

# Parental occupation, family affluence and adolescent health behaviour in 28 countries

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## Abstract

**Objectives:** We explored the association between socioeconomic position and four different aspects of adolescent health behavior in a wide range of European countries, the US, Canada and Israel.

**Methods:** Data were collected from the Health Behaviour in School-aged Children (HBSC) study in 2002. Representative samples of 13 and 15 year olds completed a standardised questionnaire during school hours in each country. Logistic regression analyses were used to investigate the independent effect of parental occupation and family affluence on tobacco and alcohol use, vegetable consumption and TV viewing.

**Results:** Family affluence showed no significant association with regular smoking in most countries, whereas an increase in smoking with decreasing occupational status was found in half of the countries. For alcohol consumption a positive association was found with family affluence in half of the countries, while no relationship with parental occupation was observed. Both measures of socioeconomic position were strong independent predictors for vegetable consumption and television viewing in almost all countries.

**Conclusions:** The findings suggest that health behaviours that begin to develop in adolescence are less strongly influenced by parental socioeconomic position. Preventive intervention strategies should take the different socioeconomic patterns of health behaviour into account.

**Keywords:** Adolescence – Health behaviour – Socioeconomic status – Family affluence – HBSC.

## Introduction

While the graded relationship between socioeconomic status (SES) and health in adulthood has been the subject of intense research<sup>1,2</sup>, far less is known about the magnitude and the pattern of social inequalities in health among adolescents.<sup>3–5</sup> The existing studies show that socioeconomic differences in adolescent health are generally less consistent and less pronounced than in any other part of the life-cycle.<sup>6–11</sup> These findings are often explained by what is referred to as a “process of equalisation”, whereby the defining features of adolescence (such as school, peers, youth culture) cut across traditional class boundaries resulting in a homogenising effect.<sup>3,7</sup> Another explanation, known as the hypothesis of latent differences, is based on the assumption that, even if there are socioeconomic differences in adolescent health, they cannot be assessed with the current measures of health.<sup>4,8,12,13</sup> Adolescents are generally regarded as a „healthy“ population and consequently it is difficult to observe socioeconomic differences in health. But the prelude of the “re-emergence” of health inequalities in adulthood is visible in the unequal distribution of individual determinants of health across socioeconomic groups (e.g. health behaviours such as substance use, nutrition, and physical activity).

However, the evidence about the relationship between socioeconomic status and health behaviour in adolescence is just as inconsistent and contradictory as it is for premature mortality and morbidity.<sup>7,14,15</sup> While some studies have identified an unequal distribution of tobacco, alcohol and other substance use measures among socioeconomic groups<sup>9,16,17</sup>, others have found no or only slight socioeconomic differences for these

behavioural outcomes.<sup>8,12,18–22</sup> More consistent socioeconomic differences are found, in general, for behaviours such as nutrition and physical activity/sedentary behaviour.<sup>8,12,17,21,23–26</sup>

Nevertheless, it may be inappropriate to combine findings from studies conducted in different socio-cultural contexts, with different methods and at different times. A further complication is that studies rarely examine a range of health behaviours but instead focus on a single behaviour.<sup>27</sup>

The present study analyses the association between parental socioeconomic position and different aspects of adolescent health behaviour in a wide range of European and North American countries. It addresses the question whether socioeconomic differences in smoking, alcohol use, vegetable consumption and television viewing exist among 13 to 15 year old adolescents and whether certain health-related behaviours are stronger associated with SES than others. We will also examine whether these relationships differ by SES indicator.

## Methods

Data were obtained from the Health Behaviour in School-aged Children (HBSC) study 2001/2002, a cross-national survey supported by the World Health Organization. The aim of the HBSC study is to describe young people's health and health behaviour and to analyse how these outcomes are related to the social context. Cross-sectional surveys of 11, 13 and 15 year old children and adolescents are carried out every four years in a growing number of countries based on an internationally agreed protocol.<sup>28</sup> The latest survey, in 2001/02, included a total of 35 countries from Europe and North America. The aims and theoretical framework of the study have been described elsewhere.<sup>29</sup>

Students are selected using a clustered sampling design, where the initial sampling unit is the school class. The recommended minimum sample size for each country was 1536 students per age group (i. e. 11, 13 and 15 year olds), to assure a 95% confidence interval of  $\pm 3\%$  for prevalence estimates. Some of the countries participating in the HBSC study did not need ethical approval. In other countries the required approval was obtained by different Institutional Review Boards. The present analysis is based on data of the 13 and 15 year olds (41454 male and 45213 female students) from 28 countries. The analysis was restricted to these age groups as the prevalence of 11 year old pupils engaging in some of the health behaviours was very low. Countries excluded were Austria, Belgium (Wallonia), England, Greenland, Lithuania, Macedonia and the Netherlands because of high rates of missing values for parental occupation (above 15%).

