Three Hypotheses about Community Effects

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Introduction

The development of a "learning society" has been viewed as synonymous with developing a "knowledge economy," and considered critical to employment and sustained economic growth (Becker 1993). The argument is that societies derive economic and social benefits by investing in people. Investments in education, health, and nutrition increase the "human capital" of a society, which is gauged by the knowledge, competencies and health of its members (Alexander 1997). Education, both formal and informal, is usually considered foremost, because it is closely related to the skills and cumulative learning that are relevant to the production of goods, services and ideas in the marketplace. During the past decade, theorists have stressed that learning societies depend also on *relationships among people*, both within communities and organizations, and among them. They have invoked the term "social capital" to embody the nature of relationships among people, and how these facilitate collective action, the strength of social networks, and the norms and values of a community (Coleman 1988). Questions about institutions and organizations have been concerned with whether their policies, rules, routines, and organizational and structural features contribute to increased teamwork, better communication, the sharing of knowledge and ideas, and an acceptance of the norms and values consistent with their goals. Similarly, questions about communities have been concerned with the nature of social support and collective action, and how these affect people's trust and trustworthiness and their sense of security and well-being.

Aside from the problems associated with the definition and measurement of social capital, which have

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been discussed by others in this volume, there are several problems confronting any assessment of the impact of social capital on social outcomes. First, social capital has to do with relationships among people in some "community", such as a school, workplace, neighbourhood, or some larger jurisdiction. To make any progress, a researcher must specify the units of analysis, and in some way define "community". But any definition of community is easily challenged. Indeed, the notion that social capital embodies networks suggests that the boundary of what people call their "community" itself depends on their stock of social capital. Moreover, every individual participates in multiple and overlapping communities (e.g. family, neighbourhood, workplace, sports teams, church group).

Second, even when community is narrowly defined, as a school or workplace for example, it is rarely feasible to randomly assign individuals to communities. Moreover, social capital is undoubtedly correlated at the community level with the aspects of economic and human capital which are known to affect social outcomes, and all of these forms of capital are correlated with demographic characteristics of the community. It is not unreasonable to presume, for example, that a school serving students from affluent families would tend to have a relatively high level of material resources, a particularly well-educated staff, and a relatively strong social network among its students, parents and staff. In statistical terms, selection bias is exacerbated by the presence of confounding variables.

Third, it may be that the important aspects of social capital do not vary much among communities within a larger jurisdiction (e.g. a province or state), but when one shifts to examining its effects at a higher level of analysis – for example, among states or provinces within a country, or among countries – the number of potential confounding variables multiply, and the correlations among them become even stronger.

Fourth, the "treatment effect" associated with possessing social capital probably varies for different types of individuals. For example, social capital may be particularly important for individuals who possess relatively little economic and human capital, in some way compensating for their relative disadvantage.

Fifth, the causal direction is unclear, and may also interact with the type of individual: for some people, social capital may help them gain access to better jobs and schooling; for others, wealth and access to better schooling may help them develop and strengthen their social capital.

Finally, social capital may have latent effects. For example, many children have to cope with economic hardship and inadequate family support, yet some of these vulnerable children go on to have successful marriages and working careers. Studies of resilient children have suggested that a relationship with a strong mentor during childhood is one of the most important factors contributing to resiliency (Werner and Smith 1982).

This paper sets out three hypotheses relevant to differences among communities in their social outcomes, and the relationships between individuals' social outcomes and their socioeconomic status. It presents some of the recent evidence pertaining to these hypotheses, and argues that they are central to an understanding of how social capital affects social outcomes. The three hypotheses can be embodied in a multilevel framework, and there are powerful statistical models for testing them (Bryk and Raudenbush 1992; Goldstein 1996). In discussing the evidence pertaining to these hypotheses in the fields of education and health, I identify some of the processes used to explain community differences, and argue that these may be a much better proxy for social capital than "trust" or "the size of people's social networks", which have been used in macro-level analyses. Finally, I speculate as to how social capital might contribute to the distribution of social outcomes, and discuss the implications of this research for conducting large-scale studies that could contribute to our understanding of the role of social capital.

The first of the three hypotheses, the *Hypothesis of Community Differences*, is straightforward: it posits that communities differ in their social outcomes, even after account is taken of people's socioeconomic status. The second hypothesis is concerned with the relationship between social outcomes and socioeconomic status, which are referred to here as socioeconomic "gradients". The H*ypothesis of Converging Gradients* holds that gradients vary among communities, and that they converge at higher levels of socioeconomic status. Consequently, successful communities are those that have been successful in bolstering the social outcomes of their least advantaged citizens. The *Hypothesis of Double Jeopardy* holds that people from less advantaged backgrounds are vulnerable, but people from less advantaged backgrounds who also live in less advantaged communities are especially vulnerable.

