

Inequality in Health, Psychosocial Resources and Health Behavior in Early Adolescence: The Influence of Different Indicators of Socioeconomic Position

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Abstract The aim of the present paper was to study the relationship between different indicators of socioeconomic position (SEP) and various health domains in young adolescents' lives. Data stem from two studies carried out in Norway in 2004; a sample of 1,153 5th–7th graders (study 1) and a sample of 654 6th graders (study 2). Indicators of SEP were family affluence, books in home and perceived wealth. Measures of health were health complaints, overall health, and life satisfaction (study 1), measures of psychosocial resources were social competence and self-esteem (study 1), and measures of health behaviours were consumption of fruits and vegetables and physical activity (study 2). Results from study 1 showed that all three SEP-indicators were significantly associated with overall health, life-satisfaction and social competence, with perceived wealth showing the strongest relationship. Health complaints and self-esteem were only associated with perceived wealth. Results from study 2 showed that only books in home was significantly associated with all three health behaviours, while the two other indicators were not. Adolescents with higher SEP report better health, more psychosocial resources and higher level of health behaviour than adolescents with lower SEP. The results indicate that the SEP indicators differ regarding their relevance to the various outcomes. Several aspects of SEP should be included in future research and indicators suitable for adolescents needs to be further developed.

Keywords Socio-economic differences · Adolescence · Health · Psychosocial resources · Health behaviour · Books · Family wealth · Cultural capital · Indicators · SEP

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1 Introduction

The relationship between socioeconomic position (SEP) and health outcomes is well established among adults, and has been shown for different health outcomes such as mortality, specific diseases and self-reported health. The relationship between SEP and health has been found for all levels of the social economic hierarchy, and is not restricted to people who are poor (Adler et al. 1994; Marmot et al. 1997). This challenge of the ‘gradient’ exists in many western countries, also in Norway, a country characterized as an egalitarian welfare state (Mackenbach et al. 1997; Strand and Kunst 2007). Most researchers acknowledge that no single explanation can account for social inequality in health, but that complex mechanisms and several pathways are involved (Adler et al. 1994; Elstad 2000). Within such a social causation perspective inequalities in health are caused by a clustering of factors across the lifespan (Carroll et al. 1996). Health behaviours and psychosocial resources have been suggested as two possible pathways that may partly explain social differences in health (Adler 2007; Adler et al. 1994; Lynch et al. 1997). While the vast majority of studies on social inequality have been conducted among adults, relatively less is known about the mechanisms in adolescence (Chen et al. 2002). Several studies have shown that SEP in childhood and adolescence influence health in adult life (Lynch et al. 1997; Strand and Kunst 2007).

Better understanding of the mechanisms in childhood and adolescence are important both in order to maximize children’s health and improve lifelong health (Adler 2007; Chen et al. 2006). Indeed, Adler has suggested that the seeds of adult health are planted in childhood and that it is important to understand the trajectories from parents SEP to health development of children (Adler 2007). The purpose of the present paper was to study social inequality in the young adolescent period by employing a broad perspective on health and SEP.

1.1 Conceptualization and Measurement of Health

Inequality research may be criticized for being more concerned with disease inequality than health inequality (Abel 2007). Frequently used health indicators in adult samples such as mortality, chronic illness and disease are also less relevant for adolescents (Currie et al. 1997; Smith et al. 1994). We believe that research on social inequality in health should encompass a broader view of health than merely the absence of disease. Thus, an important aim of the present study was to examine the relationship between SEP and various health measures such as satisfaction with life, psychosocial resources, and health behaviours.

Psychosocial resources such as social support, self-efficacy coping and optimism represent one possible pathway by which SEP influences health (Elstad 1998; Taylor and Seeman 1999). Finkelstein et al. (2007) looked at optimism as a psychological resource, and found that adolescents from families with low parental education reported less optimism than teens from more educated parents. In the present study, the psychosocial resources are represented by self-esteem and social competence. Social competence is important for children’s ability to manage their emotions, establish healthy relationships, and develop socially responsible behaviour throughout the lifespan (Elias 1997; Greenberg et al. 2003). Social competence is also

associated with less social problems and less social withdrawal (Broberg et al. 2001). Consequently, social competence may be important for the present and future health and well-being of adolescents. Health behaviours and lifestyle represent another pathway by which SEP influences the present and future health of adolescents (Torsheim et al. 2007). Health behaviour and lifestyle established in adolescence show stability into adult life (Lien et al. 2001). In a Dutch study, children's health behaviour were found to be related to family SEP, and accounted for more than 10% of health disparities later in life (van de Mheen et al. 1998).

