

# Economic difficulties and physical functioning in Finnish and British employees: contribution of social and behavioural factors

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**Background:** Childhood and current economic difficulties are associated with physical health. However, evidence concerning the factors underlying these associations is sparse. This study examines the contribution of a range of social and behavioural factors to associations between economic difficulties and physical functioning. **Methods:** We used comparable data on middle-aged white-collar employees from the Finnish Helsinki Health Study cohort ( $n=3843$ ) and the British Whitehall II Study cohort ( $n=3052$ ). Our health outcome was physical functioning measured by the SF-36 Physical Component Summary. Relative indices of inequality (RII), calculated using logistic regression analysis, were used to examine associations between economic difficulties and physical functioning, and the contribution of further socio-economic circumstances, health behaviours, living arrangements and work–family conflicts to these associations. **Results:** In age-adjusted models, childhood (RII=1.76–3.06) and current (RII=1.79–3.03) economic difficulties were associated with poor physical functioning in both cohorts. Further adjusting for work–family conflicts attenuated the associations of current economic difficulties with physical functioning in both cohorts, and also those of childhood economic difficulties in the Helsinki cohort. Adjustments for other socio-economic circumstances also caused some attenuation, while health behaviours and living arrangements had small or negligible effects. **Conclusions:** Conflicts between work and family contribute to the associations of economic difficulties with physical functioning among employees from Finland and Britain. This suggests that supporting people to cope with economic difficulties, and efforts to improve the balance between paid work and family may help employees maintain good physical functioning.

**Keywords:** comparisons, employees, physical functioning, SF-36, socio-economic position

## Introduction

Socio-economic circumstances can be conceptualized and measured in various ways. Within the broader concept of socio-economic circumstances, economic difficulties constitute a domain not fully captured by income or other conventional socio-economic measures. Economic difficulties reflect immediate material hardship but are not related to low income only. Difficulties in for example paying bills can exist at all income levels,<sup>1</sup> as they can originate from excessive consumption and debt.<sup>2,3</sup>

Economic difficulties as determinant of health have been studied less than education, occupational class or income, but there is some evidence of their associations with physical and mental health.<sup>4–11</sup> Current economic difficulties can affect health through direct material hardship, stress mechanisms or health-related behaviours.<sup>9,12</sup> Childhood economic difficulties can be associated with poorer adult health directly or indirectly through later life socio-economic circumstances and other factors such as health behaviours.<sup>10,13–15</sup> In previous studies examining the same cohorts as the present study, childhood and current economic difficulties were associated with common mental disorders (CMD) and poor physical functioning,<sup>4,5</sup> and current economic difficulties with incidence of

coronary heart disease.<sup>7</sup> Associations observed for CMD could be partly explained by work–family conflicts, but not by further socio-economic circumstances, health behaviours or living arrangements,<sup>6</sup> while those for coronary heart disease could not be explained by early life factors, working conditions or health behaviours.<sup>7</sup>

This study aims to find explanations for the previously observed associations between childhood and current economic difficulties and physical functioning in white-collar employees from Helsinki and London.<sup>5</sup> The specific aim is to examine how conventional socio-economic circumstances, health behaviours, living arrangements and work–family conflicts contribute to the associations of childhood and current economic difficulties with physical functioning. These factors may have different effects on the associations in the Helsinki and London cohorts, which share both similarities and dissimilarities. They consist of middle-aged public sector employees, but represent countries with differential welfare provision and allocation, labour markets, social and family structures and income distribution.<sup>16, 17</sup>

Although the causal order cannot be determined in this cross-sectional study, we assume a temporal order as a basis of our analysis. Childhood difficulties, education and subsequent occupational class, income and housing tenure

precede current economic difficulties and act as explanatory factors, i.e. influencing economic difficulties which in turn influence functioning. Also living arrangements, i.e. living alone or with partner/children, might influence current economic difficulties. We consider work–family conflicts as potential mediators, i.e. childhood and current economic difficulties influencing conflicts which would further influence functioning. Health behaviours occupy an intermediate role by preceding current economic difficulties as they are often adopted by adulthood, or by being a way of coping with economic difficulties.

