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Social relations or social capital? Individual and community health effects of bonding social capital

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Abstract

Social capital has become one of the most popular topics in public health research in recent years. However, even after a decade of conceptual and empirical work on this subject, there is still considerable disagreement about whether bonding social capital is a collective resource that benefits communities or societies, or whether its health benefits are associated with people, their personal networks and support. Using data from the 2000 and 2002 Health Survey for England this study found that, in line with earlier research, personal levels of social support contribute to a better self-reported health status. The study also suggests that social capital is additionally important for people's health. In both datasets the aggregate social trust variable was significantly related to self-rated health before and after controlling for differences in socio-demographics and/or individual levels of social support. The results were corroborated in the second dataset with an alternative indicator of social capital. These results show that bonding social capital collectively contributes to people's self-rated health over and above the beneficial effects of personal social networks and support.

Keywords: Social capital; Social support; Self-rated health; Multilevel modelling; Health survey for England; UK

Introduction

Social capital has become one of the most popular topics in public health research in recent years (Kawachi & Berkman, 2000; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997, 1999; Lochner, Kawachi, & Kennedy, 1999; Putnam, 1993, 2000; Wilkinson, 1996). Whilst Macinko and Starfield (2001) found only ten empirical studies on social capital and health from before 2001, Kawachi, Kim, Coutts, and Subramanian (2004) came across more than 50 papers that were published on this subject in 2002 alone. Although initially social capital was not thought to have any health benefits (Putnam, 1993), there is now an impressive body of empirical evidence suggesting that it is a significant determinant of at least some important health outcomes. For example, social capital has been shown to be associated with lower levels of general health and (subjective) well-being (Helliwell, 2003; Subramanian, Kim, & Kawachi, 2002), lower cardiovascular and cancer mortality (Kawachi et al., 1997), lower suicide rates (Helliwell, 2003), and lower violent crime rates (Kennedy, Kawachi, & Brainerd, 1998). However, even after a decade of intensive research there is still considerable disagreement about the specific social processes underlying this relationship. Various mechanisms have been proposed linking social capital to health. According to some, social capital provides social and material support, and acts as a buffer to stress

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in adverse times (Wilkinson, 1996). Others argue that socially cohesive communities are more successful at bonding together to fight potential budget cuts of local services, and as a result have better access to local services and amenities (Kawachi, Kennedy, & Glass, 1999; Sampson, Raudenbush, & Earls, 1997). It is also thought that communities with high levels of social capital are more effective at exercising social control over deviant health behaviours, such as smoking and alcohol abuse (Subramanian et al., 2002).

Szreter and Woolcock (2004) identify three perspectives with very different understandings of the efficacy of social capital, i.e., (1) a social support perspective that argues that social networks are central to people's objective and subjective welfare, (2) an inequality thesis that posits that widening levels of economic inequality has eroded mutual respect and trust between (different groups of) citizens, and (3) a political economy approach that argues that inequalities in health are essentially down to differences in access to material resources. The three perspectives on social capital seem to run parallel to the three types of bonding, bridging, and linking social capital (see e.g., Narayan, 1999; Putnam, 2000; Szreter & Woolcock, 2004). Bonding social capital refers to the 'horizontal' ties between members of a network who see themselves as similar, and can be compared to the concept of social cohesion within specific social groupings (cf., Harpham, Grant, & Thomas, 2002; Lochner et al., 1999). Bridging social capital comprises links across different groups in society that do not necessarily share similar social identities, and refers to the (perceived) levels of social justice, solidarity and mutual respect in society as a whole. Linking social capital is a specific form of bridging social capital that applies to 'vertical' interactions across explicit, formal, and institutionalised power or authority structures in society. As powerfully argued by Szreter and Woolcock (2004), all three forms are important for people's health and well-being: bonding social capital for the necessary social support, bridging social capital for solidarity and respect across the social spectrum, and linking social capital for the effective mobilisation of political institutions and will. Another important distinction is between the structural and cognitive aspects of social capital (Bain & Hicks, 1998; Lochner, Kawachi, Brennan, & Buka, 2003), with the former referring to the extent and intensity of associational links or activity, and the latter to the (individual) perceptions of support, reciprocity, sharing and trust. In other words, the structural component comprises the more 'objective' organisational structures that form social capital in a social group, while the cognitive component refers to the more subjective perceptions of the available social capital.

What becomes clear from the above is that social capital is a very broad social concept with a disparate range of meanings. Some have even argued that social capital has lost any distinct meaning because it has become a 'catch-all' for various social phenomena (Macinko & Starfield, 2001; Portes, 1998). According to Kawachi et al. (2004) one of the main reasons why social capital has become such a contested concept is because of the muddled usage in terms of it being an individual benefit through social connections, or a collective resource that benefits communities or societies. Although most public health researchers agree that social capital is the property of a group or network (e.g., Kawachi et al., 2004; Putnam, 1992, 2000; Szreter & Woolcock, 2004), some view it as the capacity of individuals to command scarce resources by virtue of their personal memberships in networks or broader social structures (e.g., Portes, 1998). In this context, Lochner et al. (1999) make a distinction between social capital and social networks and support. Whereas social capital is part of a societal structure, social networks and support refers to the social embeddedness of individuals (also see Lindström, Moghaddassi, & Merlo, 2004). This distinction is useful as it clearly distinguishes social capital as a collective concept from the well-known individual benefits of social support (see e.g., Cohen, Underwood, & Gottlieb, 2000). As pointed out by Kawachi et al. (2004), equating social capital to social networks and support would be pouring old wine into new bottles. However, the question whether the health benefits of (bonding) social capital are collective at, for example, the community level or associated with individuals and their social relationships remains largely unanswered.