1.2 Conceptualization and Measurement of SEP

SEP is usually assessed by education, income and/or occupation, either in combination or as single indicators often without much attention given to what part of SEP is actually measured. While the indicators are interrelated, and to some extent overlap, they tap unique aspects of SEP that might have different implications for health (Chen et al. 2006; Galobardes et al. 2006; Iversen 2005; Liberatos et al. 1988; Marmot et al. 1997). There seem to be no single best SEP indicator across all health outcomes and age groups. Consequently, research on social inequality should include several indicators of SEP relevant for the health outcomes and the age group being studied (Galobardes et al. 2006; Liberatos et al. 1988).

Assessing SEP from adolescents' reports represent several challenges (Currie et al. 1997; Wardle et al. 2002). As adolescents often have difficulties in reporting their parents income, education and/or occupation, there are often high numbers of missing or invalid data (Lien et al. 2001). More serious, however, is the systematic bias in missing data, as it is children and adolescents from low SEP who most often have difficulties in reporting SEP (Wardle et al. 2002). To meet this problem alternative measures of SEP suitable for children and adolescents have been developed (Currie et al. 1997; Wardle et al. 2002; Yang 2003). One such measure that was developed within the European "Health behaviour among school aged children study" (HBSC) is The Family Affluence Scale (FAS) which is an index of material wealth (Currie et al. 1997).

Several authors have suggested that other aspects of SEP such as education and cultural capital should be assessed in addition to economic/material wealth (Abel 2007; von Rueden et al. 2006; Yang 2003). While indicators of income or material wealth tap economic capital, cultural capital is associated with formal education and possessions of books (Abel 2007; Pedersen 1996). The educational and cultural aspect of SEP may be particular important for understanding social inequalities in health behaviours and psychosocial factors (Abel 2007; Arntzen 2002; Iversen 2005; Marmot et al. 1997). Lien et al. (2002) reported that parents' education (based on parents' report) was significantly correlated with several adolescent health behaviours; consumption of fruits, vegetables, and sweets, fat-intake and physical activity, while parental occupation was not. Often when parents' reports are not available, or the objective is to capture the adolescents self-reports, there is a need for alternative measures capturing the cultural or educational dimension of SEP. Within sociology and pedagogic research, the cultural/educational dimension of SEP has been assessed by question about number of books in home (Hvistendahl and Roe 2004; Pedersen 1996; Yang 2003). In studies on social inequality among adolescents

books in home have been included as part of a summative measure, together with other indicators (Torsheim et al. 2007).

While family affluence and books in home may be regarded as objective indicators, another SEP indicator used in multiple surveys among adolescents and distinct as a subjective measure, is the measure of adolescents' own perception of SEP. Studies using subjective measures of SEP demonstrate stronger associations with psychological functioning than previous studies using objective measures (Goodman et al. 2001). Thus, perceived wealth was included as a measure of adolescent's perception of SEP.

To sum up, in order to have a better understanding of the mechanisms involved in social inequality in adolescents, the aim of our research was to study the relationship between different aspects of SEP; family affluence, books in home, and perception of wealth, and various health related domains in adolescents' lives. The present article reports data from two studies carried out in Norway in autumn 2004. Study 1 is the "Social Competence in Early Adolescence Study" with a sample of 1,153 adolescents in 5th to 7th grade. Study 2 is the "Eat more!" study with a sample of 654 6th graders. The assessment of SEP was similar in the two studies; the relationship with health and psychosocial resources was addressed in study 1, while the relationship with health behaviour was addressed in study 2.

