

# Life course socioeconomic conditions and adult psychosocial functioning

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**Background** Various psychosocial factors have been linked to adult physical health and are also associated with socioeconomic position in adulthood. We evaluated the effect of socioeconomic conditions over the life course on measures of psychosocial functioning in adulthood.

**Methods** Life course socioeconomic position was assessed by retrospective recall of parents' education and occupation when the respondent was age 10, and the respondents' education, occupation, and income in 2585 men from eastern Finland aged 42, 48, 54, and 60 years. Measures of psychosocial functioning were derived from scales measuring cynical hostility, hopelessness, and depressive symptoms.

**Results** Men with both parents who had less than a primary school education or who both had unskilled manual jobs had higher age-adjusted levels of cynical hostility, hopelessness, and depressive symptoms in adulthood. Mutually adjusted analyses showed that parents' education and the respondents' education, occupation, and income all had statistically independent effects on adult levels of cynical hostility and hopelessness. For instance, men for whom neither parent had completed primary education had a 0.15 standard deviation ( $P = 0.006$ ) higher cynical hostility score, and a 0.20 standard deviation ( $P = 0.00018$ ) higher hopelessness score, after adjustment for education, occupation and income. In contrast, depressive symptoms in adulthood were only associated with the respondent's occupation and income.

**Conclusions** Childhood socioeconomic position was associated with adult psychosocial functioning, but these effects were specific to some aspects of adult psychosocial functioning—cynical hostility and hopelessness, but not depressive symptoms. Adult occupation and income were associated with all measures of psychosocial functioning. In addition to the impact of adult socioeconomic position, some aspects of poor psychosocial functioning in adulthood may also have socioeconomic roots early in life.

**Keywords** Socioeconomic factors, life course, childhood, psychosocial functioning

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While the idea that early-life exposures may influence adult health is not new,<sup>1</sup> there has been a revived interest in studying the life course determinants of health in adulthood.<sup>2,3</sup> Whether

increased morbidity and mortality in adulthood are the result of biological programming due to critical events *in utero*,<sup>4</sup> the accumulation and interaction of harmful exposures along the pathway between infancy and adulthood,<sup>5,6</sup> or a combination of both is still unclear for most diseases. Some of the best evidence for the utility of the life course approach comes from recent studies showing that both early- and later-life socioeconomic conditions can affect a variety of health outcomes in adulthood, including self-rated health,<sup>7</sup> coronary heart disease,<sup>8,9-11</sup> stroke and stomach cancer,<sup>11</sup> non-fatal myocardial infarction,<sup>12</sup> and all-cause mortality.<sup>9-11</sup>

Given the evidence that both childhood and adult socioeconomic position are associated with morbidity and mortality

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from specific causes, it follows that they are also likely to be associated with the biological and behavioural risk factors for those outcomes. Compared to the enormous literature documenting adult socioeconomic effects on risk factors,<sup>13</sup> relatively few studies have examined life course socioeconomic influences on risk factors. However, several recent studies provide evidence for independent effects of childhood and adult socioeconomic position on behavioural risk factors such as physical activity, smoking, alcohol consumption, and diet,<sup>5,14</sup> and for biological risk factors such as cholesterol, blood pressure, plasma fibrinogen, and respiratory function.<sup>15-18</sup>

In addition to biological and behavioural risk factors, evidence exists that a number of psychosocial characteristics are associated with adult morbidity and mortality. While the list of proposed psychosocial risk factors for disease is extensive,<sup>19</sup> some of the strongest evidence for a link between psychosocial functioning and physical health comes from studies of cynical hostility, hopelessness, and depression. Cynical hostility has been prospectively linked to increased risk of cardiovascular and non-cardiovascular mortality<sup>20</sup> and to biological and behavioural risk factors for coronary heart disease.<sup>20-22</sup> Prospective evidence has shown hopelessness to be predictive of fatal and non-fatal ischaemic heart disease,<sup>23</sup> atherosclerosis,<sup>24</sup> hypertension,<sup>25</sup> cancer, and myocardial infarction.<sup>26</sup> Men and women with high levels of depression or anxiety have been shown to be at increased risk of cardiovascular morbidity and mortality,<sup>23,27,28</sup> stroke,<sup>29</sup> myocardial infarction,<sup>30</sup> hypertension, and gastrointestinal disease.<sup>31</sup> Whilst ample and long-standing evidence exists that adult socioeconomic position is related to adult psychiatric illness,<sup>32-34</sup> there has been less research on the extent to which more general indicators of adult psychosocial functioning are patterned by socioeconomic conditions in early- or later-life. Our objective was to investigate the effects of childhood and adult socioeconomic position on cynical hostility, hopelessness, and depressive symptoms in adulthood.