## Methods

### Data

The Helsinki Health Study is a prospective cohort of 40- to 60-year-old employees of the City of Helsinki.<sup>18</sup> Baseline postal questionnaire surveys conducted in 2001 and 2002 were combined ( $N=5271$ , response rate 66%). The Whitehall II Study is a prospective cohort of civil servants aged 35–55 years at the recruitment time, who worked in the London offices of 20 National Civil Service departments ( $N=10\,308$ , baseline response rate 73%).<sup>19,20</sup> The data used in this study were from the Phase 5 data collection in 1997–99 ( $N=7830$ , response rate 76%). To make the two cohorts maximally comparable, we included respondents aged 45–60 years from both cohorts. Manual workers were excluded from the Helsinki cohort and those not working in the Civil Service at Phase 5 from the London cohort. Those without information on the outcome measure (3% in Helsinki, 10% in London) were excluded. The final number of participants meeting our criteria was 3843 (701 men and 3142 women) in Helsinki and 3052 (2205 men and 847 women) in London.

### Economic difficulties

Childhood economic difficulties were measured by asking whether the respondent's childhood family had faced 'serious' (Helsinki) or 'continuing' (London) financial problems before the respondent was aged 16 years ('Yes'/'No'). Current economic difficulties were measured with two questions from Pearlman's list of chronic strains<sup>1</sup> used also in previous studies:<sup>7,8</sup> (i) 'How much difficulty do you have in meeting the payment of bills'; (ii) 'How often does it happen that you do not have enough money to afford the kind of food or clothing you/your family should have?' (London); and 'How often do you have enough money to buy the food or clothing you or your family need?' (Helsinki). For the first question, the five response categories were scored from 0 'very little' to 4 'very great', and for the second question from 0 'never' to 4 'always' in London, and 0 'always' to 4 'never' in Helsinki. Scores from the two variables were summed: the total score was 0–8 with a higher score indicating a higher level of difficulties.

### Physical functioning

Physical functioning was measured with the Short Form 36 (SF-36) Physical Component Summary (PCS) that consists of questions measuring for example the ability to function in everyday tasks requiring some physical activity.<sup>21,22</sup> The measure can be affected by the person's health, although it indicates not only the state of health but also its effects on everyday life.<sup>23</sup> The scoring of the summary varies from 0 to 100, with lower scores implying poorer functioning. We used the lowest quartile of the PCS for each sex and cohort to indicate poor functioning. The cut-off point denoting the lowest quartile was 47.3 for men and 44.2 for women in the

Helsinki cohort, and 50.1 for men and 46.4 for women in the London cohort.

### Social factors

Parental education was based on information about mother's and father's education. Own education was divided into higher, intermediate, and basic education. Occupational class was divided into three hierarchical categories: administrators and managers, professionals and semi-professionals and clerical employees. Household income was divided by household size and weighted using the modified OECD equivalence scale.<sup>24</sup> Housing tenure was dichotomised into owner-occupiers and renters. Living arrangements were categorized into five groups: living alone, living with spouse, living alone with children, living with spouse and children and others.

Work-to-family and family-to-work conflicts were measured with four items for each scale.<sup>25</sup> The scales have shown Cronbach alphas ranging between 0.73 and 0.82 in the Helsinki and London cohorts.<sup>26</sup> Other studies have also provided evidence on the reliability and validity of the scales.<sup>27</sup> The work-to-family question was: to what extent do your job responsibilities interfere with your family life? The response statements were: (i) your job reduces the amount of time you can spend with the family, (ii) problems at work make you irritable at home, (iii) your work involves a lot of travel away from home and (iv) your job takes so much energy you do not feel up to doing things that need attention at home. The family-to-work question was: to what extent does your family life and family responsibilities interfere with your performance on your job in any of the following ways? The response statements were: (i) family matters reduce the time you can devote to your job, (ii) family worries or problems distract you from your work, (iii) family activities stop you getting the amount of sleep you need to do your job well and (iv) family obligations reduce the time you need to relax or be yourself. For each item, there were four response categories: 'not at all', 'to some extent', 'a great deal', 'not applicable'/'I don't have a family'. The responses were summed to form separate scales from 4 to 12 for work-to-family and family-to-work conflict. The sum scores were grouped into three categories: 'low' (4), 'average' (5–7) and 'high' (8+) conflicts.