There is some empirical evidence that social capital is important at the collective level. Several ecological studies have found an association between various social capital indicators and population health outcomes at the local (neighbourhood), regional (district), state or national level (for an overview see Kawachi et al., 2004). For example, Kawachi et al. (1997, 1999) showed that social capital is a good predictor of all-cause and cause-specific mortality, as well as people's self-rated

health at the US state level, Kennedy, Kawachi, Prothrow-Stith, Lochner, and Gupta (1998) found that mistrust, crime, quality of work relations and civic engagement are associated with life expectancy and mortality rates at the regional level in Russia and Veenstra (2002) demonstrated that social capital was negatively related to population health status across 30 health districts in Saskatchewan, Canada. However, others found little evidence that social capital has a positive effect on population health at the collective level (Kennelly, O'Shea, & Garvey, 2003; Lynch et al., 2001; Veenstra, 2000). It also has to be kept in mind that the results of ecological studies are open to collective as well as individual interpretations (Kawachi et al., 2004). That is, it is not clear whether the results from these studies reflect a genuine contextual effect or whether they are caused by compositional differences in individual levels of social trust and participation.

In addition to the extensive social support literature (see Cohen et al., 2000), there is robust empirical evidence from the social capital literature that social networks and support are beneficial for people's health. With a few exceptions (e.g., Ellaway & Macintyre, 2000; Veenstra, 2000), studies have consistently demonstrated that there are strong links between individual levels of social trust, civic participation, and people's objective and subjective health (e.g., Barefoot et al., 1998; Hyyppä & Mäki, 2001; Rose, 2000). But individual approaches have their limitations as well. While these studies are able to demonstrate the importance of social networks and support for people's personal health, they are not suitable for examining the contextual effects of social capital. That is, an individualistic analysis does not reveal whether social capital at the aggregate level is more than the sum of the individual effects of social networks and support (Poortinga, 2006).

Considering that the effects of social capital at the contextual level may be confounded with the effects of social relations and support at the individual level, multilevel modelling is a more appropriate analytical approach to study individual and collective effects of social capital (see e.g., Duncan, Jones, & Moon, 1998). Multilevel modelling makes it possible to simultaneously examine the individual and contextual determinants of public health. As a result, multilevel modelling has become very popular in the field of public health research (for an overview, see Kawachi et al., 2004). However, only few multilevel studies have tried to separate the individual and contextual health effects of social capital. Most studies only considered (aggregate) social capital indicators at the contextual level, but did not take into account individual effects of social networks and support (e.g., Browning & Cagney, 2002; Lochner et al., 2003; Subramanian, Kawachi, & Kennedy, 2001). However, where aggregated variables are included without taking into account individual compositional differences in these variables it will never be clear whether social capital collectively benefits members of a community over and above the individual benefits of social networks and support. In order to disentangle these individual and collective effects, Subramanian et al. (2002) simultaneously included social trust (as an indicator of social capital) at the individual and the community level. They concluded that the beneficial properties of social capital are mainly found at the individual level. These findings were corroborated by Lindström et al. (2004). They showed that the neighbourhood variance of self-rated health was reduced to zero when controlling for socio-demographics and differences in social participation, suggesting that the neighbourhood effects are completely compositional. Similar results were found by Poortinga (2006) using a recent European dataset. So all three studies reported here found that the initial association between social capital and self-rated health disappeared after controlling for compositional differences in socio-demographics and individual levels of social trust and participation. Despite the absence of a main social capital effect, both Subramanian et al. (2002) and Poortinga (2006) found a more complex cross-level interaction between individual levels of trust and participation, and social capital. The interaction shows that social capital does not automatically lead to a better health. The results of the two studies suggest that the beneficial health effects of social capital mainly apply to more trusting, socially active individuals. This seems to fit the conceptualisation of social capital as a social resource. As with natural resources, individuals can only benefit from social capital if they are able to access it. Individuals who are less willing or able to engage with others do not seem to profit directly from the available social (support) networks.

The aim of the current paper is to further empirically investigate the health effects of social capital. Two recent English datasets are used to examine whether the benefits of bonding social capital are individual or collective at the community

level. Particularly with regard to this type of social capital it is not clear whether its benefits are individual or collective. While it is apparent that people benefit from their personal social networks and support (see e.g., Cohen et al., 2000), it is less certain whether the sum of these networks creates additional benefits to members of a community. This paper utilises the same multilevel methodology as Subramanian et al. (2002) and Poortinga (2006), and includes the social capital indicators at both the individual and the community level. The main analyses use the conventional social capital indicators of social trust and civic participation. However, it is not clear whether the aggregated versions of these widely used variables genuinely reflect social capital at the contextual level. That is, the social trust and civic participation variables have no direct link to bonding social capital at the neighbourhood level in the sense that people do not report on features of the neighbourhood they belong to (cf., Diez-Roux, 2004). Therefore, an additional analysis is conducted with an alternative measure of social capital asking people to directly evaluate the levels of social capital in their local community.

Data and methods

Data sources

This paper uses data from the 2000 and 2002 Health Survey for England (HSE). The UK Department of Health sponsored HSE comprises a series of annual surveys beginning in 1991 covering the adult population aged 16 and over living in private households in England. Since 1994 onwards the survey has been carried out by the Joint Survey Unit of the National Centre of Social Research and the Department of Epidemiology and Public Health at University College London. Data for HSE 2000 were collected between January and December 2000. For the main general population sample, 7988 adults were interviewed living at 4787 household addresses selected from 360 sampling points or postcode sectors.[1] The data for HSE 2002 were collected from January 2002 to March 2003. In total, 7394 individual interviews were conducted within 4332 households selected from 720 postcode sectors.[2]

Health outcome

The outcome variable of this study is people's self-rated health status. Respondents were asked to rate their own general health status on a five-point scale ranging from very good to very bad "How is your health in general?" This general health question has been validated as a good predictor of mortality, and is found to be relatively insensitive to differences in the wording of the question (Idler & Benyamini, 1997). The original scale was dichotomised, with 1 representing fair, bad and very bad health, and 0 representing good or very good health.

