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British Journal of Sociology of Education

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/cbse20>

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Published online: 16 Dec 2013.

To cite this article: Ronan Van Rossem, Marjolijn Vermande, Beate Völker & Chris Baerveldt (2015) Social capital in the classroom: a study of in-class social capital and school adjustment, British Journal of Sociology of Education, 36:5, 669-688, DOI: [10.1080/01425692.2013.848779](https://doi.org/10.1080/01425692.2013.848779)

To link to this article: <http://dx.doi.org/10.1080/01425692.2013.848779>

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Social capital in the classroom: a study of in-class social capital and school adjustment

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(Received 19 June 2012; final version received 11 September 2013)

Social capital is generally considered beneficial for students' school adjustment. This paper argues that social relationships among pupils generate social capital at both the individual and the class levels, and that each has its unique effect on pupils' performance and well-being. The sample in this study consists of 1036 children in 60 first-grade classes in 46 Dutch elementary schools. Multilevel regression results show that a substantial proportion of the variance in school adjustment can be attributed to the class level and that both individual-level and classroom-level social capital have substantial effects on school adjustment. At the individual level, the size of one's network is more important than its structure. At the collective level, social capital also has a 'dark side' because it can have negative effects on adjustment, lowering the academic performance in a class.

Keywords: social capital; school adjustment; peer acceptance; social networks; elementary education

Introduction

School is an important setting for a child's development: poor school adjustment, academic or otherwise, increases the risk of future academic failure as well as of psychopathologies, problem behavior, and low socioeconomic status later in life (Parker and Asher 1987). Children spend a considerable portion of their waking time in school and most of their interactions outside the family occur there. Schools, therefore, are an important environment in the development of young children.

In the Netherlands, children start elementary school at age four, and it consists of eight grades or years. The first two years (groups 1 and 2) provide preschool or kindergarden education; it is only in group 3 that

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elementary school education begins emphasizing the three Rs. There are over 7000 primary schools in the Netherlands with an average of 220 pupils; that is, approximately 27 pupils per grade. Parents have the freedom to send their children to the school of their choice but, given the large number of schools, most children are sent to a school in the vicinity of their home. Within each school, children are divided into classes taught by either one full-time or two part-time teachers. Given the small size of most of these schools, many have only a single class for each group/grade. With the exception of the recreation period, in most schools pupils spend their time with the same group of children; social relationships in school therefore occur almost exclusively with other children from the same class.

Social capital is a popular concept in the social sciences; its main drawback is that it has become a container term that authors define according to their own needs (Dika and Singh 2002; Baum and Ziersch 2003; Szreter and Woolcock 2004; Halpern 2005). For this paper we opted for a structural network approach to social capital; that is, the resources one obtains through one's social network and group memberships (Bourdieu 1986; Burt 1992; Lin 2001; Flap 2004). This definition most closely resembles that of other forms of capital – resources at the disposal of actors, for example – and links it directly to a person's social networks. Such an approach is also neutral with regard to the outcomes of social capital: they can be positive or negative. This contrasts with the more normative conceptualizations that link social capital exclusively to positive outcomes (Putnam 2000). An additional advantage of this approach is that in relatively undifferentiated social systems, such as first-grade classrooms, one's social capital is a function of the structure of one's social network rather than of the characteristics of one's alters – those to whom one has ties – because to a varying degree all members possess the resources to be exchanged. The resources these relationships with peers provide are largely, but not exclusively, intangible and include emotional and practical support, self-esteem, information, friendship, identity, and so forth (Baerveldt et al. 2003; Crosnoe 2004). Although children may use their social capital intentionally, much of it is generated and used informally and unwittingly through everyday interactions with classmates (Lin 2003).

The education literature tends to focus on social capital at either the school level or the individual student/pupil level, ignoring the social capital generated at the classroom level. For instance, Coleman and Hoffer's (1987) landmark study focused on the cohesive 'functional' communities surrounding private high schools in the United States, created by the intergenerational closure within the dense network of ties among parents, which contribute to those students outperforming public school students. Other studies have confirmed the effects of school-level social capital on students' school adjustment (for example, Teachman, Paasch, and Carver 1997; Parcel and Dufur 2001; Crosnoe 2004). Parental support or

involvement literature takes a similar approach, focusing on the supportive relationships with parents and the intergenerational closure as sources of social capital as a condition for an individual student's school adjustment (Teachman, Paasch, and Carver 1997; Carbonaro 1998; Parcel and Dufur 2001; Thorlindsson, Bjarnason, and Sigfusdottir 2007).

