

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/47660077>

Social inequality and health: The role of social capital

Article in *Sociology of Health & Illness* · November 2010

DOI: 10.1111/j.1467-9566.2010.01270.x · Source: PubMed

CITATIONS

56

READS

196

2 authors:



Espen Dahl

Oslo Metropolitan University

101 PUBLICATIONS 2,481 CITATIONS

[SEE PROFILE](#)



Ira Malmberg-Heimonen

Oslo Metropolitan University

39 PUBLICATIONS 309 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Improving Interprofessional Collaboration in Norwegian Primary Schools [Et lag rundt eleven] [View project](#)



Development, pilot and an RCT evaluation of measures improving integration among immigrants and refugees in Norway [View project](#)

Social inequality and health: the role of social capital

Espen Dahl and Ira Malmberg-Heimonen

Department of Social Sciences, Oslo University College, Oslo

Abstract The aim of the article is to examine whether and to what degree the unequal distribution of social capital in the population explains the relationship between socioeconomic position and health in Norway. Theoretical insight and empirical evidence seem to suggest that social capital mediates the effect of socioeconomic position on health outcomes. However, only a few studies have addressed this question and those that have done so have used few and simple indicators of social capital. This study is based on a nationwide cross-sectional survey (N = 3190) commissioned by Statistics Norway. The survey was designed to cover a comprehensive set of variables measuring different aspects of the theoretical construct of social capital. Two health outcomes, self-perceived health and longstanding illness, were analysed. The results showed that the mediating role of social capital between socioeconomic position and health was negligible for both health outcomes. After controlling for socio-demographic variables and socioeconomic position, only neighbourhood satisfaction and generalised trust showed a significant association with self-perceived health, whereas none of the social capital variables had any significant association with longstanding illness. Some theoretical and methodological implications of the results are discussed.

Keywords: health inequalities, social capital and health, Norway

Introduction

It is now a well-established fact that position in the socioeconomic structure is related to health and longevity (Eurothine 2008, Machenbach *et al.* 2008). A number of explanatory models have been suggested to account for this almost universal relationship, such as childhood conditions, health-related behaviour, material conditions and circumstances, psychosocial factors, direct and indirect health-related selection, and social capital, that is to say, social resources of various kinds (Bourdieu 1986, Coleman 1988, Putnam 2000). According to some scholars, in addition to control, social capital is the chief mechanism that helps to explain the existence of social gradients in health (Marmot 2004). Whereas a vast body of research has focused on and demonstrated a relationship between indices of social capital and health (Berkman and Glass 2000, Kawachi and Berkman 2000, Putnam 2000), less research has been undertaken to question whether or not social capital mediates between socioeconomic position and health (Rostila 2008). This article aims to fill in this gap by examining whether and to what extent social capital mediates between socioeconomic

position, for example education, income and poverty, and health, *i.e.* self-perceived health and longstanding illness.

Social capital: some conceptual issues

Social capital may be a collective as well as an individual property (Kawachi and Berkman 2000, Rostila 2008). In this article we address social capital as it empirically appears at the individual level only, and limit the discussion of the concept to this level. Social capital is generally defined as 'features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit (Putnam 1995: 664–5). As such, social capital consists of social resources that are embedded in one's network and is related to the individual's abilities to mobilise various types of resources. Equivalent to other types of capital such as economic or human capital, the idea is that social capital facilitates actions and creates goods that are favourable for individuals and for society at large (Coleman 1988, Lin 2001). Positive outcomes range from economic growth at the level of the nation–state (Whiteley 2000) to individual goods such as quality of life, employment and health (Granovetter 1973, Kawachi and Berkman 2000, Putnam 2000).

Social capital includes one structural and one cognitive dimension (De Silva *et al.* 2005, Subramanian *et al.* 2003). Regarding the structural component, an important distinction is drawn between bonding and bridging social capital. Bonding social capital refers to propinquity; to the strong attachments that are formed when people who already know one another are frequently brought together, for example, as in close social contacts with family, relatives and friends (Almendorf 2005, Szreter and Woolcock 2004). Bridging social capital alludes to weaker ties that bring together different groups in society that did not previously interact with one another but are a part of the same level of the social hierarchy (Granovetter 1973, Putnam 2000, Szreter and Woolcock 2004). Examples of bridging social capital are neighbourhood contacts and civic and political participation (Almendorf 2005, Sundqvist and Yang 2005). A subtype, linking social capital, is seen as being part of bridging social capital. It is defined as 'norms of respect and networks of trusting relationships between people who are interacting across explicit, formal, or institutionalised power or authority gradients in society' (Szreter and Woolcock 2004: 655). Linking social capital is characterised by power relationships, exemplified by trust in the interaction of citizens with authorities (Almendorf 2005, Sundqvist and Yang 2005). The cognitive dimension includes generalised norms of mutual trust and reciprocity in a society (Svendsen and Svendsen 2006). It is related to the quality of social ties and may be strengthened by frequent social interaction but is nevertheless seen as a distinct dimension.

Generally, bonding social capital is seen as being a crucial source for the social support and mental health of individuals, whereas bridging social capital is seen as being important for the generation of more widespread solidarity, respect and mobilisation in society (Lin 2001, Szreter and Woolcock 2004). Berkman and Glass (2000: 143) argue that social capital may work through mechanisms related to social support, social influence, social engagement, person-to-person contact and access to resources and material goods. These mechanisms in turn influence health through pathways like health-related behaviour (for example, smoking and exercise), psychological processes (for example, self-efficacy and self-esteem) and physiological processes (for example, allostatic loads and immune system functioning) (Kawachi and Berkman 2000).

Inequality, social capital and health: empirical evidence

The high level of social capital in the Nordic countries has been explained by the Nordic welfare model (Bjørnskov 2003, Kääriäinen and Lehtonen 2006, Rothstein 2001, Svendsen and Svendsen 2006). Countries representing the Nordic welfare model are usually classified as welfare regimes that emphasise universality, generosity, solidarity and social equality (Abrahamson 1999, Esping-Andersen 1990, Gallie and Paugam 2000, Korpi and Palme 1998). Yet, even in a country with a generally high level of wealth and equality such as Norway there are still substantial variations between different groups in regard to the access they have to different types of social capital. Lower socioeconomic and disadvantaged groups have a significantly lower level of social capital, especially less formal ties and lower levels of trust, than groups that are better off (Dahl *et al.* 2008, Hyggen 2006, Malmberg-Heimonen 2008, Selle and Prakash 2004, van der Wel *et al.* 2006). These findings correspond well with international findings, especially in regard to bridging social capital (Arneil 2006, Wuthnow 2002). As in other countries, research on health inequalities in Norway shows almost without exception that lower socioeconomic position is associated with poorer health and shorter longevity (Myklestad *et al.* 2008, Sund and Krokstad 2005). The documented interrelationship between socioeconomic position, social capital and health suggests that social capital may mediate the impact of socioeconomic position on health.