Independent variables

A number of socio-demographic covariates were included at the individual and household level (gender, age, individual economic status, household social class, and household tenure). All socio-demographic variables were included as dummy variables (see Table 1). Three dummy variables represented four age categories: 16–24, 25–44, 45–64, and 65 years and older. Individual economic status compared inactive (long-term unemployed and other economically inactive) with working and retired individuals. Household social class was measured using the Registrar General's occupation-based classification: I and II (professionals and intermediates), III NM (skilled non-manual), III M (skilled manual), and IV and V (partly and unskilled manual). Household tenure compared house owners (outright or with the help of a mortgage or loan) with people who rent their accommodation, squat or live rent free.

Personal levels of social networks and support were measured with three variables (see Table 1). Social support was assessed by adding up the responses to seven statements ("there are people I know—amongst my family or friends—who": "do things to make me happy", "make me feel loved", "can be relied on no matter what happens", "would see that I am taken care of if I needed to be", "accept me just as I am", "make me feel an

[1]National Centre for Social Research and University College London. Department of Epidemiology and Public Health, Health Survey for England, 2000 (computer file). Colchester, Essex: UK Data Archive (distributor), April 2002. SN: 4487.

[2]National Centre for Social Research and University College London (2004). Department of Epidemiology and Public Health, Health Survey for England, 2002 (computer file). Colchester, Essex: UK Data Archive [distributor], May 2004, SN: 4912.

Table 1
Characteristics of the two data sets

	HSE 2000 ($n = 7988$)		HSE 2002 ($n = 7394$)	
	Base	Contrast	Base	Contrast
Health outcome				
Self-rated health	Good/very good (74.0%)	Fair/poor/very poor (26.0%)	Good/very good (74.2%)	Fair/poor/very poor (25.8%)
Individual-level predictors				
Gender	Female (54.2%)	Male (45.8%)	Female (55.1%)	Male (44.9%)
Age	16–24 (10.7%)	25–44 (37.9%) 45–64 (30.4%) 65+ (21.0%)	16–24 (13.0%)	25–44 (35.8%) 45–64 (30.7%) 65+ (20.6%)
Individual economic status[a]	Other (75.8%)	Inactive (23.8%)	Other (76.2%)	Inactive (23.5%)
Social Support	No lack (61.3%)	Some lack (23.4%) Severe lack (13.0%)	No lack (56.0%)	Some lack (25.0%) Severe lack (12.1%)
Trust	Low trust (63.9%)	High trust (35.4%)	Low trust (54.9%)	High trust (31.9%)
Civic participation	Low (51.4%)	Medium (28.9%) High (19.7%)	Low (35.3%)	Medium (28.2%) High (27.2%)
Household-level predictors				
Social class	Class I and II (38.5%)	Class III NM (15.4%) Class III M (24.8%) Class IV and V (17.4%)	Class I and II (38.4%)	Class III NM (15.3%) Class III M (24.3%) Class IV and V (18.9%)
Household tenure[b]	Other (26.4%)	House owner (73.4%)	Other (26.3%)	House owner (73.0%)
Community-level predictors				
Aggregate trust	Mean = 35.4%; SD = 15.22		Mean = 35.3%; SD = 15.22	
Aggregate participation	Mean = 48.6%; SD = 14.15		Mean = 60.9%; SD = 18.55	
Aggregate neighbourhood[c]	n/a		Mean = 67.7%; SD = 21.74	

Note:
[a]Inactive = long-term unemployed and other economically inactive, other = in employment and retired;
[b]House owner = own accommodation outright and buying accommodation with the help of a mortgage or loan, other = rent accommodation, live rent free, and squatting;
[c]Aggregate neighbourhood = proportion of respondents in each sample point agreeing or strongly agreeing with the statement "this area is a place where neighbours look after each other."

important part of their lives", and who "give me support and encouragement") with three answering categories 1: "not true", 2: "partly true", and 3: "certainly true". The seven items formed a reliable social support scale in both datasets (Cronbach's $\alpha = 0.87$ and 0.86, respectively) Two dummy variables were used to reflect 'some lack' (scores 18–20) and 'severe lack' (scores 7–17) of social support in comparison to 'no lack' of social support (score 21). Social trust was measured with the question "generally speaking, would you say that most people can be trusted (coded 1) or you cannot be too careful in dealing with people (coded 0)". Civic participation was measured by asking respondents to indicate whether they regularly join in activities of fourteen types of clubs or associations.[3] Respondents were subdivided into a group of people who are not involved in any voluntary organisation (low participation), a group of people involved in one

[3]Political parties, trade unions (including student unions), environmental groups, parent–teacher association or school association, tenants' or residents' group or neighbourhood watch, education, arts, music or singing group (including evening classes), religious group or church organisation, charity, voluntary or community group, group for elderly or older people (e.g. lunch club), youth group (e.g. scouts, guides, youth club), women's institute or townswomen's guild or women's group, social club (including working men's club, rotary club), sports club, gym, exercise or dance group, or other groups or organisations.

club or organisation (medium participation), and those who are involved in two or more clubs or organisations (high participation).

The proportion of respondents in each sample point with high levels of social trust (i.e., saying that most people can be trusted) and with high levels of civic participation (i.e., regularly joining activities of two or more clubs or organisations) were taken to reflect social capital at the community level. In the second study (HSE2002) people were also asked to what extent they agree with the statement "this area is a place where neighbours look after each other". The latter measure can be seen as a more appropriate measure for social capital, as respondents are asked to report on the levels of social capital in their local community (cf. Diez-Roux, 2004). For all three social capital indicators the community deviations from the overall mean were calculated (see Table 1).