## Measures

The data were collected by means of standardised questionnaires, administered in school classrooms according to standard instructions. Four health risk behaviours that cover different dimensions of health behaviour are included in this study: smoking, alcohol use, vegetable consumption and television use. The former two are strongly influenced by peers and less by parents and begin to develop in adolescence, while the latter two are mainly learned in early childhood and are to a large extent influenced by parents, even in adolescence.<sup>30–32</sup>

The adolescents smoking status was defined on the basis of the question "How often do you smoke tobacco at present?" Possible responses were: "every day", "at least once a week, but not every day", "less than once a week" or "never". As only a small proportion of adolescents were smoking weekly, but not daily, the original response options were dichotomised in "weekly smokers" vs. "less than weekly smokers". Alcohol use was measured with the question "At present, how often do you drink anything alcoholic, such as beer, wine or spirits (including small amounts)?" This question was separately applied to three types of alcohol: 1. beer, 2. wine and 3. spirits/liquor (response categories were "every day", "every week", "every month", "rarely" and "never"). An overall index of alcohol consumption was constructed taking into account the highest consumption of any type of alcohol. Responses were dichotomised in "at least weekly" versus "less than weekly". Regarding the consumption of vegetables, students were asked how many times a week they usually eat vegetables. The response options were: "never", "less than once a week", "about once a week", "two to four days a week", "five to six days a week", "once a day, every day", "every day, more than once". The item was dichotomised into "at least once a day" vs. "less than daily". Television use was assessed by asking pupils how many hours they usually watched television (including videos) on weekdays and on weekend days. Possible responses were "none at all", "about half an hour a day", "about 1 hour a day", "about 2 hours a day" up to "about 7 or more hours a day". Both items were combined into one variable representing the average hours of TV watching per day. Response options were recoded into "4 hours or more" (excessive television-viewers) versus less.

## Socioeconomic position

Two open-ended questions were used to assess the parents' occupational status. Students were asked to indicate separately where their father and mother work and to describe what kind of job they do. Countries were required to condense the answers into a five-point social class scheme similar to the British registrar general's classification following standard guidelines for occupational coding. Information on the occu-

**Table 1.** Sample details and descriptive statistics for family affluence and parental occupation by country.

	Family affluence (FAS)			Parental occupation			
	N	high	medium	low	high	medium	low
<b>Western European Countries (WEC)</b>							
Belgium (Flanders)	4136	41.7	21.9	36.3	32.2	41.1	26.7
France	5514	28.0	40.0	32.1	24.4	25.4	50.3
Germany	3541	28.5	38.7	32.9	21.6	40.5	37.9
Ireland	1863	38.0	22.2	39.7	65.0	20.4	14.5
Scotland	2655	22.3	40.6	37.1	47.6	18.7	33.7
Switzerland	3116	29.3	42.8	27.9	16.5	37.4	46.2
Wales	2536	25.5	43.4	31.0	44.5	18.6	36.9
<b>Northern European Countries (NEC)</b>							
Denmark	2937	28.1	43.3	28.5	25.5	26.6	47.9
Finland	3459	23.2	42.1	34.7	34.7	40.7	24.7
Norway	3358	24.2	46.4	29.4	25.6	45.0	29.4
Sweden	2409	36.1	22.0	41.9	48.2	15.2	36.6
<b>Southern European Countries (SEC)</b>							
Greece	2555	37.9	37.8	24.4	30.5	34.0	35.5
Italy	2845	35.4	41.9	22.7	22.1	56.3	21.7
Malta	1340	31.9	26.8	41.3	31.2	27.5	41.3
Portugal	1763	36.8	37.3	26.0	26.4	23.2	50.5
Spain	3721	38.3	20.4	41.3	29.4	17.8	52.7
<b>Central and Eastern European Countries (CEEC)</b>							
Croatia	2926	39.9	20.0	40.0	19.6	32.5	47.8
Czech Republic	3321	38.9	21.8	39.3	44.6	30.6	24.8
Estonia	2690	26.6	39.4	34.0	32.3	27.4	40.3
Hungary	2738	28.2	35.3	36.5	36.2	48.1	15.7
Latvia	2270	31.4	34.1	34.4	35.6	25.8	38.6
Poland	4235	26.7	36.6	36.7	21.2	31.6	47.1
Russia	5513	25.8	39.4	34.8	26.2	45.6	28.2
Slovenia	2455	40.9	21.7	37.4	22.6	30.2	47.2
Ukraine	2898	40.3	18.9	40.8	38.4	11.0	50.6
<b>North America</b>							
Canada	2720	33.1	22.4	44.5	49.3	29.4	21.3
USA	3546	35.8	38.4	25.8	45.4	27.0	27.7
Israel	3607	39.5	17.8	42.7	42.5	32.9	24.6

paternal status of the father and mother was combined, using the highest occupational status of both as the parental indicator. The original five categories were recoded into high (I and II), middle (III) and low (IV and V) occupational status. Income and material wealth represent other important dimension of socioeconomic position. Material wealth was measured with the “Family Affluence Scale (FAS)”<sup>5,33,34</sup> This validated measure consists of four different items: car ownership (0, 1, 2 or more), computer ownership (0, 1, 2, 3 or more), number of family holidays last year (0, 1, 2, 3 or more), and

own bedroom (no = 0, yes = 1). A composite FAS score was calculated by summing the responses to these four items ranging from 0 to 9. The FAS scores were subsequently recoded into tertiles within each country (high, medium, low). Table 1 provides basic information about the distribution of parental occupation and family affluence in the study population.

*Statistical analysis*

Logistic regression analyses including both SES indicators simultaneously were used to investigate the independent effect

**Table 2.** Associations between smoking (at least once a week), alcohol use (at least once a week) and socioeconomic indicators among 13- to 15-year olds by country, unadjusted prevalence (%) and odds ratios (OR)<sup>a</sup>.