Previous research has demonstrated the importance of social networks and social support for the health outcomes of individuals (Berkman and Glass 2000, Kessler *et al.* 1988, Poortinga 2006, Szreter and Woolcock 2004). Some studies have indicated that elements of bridging social capital, such as neighbourhood contacts and trust, are also related to positive health outcomes at the individual and at the collective level (Kim and Kawachi 2007, Lindström 2007, Sundqvist and Yang 2005). For instance, Sirven (2006) showed that collective actions and social networks, in particular, resulted in better self-reported health, *i.e.*, types of social capital that represent both bonding and bridging relationships. In a comparative setting, Poortinga (2006) demonstrated that individual levels of social trust and civic participation were strongly associated with self-rated health outcomes. This study also showed that in countries with a generally high level of social capital, trusting and socially active individuals reported good or very good health, compared to individuals with lower levels of trust and civic participation. However, the same interaction was not found in countries with a lower level of social capital. There are, however, counterexamples to these findings: according to the systematic review by De Silva *et al.* (2005), some studies show that social capital has no impact on mental health and a few studies even showed that a high level of social capital is linked to worse mental health.

There are not many studies that focus upon the role played by social capital in the relationship between social inequality and health. A Swedish study analysed a certain type of health-related outcome, physical activity, and found a clear social class gradient (Lindström *et al.* 2001). Nevertheless, when controlling for social participation, the original social class gradient was almost erased. The authors interpreted this finding as evidence that this specific aspect of social capital largely explains why lower class groups exercise less than the more privileged classes. In contrast, a more recent Swedish study, based on nationwide survey material, concluded that individual formal and informal social relations did not explain the association between social class and health (Rostila 2008). In that study, health was measured as self-rated health and psychological distress. A Norwegian study reached similar results. The educational gradient in self-rated health narrowed only slightly after being adjusted for

individual social capital variables like trust, participation in organised activities and number of friends (van der Wel 2007).

The foregoing theoretical discussion and account of empirical evidence suggest that there are knowledge gaps to be filled in this area of research. Theoretically, and supported by some empirical evidence, both bonding (informal) and bridging (formal) social capital may be expected to influence health in general and to mediate between socioeconomic position and health in particular. Although some empirical studies fail to give strong support for this latter expectation, it should be noted that previous research has used quite simple measures of the various dimensions of the concept of social capital. In this article, we have information on more empirical indices of social capital than have been reported in the literature hitherto. In particular, we have information on various aspects of social capital that may be especially contingent on social position, that is, bridging and linking social ties and generalised trust.

This rich information on various dimensions of social capital enables us to examine whether and to what extent social capital mediates between socioeconomic position and health, *i.e.*, self-perceived health and longstanding illness.

Data and methods

The data set

The data used for this study are derived from a survey utilising a representative sample of the Norwegian adult population, aged 18–74 years. Statistics Norway fielded the survey and linked the survey data to information in administrative registers. To ensure the good quality of the questionnaire, key questions were tested in two focus group interviews. The gross sample included 8000 respondents. After up to two postal reminders for initial non-responders, questionnaires were obtained from 3190 respondents, yielding a response rate of 39.9 per cent (Fløtten and Pedersen 2008). Overall comparisons between the study sample and the general Norwegian population are shown in the Appendix (last page of article). We note that with regard to gender, county or region of residence and age our sample corresponds well to the general population. The proportion of immigrants is, however, somewhat smaller in the study sample (6.9%) than in the general Norwegian population (10.3%). As regards education, our sample departs rather markedly from that of the overall population, as a larger proportion of our sample has higher education. (It should, however, be noted that this comparison is not entirely accurate since the population data also include people older than 74 years of age, whereas the oldest in the study sample is 74 years old.) Yet this deviation is of such magnitude that it may bias our results severely. Thus, we have weighted the study sample according to the distribution of education in the population and rerun all the logistic regression analyses (results are available upon request). None of the conclusions drawn in the article was altered by this exercise.

Measures

Dependent variables

Self-perceived health was measured by the following question: 'How do you consider your own health in general?' The response options varied from 1 = very good to 5 = very bad. The measure was reversed before further analyses were conducted. After that, a dummy variable was created, measuring good or very good health = 1. The rest of the respondents were given the value 0 on the variable.

Longstanding illness was measured by the following question: 'Do you suffer from any longstanding illness or ailment, *i.e.*, an illness/ailment that you were born with, that you have had for at least 6 months, or that you think will become permanent?' The response options were 1 = yes and 2 = no. The measure was reversed before further analyses were conducted. This question is regularly used in the Surveys of Living Conditions carried out by Statistics Norway.

Background and socioeconomic variables

Age and gender were measured by standard survey questions.

Immigrant status was measured as a dummy variable, reflecting whether respondents had immigrated to Norway (1) or not (0).

Married/cohabiting was measured as a dummy variable. Those who were either married or cohabiting were given the value 1, whereas all others were given the value 0 on this variable.

Educational level was assessed based on administrative data, NUS2000, measuring the highest achieved educational level. The Norwegian Standard Classification of Education (NUS2000), developed by statistics Norway, is used for grouping people's education activities and education background by level of education (first digit) and field of study (second digit). The level of education, which is used in this study, varied from 0 to 8, in that 0 = less than elementary school and 8 = doctoral degree (Statistics Norway 2003).

Problems growing up were measured by an additive index including 11 items, *i.e.*, problems that the respondent had experienced before the age of 16: economic problems, conflict between parents, parental drug abuse, sexual harassment, long-term bullying, other maltreatment, problem-making friends, problems at school, interrupted schooling, significant relocation and severe health problems. The idea behind the construction of the index comes from the notion of accumulation of disadvantages, *i.e.*, it is the sum of disadvantages that matters for health in adult life, either directly or indirectly. This index has been used in other studies (Malmberg-Heimonen 2008, Solem 2003).