Statistical analysis

The HSE studies use a multistage sampling strategy, and multiple interviews were conducted in the same households where possible. In order to account for the clustering at the household and sample-point level the data was analysed from a multilevel perspective (see e.g., Bryk & Raudenbush, 1992; Goldstein, 2003; Hox, 1995; Snijders & Bosker, 1999). A simple three-level random-coefficient logistic regression was conducted using the MLwiN software package (Rasbash et al., 2002), modelling the individual, household and community variations in self-rated health (see Eq. (1)).

$$\begin{aligned} y_{ijk} &= ß_0 + ß_1 x_{1ijk} + ß_2 x_{2jk} + ß_3 x_{3k} + u_{jk} + v_k, \\ y_{ijk} &\sim \text{Binomial}(\pi_{ijk}, 1), \\ u_{jk} &\sim N(0, \sigma_u^2), \\ v_k &\sim N(0, \sigma_v^2). \end{aligned} \quad (1)$$

The response variable y_{ij} is assumed to be binomially distributed, with π_{ijk} being the probability that the ith respondent of the jth household in sample point k reports a fair, bad or very bad health, and to have a variance of 1. The household (u_{ij}) and sample point (v_j) contributions are both assumed to be normally distributed with an expected value of 0 and a variation of σ_u^2 and σ_v^2 respectively. The analyses consisted of a series of six models. The first model (Model 1) is the empty model without any predictor. This model is fitted to provide a baseline for the variation in subjective health across the three levels. Model 2 considers all individual and household variables as predictors of self-rated health, including the three variables to measure personal levels of social networks and support. This model is used to estimate the contributions of the socio-demographic and social support variables to self-rated health. Model 3 only includes the aggregate social capital indicators at the community level. This model is used to estimate the unadjusted association between the social capital variables and self-rated health. Model 4 expands the third model by adding the socio-demographic variables as covariates at the individual and household level. Model 4 should show whether the community social capital effects are caused by compositional differences in socio-demographics. Model 5 simultaneously considers the community social capital indicators and personal levels of social networks and support. This model should reveal to what extent the community social capital effects are due to compositional differences in personal levels of social capital/support. The final model (Model 6) includes all predictors at the three levels of analysis, and is used to examine whether social capital has a contextual effect on health after controlling for all socio-demographic and social capital/support variables at the personal and household level.

Results

HSE 2000

Table 2 presents the results of the series of analyses using the HSE 2000 dataset. The first model (Model 1) shows that a significant but modest proportion of the total variation in subjective health can be found at the community level (4%).[4] Model 2 found that age, individual economic status, social class and household tenure are significantly related to self-rated health. No gender effect was found for subjective health (OR = 1.03; 95% CI = 0.91–1.18). Perhaps not surprisingly, people's self-reported health is negatively related to age. People aged

[4]The intraclass correlation (ICC) at the community level (level 3) was calculated here as $\rho = \sigma_{v0}^2(\sigma_{v0}^2 + \sigma_{u0}^2 + \sigma_{e0}^2)^{-1}$, with $\sigma_{e0}^2 = \pi^2/3$ (see e.g., Goldstein, Browne, & Rasbash, 2002). Because the ICC is difficult to interpret for binary responses, some authors have proposed to translate the ICC into an odds ratio scale by calculating an index termed the median odds ratio (MOR; see e.g., Larsen & Merlo, 2005).

Table 2
Fixed effects (odds ratios and 95% confidence intervals) and random effects of the self-rated health model (HSE, 2000)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed effects						
Level 1 (Individual)						
Male	—	1.03 (0.91–1.18) n.s.	—	1.10 (0.97–1.25) n.s.	—	1.03 (0.91–1.18) n.s.
Age 25–44	—	2.08 (1.57–2.74)***	—	2.12 (1.61–2.79)***	—	2.07 (1.57–2.74)***
Age 45–64	—	4.91 (3.72–6.49)***	—	5.25 (3.99–6.91)***	—	4.96 (3.75–6.57)***
Age 65+	—	12.39 (9.25–16.59)***	—	12.28 (9.22–16.35)***	—	12.53 (9.34–16.81)***
Inactive	—	2.70 (2.30–3.16)***	—	2.81 (2.41–3.28)***	—	2.70 (2.30–3.16)***
Some lack of support	—	1.36 (1.16–1.59)***	—	—	1.39 (1.19–1.62)***	1.35 (1.15–1.58)***
Severe lack of support	—	1.75 (1.45–2.10)***	—	—	2.19 (1.82–2.62)***	1.73 (1.44–2.09)***
Trust	—	0.64 (0.55–0.74)***	—	—	0.75 (0.65–0.88)***	0.67 (0.58–0.78)***
Medium participation	—	0.79 (0.68–0.93)**	—	—	0.75 (0.64–0.88)***	0.82 (0.70–0.96)*
High participation	—	0.60 (0.50–0.73)***	—	—	0.56 (0.46–0.68)***	0.62 (0.51–0.76)***
Level 2 (household)						
Class III NM	—	1.39 (1.13–1.72)**	—	1.51 (1.22–1.85)***	—	1.39 (1.12–1.72)**
Class III M	—	1.72 (1.43–2.06)***	—	1.94 (1.63–2.32)***	—	1.69 (1.41–2.03)***
Class IV and V	—	1.88 (1.54–2.30)***	—	2.20 (1.81–2.67)***	—	1.86 (1.52–2.27)***
House owner	—	0.58 (0.49–0.68)***	—	0.54 (0.46–0.64)***	—	0.59 (0.50–0.69)***
Level 3 (community)						
Aggregate trust	—	—	0.36 (0.20–0.64)***	0.36 (0.21–0.61)**	0.53 (0.29–0.96)*	0.57 (0.33–0.99)*
Aggregate participation	—	—	0.28 (0.15–0.50) ***	0.47 (0.27–0.81)**	0.50 (0.27–0.91)*	0.64 (0.36–1.12) n.s.
Random effects						
Level 1 (individual)	1	1	1	1	1	1
Level 2 (household)	1.717 (0.125)***	0.995 (0.113)***	1.748 (0.127)***	1.138 (0.113)***	1.474 (0.123)***	1.015 (0.114)***
Level 3 (community)	0.203 (0.051)***	0.074 (0.039) n.s.	0.135 (0.047)**	0.073 (0.039) n.s.	0.122 (0.045)**	0.068 (0.039) n.s.