	Tobacco smoking						Alcohol use								
	Family affluence			Parental occupation			Family affluence			Parental occupation					
	Overall %	high	medium	low	high	medium	low	Overall %	high	medium	low	high	medium	low	
<b>Western European Countries (WEC)</b>															
Belgium (Flanders)	15.3	1 <sup>b</sup>	0.95	1.22	1	1.17	<b>1.54**</b>	19.2	1	0.85	0.84	1	1.21	0.98	
France	15.9	1	1.08	<b>1.35**</b>	1	<b>0.72**</b>	0.90	9.5	1	0.90	0.85	1	1.18	0.99	
Germany	23.4	1	1.03	1.18	1	1.15	1.27	19.4	1	0.91	0.78	1	1.19	0.86	
Ireland	13.4	1	1.28	1.13	1	<b>1.67**</b>	<b>2.18***</b>	7.8	1	0.91	0.66	1	<b>1.65*</b>	1.55	
Scotland	13.3	1	1.07	1.37	1	1.14	<b>1.37*</b>	27.1	1	0.91	<b>0.73*</b>	1	0.90	0.99	
Switzerland	15.5	1	0.79	1.07	1	1.13	1.38	14.4	1	0.93	0.96	1	0.76	0.83	
Wales	15.7	1	1.22	1.37	1	1.24	<b>1.36*</b>	28.1	1	0.89	<b>0.75*</b>	1	0.83	1.01	
<b>Northern European Countries (NEC)</b>															
Denmark	11.6	1	1.04	1.04	1	1.29	<b>1.61**</b>	26.0	1	0.91	<b>0.63***</b>	1	0.98	0.82	
Finland	20.8	1	0.82	1.16	1	<b>1.40**</b>	<b>1.55***</b>	7.4	1	<b>0.62**</b>	<b>0.58**</b>	1	<b>1.61**</b>	<b>1.58*</b>	
Norway	14.5	1	0.93	1.03	1	1.17	<b>1.70**</b>	9.5	1	<b>0.62**</b>	<b>0.67*</b>	1	0.91	1.27	
Sweden	10.2	1	0.88	0.93	1	<b>1.72*</b>	<b>1.81***</b>	10.2	1	0.68	0.81	1	0.97	1.14	
<b>Southern European Countries (SEC)</b>															
Greece	9.0	1	0.97	0.97	1	1.09	1.06	21.7	1	0.81	<b>0.71*</b>	1	0.93	1.00	
Italy	14.3	1	0.80	1.08	1	0.81	1.03	29.0	1	<b>0.78*</b>	<b>0.73**</b>	1	0.94	0.97	
Malta	14.2	1	1.02	1.01	1	0.79	1.14	34.8	1	0.84	<b>0.71**</b>	1	0.86	1.19	
Portugal	16.9	1	0.83	0.95	1	0.80	1.00	11.9	1	0.72	0.84	1	1.19	1.13	
Spain	17.8	1	0.78	0.89	1	1.13	1.16	12.2	1	<b>0.71*</b>	1.01	1	1.08	1.14	
<b>Central and Eastern European Countries (CEEC)</b>															
Croatia	14.1	1	0.78	<b>0.66**</b>	1	1.65	1.46	17.9	1	<b>0.66**</b>	0.80	1	1.23	1.05	
Czech Republic	20.3	1	1.00	1.04	1	<b>1.27*</b>	<b>1.62***</b>	25.3	1	0.98	0.84	1	1.02	1.15	
Estonia	16.9	1	1.02	1.20	1	1.12	1.19	13.0	1	1.10	1.00	1	0.99	0.93	
Hungary	16.9	1	0.84	0.95	1	1.28	<b>1.53*</b>	19.0	1	<b>0.59***</b>	<b>0.62***</b>	1	1.06	1.02	
Latvia	17.6	1	1.05	1.00	1	0.78	0.84	10.7	1	0.91	1.10	1	<b>0.56**</b>	0.80	
Poland	15.6	1	1.17	<b>1.44**</b>	1	<b>1.42*</b>	1.25	10.0	1	0.77	0.81	1	0.98	1.08	
Russia	16.9	1	0.95	0.91	1	1.06	<b>1.35**</b>	19.3	1	<b>0.78**</b>	<b>0.67***</b>	1	0.99	0.88	
Slovenia	15.5	1	0.86	0.95	1	<b>1.49*</b>	1.28	15.3	1	0.89	0.74	1	1.20	1.12	
Ukraine	22.4	1	1.00	0.86	1	1.23	<b>1.37**</b>	23.4	1	0.94	<b>0.78*</b>	1	0.98	1.22	
<b>North America</b>															
Canada	10.1	1	0.86	1.35	1	1.36	<b>1.55*</b>	15.0	1	0.79	0.81	1	1.16	0.99	
USA	10.0	1	1.03	1.35	1	1.29	1.35	10.4	1	1.17	1.18	1	1.01	1.01	
Israel	10.0	1	0.83	<b>0.72*</b>	1	<b>1.43*</b>	1.30	15.8	1	0.86	<b>0.72**</b>	1	1.11	1.12	

<sup>a</sup>logistic regression models adjusted for age, gender and both SES indicators respectively, <sup>b</sup>reference group \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, bold = 95 % CI does not include 1

of both indicators on the different health behaviours. Spearman's rho values for the relation between family affluence and parental occupation varied from 0.18 in the Ukraine to 0.38 in Germany. Using separate models for family affluence and parental occupation gave findings very similar to those of the combined model. Results are presented as odds ratios with 95% confidence intervals. The highest group of family affluence and parental occupation served as the reference category with odds ratios being computed for the other two groups in comparison. All analyses controlled for gender and age category, because of their major relevance for occurrence of these lifestyle behaviours in adolescence. Analyses were conducted for each country separately. As, in general, interactions between gender and both SES indicators were not significant, analyses were conducted for boys and girls together. The analyses were done using SPSS, version 14.0.