Employment was assessed by a question measuring the respondent's main activity the week prior to filling out the questionnaire. Respondents who were employed were coded as 1, whereas others were coded as 0.

Subjective poverty was assessed by the following question: 'If you think about your current economic situation, would you count yourself as being poor?' The response options were: 1 = Yes, I'm poor, 2 = No, but I'm on the border of being poor, 3 = No, I'm not poor or on the border of being poor, 4 = I don't know. The measure was then recoded into a dummy variable assessing whether a person was poor or on the border of being poor = 1. The rest of the respondents were given the value 0 on the variable.

Equivalised household income (OECD modified scale) was based on an administrative register variable measuring household income in 2005, after taxes. The equivalised household income is an indicator of the economic resources available to each member of a household, which is possible through the weighting of various household members. The first adult was weighted 1.0, the following adults were weighted 0.5 and children under 18 years of age were weighted 0.3. The measure indicates the material resources that each individual has access to in the household (Haagenars *et al.* 1994).

Variables related to bonding social capital

Emotional support was measured based on a 5-item scale. The respondents were asked to assess whether they had someone they could have a confidential conversation with, someone to talk to if they felt down or depressed, someone who listened to what they were saying, someone who they could be themselves with and someone who really appreciated them. The

response options were 1 = yes, 2 = no, 3 = I don't know. The variables were coded into a dummy variable so that yes received the value 1 and all other responses the value 0. The variables were then added to a scale measuring the level of emotional support. The reliability of the measure was high (Cronbach's $\alpha = 0.85$).

Practical support was measured based on an 8-item scale where the level of practical support was assessed by the following questions: 'Do you know anyone who can give you advice concerning your private finances, for example, advice related to housing or taxes? Do you know anyone who can help you if you want to know more about educational opportunities, for example, further education and training courses, educational programmes for children? Do you know anyone who can help you to better understand laws and regulations? Do you know anyone who can help you if you want to influence local politics? Do you know anyone who can help you with practical work inside or outside your house or apartment? Do you know anyone who is prepared to lend you 5,000 NOK (600 EUR)? Do you know anyone who can help you with data, for example, programmes related to the Internet or PCs? Do you know anyone who can buy necessities for you if you are sick?' The response options to these questions were 0 = no, 1 = yes. The responses were cumulated in a scale measuring practical support, with a Cronbach's α of 0.68.

Number of friends and acquaintances was measured by the total number of reported friends and acquaintances from various areas of respondents' lives, *i.e.*, current and earlier workplaces, current and earlier educational institutions, neighbourhood or local area, clubs and organisations or religious communities and children's day care, and school or after-school services.

Variables related to bridging and linking social capital

Neighbourhood satisfaction was measured by the following question: 'How satisfied are you with your neighbourhood/local environment?' The responses were 1 = very dissatisfied, 2 = dissatisfied, 3 = neither dissatisfied nor satisfied, 4 = satisfied, 5 = very satisfied.

Civic participation was a 5-item measure including the following questions: 'Do you participate in a political party?', 'Do you participate in church or other religious activities?', 'Do you participate in a sports club, hobby or leisure-time club?', 'Do you participate in a community or neighbourhood organisation?' and 'Do you participate in any other kind of communities or organisations?' The response options were 0 = no and 1 = yes. The responses were cumulated in an index measuring civic participation. Cronbach's α for this measure was 0.62.

Linking social capital was measured by a variable combining the respondents' own level of education and the access they had to professional resources. Professional resources were measured by an index registering whether or not the respondent knows a lawyer, a data consultant, a journalist and a physician. A dummy variable was constructed measuring whether the respondent knew a person in each of the professional groups (1), or not (0). Education level was coded into a dummy variable (0 = less than tertiary educational attainment, 1 = tertiary educational attainment or more). The combined variable for education and professional resources was measured as follows: 1 = low level of education and low professional resources, 2 = low level of education and high professional resources, 3 = high level of education and low professional resources and 4 = high level of education and high professional resources.

Generalised trust was measured by one question: 'Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?' The responses ranged from 1 = 'you can't be too careful' to 10 = 'most people can be trusted'.

Table 1 *Descriptive statistics over variables related to socio-demographic background, socioeconomic status, social capital and health (N = 3190)*

Background	
Gender (%)	
Men (%)	49.5
Women (%)	50.5
Age (mean)	45.7
Immigrant status (%)	6.9
Married/cohabiting (%)	72.6
Socioeconomic position	
Problems growing up (%)	
less than three problems	82.4
three or more problems	17.6
Education (%)	
primary level	18.3
secondary level	43.7
tertiary, lower level	27.4
tertiary, higher level	8.4
unknown	2.3
Employed (%)	67.0
Unemployed (%)	0.9
Equivalised household income (median Nkr)	340.833
Subjective poverty (%)	
yes	14.0
no	86.0
Social capital	
Bonding social capital	
emotional support (mean)	4.5
practical support (mean)	5.7
friends and acquaintances (mean)	34.9
Bridging social capital	
neighbourhood satisfaction % (satisfied or very satisfied)	80.2
civic participation (mean)	1.3
Linking social capital (%)	
low education and low professional resources	54.7
low education and high professional resources	8.7
high education and low professional resources	24.8
high education and high professional resources	11.8
generalised trust (mean)	6.7
Self-perceived health (%) (good or very good health)	79.2
Longstanding illness (%)	37.2

Analytical strategy

In accordance with their assumed chronological or causal order, the independent variables were entered into the logistic regressions in three steps. First, background (socio-demographic) variables were entered. In the second step, the variables measuring socioeconomic position were included. Finally, in the third step, we added the various variables depicting different aspects of bonding and bridging social capital, including aspects of linking social capital and generalised trust. Our interpretation of the potentially mediating effect of social capital is

partly based on the (expected) attenuation of coefficients pertaining to the socioeconomic variables and partly on the improvements, *i.e.*, change in -2 log likelihood, of the statistical model including social capital, as compared with the previous model.

