural factors										
Smoking	1.00	1.13 (0.91 to 1.40)	–	1.51 (1.28 to 1.78)	10	2.11 (1.69 to 2.65)	13	1.27 (1.19 to 1.36)	10	<0.001
Alcohol use	1.00	1.13 (0.91 to 1.40)	–	1.53 (1.30 to 1.81)	6	2.23 (1.79 to 2.79)	4	1.29 (1.21 to 1.38)	3	0.07
Heavy drinking	1.00	1.15 (0.93 to 1.43)	–	1.58 (1.34 to 1.86)	0	2.26 (1.81 to 2.82)	2	1.30 (1.21 to 1.39)	0	0.002
Drinking problems	1.00	1.15 (0.93 to 1.43)	–	1.60 (1.36 to 1.89)	0	2.33 (1.86 to 2.91)	0	1.31 (1.23 to 1.40)	0	<0.001
Physical activity	1.00	1.19 (0.95 to 1.48)	–	1.62 (1.37 to 1.91)	0	2.32 (1.85 to 2.91)	0	1.31 (1.23 to 1.40)	0	<0.001
Dietary habits	1.00	1.15 (0.92 to 1.42)	–	1.52 (1.29 to 1.79)	9	2.19 (1.75 to 2.74)	7	1.28 (1.20 to 1.37)	7	<0.001
Relative body weight	1.00	1.13 (0.91 to 1.41)	–	1.44 (1.22 to 1.71)	21	2.05 (1.63 to 2.57)	18	1.25 (1.17 to 1.34)	17	<0.001

\*Percentage reduction not calculated as this category did not differ from the reference category in the base model. †Average increase in less than good health from the highest occupational class category (managers and professionals) to the lowest (manual workers). ‡Adjusted for age, marital status, and parental status. §Improvement of the model because of inclusion of material or behavioural factor to the base model.

**Table 3** Socioeconomic differences in less than good health, adjusting for individual material and behavioural factors, men. Odds ratios (OR) with 95% confidence intervals (95% CI) and percentage reduction in odds ratios in reference to the base model (reduction %)

	Managers and professionals		Semi-professionals		Routine non-manuals		Manual workers		Overall effect†	
	OR	OR (95% CI)	Reduction %	OR (95% CI)	Reduction %	OR (95% CI)	Reduction %	OR (95% CI)	Reduction %	p Value‡
Base model†	1.00	1.66 (1.16 to 2.35)	–	1.69 (1.08 to 2.64)	–	2.51 (1.82 to 3.45)	–	1.35 (1.21 to 1.49)	–	
Material factors										
Household income	1.00	1.62 (1.13 to 2.32)	6	1.55 (0.97 to 2.48)	20	2.29 (1.62 to 3.25)	14	1.30 (1.16 to 1.46)	13	0.27
Housing tenure	1.00	1.64 (1.15 to 2.34)	2	1.59 (1.00 to 2.52)	15	2.36 (1.70 to 3.29)	10	1.32 (1.18 to 1.47)	8	0.12
Financial difficulties	1.00	1.61 (1.13 to 2.29)	7	1.50 (0.95 to 2.37)	28	2.23 (1.61 to 3.10)	18	1.29 (1.16 to 1.44)	15	0.002
Financial satisfaction	1.00	1.60 (1.12 to 2.29)	8	1.46 (0.92 to 2.31)	33	2.26 (1.63 to 3.14)	17	1.29 (1.16 to 1.44)	15	<0.001
Behavioural factors										
Smoking	1.00	1.61 (1.13 to 2.29)	7	1.55 (0.99 to 2.45)	19	2.29 (1.65 to 3.18)	14	1.30 (1.17 to 1.45)	12	0.03
Alcohol use	1.00	1.66 (1.17 to 2.37)	0	1.70 (1.08 to 2.68)	0	2.53 (1.84 to 3.50)	0	1.35 (1.21 to 1.50)	0	0.008
Heavy drinking	1.00	1.66 (1.16 to 2.36)	0	1.66 (1.07 to 2.64)	0	2.50 (1.81 to 3.45)	0	1.34 (1.21 to 1.49)	1	0.74
Drinking problems	1.00	1.63 (1.15 to 2.33)	4	1.66 (1.06 to 2.61)	4	2.48 (1.80 to 3.42)	2	1.41 (1.20 to 1.63)	2	0.06
Physical activity	1.00	1.66 (1.15 to 2.39)	0	1.79 (1.12 to 2.86)	0	2.41 (1.72 to 3.37)	7	1.33 (1.19 to 1.48)	4	<0.001
Dietary habits	1.00	1.60 (1.12 to 2.28)	8	1.57 (1.00 to 2.47)	17	2.34 (1.69 to 3.23)	11	1.31 (1.18 to 1.46)	9	0.001
Relative body weight	1.00	1.62 (1.13 to 2.32)	5	1.58 (1.00 to 2.50)	16	2.38 (1.72 to 3.30)	8	1.32 (1.19 to 1.47)	7	<0.001