2 Method

2.1 Study 1

The "Social Competence in Early Adolescence Study" is a three-wave study among 1,153 10, 11 and 12 year old schoolchildren from four counties in Norway. The study's aim was primarily to conduct an outcome evaluation of a social and emotional competence promotion program (Second Step). The present study presents data from the baseline collection in 2004. The selection criterion was that the schools could not have used Second Step or similar social competence, conflict resolution, or anti bullying programs before. Initially we had a list of 40 schools that met this criterion, and invited every second school to participate. Due to low response, we selected every second school from an additional list of 23 schools. Eleven schools agreed to be part of the study. Students, 1,412, were then invited to participate. Parental consent was obtained from 1,169 students, and 1,153 of these participated at baseline (83%). The students filled out a questionnaire during one school hour with a teacher present in the classroom.

Measures included are:

Three indicators assessed socioeconomic position. The *Family Affluence Scale* (FAS) (Currie et al. 1997; Torsheim et al. 2007) consisting of four items: car-ownership (0, 1 or 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). Responses were summed to a scale ranging from 0 to 9. *Books in home* were measured by one question: "Approximately how many books do you have in your home?" Responses was reported on a six-point scale "0", "1–20", "21–50", "51–100", "at least 100" and "at least 500". *Perceived wealth* was measured by one

question “How well off is your family?” Responses were reported on a five-point scale ranging from “not at all well off” to “very well off”.

Three indicators measured health. *Overall Health* was measured by one question, ‘Would you say your health is...? ‘Excellent’, ‘Good’, Fair or ‘Poor’. (Range: 1–4; mean=3.43, SD=0.68). *Health complaints* were measured using a standardized symptom check list (Hetland et al. 2002). ‘In the last 6 months how often have you had the following: headache, stomach-ache, back ache, feeling low, irritability or bad temper, feeling nervous, difficulties in getting to sleep, feeling dizzy, neck- and shoulder pain, miserable feelings, and afraid. Responses were reported on a five points scale: “about every day”, “more than once a week”, ‘about every week’, ‘about every month’, and ‘rarely or never’ (Range=0–4; mean=0.80; SD=0.69; Chronbach’s alpha=0.84). The nine-item Student’s Life Satisfaction Scale (SLSS; Huebner 1991) measured *satisfaction with life*. The nine-item version has previously been used in this study as well as in the European Health Behaviour among School Children Study (HBSC; Currie et al. 2001; Huebner 1991). Students responded on a four point scale (range=1–4; mean=3.17; SD=0.51; Chronbach’s alpha=.84).

Measures of *Psychosocial Resources* included social competence and self-esteem. *Social competence* was measured with a 34 items student version of the Social Skills Rating System (SSRS; Gresham and Elliott 1990). The total scale reflects four domains of social skills; co-operation, assertion (positive social skills), self-control and empathy. Responses were reported on a four point scale ranging from “never” to “very often” (range=1–4; mean=3.09, SD=0.39; Chronbach’s alpha=0.90).

Self-esteem was measured by Rosenberg’s self-esteem scale using the five items reflecting a positive view of self as recommended by Quilty et al. (2006). Responses were reported on a four point scale ranging from “agree completely” to “disagree completely” (range=1–4; mean=3.26, SD=0.49; Chronbach’s alpha=0.84).

2.2 Study 2

The “Eat more!” study is an evaluation of a school-based intervention for increasing fruit and vegetable consumption among 6th graders in two counties in Norway. The present article makes use of baseline data. Schools were randomly selected from a list of all schools with more than 10 pupils in 6th grade in the two counties. 92 schools were invited to participate in the study, and 29 schools with 743 pupils agreed to participate. Informed consent was obtained from 664 pupils and 654 of these participated at baseline (response rate 88%). The questionnaire was filled out during a school hour with a teacher present in the classroom.

Measures included are:

Socioeconomic position as in study 1.

Health behaviours included consumption of fruits, consumption of vegetables and physical activity. *Consumption of fruits* was assessed by combining two questions “how often do you usually eat fruits” and “how often did you eat fruits last week”. Responses were reported on an eight point scale ranging from “seldom/never” to “at least three times a day” and was recoded into times per week (range=0–21; mean=8.61; SD=6.51). *Consumption of vegetables* was assessed and recoded the same way (range=0–21; mean=6.81; SD=5.56) *Leisure time physical activity* was measured by one question (Currie et al. 2001) “Outside school hours, how often do you do

sports or exercise until you are out of breath or sweat?" Responses was reported on a seven point scale ranging from "never" to "every day" and recoded into times per week (range=0–7; mean=3.48; SD=2.25).