Results

Table 1 includes descriptive statistics of the variables used in the analysis. Half of the respondents were women. The age of all respondents was, on average, 46 years, and ranged from 18–74 years. Immigrants comprised 7 per cent of the respondents. Those who were married or co-habiting comprised 73 per cent and most respondents had had less than three problems while growing up, while 18 per cent had three or more problems while growing up. Educational attainment was distributed as follows: 19 per cent had primary education or less, 44 per cent had completed secondary education and 8 per cent had completed higher tertiary education. Respondents who were employed comprised 68 per cent and the equivalised median household income was 340,833 NOK. Respondents who reported that they were poor or borderline poor comprised 14 per cent of the sample.

Bonding and bridging social capital for study participants

Generally, the proportion of respondents who had bonding and bridging social capital was high (Table 1). For example, 94 per cent of the respondents claimed to have someone to whom they could speak confidentially. When feeling discouraged or depressed, 91 per cent had someone with whom they could speak. Generally speaking, 95 per cent had someone who would listen to them when they wanted to speak and 96 per cent claimed that they had someone with whom they could be themselves. When respondents were asked if they had someone who really appreciated them, 93 per cent answered positively. Less than 1 per cent of the study respondents reported that they totally lacked emotional support. On average, study participants had a total of 34.9 friends or acquaintances from various areas of respondents' lives.

Neighbourhood satisfaction and civic participation are considered to be reflections of bridging social capital. A total of 80 per cent of respondents reported that they were very satisfied or satisfied with their neighbours, and only 3 per cent of the respondents were dissatisfied with their neighbours. On average, 27 per cent of the respondents did not participate in any kind of organised activities, while the rest participated in at least one. Sports and leisure time activities were the most popular of these.

Regarding variables that reflect linking social capital, the interaction between low education and low professional resources was the most common (54.7%), followed by high education and low professional resources (24.8%), high education and high professional resources (11.8%) and low education and high professional resources (8.7%). On average, respondents knew 2.14 individuals with high professional resources and 20 per cent knew a person from all four high professional categories (a lawyer, a data-consultant, a journalist and a physician). Finally, 10 per cent of the respondents had a low level of trust, 48 per cent a medium level of trust and 42 per cent of respondents had a high level of generalised trust. In addition, 79 per cent of the respondents reported that they had good or very good health, while 37 per cent reported having a longstanding illness.

Bivariate correlations

Table 2 presents the bivariate inter-correlations of the study variables included. In particular, self-perceived health correlates positively with most of the measurements of social capital

Table 2 Bivariate inter-correlations (Pearson's *r*) for study variables (*N* = 2928–3190)

	Background variables			Socioeconomic variables					Social capital variables								Dependent variables				
Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 Gender (men/women)	1																				
2 Age	-.05*	1																			
3 Immigrant status	.02	-.03*	1																		
4 Married/cohabiting	-.02	.15*	.06*	1																	
5 Problems growing up	.06*	-.16*	.08*	-.14*	1																
6 Education	.00	-.14*	.03	.09*	-.08*	1															
7 Employment	-.10*	-.24*	.01	.14*	-.04*	.23*	1														
8 Income	.00	.05*	-.02	.07*	-.06*	.10*	.06*	1													
9 Subjective poverty	.04*	-.08*	.13*	-.20*	.24*	-.20*	-.23*	-.09*	1												
10 Emotional support	.09*	-.15*	-.08*	.09*	-.05*	.18*	.18*	.05*	-.16*	1											
11 Practical support	.06*	-.21*	-.06*	.08*	-.03	.21*	.23*	.08*	-.16*	.44*	1										
12 Number of friends	-.10*	-.15*	-.02	-.03	-.01	.00	.06*	.00	.02	.15*	.18*	1									
13 Neighbourhood satisfaction	.02	.18*	-.07*	.13*	-.17*	-.01	.01	.06*	-.15*	.14*	.13*	.08*	1								
14 Civic participation	-.05*	.08*	-.03	.10*	-.05*	.12*	.08*	.02	-.09*	.14*	.26*	.16*	.16*	1							
15 Low educ. & low prof.	-.04	.09*	-.01	-.09*	.07*	-.75*	-.19*	-.09*	.16*	-.16*	-.26*	-.06*	-.02	-.17*	1						
16 Low educ. & high prof.	.05	-.06*	.04*	.03	-.05*	.66*	.10*	.06*	-.10*	.08*	.06*	-.07*	-.02	.04*	-.63*	1					
17 High educ. & low prof.	-.04	.00	-.03	.03	-.02	-.17*	.06*	.01	-.01	.06*	.15*	.14*	.05*	.10*	-.34*	-.18*	1				
18 High educ. & high prof.	-.02	-.06	-.01	.07*	-.03	.43*	.10*	.05*	-.10*	.09*	.18*	.04	.02	.12*	-.40*	-.21*	-.11*	1			
19 Generalised trust	.05*	.06*	-.04*	.06*	-.10*	.13*	.03	.04*	-.10*	.11*	.10*	.00	.12*	.08*	-.13*	.10*	-.02	.08*	1		
20 Self-perceived health	-.02	-.15*	-.06*	.03	-.15*	.16*	.30*	.05*	-.22*	.17*	.19*	.07*	.12*	.10*	-.14*	.10*	.00	.08*	.11*	1	
21 Longstanding illness	.04*	.15*	-.02	-.04*	.18*	-.10*	-.22*	-.01	.15*	-.07*	-.08*	-.01	-.01	-.03	.06*	-.04*	.02	-.06*	-.05	-.40*	1

**p* < 0.05. Educ = education, prof = professional resources.

included in the analyses. Of the ten bivariate coefficients, nine are highly significant. Longstanding illness is, however, more rarely associated with the social capital indices and only five of the ten coefficients are significant.

The socioeconomic variables (variables 5–9) are bivariate and significantly related to the social capital indices, varying from 6 to 8 significant associations, depending upon the socioeconomic indicator in question. Furthermore, all of the socioeconomic variables are significantly associated with the two health outcomes. The only exception is the relationship between income and longstanding illness. This pattern, *i.e.*, that social capital is often related to (ill-) health and to positions in the socioeconomic structure, indicates that social capital can potentially mediate the effects of socioeconomic position on (ill-) health.

Multivariate correlations

The results of the logistic regressions are shown in Tables 3 and 4. The first model in Table 3 shows that age is negatively associated with self-perceived health; *i.e.*, older respondents report worse self-rated health than younger respondents. In addition, immigrants report worse health than non-immigrants. Of the socioeconomic variables shown in model 2, problems while growing up and poverty are negatively associated with self-perceived health while having a higher level of education and being employed are positively associated with better self-perceived health.