Findings in peer acceptance and sociometric literature are in line with the idea of individual-level social capital generated through relationships within the school. A child's poor peer relationships, or low social capital, are predictive of future academic and behavioral problems, such as dropping out of school, poor school performance, delinquency, and developmental psychopathologies (Parker and Asher 1987; Asher and Coie 1990; Rubin, Bukowski, and Parker 1998; Parcel and Dufur 2001). Although this literature avoids using the term social capital, it does find that relations with peers generates benefits for pupils; that is, generates social capital. One's social capital is exclusively a function of the number of positive relations (friendships), irrespective of the qualities of the alters or the structure of the network. Pupils enjoy the benefits of their social capital simply because they have those relationships, not because they deliberately use them to obtain certain resources. The invisible hand of social capital (Lin 2003) is at work here through the everyday interactions among children.

Although many authors define social capital as an individual resource based on personal relationships (Bourdieu 1986; Burt 1992; Lin 2001; Flap 2004), others emphasize the collective benefits that one obtains through membership in a group or community – in this case, in being a pupil in a particular class (see, for example, Coleman 1990; Portes 1998; Putnam 2000; Halpern 2005). The social network generates collective social capital that affects all members of the network through the development and enforcement of existing group norms, the creation of a class climate, the flow of information, the enhancement of trust, social control, and the provision of public resources for the entire group. In the sociology of organizations and work, similar arguments are made regarding the importance of social relations and informal groups and teams, and of the team climate, on the well-being and functioning of workers (Mayo 1949; Homans 1992). For instance, a recent study found that psychological safety in a team was related to the social relations in the team (Schulte, Cohen, and Klein 2012). Similarly, school climate literature has shown that the school climate affects the performance and well-being of students (Haynes, Emmons, and Ben-Avie 1997; McEvoy and Welker 2000; Cohen et al. 2009). The basic idea is that the interactions and relations among the children in a class create a class climate that is an important aspect of their social and psychological environment. For instance, in a fragmented class in which pupils are divided into several factions, pupils may be less likely to trust each other or to cooperate; they may feel less safe or less comfortable, and flows of information may be more limited than they are in more cohesive classes.

On the other hand, students in fragmented classes may feel freer to behave as they prefer, whereas social control can be quite constraining in more cohesive classes.

Much of social capital literature links social capital to positive outcomes for either the individual or the collective. However, this introduces a normative bias because it assumes that collective and individual interests coincide and that researchers can identify these interests. This paper views social capital, like any other form of capital, as a neutral instrument that can be used for many purposes, either positive or negative. For instance, Mayo (1933) has noted that informal groups can use their social capital to keep the pace of work down and thus keep productivity below its maximum. Mafia clans or hate groups also generate substantial social capital, but it is difficult to consider these outcomes as positive for society. The education literature assumes that social capital has positive effects on the well-being and school adjustment of children – that is, it leads to the absence of problem behaviors and to positive educational performance. Although these may be the outcomes that parents, teachers, and researchers prefer, there is no reason to expect pupils to share these preferences. Instead, they may be more interested in just doing well enough in school and having a good time. Through informal norms and social control, such behavior may spread through a class and become part of the class climate. For instance, doing too well in school may result in being labeled a ‘nerd’ and being shunned by fellow pupils.

The networks that generate social capital and thus opportunities for actors also generate dependencies and constraints that reveal the other side of social capital. What outcomes social capital has for the pupils and the class remains an empirical question. The literature, however, assumes that both individual-level and classroom-level social capital has positive effects on children’s school adjustment; that is, higher levels of in-class social capital will lead to better school performance and fewer problem behaviors.

Methods

Sample

The data used are taken from the second wave of the Utrecht Social Development Project (Palmen 2009; Palmen et al. 2011). This paper uses data on 1241 children from 71 group 3 (first grade) classes in 49 elementary schools in the province of Utrecht and the city of Hilversum in the Netherlands during the 1998/99 school year. This region is, compared with some other regions, quite heavily urbanized. Schools were randomly chosen from among all elementary schools in this region, and all pupils in first-grade classes were included in the data collection. All parents received a letter explaining the purpose of the study and had the option to withdraw their child from the study. Information was obtained at child and class/school levels.

Children were individually interviewed by trained staff in two 20-minute to 25-minute sessions. These interviews provided information on the children's social relationships with their classmates and on child characteristics. Teachers' questionnaires provided information on class-level variables and on the behavioral problems and academic performance of the children. The teacher questionnaires were returned by 66 out of 71 teachers (93.0%). School-level information was collected for all 49 schools. Some classes contained too few group 3 pupils to calculate reliable network indicators and were dropped from the analysis. The effective sample consisted of 1036 children (83% of the total sample) in 60 classes and 46 schools.