## Methods

### Study population

We used data from the Kuopio Ischaemic Heart Disease Risk Factor Study (KIHD), a population-based study of risk factors for heart disease, mortality, and other health outcomes among middle-age men from eastern Finland.<sup>35</sup> The study population consisted of a population-based random sample of men living in the town of Kuopio or its six adjacent rural communities, recruited in two cohorts between March 1984 and December 1989. Of the 3343 eligible men, 198 (5.9%) were not included because of death, serious disease, or migration away from the area, and of the remaining 3145 men 2682 (85.3%) agreed to participate. Among those who participated, 97 (3.6%) men who reported that they did not know one or both of their parents were excluded from the current analysis. The final sample consisted of 2585 men, 42 (n = 325, 12.6%), 48 (n = 346, 13.4%), 54 (n = 1536, 59.4%), and 60 (n = 378, 14.6%) years old.

### Data imputation

Missing data are a pervasive problem in epidemiology. The standard approach is to restrict analyses to only those subjects with no missing values for the relevant variables (the so-called 'complete-case' or 'list-wise deletion' analysis). In multivariate

analyses, the number of subjects that have complete data on all the variables can be quite small relative to the actual sample size. More important, however, are the underlying assumptions for the validity of complete-case analysis. The complete-case analysis is generally valid only under the rather strict assumption that the restricted set of subjects is a completely random subset of the original sample. That is, the validity depends on whether or not the data are missing completely at random,<sup>36</sup> an assumption that is rarely true in population-based studies. For this study, we used an alternative method that makes efficient use of all the available data and imposes less restrictive assumptions (i.e. missing at random); a multiple imputation approach<sup>37</sup> using a sequential regression imputation procedure.<sup>38</sup> The procedure created imputations through a sequence of multiple regressions and used all non-missing or imputed variables as covariates. The sequence of imputation was repeated in a cyclical manner, overwriting previously drawn values and building the interdependence among the imputed values that is observed in the non-missing cases. One advantage of this approach is that the imputation process uses all of the variables in the dataset and not simply those included in the substantive analysis, thereby improving efficiency and providing unbiased estimates.<sup>39</sup>

### Measurement of socioeconomic position

Measures of childhood socioeconomic position were constructed based on the respondents' recall of the education and occupation of both parents at the time they were age 10. For parental education, respondents were asked to identify the highest level (or partial level) of education completed by each parent (i.e. primary/basic education, junior high, senior high, university). Similarly for occupation, respondents were asked to report each of their parents' 'longest lasting principal occupation'. Parental occupations were then classified as white collar and professional, skilled manual, or unskilled manual. We combined parents' occupational data (conceptualized as a measure of the early-life material environment) and parents' educational data (conceptualized as a measure of the early-life intellectual environment), as it is plausible that these different aspects of early-life socioeconomic environment may have different effects on different types of adult health outcomes.<sup>40</sup> Parental education was classified as low (did not complete primary school) or high (completed primary school or higher); parental occupation was classified as low (unskilled manual) or high (skilled manual or white-collar). The education and occupation of both parents was used to create two cross-classified measures of childhood socioeconomic position: both parents high (referent group), father high/mother low, father low/mother high, and both low, so that we could investigate synergy between maternal and paternal socioeconomic indicators. We hypothesized that the effects of maternal and paternal education on the intellectual environment of the child may not be independent. Measures of the respondents' own life course socioeconomic position were created from their education, occupation, and income. Education was measured in years of education and categorized as either low (<7 years/did not complete primary school) or high (≥7 years /completed primary school or higher). Occupation was categorized as farmer, blue-collar, or white-collar. Information on income was ascertained continuously in reference to the year prior to the baseline examination, and was divided into quartiles. Respondents were classified as either low income (bottom 25th percentile) or

high income (top 75th percentile), previously shown to predict mortality in this cohort.<sup>41</sup>