In model 3 (Table 3), the variables measuring bonding, bridging and linking social capital have been added. Once this was done, immigrant status no longer showed a significant association with self-perceived health while the other background variables were unaffected. The analysis shows that neighbourhood satisfaction and generalised trust are the only social capital measurements that are positively associated with self-perceived health, *i.e.*, the more satisfied one is with neighbours and the higher one's level of generalised trust, the better is one's self-perceived health. There were no significant associations between the other measures of social capital and self-perceived health. Overall, the decrease in -2 likelihood occurring from model 2 to model 3 is clearly significant (deviance = 73.3 with 9 d.f., $p < 0.001$), indicating that model 3 provides a better fit with the data than model 2. The findings show that the coefficients for the socioeconomic variables in model 3 do not differ much from those in model 2. The reduction in the parameter estimates are not significant, as indicated by overlapping confidence intervals (results not shown).

Table 4 shows the results for longstanding illness. Of the background variables, gender and age are substantially associated with longstanding illness: older people report more longstanding illness than younger people and women report more longstanding illness than men. Of the socioeconomic variables that are introduced in the second model, problems while growing up and self-rated poverty are positively associated with longstanding illness, whereas employed people report less longstanding illness. However, education and income were not significantly linked to this health outcome. Furthermore, as seen in model 3, none of the social capital variables included were significantly associated with longstanding illness when these were adjusted for background and socioeconomic variables. Because of this, the coefficients relating to socioeconomic variables barely changed when the social capital variables were introduced. In accordance with these observations, we note that the -2 log likelihood decreases from model 1 to model 2 and from model 2 to model 3. The fall in the -2 log likelihood from model 2 to model 3 is small and insignificant (deviance = 11.5, 9 d.f., $p > 0.05$). This indicates that model 3, which includes the social capital variables, does not improve the fit to the data when compared with model 2, which includes the socio-demographic and socioeconomic variables.

Table 3 *Social position, social capital and self-perceived health, logistic regression analyses: logistic regression coefficients (B) and odds ratios (Exp B) (N = 2873)*

<i>Variables</i>	<i>Model 1 B(Exp B)</i>	<i>Model 2 B(Exp B)</i>	<i>Model 3 B(Exp B)</i>
Background			
Gender (1 = man, 2 = woman)	-.06(.94)	.11(1.12)	.07(1.07)
Age	-.03(.97)***	-.02(.98)***	-.02(.98)***
Immigrant status (0 = no, 1 = yes)	-.52(.59)**	-.24(.75)	-.11(.89)
Married/cohabiting (0 = no, 1 = yes)	.29(1.33)**	-.25(.78)*	-.35(.71)**
Socioeconomic position			
Problems growing up		-.19(.82)***	-.16(.86)***
Education		.17(1.18)***	.20(1.22)**
Employed (0 = no, 1 = yes)		1.17(3.22)***	1.16(3.18)***
Equivalised household income		.00(1.00)	.00(1.00)
Subjective poverty		-.89(.41)***	-.77(.46)***
Bonding social capital			
Emotional support			.08(1.09)
Practical support			.06(1.06)
Number of friends			.00(1.00)
Bridging social capital			
Neighbourhood satisfaction			.31(1.36)***
Civic participation			.08(1.09)
Linking social capital			
Low education and low professional resources			.42(1.53)
Low education and high professional resources			.15(1.17)
High education and low professional resources			.14(1.14)
High education and high professional resources (ref = 1)			
Generalised trust			.08(1.08)**
-2 log likelihood	2731.1	2397.9	2324.6
Constant	2.56	1.28	-1.65

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Discussion

The aim of this study was to examine whether and to what degree the unequal distribution of social capital in the population explains the relationship between socioeconomic position and health in Norway. Previous studies have demonstrated that a lower socioeconomic position, for example, having a low level of education, is associated with lower levels of social capital and worse health. Previous studies have often found that social capital is related to health (Hyggen 2006, Malmberg-Heimonen 2008, Sund and Krokstad 2005, van der Wel *et al.* 2006). Due to these interrelationships it is plausible that social capital may mediate the impact of socioeconomic position on health.

The results from the multivariate logistic regression models do not confirm this expectation. Our analyses show that social capital does not mediate the impact of

Table 4 *Social position, social capital and longstanding illness, logistic regression analyses: logistic regression coefficients (B) and odds ratios (Exp B). (N = 2771)*

<i>Variables</i>	<i>Model 1 B(Exp B)</i>	<i>Model 2 B(Exp B)</i>	<i>Model 3 B(Exp B)</i>
Background			
Gender (1 = man, 2 = woman)	.21(1.23)**	.11(1.11)	.14(1.15)
Age	.02(1.02)***	.02(1.02)***	.02(1.02)***
Immigrant status (0 = no, 1 = yes)	.02(1.02)	-.26(.77)	-.27(.76)
Married or cohabiting (0 = no, 1 = yes)	-.26(.78)**	.08(1.09)	.07(1.07)
Socioeconomic position			
Problems growing up		.22(1.24)***	.22(1.24)***
Education		-.01(.99)	.04(1.04)
Employed (0 = no, 1 = yes)		-.73(.48)***	-.75(.47)***
Equivalised household income		.00(1.00)	.00(1.00)
Subjective poverty		.70(2.00)***	.70(2.00)***
Bonding social capital			
Emotional support			.00(1.00)
Practical support			.02(1.02)
Number of friends			.00(1.00)
Bridging social capital			
Neighbourhood satisfaction			.01(1.01)
Civic participation			.05(1.05)
Linking social capital			
Low education and low professional resources			.20(1.22)
Low education and high professional resources			.08(1.08)
High education and low professional resources			.40(1.49)
High education and high professional resources (ref = 1)			
Generalised trust			-.03(.97)
-2 log likelihood	3588.2	3372.5	3361.0
Constant	-1.67	-1.51	-1.97

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

socioeconomic position on health: the coefficients relating to socioeconomic variables barely changed when social capital indices were added to the logistic models. Only two of the social capital variables showed significant results, *i.e.*, neighbourhood satisfaction and generalised trust, and they did so only with respect to self-rated health. None of the social capital variables were significantly related to longstanding illness in the model that fully introduced social capital measurements. These findings are in line with results from Swedish and Norwegian studies (Rostila 2008, van der Wel 2007), but they contradict the results found in Lindström *et al.* (2001).