Variables

School adjustment variables

Because school adjustment involves both the psychological and social adjustment of a child to the school environment, two indicators were included: academic performance and behavioral problems.

Academic performance. For academic performance, teachers rated a child's performance on a scale of zero to 10 in seven subject areas: language, mathematics, vocabulary, reading, art, self-reliance, and learning speed. In the Dutch system, a score of 5.5 or higher is considered a passing grade. The final variable is the mean of these subject scores. This variable proved reliable (Cronbach's $\alpha = 0.92$).

Behavioral problems. To measure a child's behavioral problems we used the Amsterdam Child Behavior Checklist (ACBC), a teacher-rated scale, to assess behavioral problems in elementary school children consisting of four subscales: attention problems, aggressive behavior, fear-uncertainty, and restlessness (de Jong and Das-Smaal 1991). For this paper we combined the attention problems, aggressive behavior, and restlessness subscales into a single *externalizing problems* subscale. The ACBC consists of 21 behavioral items: the teacher has to indicate how well each item applies to the child. Of the 21 behavioral items, 17 make up the three externalizing problem subscales. Several studies have confirmed the validity of the ACBC (de Jong and Das-Smaal 1991; de Jong 1992) and found correlations of about 0.70 with similar scales on Achenbach's Teacher Report Form (de Jong 1995). The externalizing problems scale had good reliability (Cronbach's $\alpha = 0.92$).

Social capital

The key explanatory factors in this study are the individual and classroom-level social capital. These indicators are all based on the networks among the pupils. The children were asked to nominate classmates they often

played with. The digraph constructed from these answers formed the basis for the social capital indicators. Our indicators of social capital capture different aspects of closure at both levels. In elementary school classrooms, strong, close, and dense ego networks are the main source of social capital (Coleman 1988, 1990; Lin 2001).

Individual-level social capital. The major dimensions of social capital are the number and availability of persons who can be mobilized to provide resources; that is, who are willing and able to do so (see Flap 2004). The *indegree*, or the number of times the respondent is mentioned by others, is a proxy for the total amount of resources a child has access to, or that child's total social capital. Further, the *reciprocity* ratio – the number of reciprocal relationships divided by the outdegree – captures the willingness to provide resources, as reciprocal relations are stronger than non-reciprocal relations. *Transitivity* is calculated as the number of triads for which the respondent closes the transitive pattern and standardized for the respondent's outdegree and the remaining number of relationships in the network. It captures the degree of the closure of a child's classroom network, the extent to which one's friends are also friends of each other. High levels of closure in one's network also mean a high redundancy of one's social capital. *Connectedness* is the proportion of others in the network that a respondent can reach directly or indirectly and thus measures the child's integration into the classroom and the indirect social capital of the respondent. A high level of bonding social capital – high closure of the child's social network – is characterized by high scores on all social capital indicators: high indegree, high reciprocity, high transitivity, and high connectedness. High bridging social capital, to the contrary, would assume low transitivity.

Classroom-level social capital. To measure social capital at the level of the classroom, we again took structural indicators of the degree of closure of the classroom social networks: density, reciprocity, segmentation, and transitivity. The *density* of the classroom network indicates the availability of others: in a dense network, the level of cooperation is high (Coleman 1988, 1990). Density captures the total amount of social capital that can be exchanged through the network; the potential flow of resources in the classroom. The density measure is the ratio of observed relationships over the total number of possible relationships ($n_k \times (n_k - 1)$). *Segmentation* captures the extent that short (length = 1) and long path distances (length ≥ 4) dominate the network and shows that medium path distances are relatively rare. The S_4 segmentation measure was used (Baerveldt and Snijders 1994). In highly segmented networks, others are either close friends or distant relationships. High segmentation points to the fragmentation of the classroom network, of the extent to which distinct groups exist within the classroom, which, at the collective level, indicates a low level of bonding

social capital. *Reciprocity* at the classroom level also refers to the mean strength of relationships and is measured as the proportion of relationships in the network that are mutual. Because reciprocity depends on the overall density of the network, the reciprocity measure was standardized, controlling for network size and network density. *Transitivity* captures the extent of closure of a network. Holland and Leinhardt's (1970) standardized measure for transitivity was used. High bonding social capital at the level of the classroom is indicated by high scores of density and a low degree of segmentation, as well as by high reciprocity and transitivity.