### Behavioural factors

Smoking was divided into current smokers and non-smokers. Alcohol consumption was based on reported units of alcohol consumed during an average week (Helsinki) or the previous week (London). Units were converted into grams of absolute alcohol: consumption exceeding 280 g week<sup>-1</sup> among men and 140 g week<sup>-1</sup> among women was considered as heavy drinking. Physical activity was constructed from questions asking about weekly and monthly frequency and intensity of physical activity. The least active quintile was classified as physically inactive. Obesity was classified as a body mass index (BMI) of 30 or higher, calculated as kilogram per square metres from self-reported (Helsinki) or measured (London) height and weight.

### Statistical methods

Analyses were conducted separately for men and women in each cohort. For descriptive purposes, age-adjusted prevalence of poor physical functioning with 95% confidence intervals (CI) was calculated for each determinant. Relative indices of inequality (RII)<sup>28</sup> were calculated to measure the magnitude of relative differences in physical functioning by

childhood and current economic difficulties in each cohort and sex. RII is a total effect measure that takes into account the relative position of each category in the socio-economic hierarchy. RII is obtained as a continuous logistic regression coefficient for each hierarchical category of economic difficulties, with each class category being represented by its cumulative midpoint centile. The RII can be interpreted as the odds ratio of poor physical functioning for those having the most economic difficulties compared to those having the least. RII imposes linearity on the association between economic difficulties and physical functioning; in this study the linearity of associations can be judged from table 2. Multivariate logistic regression analyses that used economic difficulties as categorical variables also produced substantively similar results compared with the RII.

Age-adjusted RIIs with 95% CIs were calculated first (Model 0). In Models 1 and 2, further socio-economic circumstances were adjusted for. When analysing the association between childhood economic difficulties and physical functioning, parental education, own education, occupational class, income and housing tenure were first adjusted for Model 1. After that current economic difficulties were added (Model 2). When analysing the association between current economic difficulties and physical functioning, childhood economic difficulties were adjusted for before the other socio-economic variables. In the subsequent models, health behaviours (Model 3), living arrangements (Model 4) and work–family conflicts (Model 5) were further adjusted for.

Treatment of item missing was carried out with multiple imputation using the imputation by chained equations (ICE) method in STATA.<sup>29</sup> Five copies of the data were created by the imputation process, each with missing values imputed on the basis of the variables used in the analyses of this study. These copies were independently analysed in the logistic regression analyses, and estimates of parameters were averaged across the copies to obtain a mean estimate and 95% CIs.

## Results

### *Prevalence of poor physical functioning and economic difficulties*

Prevalence of poor physical functioning was higher among those reporting childhood and current economic difficulties in both sexes and cohorts (table 1). Fairly consistent differences in physical functioning could be observed also by

**Table 1** Number of participants (*N*) and age-adjusted prevalence (%) of poor physical functioning by childhood and current economic difficulties, Helsinki and London

	Women <i>N</i> (%)	Men <i>N</i> (%)
<b>Helsinki</b>		
Childhood economic difficulties		
0 no difficulties	2570 (23)	590 (24)
1 difficulties	572 (34)	111 (30)
Current economic difficulties		
0 no difficulties	1803 (22)	436 (24)
1–3 occasional difficulties	1042 (27)	213 (28)
≥4 frequent difficulties	297 (35)	52 (34)
<b>London</b>		
Childhood economic difficulties		
0 no difficulties	595 (23)	1645 (23)
1 difficulties	252 (29)	560 (31)
Current economic difficulties		
0 no difficulties	461 (20)	1259 (22)
1–3 occasional difficulties	317 (29)	792 (28)
≥4 frequent difficulties	69 (37)	154 (33)

occupational class, housing tenure, current smoking, physical inactivity and obesity. Furthermore, poor physical functioning was more common among respondents reporting work–family conflicts in both cohorts and sexes (table 2). In both cohorts, childhood economic difficulties were generally somewhat more common among participants in lower socio-economic positions and with unhealthy behaviours and work–family conflicts (results not shown). With the exception of parental education, current economic difficulties were generally more common in lower socio-economic positions and among those living with children and having unhealthy behaviours and work–family conflicts (results not shown).