The examples presented here pertain mainly to the distribution of literacy skills prior to full participation in the labour market: during the period of formal schooling, and among youth aged 16 to 25. The term, "literacy", is used in a very broad sense, as it is in the International Adult Literacy Survey (IALS) (OECD and Statistics Canada 1995), to describe an individual's ability to: "us[e] printed and written information to function in society, to achieve

one's goals, and to develop one's knowledge and potential" (p. 14). It entails the ability to read and comprehend written materials, including reports, documents, and mathematical charts and displays; to use that information to solve problems, evaluate circumstances, and make decisions; and to communicate that information verbally and in writing. Thus literacy is not viewed as a dichotomy of literate *versus* illiterate, but a skill continuum. Findings from the IALS suggest that a person's position on that continuum has dramatic implications for his or her economic success, health, and well-being (OECD and Statistics Canada 1995; HRDC, OECD and Statistics Canada 1997). In our study of differences among communities, we tend to focus on quantitative literacy. We prefer it for three reasons. First, it is more closely related to the effects of schooling *per se*, whereas literacy skills in the language arts are more strongly affected by family background. Second, quantitative literacy is closely related to the acquisition of high-paying jobs and long-term employment, and the demand for technically-skilled workers is likely to increase (OECD 1995). Third, differences in quantitative literacy skills among jurisdictions with different languages cannot easily be dismissed as being attributable to the difficulty level of the tests associated with their translation.

Although literacy skills are normally thought of as a form of human capital, their acquisition has important implications for social capital: they must certainly affect the nature of the social networks in which people are included and engaged, and the extent to which people can transform social capital into economic capital. Moreover, compared with other social outcomes, literacy may have a particularly strong relationship with social capital. People become members of social networks by learning the language of the culture, and using it to engage in social relations.

The Hypothesis of Variation among Communities

The first hypothesis asks whether communities vary in their outcomes, after taking account of individuals' socioeconomic status and other characteristics. A useful starting point, however, is to ask first, "To what extent do communities vary in their outcomes?" In our research at the Canadian Research Institute for Social Policy, we have been concerned with the extent to which provinces vary in their academic achievement (Willms 1996; Frempong and Willms, in press). Canada is an interesting case study in this respect, because there is no national governmental body responsible for education. The federal role is limited to transfer payments to the provinces, which jealously

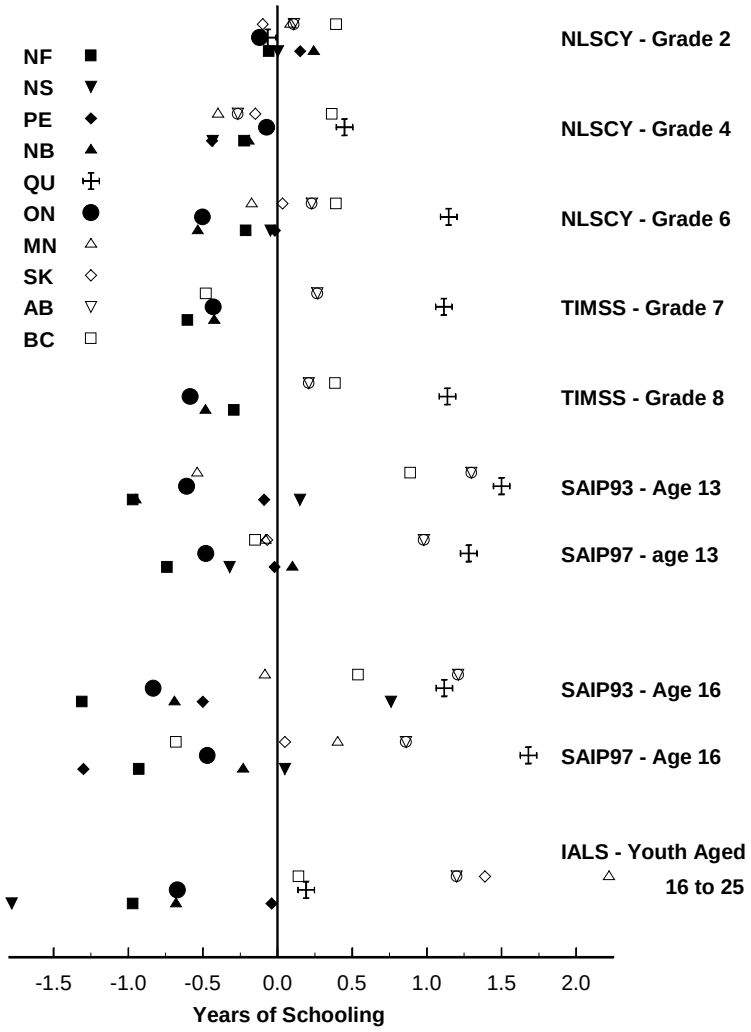
guard their constitutional jurisdiction over education. The calculation of transfer payments, until recently, pertained only to post-secondary education, and now do not refer even to this level of education (Dupré 1996). In most respects, therefore, each province operates its own education system.