## Results

Table 2 shows the association between smoking at least weekly and both SES indicators among 13 to 15 year olds across countries. Parental occupation and family affluence had very different relationships with regular smoking. Following adjustment for age, gender and parental occupation, FAS had a significant effect on regular smoking in only four countries. In addition, the direction of the effect varied between countries. A higher risk of weekly smoking among low affluent students was found only in France and Poland. In Croatia and Israel, there was an inverse social gradient for FAS. Regarding parental occupation a higher risk of weekly smoking was found among adolescents of parents with low occupational status in 14 out of 28 countries. The large majority of these countries are Northern and Western European countries or new members of the European Union. For Southern European countries, no socioeconomic differences appeared. In Poland, Slovenia and Israel, the highest risk for weekly smoking was found among adolescents from parents with medium occupational status. Overall, adolescent alcohol consumption was found to be largely unrelated to socioeconomic circumstances of the family (Table 2). A significant association between weekly alcohol use and parental occupation was found only in Ireland, Finland and Latvia. For the former two countries a higher odds ratio for weekly alcohol use was found for the medium occupational category, while in Latvia, a significant lower odds ratio was observed for children from parents of medium occupational status. Interestingly, for family affluence not only a larger number of effects was found (in 14 countries), but the direction of the effect was also in the opposite direction. Adolescents from low and medium affluent family back-

grounds had a lower risk of regular alcohol use compared to those from high affluent families.

For vegetable consumption a much more universal and uniform effect was found (Table 3). A significant social gradient for at least one SES indicator was observed in all countries showing a decreasing odds ratio for daily vegetable consumption with decreasing FAS or parental occupation in most of the countries. Substantial differences in the size of the effect between family affluence and parental occupation were not observed. While significant effects for family affluence (with the exception of Spain, Estonia, and Latvia) were found in all countries, no significant effects were found for parental occupation in all but one Central and Eastern European countries. The only exception was Estonia that showed a higher odds ratio for students from parents with low occupational status. In all countries, the risk of watching television four hours or more a day, increased with decreasing occupational status of the parents (Table 3). Compared to the other health behaviours investigated, the effect sizes especially for occupational status, were quite large with odds ratios up to 3.0 in the lowest SES categories. Compared to parental occupation, family affluence had a weaker relationship with television viewing in terms of the effect size and the number of significant associations in countries. A significant higher odds ratio of excessive television viewing for low family affluence was found in 14 countries.

## Discussion

There is still little known about the relation between parental socioeconomic status and health behaviour in adolescence. In particular, there are only a few studies, which have taken a look at various dimensions of health behaviour in the same sample.<sup>17,23,35</sup> To our knowledge, this is the first study to analyse a wider range of behaviours using a large cross-national dataset. Referring to the recent debate on equalisation in health in adolescence the analysis is focussing more on the existence of socioeconomic differences in health behaviour rather than comparing the size of inequalities across countries.

In general, the findings only partially support the hypothesis of latent socioeconomic differences in health in adolescence (expressed by differences in health behaviour), as we found pronounced socioeconomic differences in some health behaviours but not in others. The results showed that family affluence had almost no significant effect on regular smoking in the 28 countries. In contrast, an increase in smoking with decreasing occupational status was found in half of the countries. The association between alcohol use and parental socioeconomic status was also weak and inconsistent. In

**Table 3.** Associations between vegetable consumption (at least once a day), television viewing (4 hours or more a day) and socioeconomic indicators among 13- to 15-year olds by country, unadjusted prevalence (%) and odds ratios (OR)<sup>a</sup>.