### *Childhood economic difficulties and poor physical functioning*

Age-adjusted RII showed an association between childhood economic difficulties and poor physical functioning, which was statistically significant in Helsinki women (RII = 3.06; CI 2.04–4.60) and London men (RII = 2.18; CI 1.41–3.36), but not in Helsinki men (RII = 2.06; CI 0.79–5.41) and London women (RII = 1.76; CI 0.87–3.54). (Model 0, table 3). Among Helsinki women and men, adjusting for other socio-economic circumstances (Model 1) and further for current economic difficulties (Model 2) had some effects on the association. Further adjustments for health behaviours (Model 3) and living arrangements (Model 4) had negligible effects, but work–family conflicts (Model 5) clearly attenuated the association observed in Model 2 among women and men. When adjusted for only one dimension at a time, work-to-family conflict attenuated this association slightly more than family-to-work conflict (results not shown). In London, all adjustments had only small or negligible effects on the association of childhood economic difficulties with poor functioning among both women and men.

### *Current economic difficulties and poor physical functioning*

Age-adjusted RII showed an association between current economic difficulties and physical functioning, which was statistically significant among Helsinki women (RII = 2.31; CI 1.68–3.17), London women (RII = 3.03; CI 1.67–5.49) and men (RII = 1.88; CI 1.30–2.71) but not Helsinki men (RII = 1.79; CI 0.90–3.54) (Model 0, table 4). Among Helsinki women and men, adjusting for childhood economic difficulties had only a minor effect (Model 1), but after adjusting for all socio-economic circumstances (Model 2) the association was attenuated. The attenuation was equally due to all five socio-economic circumstances (no results shown). Among Helsinki women, further adjustments for health behaviours (Model 3) and living arrangements (Model 4) had only small effects, while adjusting for work–family conflicts (Model 5) clearly attenuated the association. The attenuation was equally due to work-to-family and family-to-work conflict (no results shown). Among Helsinki men, the association was further attenuated when adjusting for health behaviours (Model 3) and work–family conflicts (Model 5). Living arrangements (Model 4) had only small effects.

Among London women and men, adjusting for childhood economic difficulties had only small effects. Adjusting for other socio-economic circumstances (Model 2) attenuated the association among both women and men. This attenuation was due to mainly occupational class and income among women and all current socio-economic circumstances among men (no results shown). Among London women, further adjustments for health behaviours (Model 3) and living arrangements (Model 4) had minor effects on the association. As in

**Table 2** Number of participants (*N*) and age-adjusted prevalence (%) of poor physical functioning by explanatory and mediating variables, Helsinki and London

	Helsinki women <i>N</i> (%)	Helsinki men <i>N</i> (%)	London women <i>N</i> (%)	London men <i>N</i> (%)
Parental education				
Higher	657 (20)	201 (27)	213 (25)	496 (24)
Intermediate	799 (25)	180 (20)	148 (16)	540 (24)
Basic	1686 (27)	320 (26)	486 (27)	1169 (26)
Own education				
Higher	860 (17)	298 (22)	284 (22)	905 (24)
Intermediate	1084 (25)	223 (23)	175 (32)	687 (24)
Basic	1198 (31)	180 (33)	388 (24)	613 (29)
Occupational class				
Administrative/managerial	239 (15)	186 (19)	205 (16)	1110 (23)
Professional/semi-professional	1382 (21)	428 (27)	398 (26)	973 (27)
Clerical	1521 (30)	86 (32)	244 (30)	122 (28)
Household income				
Highest group	660 (20)	167 (23)	258 (19)	760 (22)
Second	896 (25)	187 (19)	161 (19)	312 (23)
Third	780 (26)	194 (29)	191 (28)	589 (28)
Lowest group	806 (30)	153 (32)	238 (30)	544 (27)
Housing tenure				
Owner-occupier	2210 (23)	543 (24)	776 (24)	2096 (25)
Renter	932 (29)	158 (30)	71 (28)	109 (31)
Living arrangements				
Alone	775 (27)	160 (32)	221 (21)	351 (23)
With spouse/partner	797 (26)	197 (22)	302 (26)	542 (21)
Alone with children	211 (23)	15 (21)	21 (27)	59 (22)
With spouse/partner and children	699 (21)	210 (22)	62 (25)	463 (26)
Other	659 (25)	119 (22)	241 (25)	790 (28)
Current smoking				
No	2482 (25)	534 (24)	743 (25)	1827 (24)
Yes	660 (25)	167 (28)	104 (27)	378 (30)
Heavy drinking				
No	2937 (25)	655 (26)	732 (26)	1935 (25)
Yes	205 (25)	46 (11)	115 (16)	270 (27)
Physical inactivity				
No	2523 (23)	556 (22)	691 (23)	1776 (25)
Yes	619 (32)	145 (36)	156 (33)	429 (25)
Obesity				
No	2690 (22)	602 (23)	685 (24)	1925 (23)
Yes	452 (42)	99 (40)	162 (29)	280 (36)
Family-to-work conflict				
Low	1530 (21)	369 (19)	304 (23)	730 (24)
Average	1161 (28)	243 (28)	330 (26)	1039 (25)
High	245 (31)	54 (38)	98 (34)	283 (28)
Not applicable/no family	206 (31)	35 (53)	115 (20)	153 (24)
Work-to-family conflict				
Low	571 (15)	139 (12)	142 (22)	257 (22)
Average	1852 (24)	397 (22)	412 (25)	1045 (24)
High	513 (38)	129 (41)	178 (31)	749 (27)
Not applicable/no family	206 (31)	35 (53)	115 (20)	153 (24)
Total	3142 (25)	701 (25)	847 (25)	2205 (25)