### Measurement of psychosocial functioning in adulthood

The eight-item Cynical Distrust scale,<sup>42</sup> derived from the Cook-Medley Hostility Scale,<sup>43</sup> was used to measure cynical hostility. Items included questions about the trustworthiness, sympathy, and honesty of others, and the motives of others in social relationships. Responses were on a four-point Likert scale (0 = completely agree, 1 = somewhat agree, 2 = somewhat disagree, 3 = completely disagree) and were reverse-scored and summed to create an index of cynical hostility (range = 23). Two questionnaire items measured hopelessness, defined as negative expectancies about oneself and the future. The items asked about the likelihood of reaching goals and the possibility of positive change in the future. Responses were on a five-point Likert scale, ranging from zero (absolutely agree) to four (absolutely disagree), and were reverse-scored and summed to create a continuous measure of hopelessness (range = 8). Eighteen items from the Human Population Laboratory depression index<sup>44</sup> measured depressive symptoms, and included questions about mood disturbances, negative self-concept, loss of energy, sleeping and eating problems, trouble concentrating, and psychomotor retardation or agitation. Assigning one point for each true or false answer indicative of a 'depressed' response generated scores that ranged from zero to 13. It is important to note that the items measuring depressive symptoms did not include a separate measure of hopelessness, as there is evidence for its distinctness both as a psychosocial construct<sup>45,46</sup> and in its relation to adult physical health.<sup>23,25</sup> For all three measures of adult psychosocial functioning, higher scores indicate poorer psychosocial functioning. Cronbach's  $\alpha$  for the measures of cynical hostility, hopelessness, and depressive symptoms were 0.80, 0.70, and 0.55 respectively.

### Statistical analysis

Associations between measures of life course socioeconomic position and adult psychosocial functioning were assessed using OLS multiple linear regression. All analyses were age-adjusted, and separate models were run for each psychosocial outcome. The early-life socioeconomic variables (parental occupation and education) were each entered separately to evaluate their effects on adult psychosocial functioning, and then both were entered simultaneously. Subsequently, the respondents' own socioeconomic variables were entered into each model.

Initial stratification of the data by age group suggested some possibility that the effects of childhood socioeconomic status were stronger for older ages. However, this was inconsistent across outcomes. As there was no compelling evidence for an age by life course socioeconomic position interaction, subsequent analyses were age-adjusted.

To account for the possible influence of parental history of mental illness and current physical illness, the age-adjusted analyses containing both childhood and adult socioeconomic measures were also conducted with adjustment for history of mental illness among either parent, and separately with adjustment for extant symptomatic disease (history of ischaemic heart disease, diabetes, hypertension, myalgia, arthralgia, restricted mobility). Respondents' assessment of parental history

of mental illness was obtained by self-report of an 'emotional or mental illness' for each parent. History of parental mental illness was not associated with respondents' adult psychosocial functioning. The indicators of prevalent symptomatic disease were all strongly associated with adult psychosocial functioning, but did not substantively alter the effects of life course socioeconomic indicators on these outcomes. Thus, we do not present those results here.

## Results

Table 1 shows the distribution of socioeconomic and psychosocial characteristics for the imputed data used in the analysis, and the frequency missing and distribution for each measure in the un-imputed data. Looking down the Table and comparing the socioeconomic frequency distributions between the imputed (column 2) and un-imputed (column 5) data, we see that the process of imputation did not substantially alter the distribution of the data. In particular, the mean and standard deviation of the measures of cynical hostility, hopelessness, and depressive symptoms in the imputed data were nearly identical to the un-imputed data. The correlation between hopelessness and cynical hostility was 0.32, between hopelessness and depressive symptoms was 0.37, and between cynical hostility and depressive symptoms was 0.21 (all  $P < 0.001$ , results not shown).

Table 2 presents the age-adjusted associations between measures of childhood socioeconomic position and adult measures of cynical hostility, hopelessness, and depressive symptoms. The values in the Table may be interpreted as the difference in psychosocial scale score between the exposure and the referent group. For example, men who had both parents in unskilled manual labour jobs had higher levels of adult cynical hostility (beta = 0.74,  $P < 0.001$ ), hopelessness (beta = 0.66,  $P < 0.001$ ), and depressive symptoms (beta = 0.22,  $P = 0.02$ ), compared with men whose parents had white-collar jobs. Similar patterns of increased risk were seen if both parents had less than a primary school education. When parental education and occupation were mutually adjusted, each had an independent effect on cynical hostility and hopelessness, but a higher number of adult depressive symptoms was associated only with both parents having less than a primary school education.

Table 3 shows models that include both childhood and later-life measures of socioeconomic position. The results show that parents' education and the respondents' education, occupation, and income all had statistically independent effects on adult levels of cynical hostility and hopelessness. In contrast, adult depressive symptoms are associated only with later-life socioeconomic factors—occupation and income. It is perhaps interesting to note that, after adjustment for adult occupation and income, the effects of low parental education were stronger than the respondents' education for both cynical hostility (0.59 versus 0.41) and hopelessness (0.40 versus 0.21).