Control variables

Control variables are included at both the child level and the class/school level. The literature identifies the selected variables as variables that affect school effectiveness and adjustment (see, for example, Scheerens 1999).

Child characteristics. The following child characteristics were included in the analysis: *sex* (0 = boy, 1 = girl), *ancestry* (0 = Dutch, 1 = foreign), and the *age* of the child in months. As an indicator of the cognitive development, or *intelligence*, we used the raw test scores from the Raven's Coloured Progressive Matrices (van Bon 1986).

Class composition. Class composition was measured by the *network size*, the *percentage of girls*, *sex segregation*, and the *percentage of ethnic minorities* (i.e. students with at least one non-Dutch parent) in the class. Sex segregation refers to the extent that boys and girls prefer relationships with children of their own sex to relationships with children of the other sex. We used Freeman's (1979) measure.

Teacher characteristics and classroom organization. The teacher characteristics variables include the teacher's *work experience* (the number of years he or she has been working in education), whether the teacher is full-time or part-time *employed*, the *performance orientation* of the teacher, and his or her *systematic reaction* in cases of problem behaviors (Doolaard 1996). The performance-orientation scale captures the teacher's orientation towards traditional knowledge acquisition and cognitive development rather than towards student expressiveness and personality development. This eight-item scale has an acceptable reliability ($\alpha = 0.65$). The systematic-reaction scale considers how the teacher reacts to the behavioral problems of students – whether or not the teacher systematically observes these students, makes notes, talks to colleagues about it, and develops a plan to help these students. The reliability of this scale is acceptable ($\alpha = 0.65$). A systematic response may point to uncertainty on the part of the teacher about how to deal with problems in the classroom and to a more distant relationship between teacher and pupils.

Classroom organization was measured by the extent that *formal rules* apply during *instruction* periods and *task* periods. These scales measure whether it is permitted to go to the restroom, drink water, walk around, consult with another student, consult within a group, consult between groups, obtain materials, or obtain new course materials (Doolaard 1996). The reliability of both scales was good, with $\alpha = 0.85$ for rules during instruction and $\alpha = 0.77$ for rules during tasks. These two variables are indicators of the teacher's emphasis on discipline and authority in the classroom, and also of the possibility for cooperative learning and student interaction with others in the classroom. The final class organization variable was the presence of a teacher's *class assistant* to help in the classroom. All teacher characteristics and class organization variables were obtained from the teacher questionnaire.

School characteristics. The variables in the school characteristics set measure the school organization and the environment in which the school operates, which contribute to the classroom and school climate as well as to the school-level social capital. This set includes the *percentage minority children* in the school, the level of *truancy* (i.e. the mean proportion of students absent on an average day), and the *tuition* (i.e. the amount of school fees parents had to pay), as well as the *outflow* of pupils to advanced secondary education, which is indicative of the academic level of the school. Additional variables are the *educational level of the parents* of the pupils and the *parental unemployment level*. These compare the specific school to an average school, using the following values: more than average (3), average (2), and less than average (1). The school characteristics variables were provided by the school administration.

Results

Descriptive statistics

Table 1 presents descriptive statistics. The mean score on the externalizing problems scale was about 1.75 (out of four). Only 50 out of 1025 children (or 4.9%) had major externalizing problems, as indicated by a score of three or higher; 85 (8.3%) did not display any externalizing problems. The average child in the sample was rated as performing well in school by their teacher. Only 70 out of 1013 (or 6.9%) children received a failing score (≤ 5.5), and 189 (or 18.7%) did very well academically, with scores of eight or higher. As expected, we also found a substantial correlation between academic performance and externalizing problems ($r = -0.54$, $p = 0.000$). Better performance tends to go hand in hand with fewer behavioral problems. However, the correlation is not strong enough to justify combining both indicators.

The proportion of ethnic minorities in a class varied widely. Although the average class contained 12% children from non-Dutch ancestry, many

Table 1. Descriptive statistics for school adjustment variables and explanatory variables at the child and class/school levels.