	Vegetable consumption						Television viewing							
	Family affluence			Parental occupation			Family affluence			Parental occupation				
	Overall %	high	medium	low	high	medium	low	Overall %	high	medium	low	high	medium	low
<b>Western European Countries (WEC)</b>														
Belgium (Flanders)	52.9	1 <sup>b</sup>	0.85	<b>0.67***</b>	1	<b>0.66***</b>	<b>0.59***</b>	21.2	1 <sup>b</sup>	1.08	<b>1.31**</b>	1	<b>1.78***</b>	<b>3.26***</b>
France	40.8	1	<b>0.87*</b>	<b>0.71***</b>	1	<b>1.24**</b>	0.99	19.2	1	1.04	<b>1.66***</b>	1	1.00	<b>1.62***</b>
Germany	31.1	1	0.94	<b>0.80*</b>	1	<b>0.82*</b>	<b>0.79*</b>	19.8	1	<b>1.35*</b>	<b>1.39*</b>	1	<b>1.54**</b>	<b>2.16***</b>
Ireland	39.7	1	0.95	<b>0.72**</b>	1	0.88	0.95	17.6	1	1.15	<b>1.37*</b>	1	<b>1.55**</b>	<b>1.65**</b>
Scotland	33.0	1	0.80	<b>0.61***</b>	1	0.79	<b>0.71**</b>	27.8	1	1.24	<b>1.51**</b>	1	1.19	<b>1.42**</b>
Switzerland	32.8	1	0.99	<b>0.68**</b>	1	1.20	0.87	12.9	1	1.24	<b>1.44*</b>	1	1.26	<b>2.22***</b>
Wales	21.6	1	0.96	<b>0.73*</b>	1	<b>0.55***</b>	<b>0.50***</b>	29.3	1	1.21	1.23	1	<b>1.48**</b>	<b>1.96***</b>
<b>Northern European Countries (NEC)</b>														
Denmark	26.6	1	<b>0.75**</b>	0.82	1	<b>0.65***</b>	<b>0.49***</b>	23.5	1	1.06	<b>1.34*</b>	1	<b>1.52**</b>	<b>2.31***</b>
Finland	20.6	1	<b>0.73**</b>	0.79	1	<b>0.64***</b>	<b>0.51***</b>	17.5	1	1.17	1.22	1	<b>1.39**</b>	<b>2.05***</b>
Norway	20.1	1	<b>0.65**</b>	<b>0.67***</b>	1	<b>0.60***</b>	<b>0.60***</b>	25.6	1	1.19	<b>1.31*</b>	1	1.17	<b>1.48***</b>
Sweden	27.9	1	0.94	<b>0.73**</b>	1	0.77	<b>0.70***</b>	18.2	1	0.98	<b>1.40*</b>	1	<b>1.50*</b>	<b>1.40**</b>
<b>Southern European Countries (SEC)</b>														
Greece	20.3	1	<b>0.73**</b>	<b>0.56***</b>	1	<b>0.72**</b>	<b>0.61***</b>	17.8	1	1.12	<b>1.35*</b>	1	<b>1.61***</b>	<b>2.12***</b>
Italy	22.4	1	<b>0.66***</b>	<b>0.44***</b>	1	1.16	0.85	18.4	1	1.13	<b>1.51**</b>	1	<b>1.38*</b>	<b>1.43*</b>
Malta	13.2	1	0.88	<b>0.59**</b>	1	<b>0.59*</b>	<b>0.53**</b>	17.1	1	0.73	1.07	1	<b>3.27***</b>	<b>2.94***</b>
Portugal	23.5	1	<b>0.74*</b>	0.88	1	0.76	<b>0.64**</b>	33.9	1	1.03	1.19	1	<b>1.40*</b>	<b>1.61***</b>
Spain	9.4	1	1.03	0.81	1	0.88	<b>0.70**</b>	20.3	1	0.97	1.21	1	<b>1.41*</b>	<b>1.79***</b>
<b>Central and Eastern European Countries (CEEC)</b>														
Croatia	21.8	1	0.88	<b>0.71**</b>	1	0.85	0.98	31.1	1	1.12	1.12	1	<b>1.38**</b>	<b>1.48***</b>
Czech Republic	25.8	1	<b>0.77*</b>	<b>0.70***</b>	1	1.08	0.94	22.5	1	0.97	1.06	1	<b>1.37**</b>	<b>1.51***</b>
Estonia	13.4	1	0.99	0.86	1	1.05	<b>1.48**</b>	35.5	1	0.98	1.10	1	1.22	<b>1.38**</b>
Hungary	13.7	1	<b>0.63***</b>	<b>0.50***</b>	1	0.91	1.11	20.9	1	1.01	<b>1.38*</b>	1	<b>1.56***</b>	<b>1.80***</b>
Latvia	27.4	1	0.87	1.00	1	1.27	1.04	36.7	1	0.99	1.09	1	1.21	<b>1.71***</b>
Poland	34.4	1	0.96	<b>0.67***</b>	1	0.86	0.87	28.2	1	1.02	1.11	1	1.12	<b>1.49***</b>
Russia	35.4	1	<b>0.77***</b>	<b>0.65***</b>	1	0.94	1.13	32.3	1	1.00	<b>1.21*</b>	1	<b>1.20*</b>	<b>1.36***</b>
Slovenia	24.7	1	0.89	<b>0.75**</b>	1	0.78	0.89	15.6	1	0.95	1.09	1	<b>1.47*</b>	<b>1.63**</b>
Ukraine	44.4	1	0.99	<b>0.76**</b>	1	1.01	1.06	42.9	1	1.00	0.98	1	1.29	<b>1.36***</b>
<b>North America</b>														
Canada	38.6	1	0.93	<b>0.75**</b>	1	0.78*	<b>0.73**</b>	19.0	1	1.28	1.16	1	<b>1.32*</b>	<b>1.60***</b>
USA	29.2	1	<b>0.83*</b>	<b>0.68***</b>	1	<b>0.82*</b>	0.98	28.2	1	1.08	<b>1.58***</b>	1	<b>1.42***</b>	<b>1.68***</b>
Israel	48.5	1	0.87	<b>0.83*</b>	1	0.95	0.89	35.7	1	1.10	1.09	1	<b>1.57***</b>	<b>1.26**</b>

<sup>a</sup>logistic regression models adjusted for age, gender and both SES indicators respectively, <sup>b</sup>reference group. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, bold = 95% CI does not include 1

most countries no association was found with occupational status and in those few countries where an effect of family affluence was observed, low affluent students had a lower odds ratio of regular alcohol use. These results confirm previous studies, which identified weak relationships between parental socioeconomic status and adolescent tobacco use and an inverse social gradient for alcohol consumption in adolescence.<sup>8,18, 19,21,35–38</sup>

A different picture was observed for socioeconomic differences in vegetable consumption and television viewing. Family affluence and parental occupation were strong independent predictors of both outcomes. The results are consistent for both SES indicators (an increasing risk of health-damaging behaviours, i.e. higher levels of excessive television viewing and lower levels of daily vegetable consumption with decreasing socioeconomic status). These results underline previous findings from single studies on sedentary behaviour and vegetable consumption.<sup>12,25,35,39–41</sup>