## Discussion

This study presents evidence that both early and later socioeconomic position are associated with adult psychosocial functioning, at least for measures of cynical hostility and hopelessness. Men whose parents both had less than a primary school education were more likely to report higher levels of cynical

**Table 1** Childhood and adult socioeconomic characteristics and adult psychosocial characteristics in the Kuopio Ischaemic Heart Disease Risk Factor Study population, 1984–1989, imputed and un-imputed data

	Imputed Data <sup>a</sup>		Un-imputed Data <sup>b</sup>		Missing	%
	No.	%	No.	%		
<b>Respondents' education</b>					5	0.1
Less than primary	771	29.8	804	30.0		
Primary or better	1814	70.2	1873	70.0		
<b>Respondents' occupation</b>					41	1.5
Farmer	416	16.1	427	16.2		
Blue collar	1112	43.0	1170	44.3		
White collar	1057	40.9	1044	39.5		
<b>Respondents' income</b>					46	1.7
Bottom 25%	631	24.4	656	24.9		
Top 75%	1954	75.6	1980	75.1		
<b>Parents' occupation<sup>c</sup></b>					106	4.0
Father(low) Mother(low)	910	35.2	913	35.4		
Father(high) Mother(low)	556	21.5	543	21.1		
Father(low) Mother(high)	103	4.0	102	4.0		
Father(high) Mother(high)	1016	39.3	1018	39.5		
<b>Parents' education<sup>d</sup></b>					141	5.3
Father(low) Mother(low)	1132	43.8	1119	44.0		
Father(high) Mother(low)	161	6.2	155	6.1		
Father(low) Mother(high)	328	12.7	320	12.6		
Father(high) Mother(high)	964	37.3	947	37.3		
<b>Respondents' psychosocial characteristics</b>		<b>Mean (SD)</b>		<b>Mean (SD)</b>		
Cynical hostility	2585	12.6 (4.0)	2289	12.6 (4.2)	393	14.7
Hopelessness	2585	2.7 (2.0)	2587	2.7 (2.0)	95	3.5
Depressive symptoms	2585	1.9 (2.1)	2626	1.9 (2.1)	56	2.1

<sup>a</sup> Imputed data, n = 2585 in the analysed sample (2682 total sample—97 excluded).

<sup>b</sup> The number of observations in the unimputed data varies according to the number missing on each item.

<sup>c</sup> 'Low' occupation refers to those with unskilled manual occupations, while 'high' refers to those with skilled manual or white collar occupations.

<sup>d</sup> 'Low' education refers to those with less than a primary school education, while 'high' refers to those completing primary school or better.

**Table 2** Beta coefficients (standard errors) derived from multivariable linear regression models of parents' occupation and education and the respondents' adult psychosocial functioning (cynical hostility, hopelessness, and depressive symptoms)<sup>a</sup>

	Cynical hostility			Hopelessness			Depressive symptoms		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<b>Parents' occupation</b>									
Father(high) Mother(low)	0.162 (0.21)		0.013 (0.21)	0.221 (0.11) <sup>b</sup>		0.133 (0.11)	0.082 (0.11)		0.056 (0.11)
Father(low) Mother(high)	-0.072 (0.42)		-0.392 (0.41)	0.408 (0.22)		0.298 (0.21)	0.266 (0.22)		0.235 (0.22)
Father(low) Mother(low)	0.740 (0.18) <sup>c</sup>		0.464 (0.19) <sup>c</sup>	0.657 (0.09) <sup>c</sup>		0.470 (0.10) <sup>c</sup>	0.220 (0.10) <sup>b</sup>		0.170 (0.10)
<b>Parents' education</b>									
Father(high) Mother(low)		0.485 (0.34)	0.459 (0.34)	0.460 (0.17) <sup>c</sup>	0.415 (0.17) <sup>b</sup>		0.206 (0.18)	0.187 (0.18)	
Father(low) Mother(high)		0.218 (0.26)	0.117 (0.26)	0.338 (0.13) <sup>c</sup>	0.231 (0.13)		0.075 (0.14)	0.035 (0.14)	
Father(low) Mother(low)		1.075 (0.18) <sup>c</sup>	0.954 (0.19) <sup>c</sup>	0.812 (0.09) <sup>c</sup>	0.685 (0.09) <sup>c</sup>		0.239 (0.09) <sup>b</sup>	0.193 (0.10) <sup>b</sup>	

<sup>a</sup> Model 1 = Parents' occupation + age; Model 2 = Parents' education + age; Model 3 = Parents' occupation + Parents' education + age. Referent group for Parents' occupation and education is 'Father(high) Mother(high)'.

<sup>b</sup> P ≤ 0.05 for comparison with the referent group.

<sup>c</sup> P ≤ 0.01 for comparison with the referent group.