†Average increase in less than good health from the highest occupational class category (managers and professionals) to the lowest (manual workers). ‡Adjusted for age, marital status, and parental status. §Improvement of the model because of inclusion of material or behavioural factor to the base model.



**Table 4** Socioeconomic differences in less than good health after adjusting for material factors, behavioural factors, and both types of factors together, women. The effects of material and behavioural factors divided into independent and shared effects. Odds ratios (OR) with 95% confidence intervals (95% CI) and percentage reduction in odds ratios in reference to the base model (reduction %)

	Managers and professionals	Semi-professionals	Routine non-manuals	Manual workers	Overall effect†
		OR (95% CI)	Reduction %*	OR (95% CI)	Reduction %
Base model†	1.00	1.14 (0.92 to 1.42)	1.57 (1.33 to 1.84)	2.28 (1.83 to 2.85)	1.30 (1.22 to 1.39)
Material factors	1.00	1.02 (0.82 to 1.28)	1.26 (1.05 to 1.51)	1.77 (1.39 to 2.26)	1.19 (1.10 to 1.28)
Behavioural factors	1.00	1.10 (0.88 to 1.37)	1.37 (1.16 to 1.63)	1.85 (1.46 to 2.33)	1.21 (1.13 to 1.29)
Material and behavioural factors	1.00	1.01 (0.80 to 1.27)	1.16 (0.96 to 1.40)	1.54 (1.20 to 1.98)	1.13 (1.05 to 1.22)
Independent effect of behavioural factors		-	-	72-55 = 17%	57-38 = 19%
Shared effect (dependent behavioural/indirect material)		-	-	34-17 = 17%	30-19 = 11%
Direct effect of material factors		-	-	55-17 = 38%	38-11 = 27%

\* Percentage reduction not calculated as this category did not differ from the reference category in the base model. †Average increase in less than good health from the highest occupational class category (managers and professionals) to the lowest (manual workers). ‡Adjusted for age, marital status, and parental status.

**Table 5** Socioeconomic differences in less than good health after adjusting for material factors, behavioural factors, and both types of factors together, men. The effects of material and behavioural factors divided into independent and shared effects. Odds ratios (OR) with 95% confidence intervals (95% CI) and percentage reduction in odds ratios in reference to the base model (reduction %)

	Managers and professionals	Semi-professionals	Routine non-manuals	Manual workers	Overall effect†
		OR (95% CI)	Reduction %	OR (95% CI)	Reduction %
Base model†	1.00	1.66 (1.16 to 2.35)	1.69 (1.08 to 2.64)	2.51 (1.82 to 3.45)	1.35 (1.21 to 1.49)
Material factors	1.00	1.58 (1.11 to 2.26)	1.41 (0.89 to 2.25)	2.16 (1.55 to 3.01)	1.27 (1.14 to 1.42)
Behavioural factors	1.00	1.58 (1.09 to 2.31)	1.53 (0.94 to 2.48)	2.08 (1.46 to 2.96)	1.26 (1.12 to 1.42)
Material and behavioural factors	1.00	1.54 (1.05 to 2.25)	1.37 (0.83 to 2.24)	1.87 (1.30 to 2.70)	1.22 (1.08 to 1.37)
Independent effect of behavioural factors		18-11 = 7%	47-40 = 7%	42-23 = 19%	37-20 = 17%
Shared effect (dependent behavioural/indirect material)		11-7 = 4%	24-7 = 17%	28-19 = 9%	24-17 = 7%
Direct effect of material factors		11-4 = 7%	40-17 = 23%	22-9 = 14%	20-7 = 13%

†Average increase in less than good health from the highest occupational class category (managers and professionals) to the lowest (manual workers). ‡Adjusted for age, marital status, and parental status.