Helsinki, adjusting for work–family conflicts (Model 5) had the strongest attenuating effect, although the association still remained clear. The attenuation was slightly larger by work-to-family than family-to-work conflict (no results shown). Among London men, further adjusting for health behaviours (Model 3) and work–family conflicts (Model 5) had some additional attenuating effect on the association but adjustment for living arrangements (Model 4) had practically no effects.

## Discussion

### Main results

First, adjusting for conventional socio-economic circumstances, i.e. parental and own education, occupational class, household income and housing tenure, to some degree attenuated the association of both current and childhood economic difficulties with physical functioning in both

cohorts. This could be expected, as the different domains of socio-economic circumstances, although also reflecting impacts specific to each domain, are at the same time interrelated.<sup>30,31</sup> Second, adjustments for health behaviours slightly affected the association of current economic difficulties with physical functioning in both cohorts, but less so among women. It is possible that current economic difficulties influence the health-related behaviours differently among men and women, and therefore affect the association more among men. The effects of individual health behaviours were small and fairly similar (no results shown).

Third, work–family conflicts provided the strongest explanation for the association between current economic difficulties and physical functioning in both cohorts and sexes. We have observed a similar effect of work–family conflicts on the association of current economic difficulties with CMDs.<sup>6</sup> It is possible that economic difficulties influence work–family conflicts for example by increasing strain within family or limiting access to childcare or care for elderly parents.

**Table 3** Associations of childhood economic difficulties with poor physical functioning and the contribution of socio-economic circumstances, living arrangements, health behaviours and work–family conflicts

	Inequality indices (95% CIs)					
	Model 0 Age-adjusted	Model 1 0 + Socio-economic circumstances <sup>a</sup>	Model 2 1 + Current economic difficulties	Model 3 2 + Health behaviours <sup>b</sup>	Model 4 2 + Living arrangements	Model 5 2 + Work–family conflicts <sup>c</sup>
Helsinki						
Women						
Childhood economic difficulties	3.06 (2.04–4.60)	2.68 (1.77–4.06)	2.49 (1.64–3.78)	2.45 (1.61–3.72)	2.45 (1.61–3.72)	2.01 (1.30–3.11)
Men						
Childhood economic difficulties	2.06 (0.79–5.41)	1.79 (0.67–4.77)	1.72 (0.64–4.63)	1.73 (0.64–4.68)	1.59 (0.59–4.27)	1.33 (0.48–3.72)
London						
Women						
Childhood economic difficulties	1.76 (0.87–3.54)	1.69 (0.83–3.44)	1.54 (0.75–3.17)	1.64 (0.79–3.40)	1.61 (0.78–3.32)	1.51 (0.73–3.12)
Men						
Childhood economic difficulties	2.18 (1.41–3.36)	2.19 (1.41–3.38)	2.10 (1.35–3.25)	2.06 (1.33–3.21)	2.09 (1.35–3.23)	2.02 (1.30–3.13)