**Table 3** Beta coefficients (standard errors) derived from multivariable linear regression models of parents' occupation and education and the respondents' education, occupation, income, and adult psychosocial functioning (cynical hostility, hopelessness, and depressive symptoms)<sup>a</sup>

	Cynical hostility			Hopelessness			Depressive symptoms		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<b>Parents' occupation</b>									
Father(high) Mother(low)	-0.007 (0.21)	-0.172 (0.21)	-0.207 (0.21)	0.118 (0.11)	0.065 (0.11)	0.036 (0.11)	0.055 (0.11)	0.005 (0.11)	-0.019 (0.11)
Father(low) Mother(high)	-0.345 (0.41)	-0.586 (0.42)	-0.594 (0.41)	0.334 (0.21)	0.269 (0.21)	0.262 (0.21)	0.237 (0.22)	0.165 (0.22)	0.159 (0.22)
Father(low) Mother(low)	0.404 (0.19) <sup>b</sup>	0.188 (0.19)	0.143 (0.19)	0.425 (0.10) <sup>c</sup>	0.317 (0.10) <sup>c</sup>	0.281 (0.10) <sup>c</sup>	0.167 (0.10)	0.095 (0.10)	0.065 (0.10)
<b>Parents' education</b>									
Father(high) Mother(low)	0.433 (0.34)	0.295 (0.34)	0.298 (0.34)	0.396 (0.17) <sup>b</sup>	0.297 (0.17)	0.300 (0.17)	0.186 (0.18)	0.136 (0.18)	0.139 (0.18)
Father(low) Mother(high)	0.077 (0.26)	-0.061 (0.26)	-0.102 (0.26)	0.202 (0.13)	0.095 (0.13)	0.060 (0.13)	0.034 (0.14)	-0.017 (0.14)	-0.046 (0.14)
Father(low) Mother(low)	0.833 (0.19) <sup>c</sup>	0.628 (0.20) <sup>c</sup>	0.589 (0.20) <sup>c</sup>	0.594 (0.09) <sup>c</sup>	0.433 (0.09) <sup>c</sup>	0.401 (0.09) <sup>b</sup>	0.188 (0.10)	0.112 (0.10)	0.085 (0.10)
<b>Respondents' education</b>									
Low (< primary)	0.678 (0.20) <sup>c</sup>	0.523 (0.20) <sup>b</sup>	0.407 (0.20) <sup>b</sup>	0.509 (0.09) <sup>c</sup>	0.305 (0.09) <sup>c</sup>	0.210 (0.09) <sup>b</sup>	0.029 (0.10)	-0.040 (0.10)	-0.119 (0.10)
<b>Respondents' occupation</b>									
Farmer		0.048 (0.24)	-0.270 (0.26)		0.648 (0.12) <sup>c</sup>	0.386 (0.12) <sup>c</sup>		0.104 (0.13)	-0.113 (0.14)
Blue collar		1.123 (0.20) <sup>c</sup>	1.007 (0.20) <sup>c</sup>		0.788 (0.09) <sup>c</sup>	0.693 (0.09) <sup>c</sup>		0.404 (0.10) <sup>c</sup>	0.325 (0.10) <sup>c</sup>
<b>Respondents' income</b>									
Low (bottom 25%)			0.872 (0.20) <sup>c</sup>			0.716 (0.10) <sup>c</sup>			0.594 (0.11) <sup>c</sup>

<sup>a</sup> Model 1 = Parents' education + Parents' occupation + Respondent's education and age; Model 2 = Model 1 + Respondent's occupation; Model 3 = Model 2 + Respondent's income. Referent group for Parents' occupation and education is 'Father(high) Mother(high)'; for Respondent's education is 'primary or better'; for Respondent's occupation is 'white collar'; for Respondent's income is 'top 75%'.

<sup>b</sup>  $P \leq 0.05$  for comparison with the referent group.

<sup>c</sup>  $P \leq 0.01$  for comparison with the referent group.

hostility and hopelessness, regardless of their own education and adult occupation and income. On the other hand, patterns of adult depressive symptoms were much more sensitive to current socioeconomic circumstances than to early-life socioeconomic indicators. We found little evidence that mothers' and fathers' socioeconomic characteristics interacted to affect adult psychosocial functioning. In addition to the evidence that the childhood socioeconomic environment affects biological and behavioural risk factors for adult disease,<sup>14,17,18,47</sup> the results presented here suggest that childhood socioeconomic conditions may also have important influences on some aspects of adult psychosocial functioning.