This study adds to existing knowledge by including a number of measures that are intended to capture various aspects of the two main dimensions of social capital, the structural dimension, *i.e.*, bonding, bridging and linking social relationships, as well as the cognitive dimension, *i.e.*, generalised trust. Despite the rather rich provision of social capital

indices measured in this study, these variables add little to an understanding of the relationship between socioeconomic position and health.

Furthermore, once socio-demographic and socioeconomic variables were accounted for in the logistic regression models, all but two measures of social capital variables turned out to be insignificant. This is in contrast to the bivariate correlation analysis that showed that nearly all the social capital variables were significantly associated with self-perceived health and that half of the social capital variables were related to longstanding illness. This indicates that when one assesses the possible impact of social capital on health it is very important to account for variables that are related to social position and to be aware that there may also be other plausible causal factors, for example, childhood conditions (Smith and Lynch 2004).

The Nordic countries are characterised by a high level of social capital, for example, participation in organised activities and generalised trust (Svendsen and Svendsen 2006). Although previous studies have demonstrated that lower socioeconomic and disadvantaged groups have a significantly lower level of social capital (Dahl *et al.* 2008, Hyggen 2006, van der Wel *et al.* 2006) due to generous income maintenance programmes, there may be less variability in the distribution of social capital in Norway than in other countries (Abrahamson 1999, Esping-Andersen 1990, Gallie and Paugam 2000, Korpi and Palme 1998). Thus, generalising from our findings cannot be done without qualification. It is possible that in countries with less equal distribution of social capital between socioeconomic groups social capital may play a more crucial mediating role for health. Only comparative studies can shed light on this issue.

Marmot's (2004) hypothesis, which is referred to in the introduction to this article, *i.e.* that social networks and social participation are important links between socioeconomic position and health, is not supported by our analysis. The connections between social capital and health have received harsh criticism for theoretical, empirical and political reasons. For example, Smith and Lynch (2004) argued that studies that demonstrate a relationship between social capital and health often fail to consider other distant or proximate factors that may help explain health and health inequalities, such as material hardship or childhood conditions. In our analyses we did control for an index variable that tapped different problems the respondents experienced while growing up. The variable was retrospective and based upon the respondent's self-report. Not only did this variable contribute to erasing the effects of social capital but also, in some models, to rendering socioeconomic variables like education and household income insignificant. A likely interpretation is that childhood conditions affect health in adult life directly as well as indirectly by influencing people's contemporary socioeconomic circumstances. Hence, these findings suggest that adult health may be the result of both long-term childhood conditions and of factors related to their current socioeconomic position.

Many studies, including Norwegian ones, show that education, income and social class have separate and independent effects on health and life expectancy (Geyer *et al.* 2006, Sund and Krokstad 2005). In the present study the impact of education and income on the two health outcomes under scrutiny are not consistent, however. A re-estimation of model 2 (in Table 3 and 4), which omitted employment, self-rated poverty and childhood conditions, showed the significant effect of education on both health outcomes. Hence, a weak education effect may be mediated or caused by (one or more) of these factors. However, we were unable to detect any significant relationship between income and either of the health outcomes, not even in the bivariate analysis (see Table 2). One reason may be non-response bias (see below).

The measures of health that are used in the present study have been applied in numerous studies in many countries (Daalstra and Kunst *et al.* 2006, Lahelma and Martikainen *et al.* 2004, Stronks *et al.* 1998). Countries' self-rated health can be seen as a global assessment of

health summarising both physical and mental aspects of health in one conceptual framework (Björner *et al.* 1996). Several studies report that illness and functional status explain a substantial share of the variation in subjective health (Manderbacka *et al.* 1999, Murata *et al.* 2006, Simon *et al.* 2000). Part of the variation is, however, also accounted for by economic, psychological and social factors (Murata *et al.* 2006). Self-rated health is also found to predict mortality over and beyond that which is related to illness and disease (DeSalvo *et al.* 2006). One limitation of this measure should be mentioned: it might lead to an underestimation of socioeconomic inequalities in health, perhaps because high status individuals have higher health expectations (Delpierre *et al.* 2009). Longstanding illness is also a broad measure of health status but seems to have a narrower scope than self-perceived health. A validation of limiting longstanding illness, which probably is not too different from longstanding illness, found that the measure was associated with severe chronic conditions and diseases (Manor *et al.* 2001). Table 2 shows that the correlation coefficient between self-rated health and longstanding illness is quite high ($r = .40$), but that there remains a large amount of unshared variation. The fact that self-perceived health and longstanding illness behave differently in our analyses indicates that they are far from identical constructs.

We have utilised a cross-sectional data set. As a consequence, one should not interpret the statistical associations, *i.e.*, the estimated odds, as causal relations. Thus, when we speak of 'effects', we do not imply causality in either direction but merely refer to statistical relationships.

For several background variables (gender, county/region and age) our sample is fairly representative of the Norwegian population. For other variables, such as immigrant status and, in particular, education, it is less so. How serious is this systematic bias for the results and the conclusions we have drawn? If we were to calculate prevalence figures for health, for example, such systematic bias might have been severe. However, in this article we were mainly interested in associations between variables, and the underrepresentation of disadvantaged individuals therefore poses less of a problem (Kleinbaum *et al.* 1998). As mentioned in the methods section a re-analysis of the data using a weighted education variable did not alter the results. Furthermore, low-income individuals are likely to be underrepresented in the study sample. Hence, although this is not very likely, we cannot totally dismiss the possibility that we may have underestimated the effects of income on health.