2.3 Analyses

All analyses were conducted using SPSS 14.00. Variables with reversed scores were recoded so higher scores represent higher (or more positive) values. Non-response was generally low and missing values were treated as missing. Questions on SEP were completed by 92–96% of the samples in the two studies. Correlation analyses (Spearman's rho) were conducted to analyze the relationship between the SEP indicators (raw scores). Subsequently, subjects were divided into three SEP-groups corresponding to low, medium and high SEP and a two-way between- groups analysis of variance was conducted to explore the impact of SEP on health outcome variables. Separate analyses (univariate general linear models) were conducted for each health outcome. The health outcome variable was entered as dependent variable, while the three SEP-indicators were entered as fixed factors. As samples were clustered within schools, we tested for cluster effects by running all analyses with schools as fixed factors in addition to SEP-indicators. Entering school as fixed factor did not have any major effect on the results; consequently, the results from the initial model (without schools) were reported. Partial eta squared was reported when there was significant difference in health outcome by SEP-groups. Cohen criteria classifying 0.01 as a small effect, 0.06 as a medium effect and 0.14 as large effect were used (Pallant 2004).

3 Results

3.1 Study 1

Correlation analyses (Spearman's rho) between the three SEP- indicators showed that they were significantly, but weakly correlated: family affluence and books ($\rho=0.24$; $p<0.001$), family affluence and perceived wealth ($\rho=0.17$; $p<0.001$) and books and perceived wealth ($\rho=0.10$; $p<0.01$). Distribution of subjects into the three SEP-groups (low, medium and high) for the three indicators are shown in Table 1.

Table 1 Descriptive statistics and distribution of valid SEP-scores in study 1 and study 2 (number of subjects and percentages)

SEP-indicator	Family affluence			Books in home			Perceived wealth		
	Low 1–5	Medium 6–7	High 8–9	Low ≤100	Medium > 100	High >500	Low ≤ quite well	Medium well	High very well
Study	250	488	345	460	396	251	304	528	247
1-distribution	(23%)	(45%)	(32%)	(42%)	(36%)	(23%)	(28%)	(49%)	(23%)
Study	123	301	175	225	232	160	166	259	179
2-distribution	(21%)	(50%)	(29%)	(36%)	(38%)	(26%)	(27%)	(43%)	(30%)

Table 2 presents the results from the univariate analyses of variance (GLM) for health complaints, overall health and life satisfaction by SEP groups. As is apparent from the table, health complaints was only associated with perceived wealth, however the effect size was very small with only 1% of the variance accounted for. No significant relationship was observed between health complaints and the two other SEP-indicators. Overall health was associated with books in home and perceived wealth, while life-satisfaction was associated with family affluence and perceived wealth. Children in the highest SEP-group (very well off) reported better overall health and life-satisfaction than children in the medium and low SEP groups. Perceived wealth accounted for 6% of the variance in overall health, and 4% of the variance in life-satisfaction, and was the strongest SEP indicator as shown by its *F*-value, significance level and eta squared.

As is apparent from Table 3, there was a significant difference in mean level of social competence by all three SEP indicators. Thus, the results indicate that children with higher SEP are more socially competent. Perceived wealth accounted for 7% of the variance in social competence. All the three SEP indicators accounted for 11% of the variance in social competence. Self-esteem, on the other hand was only associated with perceived wealth. Perceived wealth accounted for 3% of the variance in self-esteem.

3.2 Study 2

Correlation between the SEP-indicators (raw scores) showed that family affluence and books were positively and significantly correlated at the $p < 0.001$ level ($\rho = 0.17$). Correlation between family affluence and perceived wealth was 0.14 ($p < 0.01$), while correlation between books and perceived wealth was 0.09 ($p < 0.05$). Distribution of subjects into the three SEP-groups (low, medium and high) for the three indicators are shown in Table 1.