Variable	<i>N</i>	Range ^a	Mean	Standard deviation
School adjustment^b				
Academic performance	1013	3–10	7.04	0.99
Externalizing problems	1025	1.00–3.76	1.76	0.59
Child characteristics^b				
Ancestry: foreign	1036	0–1	0.11	0.32
Sex: girl	1035	0–1	0.50	0.50
Age	1036	68–109	81.99	5.18
Intelligence	1036	10–36	24.79	4.59
Child social capital^b				
Indegree	1036	0–14	3.69	2.40
Reciprocity	1036	0.00–1.00	0.51	0.37
Transitivity	1036	–10.54–2.06	–1.13	1.77
Connectedness	1036	0.00–1.00	0.78	0.34
Classroom social capital^c				
Density	60	0.10–.32	0.19	0.05
Reciprocity	60	0.27–8.37	4.02	1.90
Segmentation	60	0.00–1.00	0.54	0.22
Transitivity	60	0.00–17.87	6.36	4.43
Class composition^c				
Proportion minorities	60	0.00–0.88	0.12	0.16
Proportion girls	60	0.00–0.78	0.50	0.13
Network size	60	5–32	19.20	7.06
Sex segregation	60	–0.08–1.00	0.52	0.25
Teacher characteristics and classroom organization^c				
Rules: instruction	60	1.00–3.00	2.56	0.42
Rules: tasks	60	1.00–2.75	1.46	0.34
Experience	60	1–35	15.10	9.80
Part-time employment	60	0–1	0.45	0.50
Systematic response	60	1.25–4.00	2.80	0.58
Performance orientation	60	2.00–3.63	2.83	0.36
Class assistant	60	0–1	0.23	0.43
School characteristics^d				
Proportion minorities	46	0–91	8.76	16.16
Tuition	46	0–600	74.48	118.58
Truancy	46	1–3	1.39	0.58
Outflow	46	0–77	25.15	18.59
Parental education	46	1–3	2.13	0.75
Parental unemployment	46	1–3	1.37	0.64

Note: ^aMinimum and maximum values for dichotomous, count and ordinal variables are provided as integer values.

^b Unit of analysis: children.

^c Unit of analysis: classes.

^d Unit of analysis: schools.

did not have any minority students (21 classes, 35%); only a few contained more than one-third minority students (five classes, 8.3%). The sex

distribution in the classes is less skewed, but the percentage of girls in a class still varied from 0 to 78%.

The average age of the children in the sample was six years and 10 months. The youngest child in the sample was five years and eight months; the oldest child was nine years and one month. The sample was equally divided between boys and girls, and 11% of the sample had foreign ancestry.

With regard to individual social capital, a child was named by 3.7 classmates on average. Only a small number of children were not mentioned by anyone (52/1036, 4.0%); another small group was mentioned by more than eight classmates as frequent playmates (48/1036, 4.6%). All other indicators of social capital showed large variations.

There was also a large variation in the classroom social capital. The density of networks ranged from 0.10 to 0.32, with a mean of 0.19. Both reciprocity and transitivity were found to be relatively high. Segmentation also varied widely, from 0.03 to 1.00, with a mean segmentation score of 0.54.

With regard to the population the schools recruited from, most schools claimed that unemployment among their pupils' parents was below average (33/46, 72%). Only four schools (9%) claimed higher than average unemployment among the pupils' parents; 10 schools (22%) reported the average socioeconomic status of parents was below average; and 16 schools (35%) claimed above-average socioeconomic status.

Multilevel regression results

Academic performance

The results of the final multilevel regression models are shown in Table 2. This table shows only the full and parsimonious models. The full model explains 24% of the total variance in academic performance, the parsimonious model 23%. At the child level about 22% of the variance is explained by these models, and at the class/school level 50% is explained by the full model, 36% by the parsimonious model.

A child's academic performance was significantly affected by that child's social capital, with a gross effect of 2.9% ($p < 0.001$). Children who were sought out more often as playmates performed significantly better than children who were less popular. The other child-level social capital indicators had no significant effects on academic performance.

All child characteristic variables had significant effects on academic performance. Older children performed, on average, less well than younger ones. However, one needs to keep in mind that the causal effect here may be reversed, because older children are more likely to have been held back for one reason or another, including poor academic performance. The children's intelligence was, as expected, a strong predictor of academic performance; higher intelligence led to better performance. Girls on average

Table 2. Multilevel regression results for school adjustment variables.