Address for correspondence: Espen Dahl, Department of Social Sciences, Oslo University College, Pb 4, St. Olavs plass, 0130 Oslo, Norway
e-mail: espen.dahl@sam.hio.no

References

- Abrahamson, P. (1999) The welfare modelling business, *Social Policy & Administration*, 33, 4.
- Almedom, A. (2005) Social capital and mental health: an interdisciplinary review of primary evidence, *Social Science & Medicine*, 61, 5.
- Arneil, B. (2006) *Diverse Communities. The Problem with Social Capital*. Cambridge: Cambridge University Press.
- Berkman, L.F. and Glass, T. (2000) Social integration, social networks, social support, and health. In Berkman, L.F. and Kawachi, I. (eds) *Social Epidemiology*. Oxford: Oxford University Press.
- Björner, J.B., Søndergaard, K., Orth-Gomér, K., Tibblin, G., Sullivan, M. and Westerholm, P. (1996) Self-rated health: a useful concept in research, prevention, and clinical medicine, *Swedish Council for Planning and Coordination of Research, Stockholm* (1996) [Report No. 96:9].

- Bjørnskov, C. (2003) The happy few: cross-country evidence on social capital and life satisfaction, *Kyklos*, 56, 1, 3–16.
- Bourdieu, P. (1986) The forms of capital. In Richardson, J.G. (ed.) *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood Press.
- Coleman, J. (1988) Social capital in the creation of human capital, *American Journal of Sociology*, 94, S95–120.
- Daalstra, J.A.A., Kunst, A.E. and Mackenbach, J. (2006) A comparative appraisal of the relationship of education, income and housing tenure with less than good health among the elderly in Europe, *Social Science & Medicine*, 62, 8, 2046–60.
- Dahl, E., Lorentzen, T. and Fløtten, T. (2008) Poverty dynamics and social exclusion in Norway, *Journal of Social Policy*, 37, 2, 231–49.
- De Silva, M., McKenzie, K., Harpham, T. and Huttly, S. (2005) Social capital and mental illness: a systematic review, *Journal of Epidemiology and Community Health*, 59, 8, 619–27.
- Delpierre, C., Lauwers-Cances, V., Datta, G.D., Lang, T. and Berkman, L. (2009) Using self-rated health for analyzing social inequalities in health: a risk for underestimating the gap between socioeconomic groups? *Journal of Epidemiology and Community Health*, 63, 6, 426–32.
- DeSalvo, K.B., Bloser, N., Reynolds, K.H.J. and Muntner, P. (2006) Mortality prediction with a single general self-rated health question, a meta-analysis, *Journal of General Internal Medicine*, 21, 267–75.
- Esping-Andersen, G. (1990) *The three worlds of welfare capitalism*. Cambridge: Polity.
- Eurothine (2008) Tackling health inequalities in Europe: an integrated approach – final report. University Medical Centre. Rotterdam: Department of Public Health.
- Fløtten, T. and West Pedersen, A. (2008) Fattigdom som mangel på sosialt aksepterte levekår. In Seim, S. and Harsløf, I. *Fattigdommens dynamikk—perspektiver på marginalisering i det norske samfunnet*. (The dynamics of poverty – perspectives on marginalisation in the Norwegian society.) Oslo: Universitetsforlaget.
- Gallie, D. and Paugam, S. (2000) The experience of unemployment in Europe: the debate. In Gallie, D. and Paugam, S. (eds) *Welfare Regimes and the Experience of Unemployment in Europe*. New York: Oxford University Press.
- Geyer, S., Hemström, Ö., Peter, R. and Vågerö, D. (2006) Education, income and occupational class cannot be used interchangeably in social epidemiology. Empirical evidence against an unquestioned practice. *Journal of Epidemiology and Community Health*, 60, 9, 804–10.
- Granovetter, M. (1973) The strength of weak ties, *American Journal of Sociology*, 78, 6, 1360–80.
- Hagenaars, A., de Vos, K. and Zaidi, M.A. (1994) *Poverty Statistics in the Late 1980s: Research Based on Micro-data*. Luxembourg: Office for Official Publications of the European Communities.
- Hyggen, C. (2006) Risks and resources: social capital among social assistance recipients in Norway, *Social Policy & Administration*, 40, 5, 493–508.
- Kääriäinen, J. and Lehtonen, H. (2006) The variety of social capital in welfare state regimes – a comparative study of 21 countries, *European Societies*, 8, 1, 27–57.
- Kawachi, I. and Berkman, L.F. (2000) Social cohesion, social capital and health. In Berkman, L.F. and Kawachi, I. (eds) *Social Epidemiology*. Oxford: Oxford University Press.
- Kessler, R., Turner, B. and House, J. (1988) Effects of unemployment on health in a community survey: main modifying and mediating effects, *Journal of Social Issues*, 44, 4, 69–85.
- Kim, D. and Kawachi, I. (2007) U.S. state-level social capital and health-related quality of life: multilevel evidence of main mediating, and modifying effects, *Annals of Epidemiology*, 17, 4, 258–69.
- Kleinbaum, D.G., Kupper, L. and Morgenstern, H. (1998) Selection bias. In Kleinbaum, D.G., Lawrence, L., Kupper, L. and Morgenstern, H. (eds) *Epidemiologic Research*. New York: Van Nostrand Reinhold.
- Korpi, W. and Palme, J. (1998) The paradox of redistribution and strategies of equality: welfare state institutions, inequality, and poverty in the western countries, *American Sociological Review*, 63, 5, 661–88.