## Key points

- Material and behavioural factors are important explanations for socioeconomic differences in health, but few studies have examined the interrelations between these two groups of factors.
- The effect of material factors on health may be mediated by behavioural factors, and unhealthy behaviours may partly result from living in poorer material circumstances.
- Both material and behavioural factors were important in explaining occupational class differences in health.
- Material and behavioural factors explained occupational class differences in health mostly independently of each other.

non-manual men the total effect of material factors and the shared effect of material and behavioural factors were exceptionally large. However, this may be attributable to random variation because the number of routine non-manual men was very small.

## Methodological considerations

In our study less of the socioeconomic differences in health were explained by material and behavioural factors than in previous studies examining the contribution of these two groups of factors simultaneously.<sup>11–13</sup> One reason for this may be that our data derived from a comparatively homogeneous sample of economically active population. This may truncate some of the socioeconomic variation in health, and also level off the contribution of the explanatory factors.

Our study included all available material and behavioural factors that were considered as potential candidates for explaining socioeconomic differences in health. Material factors consisted of four indicators ranging from the key indicators of material resources to subjective measures of financial situation. Behavioural factors included all leading behavioural risk factors for the major chronic diseases. Three indicators were used to measure different dimensions of alcohol consumption, and dietary habits were measured by a summary index of recommended food habits, covering various aspects of diet. However, some of the occupational class differences in health may have remained unexplained if our indicators were unable to capture all relevant aspects of material and behavioural factors.

Cross sectional data were used to examine the influence of socioeconomic position on health, assuming that material and behavioural factors contribute the occupational class differences and that the effect of material factors may partly go indirectly through behavioural factors. Nevertheless, the possibility of reverse causation, implying that those with poorer health become selected to lower occupational classes, needs to be borne in mind. However, longitudinal evidence suggests that the effect of health related selection on socioeconomic differences in health is quite modest.<sup>37, 38</sup> Furthermore, in our study all respondents were employed, suggesting that the groups most prone to selection were not included.

## Conclusion

Both material and behavioural factors were important in explaining occupational class differences in health. The effects of material and behavioural factors were mostly independent of each other, although especially in women some part of their contribution was shared. In both women

## Policy implications

- Improving both material conditions and health behaviours is important for reducing socioeconomic inequalities in health.
- Health behaviours, such as smoking, obesity, and unhealthy diet contribute to socioeconomic inequalities in health. However, health behaviours are embedded in material conditions and this should be taken into account when targeting individual behaviours.

and men, the indirect effect of material factors through behavioural factors was less than a half of their direct effect. Other pathways through which material factors may influence health should therefore be examined in future studies.

The most important behavioural factors contributing to occupational class differences in health were smoking, obesity, and unhealthy diet. These behaviours should therefore be among those first considered when behavioural interventions aiming to reduce health inequalities are planned. The effect of behavioural factors was partly dependent on material circumstances, suggesting that improvements of material conditions among the lower occupational classes may lead to more equal distribution of health behaviours. Thus, material conditions in which health behaviours are embedded should be taken into account when targeting individual behaviours. However, these results indicate that the contribution of behavioural factors was mostly independent of material factors. Reduction in socioeconomic differences in health could therefore be expected from targeting these behaviours directly.

## ACKNOWLEDGEMENTS

We thank all participating employees of the City of Helsinki and members of the Helsinki health study group.

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Funding: the Helsinki health study is supported by Academy of Finland (number 48118 and number 53245), and the Finnish Work Environment Fund (number 99090). OR is supported by the Academy of Finland (number 45664). PM is supported by the Academy of Finland (number 70631 and number 48600).

Conflicts of interest: none declared.

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