The specific mechanisms linking childhood socioeconomic conditions and adult cynical hostility and hopelessness are far from clear. Given that the time from exposure to outcome was about 50 years on average, a number of other childhood or adult social, behavioural or biological factors may have contributed to patterns of adult psychosocial functioning. However, it is also possible that cynical hostility and hopelessness are sensitive to the environments in which people grow up and live. Thus, these adult psychosocial characteristics that develop over time into relatively stable ways that individuals interact with others and view their place in the world are plausibly associated with experiences and environments encountered during earlier periods of life. Childhood deprivation has been

shown to be associated with a multitude of potentially harmful exposures, such as a poor educational environment, poor housing quality, parental conflict and loss, environmental exposures, and violence.<sup>48</sup> In addition to the effects of such exposures on the physical health and education of children,<sup>49,50</sup> there is also evidence of early negative psychosocial effects,<sup>51</sup> which may lead to increased risk of psychiatric illness in later life.<sup>52</sup> A longitudinal study from Finland found that hostile child-rearing attitudes in mothers predicted hostile attitudes in 15 year old boys,<sup>53</sup> and a US study found that father's occupation was related to measures of mental health (including 'hostile suspiciousness') among men in their twenties.<sup>54</sup> Given the breadth of negative externalities associated with low socioeconomic position, it is not difficult to imagine that during the course of childhood and adolescence individuals chronically exposed to hardship may develop a persistently cynical and distrustful view of the world, a view that over time may also lead to hopelessness about the future.<sup>55</sup>

The results for cynical hostility and hopelessness also demonstrated important effects of both parental occupation and parental education. While adjustment for multiple measures of adult socioeconomic position attenuated the relationship between parental occupation and cynical hostility, both measures of childhood socioeconomic position remained strongly related to hopelessness. Given the data in hand, it is difficult

to know how to interpret these results. Although done rather crudely here in terms of education and occupation corresponding to intellectual and material environment, it nevertheless seems useful to conceptualize potentially different domains of early-life socioeconomic environment and their potential impact on a variety of different later-life health related outcomes.

In contrast to the results for cynical hostility and hopelessness, childhood socioeconomic position was not associated with adult depressive symptoms after accounting for adult socioeconomic characteristics. The assessment of depressive symptoms used here essentially measures relatively acute somatic symptoms that are commonly associated with depression. Such symptoms are perhaps more likely to be transitory and responsive to recent events and experiences than are the measures of hopelessness and cynical hostility. Both hopelessness, which captures an attitude regarding low expectations and futility about the future, and cynical hostility, which captures a suspicious and mistrustful world view, may tend to reflect more enduring cognitive mind-sets. The likely complex relationships between these three outcomes certainly merit further investigation and it is possible that cynical hostility or hopelessness or both are precursors to adult depression.

The specificity of the associations between childhood socioeconomic factors and adult psychosocial functioning observed here is interesting and may be informative about pathways between childhood and adult health. There is evidence that childhood socioeconomic deprivation is not uniformly associated with all adult health outcomes.<sup>16</sup> Indeed, it is logical to assume that not all adult health outcomes would be influenced to the same degree by early-life factors—it would depend upon which particular risk factors were associated with deprivation in childhood, and the distribution of these risk factors would likely differ across place and time. For instance, it seems plausible that things like motor vehicle accidents are likely to be more strongly associated with socioeconomic indicators reflecting the current environment, whereas other outcomes like dietary patterns are more plausibly the result of life-long learned processes that could be linked to childhood as well as current socioeconomic conditions.

In addition, the evidence for a relationship between childhood socioeconomic conditions and adult depression is inconsistent. Some studies have found that childhood socioeconomic position is associated with adult depression, but these are hard to interpret because they have not accounted for adult socioeconomic position,<sup>54,56,57</sup> while others have found either no relationship with childhood socioeconomic position<sup>58</sup> or strong effects of other measures of childhood adversity such as parental loss or abuse.<sup>59–61</sup> Given that socioeconomic differentials in depression may increase with age,<sup>54,62</sup> one reason for the discrepant results in the above studies may be the failure to measure socioeconomic conditions in both early- and later-life. In particular, and consistent with the results presented here, depression is likely to be particularly sensitive to occupational and employment conditions (e.g. the extent of direction, organizational control, and planning) in adulthood.<sup>33,63–65</sup>

However, we would caution against interpreting our results as evidence that childhood socioeconomic conditions are unimportant in relation to adult depressive symptoms simply because of the social links between poorer childhood and later socioeconomic disadvantage. In other words, adjustment for adult

socioeconomic indicators could be viewed as over-adjustment for socioeconomic factors in the pathway between childhood and adult conditions. The important influence of childhood socioeconomic conditions on socioeconomic destinations in adulthood militates against explanations for adult health outcomes that emphasize socioeconomic conditions at a single stage of life. The attenuation of the impact of early-life factors on depressive symptoms after adjustment for adult socioeconomic position in our study simply implies that later-life factors are more closely aligned with adult depressive symptoms. Finally, since our study measures depressive symptoms and not clinically diagnosed depressive disorder, we cannot rule out the possibility that childhood socioeconomic conditions may be causally related to clinical depression. Clearly this is an area of research that requires additional investigation.