- Lahelma, E., Martikainen, P., Laaksonen, M. and Aittomäki, A. (2004) Pathways between socioeconomic determinants of health, *Journal of Epidemiology and Community Health*, 58, 327–32.
- Lin, N. (2001) *Social Capital: A Theory of Social Structure and Action*. Cambridge: Cambridge University Press.
- Lindström, M. (2007) Social capital, anticipated mental health, and self-reported mental health: a population based study, *Social Science & Medicine*, 66, 1, 1–13.
- Lindström, M., Hanson, B.S. and Östergren, P.-O. (2001) Socioeconomic differences in leisure-time physical activity: the role of social participation and social capital in shaping health related behaviour, *Social Science & Medicine*, 52, 3, 441–51.
- Mackenbach, J.P., Stirbu, I., Roskam, A.-J.R., Schaap, M.M., Menvielle, G., Leinsalu, M. and Kunst, A.E. (2008) Socioeconomic inequalities in health in 22 European countries, *New England Journal of Medicine*, 81, 23, 2468–81.
- Malmberg-Heimonen, I. (2008) Sosial tillit blant langtidsmottakere av sosialhjelp: betydelsen av fattigdom og oppvekstvilkår. In: Harslof, I. and Seim, S. (eds) *Fattigdomens dynamikk - Perspektiver på marginalisering i det norske samfunnet*. (Social trust among long-term social assistance recipients) Oslo: Universitetsforlaget.
- Manderbacka, K., Lundberg, O. and Martikainen, P. (1999) Do risk factors and health behaviours contribute to self-ratings of health? *Social Science & Medicine*, 48, 12, 1713–20.
- Manor, O., Matthews S. and Power, C. (2001) Self-rated health and limiting longstanding illness: inter-relationships with morbidity in early adulthood. *International Epidemiological Association*, 30, 600–607.
- Marmot, M. (2004) *Status Syndrome: How Your Social Standing Directly Affects Your Health and Life Expectancy*. London: Bloomsbury.
- Murata, C., Kondo T., Tamakoshi, K., Yatsuya, H. and Toyoshima, H. (2006) Determinants of self-rated health: could health status explain the association between self-rated health and mortality? *Archives of Gerontology and Geriatrics*, 43, 3, 369–80.
- Myklestad, I., Rognerud, M. and Johansen, R. (2008) *Utsatte grupper og psykisk helse*. (Psychological health among vulnerable groups). *Folkehelseinstituttet rapport 2008*, 8. Nydalen: Nordberg Trykk AS.
- Poortinga (2006) Social capital: an individual or collective recourse for health? *Social Science & Medicine*, 62, 2, 292–302.
- Putnam, R.D. (2000) *Bowling Alone. The Collapse and Revival of American Community*. New York: Simon & Schuster.
- Putnam, R.D. (1995) Turning in, turning out: the strange disappearance of social capital in America, *Political Science and Politics*, 28, 4, 664–83.
- Rostila, M. (2008) Healthy bridges. Studies of social capital, welfare, and health, Health Equity studies No. 10 (PhD dissertation), Department of Sociology. Stockholm: Stockholm University.
- Rothstein, B. (2001) Social capital in the social democratic welfare state, *Politics & Society*, 29, 2, 207–41.
- Selle, P. and Prakash, S. (eds) (2004) *Investigating Social Capital: Comparative Perspectives on Civil Society, Participation and Governance*. London: Sage.
- Simon, J.G., van de Mheen, H., van der Meer, J. and Mackenbach, J.P. (2000) Socio-economic differences in self-assessed health in a chronically ill population, *Journal of Behavioral Medicine*, 23, 5, 399–420.
- Sirven, N. (2006) Endogenous social capital and self-related health: cross-sectional data from rural areas of Madagascar. *Social Science & Medicine*, 63, 6, 1489–1502.
- Smith G.D. and Lynch J. (2004) Commentary: social capital, social epidemiology and disease aetiology, *International Journal of Epidemiology*, 33, 4, 691–700.
- Solem, P.E. (2003) *Forskningsinstrumentene i norLAG (Research measures in norLAG)*. Oslo: NOVA Norsk institutt for forskning om oppvekst, velferd og aldring.
- Statistics Norway (2003) *Norwegian standard classification of education*. Oslo: Statistics Norway.
- Statistics Norway (2005) *Population and labour market statistics*. Oslo: Statistics Norway.

- Stronks, K., van de Mheen, H.D. and Mackenbach, J.P. (1998) The importance of psychosocial stressors for socio-economic inequalities in perceived health, *Social Science and Medicine*, 46, 4–5, 611–23.
- Subramanian SV., Lochner K. and Kawachi, I. (2003) Neighborhood differences in social capital in the US: compositional artifact or a contextual construct? *Health and Place*, 9, 1, 33–44.
- Sund, E.R. and Krokstad, S. (2005) *Sosiale ulikheter i helse i Norge – en kunnskapsoversikt. Sosial- og helsedirektoratet, rapport.* (Social inequalities in health in Norway – a review of knowledge.) Oslo: Sosial og Helsedirektoratet.
- Sundqvist, K. and Yang, M. (2007) Linking social capital and self-related health: a multilevel analysis of 11,175 men and women in Sweden, *Health & Place*, 13, 2, 324–34.
- Svendsen, G.T. and Svendsen, G.L.H. (2006) *Social kapital – en introduksjon.* Copenhagen: Hans Reitzels Forlag.
- Szreter, S. and Woolcock, M. (2004) Health by association? Social capital, social theory, and the political economy of public health, *International Journal of Epidemiology*, 33, 4, 650–67.
- Wel, K. van der (2007) Social capital and health – a multilevel analysis of 25 administrative districts in Oslo. *Norsk Epidemiologi*, 17, 1, 71–8.
- Whiteley, P. (2000) Economic growth and social capital, *Political Studies*, 48, 3, 443–66.
- Wel, K. van der, Dahl, E., Lødemel, I., Løyland, B., Ohrem Naper, S. and Slagsvold, M. (2006) *Funksjonsevne blant langtidsmottakere av sosialhjelp* (Functional ability among long-term social assistance recipients.) HiO Rapport 29. Oslo: Høgskolen i Oslo.
- Wuthnow, R. (2002) The United States: bridging the privileged and the marginalized. In Putnam, R.D. (ed.) *Democracies in Flux: The Evolution of Social Capital in Contemporary Society*. Cary, NC: Oxford University Press.

Appendix

Demographic characteristics of the general Norwegian population and study sample (N = 3190)

<i>Variables</i>	<i>General population*</i>	<i>Study sample</i>
Gender (%)		
Men	50.5	49.5
Women	49.5	50.5
Total	100	100
County (%)		
Oslo-Akershus	22.0	24.4
Hedmark-Oppland	8.2	8.4
Sør-Østlandet	19.4	17.9
Agder-Rogaland	14.0	13.4
Vestlandet	17.5	17.9
Trøndelag	8.7	8.8
Nord-Norge	10.2	9.2
Total	100	100
Age (%)		
16–19 years	3.6	2.6
20–24 years	8.6	5.5
25–39 years	30.2	28.5
40–54 years	30.0	32.2
55–66 years	19.6	21.5
67–74 years	7.8	9.3
Total	100	100
Education (%)		
Primary	25.6	18.3
Secondary	43.4	43.7
Tertiary, lower level	20.4	27.4
Tertiary, higher level	6.1	8.4
No education/unknown	4.4	2.3
Total	100	100
Ethnicity (%)		
Immigrants	10.6	6.9
Non-immigrants	89.4	93.1
Total	100	100

*Source: Statistics Norway, (2005).