RII (the relative increase in poor physical functioning from the lowest to the highest score of economic difficulties) values from logistic regression analysis, Helsinki and London are given

a: Parental education, own education, occupational class, household income, housing tenure

b: Current smoking, heavy drinking, physical inactivity, obesity

c: Family-to-work and work-to-family conflict

**Table 4** Associations of current economic difficulties with poor physical functioning and the contribution of socio-economic circumstances, living arrangements, health behaviours and work–family conflicts

	Inequality indices (95% CIs)					
	Model 0 Age-adjusted	Model 1 0 + Childhood economic difficulties	Model 2 1 + Socio-economic circumstances <sup>a</sup>	Model 3 2 + Health behaviours <sup>b</sup>	Model 4 2 + Living arrangements	Model 5 2 + Work–family conflicts <sup>c</sup>
Helsinki						
Men						
Current economic difficulties	1.79 (0.90–3.54)	1.69 (0.85–3.37)	1.31 (0.62–2.75)	1.16 (0.54–2.48)	1.27 (0.60–2.70)	0.94 (0.42–2.12)
Women						
Current economic difficulties	2.31 (1.68–3.17)	2.10 (1.52–2.90)	1.73 (1.23–2.45)	1.60 (1.12–2.27)	1.75 (1.24–2.48)	1.39 (0.97–1.99)
London						
Men						
Current economic difficulties	1.88 (1.30–2.71)	1.80 (1.25–2.60)	1.62 (1.09–2.41)	1.48 (0.99–2.21)	1.59 (1.07–2.36)	1.53 (1.02–2.28)
Women						
Current economic difficulties	3.03 (1.67–5.49)	2.91 (1.59–5.29)	2.41 (1.25–4.66)	2.32 (1.19–4.50)	2.35 (1.21–4.56)	2.06 (1.05–4.04)

RII (the relative increase in poor physical functioning from the lowest to the highest score of economic difficulties) values from logistic regression analysis, Helsinki and London are given

a: Parental education, own education, occupational class, household income, housing tenure

b: Current smoking, heavy drinking, physical inactivity, obesity

c: Family-to-work and work-to-family conflict

Work–family conflicts in turn could further impede health maintenance. Work–family conflicts could also reduce the capacity to handle economic difficulties. In addition, simultaneously occurring economic difficulties and work–family conflicts may increase overall strain and exhaustion which could affect health leading to reduced functioning.<sup>9,10</sup>

Adjusting for work–family conflicts also attenuated the association of childhood economic difficulties with physical functioning in the Helsinki cohort. Economic difficulties experienced in childhood have been suggested to be related to economic difficulties in later life.<sup>9,10</sup> However, in this study the association between childhood economic difficulties and physical functioning was not strongly affected after adjustment for current economic difficulties.

Overall, the present results were very similar for the Finnish and the British cohort. This might be due to both cohorts

consisting of white-collar middle-aged public sector employees with regular incomes and long work contracts. However, some differences were also observed, as the influence of work–family conflicts was somewhat stronger in the Finnish cohort than in the British cohort. Generally, there were fewer differences between the cohorts with regard to current economic difficulties than to childhood economic difficulties.

### Methodological considerations

There are some limitations that need to be acknowledged. First, as our sample was rather homogeneous consisting of white-collar employees only, generalizations of the results to other occupational groups and general populations should be

avoided. In employee cohorts socio-economic variations in health are also likely to be smaller than in general populations.<sup>32</sup>

Second, due to cross-sectional design, causality between economic difficulties, physical functioning and the contributory factors cannot be determined and interpretations concerning the direction of associations should be made with caution. For example, there is a possibility of health-related selection, meaning that poor physical functioning can lead to economic difficulties along with other disadvantaged socio-economic circumstances. Some previous empirical studies have suggested that the causal direction would mainly be from socio-economic position to health,<sup>33,34</sup> although evidence not fully supporting this view also exists.<sup>35</sup> Furthermore, our cohorts consisted of employed people, which is likely to diminish the possibility of selection due to the healthy worker effect.