#### *Interpretation*

Overall, the patterns of SES associations are remarkably in the same direction across geographic areas, i.e. both measures of socioeconomic position show either a consistent association with particular behaviours or not. This may indicate, at least, that the basic directions of the SES-behaviour relationship are the same across countries. Thus, some important observations on the differential association between the SES indicators and the four behaviours could be made. Occupational status of the parents exerts a stronger effect on smoking and television viewing than family affluence, while family affluence showed a stronger association with alcohol use and vegetable consumption, although on different levels (larger number of effects for vegetable consumption – smaller number of effects for alcohol use). These findings suggest that different dimensions of socioeconomic position have different effects on health behaviour in adolescence.<sup>14</sup> Family affluence is much more related to income and material wealth. This suggests that it may be the availability of financial resources, more than social status associated with living in a family with higher education and good jobs, which influences alcohol use.<sup>12,42</sup> However, it is difficult to explain why family affluence is not associated with tobacco smoking as cigarettes are costly in many countries. On the other hand, parental occupation reflects to some extent parents' educational status. Educational strategies, values, norms and model behaviour may be more likely to positively influence television use and smoking in adolescence, thus explaining the congruence of parental educational background and adolescents' behavioural patterns. Vegetable consumption, which is strongly associated with both SES measures, might be influenced by financial re-

sources as well as knowledge about health-promoting effects of healthy nutrition. The provision of healthy foods such as fruit, vegetables and milk at school<sup>43</sup> may offer a means to decrease socioeconomic differences as far as these will not interact with family financial status. In general, it is important that further investigations assess to what extent the different dimensions of SES influence adolescent health behaviour as they could give important insights for preventive strategies. Regarding the relatively small socioeconomic differences in smoking and alcohol use, our results suggest that other determinants may have a greater impact on substance use in adolescence than SES. While health behaviour in childhood is highly influenced by the parents, the influence of peers and youth culture increases with age. Both have shown to be significant predictors of adolescents' health behaviour.<sup>44</sup> Such process may lead to a decreasing influence of the family background and might result in a homogenising effect of socioeconomic differences.<sup>3,7</sup> This applies especially for those behaviours that do not start until adolescence (e.g. tobacco and alcohol consumption) and suggests also that the determining role of socioeconomic background for some behaviours might emerge only later in life.<sup>45,46</sup> Studies which show that adolescent substance use is strongly linked to the students' own social position (i.e. the educational level) but not to parental SES, support this argumentation.<sup>23,35,46</sup>

In contrast, our results show that vegetable consumption and television use are strongly associated with parental SES. An important difference is that these behaviours – unlike tobacco and alcohol use – are mainly learned in childhood where parental influence is much stronger than in adolescence and even in adolescence are to a large extent influenced by parents.<sup>30,40,47</sup> Even though data on parental health behaviour were not available in this study, previous research suggests that family influences (including direct modelling of behaviour by parents) play a major role in the development of health-related attitudes and behaviours of children and adolescents.<sup>17,48</sup> Indeed, even in young adults these behaviours still reflect a strong parental influence.<sup>49</sup> The influence of socioeconomic status is apparently imparted through the behaviour, defaults and control of the parents to the adolescents.<sup>50</sup> It can be argued that for these lifestyle behaviours, unlike for tobacco and alcohol consumption, parental influences, which are mediated via social inequalities, exert a much stronger impact than peer or school-related factors.

#### *Methodological considerations*

The strengths of the study lie in the use of a large cross-national dataset and the availability of various measures of health-related behaviour and socioeconomic status. One limitation of the study is that the HBSC survey is a rather broad study on

health and health behaviour. Thus, only a limited number of self-report items could be included in the survey. Moreover, interpreting adolescent substance use patterns obtained from self-reports can be difficult. Self-reports of tobacco and alcohol use may be influenced by social desirability. However, it has been repeatedly shown that these self-reports can claim a high degree of validity.<sup>51</sup> Nevertheless, while dichotomous classifications of alcohol use and smoking are crude, they are probably less vulnerable to reporting errors.

Another limitation is that questions on parental occupation using adolescent's self-report are problematic. Even though several studies indicate that the classifiable answers of adolescents can be considered as good proxy reports of parental occupation<sup>52–54</sup>, it remains problematic that many adolescents are not able to indicate their parents' occupation at all. If missing or unclassifiable responses are unequally distributed among social groups, it might influence the results. Therefore, the results on occupational differences should be interpreted cautiously. Further, even though various dimensions of health behaviour were analysed there are, of course, other important lifestyle factors that were not included in this study. However, our argumentation of a differential socioeconomic patterning of behaviours that start in adolescence and behaviours that are already established in adolescence is supported by further cross-national studies using other indicators such as drunkenness, tooth brushing and fruit consumption.<sup>55–57</sup>

Despite those methodological restrictions, the results show that the relationship between adolescent health behaviour and socioeconomic status is very complex. Health behaviours that begin to develop in adolescence (tobacco smoking and alcohol use) are less strongly influenced by parental socioeconomic status. In contrast, more pronounced and a larger number of socioeconomic differences exist for behaviours, which are established in childhood (e. g. vegetable consumption and television viewing). This pattern points to conflicting spheres of influence and supports the idea of an equalisation process of socioeconomic differences in some behavioural outcomes. Further investigations need to assess to what extent specific elements of adolescence (such as school and peer-related factors) mediate the effect of family background. Preventive intervention strategies should take the different patterns and determinants of health behaviour into account.