Note: *$p<.05$, **$p<.01$, ***$p<.001$, n.s. = non-significant.

25–44 were more than two times more likely (OR = 2.08; 95% CI = 1.57–2.74), people aged 45–64 nearly five times more likely (OR = 4.91; 95% CI = 3.72–6.49), and people aged 65 and over more than twelve times more likely (OR = 12.39; 95% CI = 9.25–16.59) to report fair, bad or very bad health than people aged 16–24. Personal economic status is a strong predictor of health. People who are economically inactive are more than two-and-a-half times more likely to report fair/bad/very bad health than people who are working or retired (OR = 2.70; 95% CI = 2.30–3.16). A statistically significant social class gradient was found for self-rated health. Compared to 'professional and intermediate' households, 'skilled non-manual' (OR = 1.39; 95% CI = 1.13–1.72), 'skilled manual' (OR = 1.72; 95% CI = 1.43–2.06), and 'partly and unskilled manual' (OR = 1.88; 95% CI = 1.54–2.30) households were all more likely to report poor health. Household tenure was also found to affect people's self-reported health status. House owners are about half as likely to report poor health as people with a different household tenure (OR = 0.58; 95% CI = 0.49–0.68). Model 2 also shows that individual levels of social capital (as measured by social support, social trust and civic participation) are associated with self-rated health. People with some lack (OR = 1.36; 95% CI = 1.16–1.59) or a severe lack (OR = 1.75; 95% CI = 1.45–2.10) of social support more often report poor health than people with no lack of social support. Individuals with a high level of trust were less likely to report poor self-rated health compared to individuals with a low level of trust (OR = 0.64; 95% CI = 0.55–0.74). People with a medium level of civic participation (OR = 0.79; 95% CI = 0.68–0.93) as well as people with a high level of civic participation (OR = 0.60; 95% CI = 0.50–0.73) had a better self-rated health status than people with a low level of civic participation.

Model 3, with the aggregate social trust and civic participation variables as the only predictors, found that social capital is significantly associated with people's subjective health at the community level. That is, people from communities where no one has a high level of trust are nearly three times more likely to report fair, bad or very bad health than people living in communities where everybody has a high level of trust (OR = 0.36; 95% CI = 0.20–0.64). Similar results were found for the aggregate participation social capital indicator (OR = 0.28; 95% CI = 0.15–0.50). However, Model 3 does not show whether this is a genuine contextual effect or whether it reflects differences in composition between the different communities. This study suggests that that the community social capital effects are only partly compositional. Controlling for differences in socio-demographics only slightly affected the community effects of the aggregate social trust and aggregate civic participation variables (see Model 4). Controlling for personal differences in social support, social trust and civic participation had a bigger effect on the two social capital indicators (see Model 5). However, both indicators remained significantly related to self-rated health. Differences between the two social capital indicators emerged in the final model (Model 6). While controlling for all socio-demographic and personal social capital/support variables rendered the community effects of the aggregate civic participation measure non-significant, the association between the aggregate social trust variable and self-rated health remained significant.

The random part of the model also provides information about social capital as a contextual phenomenon (cf., Merlo, Chaix, Yang, Lynch, & Rastam, 2005). The idea of contextual phenomenon corresponds to the statistical concept of clustering at the higher levels of analyses, such as the neighbourhood. If the outcome variable is clustered (i.e., people in the same neighbourhood are more similar to each other than to people from other areas), it is necessary to use multilevel regression, as normal regression analyses assumes independence of individual measures. Where this assumption is violated, the results of the regression analysis are biased. However, clustering is not just a statistical nuisance that needs to be addressed for obtaining correct statistical estimations; it can also be considered a key concept in social epidemiology that yields important information by itself. The more the health status of people within a neighbourhood are alike (as compared with people in other neighbourhoods), the more probable it is that the determinants of individual health are directly related to the contextual environment of the neighbourhood. As noted earlier, about 4% of the overall variance can be found at the community level. This modest but significant clustering of self-rated health at the neighbourhood level becomes non-significant when controlling for all socio-demographic and social capital/support variables (Model 2). These results suggest that the health differences between communities are largely

compositional. This may mainly be due to socio-demographics, as the addition of the group of socio-demographic variables rendered the community variation of self-rated health non-significant in Model 4. Table 2 also shows that a third of the variance in self-rated health can be found at the household level (33%). Some of the household variance is explained by compositional differences in socio-demographics. However, self-rated health still varied considerably even after controlling for all the variables that were considered in this study.

HSE 2002

Table 3 presents the results of the series of analyses using the HSE 2002 dataset. The first model (Model 1) shows that about 10% of the overall variation in self-rated health can be found at the community level. This is considerably higher than in the HSE 2000 dataset. Model 2 shows that age, individual economic status, social class and household tenure are significantly related to self-rated health. These results are largely comparable to the ones obtained in the former dataset. People aged 25–44 were nearly two times more likely (OR = 1.98; 95% CI = 1.43–2.74), people aged 45–64 nearly six times more likely (OR = 5.85; 95% CI = 4.24–8.06), and people aged 65 and over nearly 14 times more likely (OR = 13.94; 95% CI = 9.91–19.61) to report fair, bad or very bad health than people aged 16–24. People with an inactive economic status were nearly two-and-a-half times more likely to report poor health compared to working and retired individuals (OR = 2.42; 95% CI = 2.00–2.94). Again a statistically significant household social class gradient was found for self-rated health. Households classified as 'skilled manual' (OR = 1.52; 95% CI = 1.21–1.90), and 'partly and unskilled manual' (OR = 1.85; 95% CI = 1.46-2.34) more often reported fair/bad/very bad health than people living in households classified as 'professional and intermediate'. However, no significant differences were found between households classified as 'professional and intermediate' and 'skilled non-manual' (OR = 1.22; 95% CI = 0.95–1.57). After controlling for social class differences, house ownership (OR = 0.47; 95% CI = 0.39–0.57) was still significantly related to subjective health. Just as in the HSE2000 dataset, no gender effect was found for subjective health (OR = 1.03; 95% CI = 0.88–1.21). Model 2 also shows that social support contributes to people's subjective health. People with 'some lack' (OR = 1.33; 95% CI = 1.11–1.60) and a 'severe lack' (OR = 2.19; 95% CI = 1.74–2.75) of social support were more likely to report poor health compared to people with 'no lack' of social support. At the same time, trusting individuals were less likely to report poor health (OR = 0.69; 95% CI = 0.58–0.82). Civic participation was also related to subjective health. Individuals with medium levels of civic participation (OR = 0.76; 95% CI = 0.62–0.91) and high levels of civic participation (OR = 0.61; 95% CI = 0.50–0.75) less often reported poor health than individuals who are not involved in any club or organisation.