As presented in Table 4, there was a significant relationship between the SEP-indicator books and health behaviours, while no significant relationship with health behaviour was observed for the two other indicators. Thus, children in the lowest

Table 2 Health and well-being by socioeconomic position (study 1)

Health and well-being	SEP-indicator	Low	Medium	High	<i>F</i> -value	Eta-squared
Health complaints	Family affluence	0.75 (0.05)	0.80 (0.03)	0.79 (0.04)	0.44	
	Books in home	0.76 (0.03)	0.81 (0.04)	0.77 (0.05)	0.42	
	Perceived wealth	0.88 (0.05)	0.75 (0.03)	0.71 (0.05)	5.0**	0.01
Overall health	Family affluence	3.40 (0.04)	3.48 (0.03)	3.50 (0.04)	1.61	
	Books in home	3.44 (0.03)	3.39 (0.04)	3.55 (0.04)	4.56*	0.01
	Perceived wealth	3.22 (0.04)	3.47 (0.03)	3.69 (0.04)	33.5***	0.06
Life satisfaction	Family affluence	3.14 (0.03)	3.16 (0.03)	3.25 (0.03)	4.19*	0.01
	Books in home	3.14 (0.03)	3.21 (0.03)	3.20 (0.03)	2.05	
	Perceived wealth	3.04 (0.03)	3.21 (0.02)	3.30 (0.03)	18.1***	0.04

Estimated marginal means (SEs) and *F*-statistics

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 3 Psychosocial resources by socioeconomic position (study 1)

Psychosocial resources	SEP-indicator	Low	Medium	High	F-value	Eta-squared
Social competence	Family affluence	3.07 (0.03)	3.10 (0.02)	3.16 (0.02)	3.8*	0.01
	Books in home	3.04 (0.02)	3.15 (0.02)	3.14 (0.03)	10.6***	0.02
	Perceived wealth	2.96 (0.02)	3.12 (0.02)	3.25 (0.02)	40.7***	0.07
Self-esteem	Family affluence	3.26 (0.03)	3.26 (0.02)	3.31 (0.03)	1.36	
	Books in home	3.24 (0.02)	3.28 (0.03)	3.31 (0.03)	1.54	
	Perceived wealth	3.16 (0.03)	3.28 (0.02)	3.40 (0.03)	15.5***	0.03

Estimated marginal means (SEs) and *F*-statistics

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

SEP-group (less than 100 books in home) consumed fruits 7.8 times a week, children in the medium group consumed 9.3 times a week, while children in the highest SEP-group (more than 500 books) consumed fruits 9.8 times a week. Consumption of vegetables in the lowest SEP-group (less than 100 books) was 5.7 times a week, 7.2 in the medium group and 8.1 in the high SEP-group (more than 500 books). Finally, the results revealed that there also was a weak significant relationship between the SEP-indicator books and physical activity. However, the effect sizes were small and books accounted for 2% of the variance in fruit consumption and physical activity and 3% of the variance in vegetable consumption.

4 Discussion

The purpose of this paper was to examine the relationship between three indicators of SEP and health related variables of particular relevance for young adolescents. Correlations between the SEP indicators were relatively weak and similar in the two studies. Similar weak correlations between different SEP indicators have been

Table 4 Health behaviour by socioeconomic position (study 2)

Health behaviour (times per week)	SEP-indicator	Low	Medium	High	F-value	Eta-squared
Consumption of fruits	Family affluence	8.5 (0.6)	8.8 (0.4)	9.5 (0.5)	0.8	
	Books in home	7.8 (0.5)	9.3 (0.6)	9.8 (0.7)	5.3**	0.02
	Perceived wealth	8.2 (0.5)	9.5 (0.5)	9.1 (0.5)	1.6	
Consumption of vegetables	Family affluence	6.8 (0.5)	6.6 (0.34)	7.7 (0.45)	2.1	
	Books in home	5.7 (0.4)	7.2 (0.4)	8.1 (0.5)	8.5***	0.03
	Perceived wealth	6.3 (0.5)	7.3 (0.4)	7.4 (0.4)	2.1	
Physical activity	Family affluence	3.5 (0.2)	3.5 (0.1)	3.6 (0.2)	0.1	
	Books in home	3.2 (0.2)	3.5 (0.2)	3.9 (0.2)	4.3*	0.02
	Perceived wealth	3.5 (0.2)	3.5 (0.2)	3.6 (0.2)	0.2	

Estimated marginal means (SEs) and *F*-statistics

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

reported from other studies as well (von Rueden et al. 2006), and suggest that the indicators represent different aspects of SEP.