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#### References

- Adler NE, Ostrove J. Socioeconomic status and health: what we know and what we don't. *Ann NY Acad Sci* 1999;896:3–15.
- Mackenbach JP, Bakker M, Kunst A, Diderichsen F. Socioeconomic inequalities in health in Europe – An overview. In: Mackenbach JP, Bakker MJ, editors. *Reducing inequalities in health: a European perspective*. London: Routledge; 2002:3–24.
- Chen E, Matthews KA, Boyce WT. Socio-economic differences in children's health: how and why do these relationships change with age? *Psychol Bull* 2002;128:295–329.
- Geckova A, van Dijk JP, Groothoff JW, Post D. Socio-economic differences in health risk behaviour and attitudes towards health risk behaviour among Slovak adolescents. *Soz Praventivmed* 2002;47:233–39.
- Torsheim T, Currie C, Boyce W, Kalnins I, Overpeck M, Haugland S. Material deprivation and self-rated health: a multilevel study of adolescents from 22 European and North American countries. *Soc Sci Med* 2004;59:1–12.
- Rahkonen O, Arber S, Lahelma E. Health inequalities in early adulthood: a comparison of young men and women in Britain and Finland. *Social Science & Medicine* 1995;41:163–71.
- West P. Health inequalities in the early years: is there equalisation in youth? *Soc Sci Med* 1997;44:833–58.
- Tuinstra J, Groothoff JW, van den Heuvel WJ, Post D. Socio-economic differences in health risk behavior in adolescence: do they exist? *Social Science & Medicine* 1998;47:67–74.
- Goodman E, Huang B. Socioeconomic status, depressive symptoms, and adolescent substance use. *Archives of Pediatrics & Adolescent Medicine* 2002;156(5):448–453.
- Koivusilta L, Rimpela A, Kautiainen S. Health inequality in adolescence. Does stratification occur by familial social background, family affluence, or personal social position? *BMC Public Health* 2006;6:110.
- Spencer NJ. Social equalization in youth: evidence from a cross-sectional British survey. *European Journal of Public Health* 2006;16:368–75.
- Piko B, Fitzpatrick KM. Socioeconomic status, psychosocial health and health behaviours among Hungarian adolescents. *Eur J Public Health* 2007.
- Friestad C, Klepp KI. Socioeconomic status and health behaviour patterns through adolescence: Results from a prospective cohort study in Norway. *European Journal of Public Health* 2006;16:41–7.
- Currie CE, Elton RA, Todd J, Platt S. Indicators of socioeconomic status for adolescents: the WHO Health Behaviour in School-aged Children Survey. *Health Educ Res* 1997;12:385–97.
- Hagquist CEI. Health inequalities among adolescents – the impact of academic orientation and parents' education. *European Journal of Public Health* 2007;17(1):21–6.
- de Vries H. Socio-economic differences in smoking: Dutch adolescents' beliefs and behaviour. *Social Science & Medicine* 1995;41:419–24.
- Lowry R, Kann L, Collins JL, Kolbe LJ. The effect of socioeconomic status on chronic disease risk behaviors among US adolescents. *The Journal of American Medical Association* 1996;276:792–97.