The results of the second study again suggest that the social capital effects at the community level are only partly compositional. Model 3 shows that both social capital indicators are significantly related to subjective health. People living in communities with all inhabitants expressing high levels of trust are four times less likely to report fair, bad or very bad health than people living in communities with all inhabitants expressing high levels of trust (OR = 0.25; 95% CI = 0.14–0.45). People living in communities with all inhabitants having high levels of civic participation are about two-and-a-half times less likely to report fair, bad or very bad health than people living in communities with none of its inhabitants having high levels of civic participation (OR = 0.38; 95% CI = 0.22–0.65). Controlling for differences in socio-demographics slightly affected the community effects of the aggregate social trust and aggregate civic variables (see Model 4). Although the association between aggregate participation and self-rated health was clearly reduced, it remained significant. Whilst controlling for personal differences in social support, social trust and civic participation rendered the community effects of the aggregate civic participation measure non-significant, the aggregate social trust variable remained associated with self-rated health (see Model 5). The final model (Model 6) shows that controlling for all socio-demographic and individual social capital/support variables rendered the community effects of the aggregate civic participation measure non-significant. However, also here the association between the aggregate social trust variable and self-rated health remained significant.

An additional analysis was conducted with an alternative measure of social capital. This new measure may be a better indicator of neighbourhood social capital as people are asked to directly

Table 3
Fixed effects (odds ratios and 95% confidence intervals) and random effects of the self-rated health model (HSE 2002)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed effects						
Level 1 (individual)						
Male	—	1.03 (0.88–1.21) n.s.	—	1.14 (1.00–1.31) n.s.	—	1.04 (0.89–1.21) n.s.
Age 25–44	—	1.98 (1.43–2.74)***	—	2.13 (1.60–2.83)***	—	1.99 (1.43–2.75)***
Age 45–64	—	5.85 (4.24–8.06)***	—	6.13 (4.62–8.13)***	—	5.92 (4.28–8.18)***
Age 65+	—	13.94 (9.91–19.61)***	—	14.91 (11.05–20.12)***	—	14.34 (10.18–20.21)***
Inactive	—	2.42 (2.00–2.94)***	—	2.53 (0.087)***	—	2.43 (2.00–2.95)***
Some lack of support	—	1.33 (1.11–1.60)**	—	—	1.44 (1.18–1.76)***	1.34 (1.12–1.61)**
Severe lack of support	—	2.19 (1.74–2.75)***	—	—	2.77 (2.16–3.55)***	2.21 (1.76–2.78)***
Trust	—	0.69 (0.58–0.82)***	—	—	0.78 (0.64–0.95)*	0.75 (0.62–0.90)**
Medium participation	—	0.76 (0.62–0.91)**	—	—	0.66 (0.53–0.81)***	0.77 (0.63–0.94)**
High participation	—	0.61 (0.50–0.75)***	—	—	0.55 (0.44–0.69)***	0.62 (0.51–0.77)***
Level 2 (household)						
Class III NM	—	1.22 (0.95–1.57) n.s.	—	1.31 (1.04–1.64)*	—	1.20 (0.93–1.55) n.s.
Class III M	—	1.52 (1.21–1.90)***	—	1.69 (1.38–2.06)***	—	1.47 (1.18–1.84)***
Class IV and V	—	1.85 (1.46–2.34)***	—	2.09 (1.69–2.58)***	—	1.78 (1.40–2.26)***
House owner	—	0.47 (0.39–0.57)***	—	0.43 (0.36–0.52)***	—	0.47 (0.39–0.58)***
Level 3 (community)						
Aggregate trust	—	—	0.25 (0.14–0.45)***	0.32 (0.19–0.53)***	0.33 (0.16–0.67)**	0.39 (0.22–0.71)**
Aggregate participation	—	—	0.38 (0.22–0.65) ***	0.60 (0.38–0.94)*	0.63 (0.33–1.18) n.s.	0.90 (0.53–1.54) n.s.
Random effects						
Level 1 (individual)	1	1	1	1	1	1
Level 2 (household)	2.240 (0.165)***	1.199 (0.152)***	2.200 (0.163)***	1.268 (0.133)***	2.569 (0.210)***	1.244 (0.155)***
Level 3 (community)	0.600 (0.102)***	0.319 (0.086)***	0.484 (0.095)***	0.251 (0.070)***	0.558 (0.125)***	0.302 (0.087)***

Note: *$p<.05$, **$p<.01$, ***$p<.001$, n.s. = non-significant.

assess the levels of social capital of their local community with the question "this area is a place where neighbours look after each other" (cf., Diez-Roux, 2004). Table 4 presents the results using this alternative measure of social capital. It appeared that this social capital indicator was significantly related to self-rated health, before and after controlling for individual differences in socio-demographics and/or personal levels of social networks and support. Model 3 shows that people living in communities with all inhabitants agreeing with the statement are about half as likely to report fair, bad or very bad health as people living in communities with all inhabitants disagreeing with the statement that "this area is a place where neighbours look after each other" (OR = 0.56; 95% CI = 0.34–0.91). The association between the new social capital indicator and self-rated health remains significant when controlling for differences in socio-demographics (Model 4), personal levels of social networks and support (Model 5), or the socio-demographic and individual social capital/support variables together (Model 6). Note that the association between the social capital indicator and self-rated health is strengthened when accounting for compositional differences in socio-demographics. This means that the differences between communities with varying levels of social capital are greater when they are similar in socio-demographic composition.