Results from study 1 showed that the SEP-indicator perceived family wealth was significantly associated with overall health, life satisfaction and subjective health complaints. No significant association was observed between health complaints and the two other indicators. Inconsistent results on SEP and health complaints have also been reported in previous studies. Lien et al. (2002) reported no significant relationship between parents' education and health complaints (parent's level of education assessed from a parent's report) while, Koivusilta et al. (2006) reported that weekly health complaints were associated with parent's labour market position and number of vacation travels, but not with parents' education.

In the present study, social competence was the only variable significantly associated with all three SEP indicators. Broberg et al. (2001) also reported that social competence was positively associated with SEP in a sample of Swedish adolescents. Singh-Manoux et al. (2005) suggests that social skills acquired through socialization should be given more attention in social inequality research. During the last decade, the teaching of social skills has received increased attention in schools. In Norway as well as other countries social competence promotion programs have been widely implemented (Holsen et al. 2008). While evaluation of such programs show positive results, the evaluations have rarely addressed whether the programs were effective in reaching children from low socioeconomic background.

Taken together, the results indicate that for psychosocial resources and overall health and well-being, the subjective perception of how well off one is, is important. While some authors have suggested that the relationship between subjective social status and subjective health indicators is partly due to negative affect as a confounder, previous studies have shown that the relationship holds and remains significant even after controlling for negative affect (Adler et al. 2000; Operario et al. 2004). The weak correlation between family affluence and perceived wealth in the present study may also indicate that adolescents' perception of wealth is influenced by other aspects of their lives than those captured by FAS, such as having a car and a bedroom of one own. Operario et al. (2004) argue that subjective beliefs about social status may capture subtle aspects of SEP more accurately than objective measures.

As regards the relationship between SEP and health behaviour, only the indicator books was significantly associated with all three health behaviours. As books is related to culture/education (Hvistendahl and Roe 2004; Yang 2003), the results support the idea that culture/education may be more important for health behaviour than family affluence/material wealth. In a review of studies addressing the relationship between SEP and health behaviours among adolescents, Hanson and Chen (2007) concluded that while the majority of studies showed significant relationship between measures of socio economic position and health behaviour among adolescents, the association was more likely if SEP was measured as parental education. Norwegian studies have also reported positive relationship between parental education and adolescents' health behaviours (Friestad and Klepp 2006; Lien et al. 2002). Singh-Manoux (2005) suggested that socialization practices whereby children observe and imitate parental behaviour is a central mechanism in explaining social patterns of health behaviours and psychosocial resources. In a

study by Vereecken et al. (2004) the relationship between mothers educational level and preschoolers intake of fruits and vegetables was mediated by mothers own intake and parental practices such as encouragement and verbally rewarding of healthy food consumption.

As the results from the present study and previous research have shown, social inequality in health is not only a matter of inequality in affluence or material wealth. The educational/cultural aspect seems to be important in relation to health behaviour and lifestyle. In this respect, Abel has suggested that Bourdieu's cultural capital theory could aid our understanding of production and reproduction of health inequalities (Abel 2007). Up to date, cultural capital has received little attention in health research, and von Rueden et al. (2006) have recommended that measures capturing cultural capital should be included in future research on health inequality. We fully agree and believe that "books" is one good candidate, but that additional indicators of cultural capital need to be developed. As societies are rapidly changing, it is possible that books become less relevant as a marker of cultural capital as use of electronic resources (internet and computer) increases. Preferably a cultural capital index consisting of several items relevant for health research should be developed. Thus, we believe health inequality researchers would benefit from interdisciplinary collaboration for developing reliable and valid measures for assessing different aspects of SEP in adolescence.

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