Five additional issues require comment. First, retrospective reports of parental occupation and education are clearly not as desirable as data from objective sources. Nevertheless, we cannot think of a reason why respondent recall of mothers' and fathers' education and occupation should be subject to recall bias. More importantly, if bias was present, we do not see how it could produce the pattern of results observed, where parental socioeconomic factors were associated with hopelessness and cynical hostility but not depressive symptoms. Second, it should be noted that the independent effects of childhood and adult socioeconomic position reported in the results were modest in magnitude—in the order of one-quarter to one-half a standard deviation of each psychosocial outcome. However, the relatively small, unique contribution of multiple measures of socioeconomic position across different stages of the life course suggests that the cumulative effects of life course socioeconomic position on adult hostility and hopelessness will be more substantial. Third, we were unable to obtain early-life measures of psychological functioning for this population. Given both the time between exposure and outcome, and the potential effects of childhood and adolescent psychosocial functioning on adult psychosocial indicators,<sup>58,66</sup> measures of this sort from early-life would allow for a better picture of the relationship between socioeconomic position and psychosocial functioning across the life course. Fourth, it is important to remember that this study was conducted on a sample of Finnish men born between 1926 and 1947, most of whom grew up amid the unique economic and social consequences of the Second World War. While this may be seen as a limitation to the generalizability of the results, it may also be viewed as a conceptual strength, allowing for a more refined understanding of the results. For example, another Finnish study of childhood experiences and adult depression among people born from 1905 to 1954 found no effect of father's social class, and found childhood experiences were more strongly related to depression among women than among men.<sup>61</sup> Studies assessing the effects of socioeconomic factors on health, particularly across the life course, should pay close attention to the particular historical, geographical, and cultural circumstances pertaining to the cohort being studied. If we abstract individual elements of peoples' lives from the contexts in which those lives were led, it may impair our ability to better understand the mechanisms through which the economic and social environment affects health throughout life.<sup>16</sup> Finally, it is possible that our results are confounded by unreported parental psychiatric illness; however, the lack of

any association between our measure of self-reported history of emotional/mental illness in either parent and measures of adult psychosocial functioning makes this less plausible. More importantly, our results have implications for the effects of residual confounding on potential links between psychosocial exposures and health. We have shown that psychosocial factors like hopelessness and hostility are influenced by socioeconomic conditions in childhood, and by education, occupation and income. Thus, when studies seek to determine the association between a particular psychosocial factor and an outcome, adjusted for socioeconomic position, they may underestimate confounding by life course socioeconomic factors if they only adjust for one or even two measures of current socioeconomic position. It is possible that simple socioeconomic adjustment for things like education or occupation will result in inflated estimates of the association between certain psychosocial exposures and health outcomes.

The importance of our study lies in the measurement of socioeconomic position over the life course, which highlights

the need to begin to think about adult health in a perspective that encompasses the positive and negative exposures that accrue throughout life. A more complete understanding of the pathways between the childhood socioeconomic environment and subsequent psychosocial functioning obviously requires further study. However, consistent with previous research on the effects of childhood socioeconomic position on physical health in later life, the results presented here suggest that, in addition to the impact of adult socioeconomic position, some aspects of poor psychosocial functioning in adulthood may also have socioeconomic roots early in life.

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### KEY MESSAGES

- Adult levels of cynical hostility and hopelessness are associated with socioeconomic conditions in both early and later life.
- Socioeconomic factors in adulthood are more strongly associated with adult depressive symptoms than socioeconomic conditions in childhood.
- Understanding socioeconomic variations in adult health outcomes—including psychosocial functioning—may require assessment of socioeconomic position over the life course.

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## Commentary: Childhood socioeconomic status, life course pathways and adult mental health

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The paper by Harper *et al.*<sup>1</sup> in this issue of the *International Journal of Epidemiology* provides new evidence that childhood socioeconomic conditions matter for adult mental health. Their study joins many others in showing that—at the very beginning of life—socioeconomic stratification sets the stage for the exposure to risks that eventually lead to diseases of diverse aetiologies.<sup>2,3</sup>

Harper *et al.* studied 2585 Finnish men, and found that those of lower childhood socioeconomic status (SES), indexed by parental occupation and education, had significantly higher mean values on scales of cynical hostility, hopelessness, and depressive symptoms. On the basis of multiple regression models estimated separately for both childhood SES indicators, parental occupation and education had comparable effects on the psychosocial outcomes. These effects were slightly attenuated when both childhood SES indicators were modelled simultaneously, and were further attenuated after the subject's own SES was controlled for; however, childhood SES remained significantly related to cynical hostility and hopelessness, although not depressive symptoms. It is possible that the lower reliability of the depression index in this sample and the assessment of depression on a current rather than lifetime basis contributed to the weak association between childhood SES and adult depressive symptoms.