	Academic performance		Externalizing problems	
	Full model	Parsimonious model	Full model	Parsimonious model
<i>N</i>		1013		1025
FIXED COMPONENTS				
Constant	6.164 ^{***} (1.331)	7.259 ^{***} (0.602)	2.239 ^{**} (0.772)	1.722 ^{***} (0.251)
Child-level variables				
<i>Child characteristics</i>				
Ancestry: foreign	-0.225 [*] (0.102)	-0.221 [*] (0.100)	-0.014 (0.061)	
Sex: girl	0.167 ^{**} (0.055)	0.160 ^{**} (0.055)	-0.301 ^{***} (0.033)	-0.301 ^{***} (0.033)
Age	-0.021 ^{***} (0.006)	0.022 ^{***} (0.006)	0.007 (0.003)	
Intelligence	0.084 ^{***} (0.006)	0.084 ^{***} (0.006)	-0.031 ^{***} (0.004)	-0.031 ^{***} (0.004)
<i>Child-level social capital</i>				
Indegree	0.070 ^{***} (0.015)	0.079 ^{***} (0.014)	-0.056 ^{***} (0.009)	-0.062 ^{***} (0.008)
Reciprocity	0.117 (0.087)		-0.089 (0.052)	
Transitivity	-0.029 (0.019)		0.013 (0.011)	
Connectedness	-0.129 (0.097)		0.098 (0.058)	
Class-level variables				
<i>Class-level social capital</i>				
Density	2.781 (2.568)		0.817 (1.494)	2.614 ^{***} (0.636)
Reciprocity	0.025 (0.035)		-0.026 (0.020)	
Segmentation	1.267 (0.653)	0.660 ^{**} (0.231)	-0.178 (0.382)	
Transitivity	-0.052 ^{**} (0.020)	-0.031 ^{**} (0.011)	-0.024 [*] (0.012)	-0.032 ^{***} (0.010)
<i>Class composition</i>				
Proportion minorities	0.551 (0.624)		-0.054 (0.365)	
Proportion girls	-1.283 ^{**} (0.440)	-1.192 ^{***} (0.361)	0.402 (0.253)	0.029 ^{***} (0.007)
Network size	0.020 (0.020)		0.022 (0.012)	
Sex segregation	-0.127 (0.240)		-0.090 (0.137)	

(Continued)

Table 2. (Continued).

	Academic performance		Externalizing problems	
	Full model	Parsimonious model	Full model	Parsimonious model
<i>Teacher characteristics and classroom organization</i>				
Rules: instruction	-0.169 (0.120)		-0.073 (0.070)	
Rules: tasks	0.275 (0.158)		-0.075 (0.093)	
Experience	-0.006 (0.006)		0.005 (0.003)	
Part-time employment	0.003 (0.108)		-0.020 (0.059)	
Systematic response	-0.165* (0.083)	-0.168* (0.073)	0.062 (0.048)	0.113* (0.047)
Performance orientation	0.005 (0.130)		-0.044 (0.076)	
Class assistant	-0.100 (0.116)		0.053 (0.067)	
School-level variables				
<i>School characteristics</i>				
Proportion minorities	0.004 (0.008)	0.006* (0.003)	0.003 (0.004)	
Tuition	0.001* (0.000)	0.001*** (0.000)	0.000 (0.000)	
Truancy	-0.033 (0.102)		0.042 (0.059)	
Outflow	0.000 (0.003)		-0.002 (0.002)	
Parental education	0.015 (0.077)		-0.013 (0.045)	
Parental unemployment	0.053 (0.119)		-0.094 (0.070)	
RANDOM COMPONENTS				
Class/school level				
Constant	0.039** (0.015)	0.050** (0.017)	0.012* (0.005)	0.024** (0.007)
Individual level				
Constant	0.705*** (0.032)	0.709*** (0.032)	0.260*** (0.012)	0.262*** (0.012)
EXPLAINED VARIANCE				
Individual level	21.9%	21.5%	17.3%	16.7%
Class/school level	50.1%	36.0%	63.3%	26.6%
Total	24.2%	22.6%	21.7%	17.6%

Note: Data presented as *b* (standard error). Significance: * $p = 0.050$;

** $p = 0.010$;

*** $p = 0.001$.

performed better than boys, while ethnic minorities did less well than Dutch-ancestry children.

Although at the individual level a child's minority status had a negative effect on academic performance, the proportion of ethnic minorities in a class had no significant effect on a child's academic performance. In classes with a high proportion of girls, however, average academic performance is significantly lower than in classes with only a few girls.

Academic performance was affected not only by child-level social capital but by classroom-level social capital as well (gross effect: 2.9%, $p < 0.010$). Children in more segmented classes – classes in which children have a few preferential playmates and have little interaction with other classmates – tend to do better academically than children in classes with low segmentation; that is, in classes in which all children were more equally likely to play with each other. In contrast, high transitivity in the class social network, which is indicative of the formation of more clique-like structures, led to lower academic performance. Note that transitivity is not a consequence of segmentation. Because segmentation cuts off contacts with parts of the network, it leads to lower overall transitivity in the network ($r = -0.50$, $p = 0.000$, $N = 60$). Therefore, while the differentiation of relationships within the classroom is good for academic performance, clique formation is not.