18. Donato F, Monarca S, Chiesa R, Feretti D, Modolo MA, Nardi G. Patterns and covariates of alcohol drinking among high school students in 10 towns in Italy: a cross-sectional study. *Drug Alcohol Depend* 1995;37:59–69.
19. Donato F, Monarca S, Chiesa R, Feretti D, Nardi G. Smoking among high school students in 10 Italian towns: patterns and covariates. *Int J Addict* 1994;29:1537–57.
20. Challier B, Chau N, Predine R, Choquet M, Legras B. Associations of family environment and individual factors with tobacco, alcohol and illicit drug use in adolescents. *European Journal of Epidemiology* 2000;16:33–42.
21. Mullan E, Currie CE. Socioeconomic inequalities in adolescent health. In: Currie CE, Hurrelmann K, Settertobulte W, Smith R, Todd J, editors. *Health and health behaviour among young people*. Copenhagen: WHO Europe; 2000:65–72.
22. Huurre T, Aro H, Rahkonen O. Well-being and health behaviour by parental socioeconomic status: a follow-up study of adolescents aged 16 until age 32 years. *Soc Psychiatry Psychiatr Epidemiol* 2003;38:249–55.
23. Bergstrom E, Hernell O, Persson LA. Cardiovascular risk indicators cluster in girls from families of low socio-economic status. *Acta Paediatrica* 1996;85:1083–90.
24. van Lenthe FJ, Boreham CA, Twisk JW, Strain JJ, Savage JM, Smith GD. Socio-economic position and coronary heart disease risk factors in youth. Findings from the Young Hearts Project in Northern Ireland. *European Journal of Public Health* 2001;11:43–50.
25. Renders CM, Henneman L, Timmermans DR, Hirasig RA. [Television watching and some eating habits of 6–14-year-old children in Amsterdam, the Netherlands; a cross-sectional study]. *Ned Tijdschr Geneesk* 2004;148(42):2072–76.
26. Xie B, Gilliland FD, Li YF, Rockett HR. Effects of ethnicity, family income, and education on dietary intake among adolescents. *Prev Med* 2003;36:30–40.
27. Wardle J, Jarvis MJ, Steggle N et al. Socio-economic disparities in cancer-risk behaviors in adolescence: baseline results from the Health and Behaviour in Teenagers Study (HABITS). *Preventive Medicine* 2003;36:721–30.
28. Currie C, Roberts C, Morgan A et al. Young people's health in context – Health Behaviour in School-aged Children (HBSC) study: International report from the 2001/02 survey. Copenhagen: WHO-Europe; 2004.
29. Currie C, Samdal O, Boyce W. *Health Behaviour in School-aged Children: a WHO Cross-National Study (HBSC), Research Protocol for the 2001/2002 Survey*. Edinburgh: University of Edinburgh, Child and Adolescent Health Research Unit (CAHRU); 2001.
30. Kennedy C. Examining television as an influence on children's health behaviors. *J Pediatr Nurs* 2000;15:272–81.
31. Simons-Morton B, Haynie DL, Crump AD, Eitel SP, Saylor KE. Peer and parent influences on smoking and drinking among early adolescents. *Health Educ Behav* 2001;28:95–107.
32. Hill L, Casswell S, Maskill C, Jones S, Wyllie A. Fruit and vegetables as adolescent food choices in New Zealand. *Health Promotion International* 1998; 13:55–65.
33. Boyce W, Torsheim T, Currie C, Zambon A. The family affluence scale as a measure of national wealth: Validation of an adolescent self-report measure. *Social Indicators Research* 2006;78:473–87.
34. Currie C, Molcho M, Boyce W, Holstein B, Torsheim T, Richter M. Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Soc Sci Med* 2008;66:1429–36.
35. Vereecken CA, Maes L, De BD. The influence of parental occupation and the pupils' educational level on lifestyle behaviors among adolescents in Belgium. *J Adolesc Health* 2004;34:330–8.
36. Glendinning A, Shucksmith J, Hendry L. Social class and adolescent smoking behaviour. *Soc Sci Med* 1994;38:1449–60.
37. Shucksmith J, Glendinning A, Hendry L. Adolescent drinking behaviour and the role of family life: a Scottish perspective. *J Adolesc Health* 1997;20:85–101.
38. Lampert T. Smoking and passive smoking exposure in young people. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). *Dtsch Arztebl Int* 2008; 105:265–71.
39. Christakis DA, Ebel BE, Rivara FP, Zimmerman FJ. Television, video, and computer game usage in children under 11 years of age. *J Pediatr* 2004;145:652–6.
40. Lien N, Jacobs DR, Jr., Klepp KI. Exploring predictors of eating behaviour among adolescents by gender and socio-economic status. *Public Health Nutr* 2002;5:671–81.
41. Lampert T, Sygusch R, Schlack R. Use of electronic media in adolescence. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). *Bundesgesundheitsbl Gesundheitsforsch Gesundheitssch* 2008; 50:643–52.
42. Hanson MD, Chen E. Socioeconomic status and substance use behaviors in adolescents – The role of family resources versus family social status. *J Health Psychol* 2007;12:32–5.
43. Matthews A, Cowburn G, Rayner M, Longfield J, Powell C. The marketing of unhealthy food to children in Europe. A report of phase 1 of the Children, obesity and associated avoidable chronic diseases project. Brussels: 2005.
44. Resnick MD, Bearman PS, Blum RW et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA* 1997;278:823–32.
45. Droomers M, Schrijvers CT, Casswell S, Mackenbach JP. Occupational level of the father and alcohol consumption during adolescence; patterns and predictors. *J Epidemiol Community Health* 2003;57:704–10.
46. Paavola M, Vartiainen E, Haukkala A. Smoking from adolescence to adulthood: the effects of parental and own socioeconomic status. *Eur J Public Health* 2004;14:417–421.
47. Sweeting H, Anderson A, West P. Socio-demographic correlates of dietary habits in mid to late adolescence. *Eur J Clin Nutr* 1994;48: 736–48.
48. Koivisto Hursti UK. Factors influencing children's food choice. *Ann Med* 1999;31 Suppl 1:26–32.
49. Lau RR, Quadrel MJ, Hartman KA. Development and change of young adults' preventive health beliefs and behavior: influence from parents and peers. *J Health Soc Behav* 1990;31: 240–59.
50. Dodge KA, Pettit GS, Bates JE. Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Dev* 1994;65:649–665.
51. Newell SA, Girgis A, Sanson-Fisher RW, Savolainen NJ. The accuracy of self-reported health behaviors and risk factors relating to cancer and cardiovascular disease in the general population: a critical review. *American Journal of Preventive Medicine* 1999;17:211–229.
52. Lien N, Friestad C, Klepp KI. Adolescents' proxy reports of parents' socioeconomic status: How valid are they? *J Epidemiol Community Health* 2001;55:731–737.

53. West P, Sweeting H, Speed E. We really do know what you do: A comparison of reports from 11 year olds and their parents in respect of parental economic activity and occupation. *Sociology-the Journal of the British Sociological Association* 2001;35:539–59.

54. Vereecken CA, Vandegheuchte A. Measurement of parental occupation. Agreement between parents and their children. *Arch Public Health* 2003; 61:141–9.

55. Richter M, Leppin A, Nic GS. The relationship between parental socio-economic status and episodes of drunkenness among adolescents: findings from a cross-national survey. *BMC Public Health* 2006;6:289.

56. Maes L, Vereecken C, Vanobbergen J, Honkala S. Tooth brushing and social characteristics of families in 32 countries. *Int Dent J* 2006;56(3):159–67.

57. Vereecken CA, Inchley J, Subramanian SV, Hublet A, Maes L. The relative influence of individual and contextual socio-economic status on consumption of fruit and soft drinks among adolescents in Europe. *Eur J Public Health* 2005;15(3):224–232.

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