Third, as our data were mostly self-reported, the possibility of reporting bias has to be considered. The respondents' poor health, or their disposition to respond negatively in surveys i.e. negative affectivity, might influence their responses to questions about economic difficulties and other circumstances.<sup>36</sup> The retrospective questions about childhood conditions might be particularly affected. However, retrospective information concerning childhood adversities and socio-economic conditions have been widely used and their measurement has shown sufficient reliability in the recall of the conditions.<sup>37,38</sup> Fourth, attrition in the fifth follow-up phase of the Whitehall data may have affected the results. However, we used the Phase 5 data as the earlier phases did not include all the required measures of socio-economic circumstances.

## Conclusions

Associations observed between current economic difficulties and physical functioning in middle-aged white-collar women and men in Finland and Britain may be partly explained by conflicts between work and family. This explanation also appears to apply to the association between childhood economic difficulties and physical functioning in the Finnish cohort. Also other socio-economic circumstances explained a part of the associations in both countries. In the light of our results, supporting people to cope with economic difficulties and preventing conflicts between work and family could be beneficial for reducing inequalities in physical functioning.

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*Conflicts of interest:* None declared.

## Key points

- This study examined the contribution of other socio-economic circumstances, health behaviours, living arrangements and work–family conflicts to the associations of childhood and current economic difficulties with physical functioning among employees from Finland and Britain.
- Work–family conflicts partly explained the associations of current economic difficulties with physical functioning in the Finnish and British employee cohorts, and those of childhood economic difficulties in the Finnish cohort.
- Also other socio-economic circumstances explained a part of the associations whereas living arrangements and health behaviours had negligible effects.
- Work–family conflicts and economic difficulties should be considered in efforts to reduce inequalities in physical functioning.

## References

- 1 Pearlman LI, Schooler C. The structure of coping. *J Health Soc Behav* 1978;19:2–21.
- 2 Drentea P, Lavrakas PJ. Over the limit: the association among health, race and debt. *Soc Sci Med* 2000;50:517–29.
- 3 Zimmermann FJ, Katon W. Socioeconomic status, depression disparities, and financial strain: what lies behind the income–depression relationship? *Health Econ* 2005;14:1197–215.
- 4 Laaksonen E, Martikainen P, Lahelma E, et al. Socioeconomic circumstances and common mental disorders among Finnish and British public sector employees: evidence from the Helsinki Health Study and the Whitehall II Study. *Int J Epidemiol* 2007;36:776–86.
- 5 Laaksonen E, Martikainen P, Head J, et al. Associations of multiple socioeconomic circumstances with physical functioning among Finnish and British employees. *Eur J Public Health* 2009;19:38–45.
- 6 Laaksonen E, Martikainen P, Lallukka T, et al. Economic difficulties and common mental disorders among Finnish and British white-collar employees: the contribution of social and behavioural factors. *J Epidemiol Community Health* 2009;63:439–46.
- 7 Ferrie JE, Martikainen P, Shipley MJ, Marmot M. Self-reported economic difficulties and coronary events in men: evidence from the Whitehall II Study. *Int J Epidemiol* 2005;34:640–48.
- 8 Laaksonen M, Rahkonen O, Martikainen P, Lahelma E. Multiple dimensions of socioeconomic position and self-rated health. The contribution of childhood socioeconomic circumstances, adult socioeconomic status and material resources. *Am J Public Health* 2005;95:1403–9.
- 9 Kahn JR, Pearlman LI. Financial strain over the life course and health among older adults. *J Health Soc Behav* 2006;47:17–31.
- 10 Pudrovska T, Schieman S, Pearlman LI. The sense of mastery as a mediator and moderator in the association between economic hardship and health in late life. *J Aging Health* 2005;17:634–60.
- 11 Skapinakis P, Weich S, Lewis G, et al. Socio-economic position and common mental disorders: Longitudinal study in the general population in the UK. *Br J Psychiatry* 2006;189:109–17.
- 12 Pearlman LI. The sociological study of stress. *J Health Soc Behav* 1989;30:241–56.
- 13 Kuh D, Ben-Shlomo Y, Lynch J, et al. Life course epidemiology. Glossary. *J Epidemiol Community Health* 2003;57:778–83.
- 14 Davey-Smith G, Hart C, Hole D, et al. Education and occupational social class: which is the more important indicator of mortality risk? *J Epidemiol Commun Health* 1998;52:153–60.
- 15 Poulton R, Caspi A, Milne B, et al. Association between children's experience of socioeconomic disadvantage and adult health: a lifecourse study. *Lancet* 2002;360:1640–45.