The random effects in Tables 3 and 4 show that the health differences between communities are only partly compositional. Although the community-level variation in self-rated health is reduced by each set of variables (socio-demographics, personal levels of social capital/support, and social capital indicators), it remained highly significant. More than a third of the total variance could be found at the household level (37%). Just as in the former dataset some of this variation could be explained by differences in socio-demographics composition. However, also here most of the household variation in self-rated health remained unexplained -even after controlling for all the variables that were considered in this study.

Discussion

Social capital has evoked heated debates in the field of public health research in recent years. However, even after a decade of conceptual and empirical work on this subject there is still considerable disagreement about how social capital relates to population health. The aim of the current paper was to further empirically investigate one aspect of the debate about social capital. Two versions of the Health Survey for England were used to examine whether the benefits of bonding social capital are individual or collective at the community level.

With regard to the individual and household level predictors this study produced results that were consistent with previous research. Old age is strongly associated with a poor self-reported health status; economically inactive people more often report poor health compared to economically active people; there is a strong social class gradient in self-reported health (with people living in households classified as 'skilled manual' and as 'partly and unskilled manual' being more likely to report poor health than people living in households classified as 'professional and intermediate'); house ownership is associated with a better self-rated health status; and no significant differences were found between male and female respondents. This paper also found that high levels of social support contribute to better self-reported health. Whilst people with higher levels of social trust and civic participation were less likely to report poor health, people experiencing some or a severe lack of social support were more likely to report poor health. These findings, as well as the results that economic inactivity is associated with a poorer self-reported health status, support the well-established view that social networks and support are essential for someone's personal well being.

The results of this study further suggest that bonding social capital collectively contributes to people's self-rated health, over and above the beneficial effects of social networks and support. Although the association between aggregate civic participation and self-reported health disappeared when controlling for socio-demographics and individual levels of social support, the association between aggregate social trust and self-reported health remained significant in both datasets. The importance of bonding social capital was confirmed in the second dataset with an alternative social capital indicator. Also the new social capital variable, which asks people to directly assess the levels of social capital of their local community, was related to self-rated health before and after controlling for socio-demographics and individual levels of social support. These findings contradict previous

Table 4
Fixed effects (odds ratios and 95% confidence intervals) and random effects of the self-rated health model with 'aggregate neighbourhood' as social capital indicator (HSE 2002).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed effects						
Level 1 (individual)						
Male	—	1.03 (0.88–1.21) n.s.	—	1.13 (0.97–1.32) n.s.	—	1.04 (0.89–1.21) n.s.
Age 25–44	—	1.98 (1.43–2.74)***	—	2.01 (1.46–2.77)***	—	2.00 (1.44–2.77)***
Age 45–64	—	5.85 (4.24–8.06)***	—	5.82 (4.23–8.02)***	—	6.01 (4.35–8.31)***
Age 65+	—	13.94 (9.91–19.61)***	—	13.80 (9.83–19.37)***	—	14.61 (10.35–20.64)**
Inactive	—	2.42 (2.00–2.94)***	—	2.58 (2.13–3.12)***	—	2.44 (2.01–2.96)***
Some lack of support	—	1.33 (1.11–1.60)**	—	—	1.43 (1.17–1.75)***	1.32 (1.10–1.59)**
Severe lack of support	—	2.19 (1.74–2.75)***	—	—	2.73 (2.14–3.50)***	2.17 (1.72–2.73)***
Trust	—	0.69 (0.58–0.82)***	—	—	0.72 (0.59–0.87)***	0.69 (0.58–0.82)***
Medium participation	—	0.76 (0.62–0.91)**	—	—	0.63 (0.51–0.77)***	0.76 (0.63–0.92) **
High participation	—	0.61 (0.50–0.75)***	—	—	0.52 (0.42–0.65)***	0.62 (0.51–0.76)***
Level 2 (household)						
Class III NM	—	1.22 (0.95–1.57) n.s.	—	1.33 (1.03–1.71)*	—	1.21 (0.93–1.56) n.s.
Class III M	—	1.52 (1.21–1.90)***	—	1.73 (1.40–2.16)***	—	1.52 (1.22–1.90)***
Class IV and V	—	1.85 (1.46–2.34)***	—	2.14 (1.70–2.70)***	—	1.83 (1.44–2.32)***
House owner	—	0.47 (0.39–0.57)***	—	0.44 (0.36–0.53)***	—	0.48 (0.39–0.58)***
Level 3 (community)						
Aggregate neighbourhood	—	—	0.56 (0.34–0.91)*	0.44 (0.28–0.70)***	0.60 (0.37–0.98)*	0.52 (0.33–0.83)**
Random effects						
Level 1 (individual)	1	1	1	1	1	1
Level 2 (household)	2.240 (0.165)***	1.199 (0.152)***	2.319 (0.169)***	1.188 (0.150)***	2.525 (0.090)***	1.236 (0.154)***
Level 3 (community)	0.600 (0.102)***	0.319 (0.086)***	0.598 (0.104)***	0.324 (0.085)***	0.588 (0.126)***	0.314 (0.087)***

Note: *$p<.05$, **$p<.01$, ***$p<.001$, n.s. = non-significant.

research that found that the collective health-effects of social capital are an artefact of compositional differences in social networks and support (Subramanian et al., 2002; Lindström et al., 2004; Poortinga, 2006). In addition, but not reported here, the complex cross-level interaction between individual and collective levels of social capital found by Subramanian et al. (2002) and Poortinga (2006) could not be replicated with the two datasets used here. Differences in results between social capital studies may be partly attributable to differences in geographical scale, definition of the area units under study, and the larger context where the area is located. For example, where Poortinga (2006) examined the impacts of social capital at the national level, the current study focussed on the importance of social capital at the neighbourhood level. Moreover, associations between neighbourhood characteristics and individual health that are found in one country may not necessarily be transferable to other countries using other neighbourhood definition, or having different levels of social capital (cf., Subramanian & Kawachi, 2004).