The characteristics of the teacher and the class organization had little effect on the academic performance of the pupils. Only one variable in this set had a statistically significant effect on academic performance: whether or not the teacher reacts in a systematic manner to problem behavior in the classroom. In classrooms where the teacher adopted a more systematic response rather than an informal one to such disturbances, the pupils' performance tended to be worse.

School characteristics also had only a minor effect on a child's academic performance. It is worth mentioning that the proportion of ethnic minorities in the school had a statistically significant positive net effect on academic performance, whereas class ethnic composition did not. School and class ethnic composition are of course highly correlated ($r = 0.86$, $p = 0.000$, $N = 60$), especially as the creation of 'black' and 'white' classes within a mixed school is discouraged. A school's tuition amount also had a statistically significant effect on a child's academic performance. Children in more expensive schools performed significantly better than pupils in less expensive schools, but the effect was quite limited.

Behavioral problems

The full model explained 22% of the total variance in externalizing problems, 17% of the variance at the individual level, and 63% at the class/school level. Most of the variance explained at the class/school level, however, is due to non-significant variables. In the parsimonious model, for

externalizing problems the proportion of the variance explained at the class/school level drops to 27%, whereas the variance explained at the individual level remains stable. The total explained variance drops to 18%.

Child-level social capital proved an important factor for externalizing problems, with a gross effect of 5.1% of the variance explained ($p < 0.001$). Children who were frequently sought out by their classmates displayed fewer externalizing problems than children who were not or who were only rarely nominated as a playmate. The other child-level social capital variables did not have a significant effect on externalizing problems.

Further, more intelligent children on the average showed fewer externalizing problems than less intelligent ones. Girls also scored significantly lower than boys on the externalizing problems scale. No significant effects were observed for the ancestry or the age of the child.

The classroom-level social capital variables did have significant effects on externalizing problems. A denser network of friendship relationships among pupils in a class leads to an increase in externalizing problems. Higher transitivity in classroom friendship relationships, in contrast, leads to a decrease in problem behavior in the class. Combined, these effects suggest that while a dense, non-structured network in a classroom supports externalizing behaviors, the structuring of these relationships into closed groups, which are supposed to provide a lot of support, does inhibit externalizing behaviors. Although cliques are detrimental to academic performance in the class, they do seem to be beneficial in preventing externalizing problems, such as aggression.

Furthermore, class/school-level variables had a net contribution of 6.4% to the explained variance for externalizing problems ($p < 0.001$). Children in larger classes showed higher levels of externalizing problems than children in smaller ones. The gender and ethnic composition of the class did not have significant effects on externalizing problems, nor did the other class/school-level characteristics variables.

Conclusion and discussion

A number of conclusions can be drawn from our analysis. First, the results support earlier research: although most of the variation in school adjustment tends to occur at the child level, a substantial part of the variation is associated with class-level and school-level factors. School adjustment refers to how well the child adapts to the school environment; it is therefore no surprise to find that characteristics of both the child and the environment affect the outcomes. The almost complete lack of effects for the teacher characteristics and classroom organization variables is also noteworthy. Only the manner in which a teacher responded to problem behavior in the classroom had marginally significant effects on school adjustment. The

effect of school-level characteristics was also quite weak, showing some influence only on academic performance, but not on behavioral problems.

Second, the focus of this paper was on the social capital generated within the school-based social networks among pupils. The results indicate that this kind of social capital, both at the child and at the classroom level, affects school adjustment, not only with regard to academic achievement but also with regard to behavioral problems. For the age group studied here, we found that a child's individual-level social capital tends to be more important than a child's classroom-level social capital, especially with regard to externalizing problems, after control variables were added to the model.

Third, at the individual level our findings are consistent with the sociometric and peer acceptance literature (Newcomb, Bukowski, and Pattee 1993). Children who were popular with their classmates tended to perform better academically and showed fewer externalizing problems than children with few nominations. Given the lack of formal differentiation among the pupils and the non-specific nature of the resources, the simplest way to accumulate social capital is to obtain many relationships. At the individual level, no evidence of the benefits of further closure or cohesion of one's social network was observed.

Fourth, the results for the classroom social capital suggest that more social capital is not always beneficial with regard to the objectives of the education system. Not only did a denser friendship network among pupils lead to more behavioral problems, but the presence of more clique-like structures, as indicated by higher levels of transitivity, also leads to lower academic performance, while higher segmentation in the network leads to improved performance. Higher transitivity, however, leads to fewer behavior problems in the class.