While these analyses can be criticized for the use of retrospective reports of childhood SES, adults do seem to be able to accurately recall their parents' SES at the time of their childhood.<sup>4</sup> Whether or not high levels of hostility, hopelessness,

and depressive symptoms influence the reporting of childhood SES is less clear. In light of evidence that current mood impacts certain aspects of memory,<sup>5,6</sup> this issue remains a concern.

Interpretation of the results of this study depends on our ability to gauge the location and magnitude of the differences in hostility, hopelessness, and depressive symptoms that were observed between men of lower versus higher childhood SES. By location, I refer to the question of whether SES differences in the psychosocial outcomes lie entirely within the normal range of functioning or whether they shift individuals into the severe range of a normal distribution. Regarding magnitude, I refer to the issue of whether the effects are meaningful, that is, are of 'clinical significance'. To address both of these questions, additional information is needed, such as the correlation of the psychosocial outcomes with psychiatric diagnoses, and the level of functional impairment associated with high scores for hostility, hopelessness, and depressive symptoms. Yet, as Harper *et al.* maintain, even small effects that exist at any single point in time may accumulate over the life course and lead to significant impairment. However, SES indicators obtained at multiple life stages are needed to directly test accumulation hypotheses (for example, see Holland *et al.*).<sup>7</sup>

The study by Harper *et al.* brings to the fore two important challenges for researchers conducting epidemiological investigations within a life course framework.

### Challenge 1: The Use of Socioeconomic Status in Life Course Epidemiology

Epidemiological investigations into socioeconomic gradients in disease are often criticized as 'Black Box' epidemiology because explanations for such gradients are seldom elucidated.<sup>8</sup> In addition, the tendency to use measures of socioeconomic conditions interchangeably makes it difficult to generate hypotheses regarding the specific domains of SES that are relevant for any

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particular outcome. This lack of clarity is especially problematic for studies investigating the effects of SES across the life course. The reason for this is that we tend to regard the most common indicators of SES—i.e. education, occupation, and income—as attributes of individuals rather than of contexts. This is an incorrect assumption in 'life course' studies, wherein parents' SES is used to represent their children's socioeconomic context. And despite considerable shared variation between indicators of parental SES, they may not be entirely redundant, with the variance specific to each measure of parental SES reflecting distinct aspects of the childhood environment that impact long-term health.

It is notable that Harper *et al.* considered two aspects of children's socioeconomic context, parental education and occupation, and hypothesized that each represents a different component of the childhood environment, i.e. children's intellectual and material resources respectively. As parental education and occupation were found to have independent effects on adult cynical hostility and hopelessness, it is possible to conclude that both of these domains are important for adult well-being. It is important to distinguish between the two hypotheses presented here. The first, or 'measurement' hypothesis, is that parental education and occupation reflect different aspects of the childhood environment. The second, or 'causal' hypothesis, is that both of the domains measured by parental education and occupation influence adult well-being. Further research is needed to explicitly test both of these hypotheses.

## Challenge 2: Identifying Common Pathways

To a large extent, the focus of life course epidemiology has been the correlation of childhood factors with single adult health conditions, leading investigators to call for future studies of the pathways between childhood risks and specific adult disorders. Harper *et al.* have gone beyond this by analysing multiple, albeit related, dimensions of adult psychosocial health. Their finding that childhood conditions predict multiple aspects of adult functioning may lead one to hypothesize that common pathways exist linking early life SES to adult health. The identification of common pathways has substantial public health relevance for the translation of life course epidemiology into practice; this is because interventions that target common pathways have the potential to reduce morbidity related to multiple conditions.

Perhaps the most frequently hypothesized pathway—or mediating variable—between childhood SES and adult health is adult SES. Adult SES is considered a pathway because it is heavily influenced by childhood SES (for example, see Power and Matthews regarding this issue in the 1958 British Birth Cohort<sup>9</sup>) and is itself predictive of subsequent health outcomes, including the ones studied by Harper *et al.*<sup>10</sup> While Harper *et al.* found that childhood SES remained significantly associated with measures of adult psychosocial functioning after adult SES was controlled for, Lynch *et al.* previously reported that—in the same sample—childhood SES did not predict adult mortality independent of adult SES.<sup>11</sup> Taken together, these findings indicate that adult SES is one, but not the only, pathway linking childhood SES to adult health. For those life course associations

that are mediated by adult SES, programmes aimed at reducing adult SES gradients in health are needed.<sup>12,13</sup> Even without a complete understanding of the pathways involved, though, research on the life course effects of childhood SES supports the assertion that improving the socioeconomic conditions of children<sup>14,15</sup> would have a long-term benefit for adult health and may be an especially powerful avenue towards the reduction of health inequalities.

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