Another interesting finding of the current study is that a large part of the variation in self-rated health can be found at the family or household level. According to Fukuyama (1995) this smallest and most basic of groups is an essential source of social capital. However, the family has been largely overlooked in the empirical social capital literature. It may be worthwhile to examine this important source of social capital in more detail in future research.

Of course the current study is not without limitations. An important weakness of cross-sectional studies is that one cannot draw conclusions about the direction of the found relationships. While it is usually assumed that a lack of social capital leads to poorer health, it may also be that individuals report poorer social capital because they have poorer health. It is not unlikely that illness will have an effect on people's social activities and perceived social support. Another limitation of the current study is that it relies on self-reported health and social capital information. It may well be that these responses are subject to similar reporting biases. As argued in Poortinga (2006), both self-rated health and self-reported social capital could well be expressions of people's general well-being. Uncertainties with regard to these self-reported measures could be circumvented by using more specific and objective health outcomes and/or using more contextual measures of social capital. Moreover, this study used the customary aggregated social trust and civic participation variables to measure social capital, whilst it is still unclear whether these widely used variables comprehensively capture the concept of social capital. Aggregate measures are problematic because they generally do not reflect the underlying social processes that link social capital to various health outcomes. This means that they provide no pointers for improving public health. For that reason various authors have argued for the use of ecological social capital indicators (e.g., Harpham et al., 2002; Lochner et al., 1999). Recent examples of ecological social capital indicators are voter turn-out (Cummins, Stafford, Macintyre, Marmot, & Ellaway, 2005; Stafford, Cummins, Macintyre, Ellaway, & Marmot, 2005), the number of public spaces per capita, and the number of voluntary organisations per capita (Veenstra, 2005). But it is far from certain whether these integral measures better reflect capital at the contextual level than aggregate measures do. At this moment many questions remain unanswered with regard to the reliability and validity of integral measures of social capital. In addition, and just like many aggregate measures, they generally do not reveal the underlying social processes that link social capital to public health.

Although the current study solely relied on aggregate measures, one of its strengths is that it used multiple indicators of social capital. In addition to the conventional social trust and civic participation variables, respondents were asked whether they live in a place where neighbours look after each other. It was found that, just as the standard aggregate social trust variable, the aggregated version of this variable was associated with self-rated health before and after controlling for socio-demographics and individual levels of social support. These consistent results indicate that social capital is indeed important for population health. While the new variable is still an aggregate indicator of social capital, it may be preferable to the conventional social trust and civic participation measures. The social trust and civic participation variables have no direct link to bonding social capital at the neighbourhood level in the sense that people do not report on features of the neighbourhood they belong to. For example, even if trust is an important component of bonding social capital, the conventional social trust item seems to measure a very diffuse kind of trust rather than trust in the

community. In contrast, the new measure asks people to directly assess the levels of bonding social capital in their local community. Thus, a measure of the neighbourhood-level construct of social capital is obtained by combining the evaluations of the neighbourhood by its inhabitants (cf., Diez-Roux, 2004).

Another limitation of this study is the use of postcode sectors as a proxy for neighbourhoods. Postcode sectors are fairly large areas consisting of approximately 2500 households and may not match the residents' perceptions of their neighbourhood. Although the use of proxies is often the only practical alternative in studying neighbourhood effects it has to be kept in mind that the misspecification of the level of the relevant geographical area may affect the outcome of the study (Diez-Roux, 2001).

As a final reflection, there have been many debates about the nature, aspects and importance of social capital in the field of health research. These sometimes-heated debates are undoubtedly fuelled by the lack of adequate conceptualisation, operationalisation and measurement of the concept. Social capital is a very broad and indistinct concept that could include nearly every aspect of the social environment. This has led to a certain impasse in empirical social capital and health research. Veenstra (2005) observed that "the social capital and health discourse (…) represents one of enthusiastic uptake by researchers and policy makers followed by empirical exploration leading to inconclusive findings and then a degree of disenchantment and disappointment" (p. 2069). In order to make empirical progress in this field of research, it may be more productive to focus on more specific social processes instead of using generic conceptualisations and indicators that do not provide practical handles for improving population health (cf. Macintyre, Ellaway, & Cummins, 2002). Szreter and Woolcock (2004) have made a promising start with unpacking the woolly concept of social capital by distinguishing three specific types of social capital. The main contribution of their framework is that it shows that the social environment can contribute to public health in different ways. It distinguishes between the different effects of social support networks (bonding social capital), social and economic inequalities (bridging social capital), and political power (linking social capital). It is important to consider that the three types of social capital are not mutually exclusive. For example, the current study specifically focussed on bonding social capital. However, that does not mean that the other forms of social capital are not important. As rightly argued by Szreter and Woolcock (2004), a balanced distribution of the three forms of social capital is necessary for a 'healthy society'. A situation in which the different types of social capital may not be in balance is what Fukuyama (1999) calls the "miniaturization of community" (Lindström, 2004). According to Fukuyama, the rise of individualism and the displacement of more traditional sorts of associations by smaller and more flexible groups have diminished the radius of trust. While individuals may still benefit from these small-scale groups, they do not necessarily add to overall social cohesion. In future research, a more detailed comparison should be made between bonding, bridging and linking social capital, and more attention should be given to what constitutes a healthy mix of the different forms of social capital.

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