We offer a possible explanation for these findings. Denser networks provide more opportunities for mischief, more 'partners in crime'. Large networks of highly connected pupils are more difficult to control than isolated ones. In addition, in larger cohesive groups problematic behavior can be a means to achieve a particular group position; to gain dominance or status, for example (see Geary et al. 2003). High closure, as indicated by higher levels of transitivity in the classroom friendship network, creates, according to balance theory, a more psychologically comfortable environment (Holland and Leinhardt 1972; Leinhardt 1973) and allows for more peer social control. Peer control may also enforce informal norms that play down the importance of academic performance, stressing sufficient performance rather than excellence. In a highly closed network there is little room for academic competition because it puts stress on the network. On the other hand, the presence of different groups within a class, such as is indicated by the segmentation variable, does stimulate competition. A somewhat more competitive academic climate might benefit overall academic performance.

The results show no benefit, however, of non-redundant relationships at the individual level. Given the nature of the resources that constitute social capital in elementary school classrooms, redundancy in relations may be a good thing for the child. Bonding social capital is the most important form of social capital in elementary school. In such an undifferentiated social system, most classmates can provide the resources needed by children, and therefore there is little need for more targeted relationships.

This paper has tried to bring together several distinct research traditions – the more psychological peer acceptance literature and the sociological team-climate and social capital literatures – arguing that the relationships among pupils themselves are a source of social capital. In summary, we have found that: social capital generated by a pupil's social networks does affect school adjustment; it is relevant to distinguish social capital at different levels; social capital at different levels cannot be reduced to one another; and the degree of structural closure, as indicated by transitivity, affects performance as well as problem behavior. Social networks with low transitivity enhance individual performance but also increase the chance of problem behaviors. One interpretation of this finding is that close, highly transitive networks provide little room for individual performance, because of high social control (see Burt 1992); however, they also provide a comfortable psychological climate that mitigates problematic behavior. The former interpretation is similar to Burt's (1992) notion of structural holes that enhance performance; the latter follows balance theory (Heider 1958; see also, for example, the discussion by Hummon and Doreian 2003). One needs to keep in mind that causality might be reversed: it may be that high rates of problem behavior cause intransitive classroom networks, rather than the other way around.

This paper points out that social capital can have multiple sources and can manifest at multiple levels. In the literature the emphasis has been on either the school level or the individual level, with little attention paid to intermediate levels, such as the classroom, or to the internal networks in the school as a source of social capital. The various networks, whether internal school networks among pupils or external networks among parents, provide access to distinct resources and therefore should be treated as separate forms of social capital. Theoretically, the two are independent of each other, yet empirically they may prove related. Although all relationships are among individuals, they also generate social capital at higher levels; that is, they provide access to collective resources available to all or some of the members of the group. This higher level social capital (classroom, school) is an emergent property of the individual-level network. The resources that make up school or classroom social capital are not merely the basic aggregates of individual resources, but emerge from the structure of the overall network. These resources include information flows, social control, a sense of belonging, the reinforcement of norms, and the classroom climate. Too often one sees social capital as something exclusively positive; that is, as

contributing to positive outcomes such as better school adjustment. But as with other kinds of capital, the effects of social capital depend on the goals of the actors. In education studies, one also readily assumes that a strong academic performance is a shared goal of all participants, including the pupils. Educational aspirations and motivation, however, can vary widely and are certainly not shared by all pupils. A perverse side effect of high social capital – its ‘dark’ side (Field 2003) – may be the development and spread of informal classroom norms that put less value on academic achievement. Closed networks form ideal settings for the development and reinforcement of such informal norms.

The effects of still higher levels of social capital or social capital generated through external ties to parents or friends in the neighborhood, for example, were not investigated in this paper. These, of course, will also affect school adjustment. There is some evidence that social capital that comes from the community around a school is generally beneficial to school adjustment. The tuition charged by a school had a positive effect on academic performance. Coleman and Hoffer (1987) mentioned that even a small tuition fee led to a more selective school, attracting much more motivated and supportive parents. On the other hand, no effects were found for the socioeconomic composition of the school. Which form of social capital will have which effect and how the different forms of social capital will interact remains an open question. Morgan and Sorensen’s (1999) study, for instance, found that in American high schools, after controlling for internally generated social capital, school-level social capital due to external ties among parents was even negatively associated with mathematics achievement. Although this study was criticized (see Carbonaro 1999; Hallinan and Kubitschek 1999), it does point out that social capital is not always beneficial. One could hypothesize that different forms of social capital reinforce each other, but that they also compensate for each other or cancel each other out. For instance, in schools with low school-level social capital, individual-level social capital may be much more important than in schools with high social capital. The answer to such questions is a task for future research.

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