- 16 Esping-Andersen G. *Three worlds of welfare capitalism*. Oxford: Polity Press, 1990.
- 17 Gottschlak P, Schmeeding TM. Cross-national comparisons of earnings and income inequality. *J Econ Lit* 1997;35:633–87.
- 18 Lahelma E, Martikainen P, Rahkonen O, et al. Occupational class inequalities across key domains of health: results from the Helsinki Health Study. *Eur J Public Health* 2005;15:504–10.
- 19 Marmot M, Davey Smith G, Stansfeld S, et al. Health inequalities among British Civil Servants: the Whitehall Study. *Lancet* 1991;337:1387–93.
- 20 Marmot M, Brunner E. Cohort profile: the Whitehall II study. *Int J Epidemiol* 2005;34:251–56.
- 21 Ware JE, Kosinski M, Keller SK. *SF-36® Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA: The Health Institute, 1994.
- 22 Ware J, Kosinski M. Interpreting the SF-36 summary health measures: a response. *Qual Life Res* 2001;10:405–14.
- 23 Stansfeld SA, Bosma H, Hemingway H, Marmot MG. Psychosocial work characteristics and social support as predictors of SF-36 health functioning: the Whitehall II study. *Psychosom Med* 1998;60:247–55.
- 24 Hagenaars A, de Vos K, Zaidi MA. *Poverty statistics in the Late 1980s: research based on micro-data*. Luxembourg: Office for Official Publications of the European Communities, 1994.
- 25 Grzywacz J, Marks N. Reconceptualizing the work–family interface: an ecological perspective on the correlates of positive and negative spillover between work and family. *J Occup Health Psychol* 2000;5:111–16.
- 26 Lallukka T, Chandola T, Roos E, et al. Work–family conflicts and health behaviors among British, Finnish, and Japanese employees. *Int J Behav Med* 2010;17:134–42.
- 27 Netemeyer R, Boles J, McMurrian R. Development and validation of work–family conflicts and family–work conflict scales. *J Appl Psychol* 1996;81:400–10.
- 28 Mackenbach JP, Kunst AE. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Soc Sci Med* 1997;44:757–71.
- 29 Royston P. Multiple imputation of missing values. *Stata J* 2004;4:227–41.
- 30 Braveman PA, Cubbin C, Egerter S, et al. Socioeconomic status in health research. One size does not fit all. *J Am Med Assoc* 2005;294:2879–88.
- 31 Galobardes B, Lynch J, Davey Smith G. Measuring socioeconomic position in health research. *Br Med Bull* 2007;81–82:21–37.
- 32 Martikainen P, Valkonen T. Bias related to the exclusion of the economically inactive in studies on social class differences in mortality. *Int J Epidemiol* 1999;28:899–904.
- 33 Benzeval M, Judge K. Income and health: the time dimension. *Soc Sci Med* 2001;52:1371–90.
- 34 Blane D, Davey-Smith G, Bartley M. Social selection: what does it contribute to social class differences in health? *Sociol Health Illn* 1993;15:1–15.
- 35 Martikainen P, Valkonen T, Moustgaard H. The effects of individual taxable income, household taxable income, and household disposable income on mortality in Finland, 1998–2004. *Population Stud* 2009;63:147–62.
- 36 Watson D. Intraindividual and interindividual analyses of positive and negative affect: their relation to health complaints, perceived stress, and daily activities. *J Pers Soc Psychol* 1988;54:1020–30.
- 37 Dube SR, Williamson DF, Thompson T, et al. Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse Negl* 2004;28:729–37.
- 38 Krieger N, Okamoto A, Selby JV. Adult female twins recall of childhood social class and father's education: a validation study for public health research. *Am J Epidemiol* 1998;147:704–8.