There have been some attempts by the Council of Ministers of Education, Canada (CMEC) to monitor performance at the national level, and provide comparative data. Frempong and I have assembled these data, and data from three national and international studies, to discern whether provinces do indeed vary in their achievement scores, and to estimate the extent of variation among communities within provinces (Frempong and Willms, in press). The data were garnered from the first wave of the *National Longitudinal Study of Children and Youth* (NLSCY) (Statistics Canada and HRDC 1995); the *Third International Mathematics and Science Study* (Beaton et al. 1996), and the *International Adult Literacy Study* (OECD and Statistics Canada 1995). Although each of these studies has limitations with respect to the assessment of the distribution of literacy skills, together they provide a useful portrait of successful schools and schooling systems in Canada. To better compare the findings across studies, we attempted to scale the achievement variable in a "years-of-schooling" metric; for details, see Frempong & Willms (in press). Figure 1 presents a summary of our findings pertaining to inter-provincial variation in mathematics achievement.

When children enter school, there is considerable variation in their cognitive capacity, and their potential to benefit from formal schooling – what is often loosely called "readiness to learn". Analyses of children's receptive vocabulary at ages 4 and 5 suggest that much of this variation is among schools (and communities defined in other ways) within provinces, and relatively little variation is between provinces (Willms 1999a). However, by the end of grade 2, the variation among provinces, at least in mathematics results, is discernible and statistically significant. Moreover, the extent of variation among provinces increases as children progress through the schooling system. The results for Quebec are particularly intriguing: it clearly emerges as the top-performing province by the end of grade 4, and it maintains its advantage through to the end of secondary school. In contrast, Ontario, which is Canada's largest and most affluent province, anchors the bottom end of the distribution. The figure also depicts a widening east-west divide: as children progress through the system, British Columbia and the three prairie provinces tend to have scores that are above the national average, while the average scores of the four Atlantic provinces fall below the

national average.

Figure 1. Inter-Provinicial Differences in Mathematics Scores



Some of the differences among the Canadian provinces in their quantitative literacy skills have been evident for nearly two decades (Willms 1996). They are not attributable to variation in children's socioeconomic backgrounds or their race or ethnicity; in fact, controlling for socioeconomic status and minority status yields estimates of an even wider gap between Ontario and Quebec. Understanding why these differences persist is clearly relevant to the economic growth and well-being of Canadians. But they also have an important lesson for the study of human and social capital:

The formation of human and social capital begins early. These results indicate that we can identify successful communities as early as the second grade. We believe that at least some, and perhaps a large proportion, of the variation among jurisdictions is rooted in the early years, and determined by the ability of communities to develop children's literacy skills during the period from conception to age 5 (McCain and Mustard 1999).

Hypothesis of Converging Gradients

Figure 2 displays the socioeconomic gradients for youth aged 16 to 25, for quantitative literacy skills across the twelve countries that had participated in the IALS by 1997 (adapted from Willms 1998, 1999b and c). Figure 3 displays the results for eleven US states and the ten Canadian provinces. The outcome measure in both analyses is quantitative literacy: the left-hand Y-axes display the "levels" of IALS literacy scores, with the scale used in the international reports. The right-hand Y-axes display the skills levels as effect sizes; that is, as a fraction of a standard deviation.[2] The level of education of the youths' parents is on the X-axis, expressed in years of schooling. The figures display the regression lines of literacy scores on parental education for each jurisdiction (country, state, or province), with each line drawn to encompass the range of parents' education, from the 10^{th} to the 90^{th} percentile for each jurisdiction.

The results in Figure 2 show clearly that countries vary considerably in both their levels of literacy scores, and in their socioeconomic gradients. But perhaps more important, at least with respect to the discussion on social capital, is that the gradients converge at higher levels of socioeconomic status: there is a strong inverse relationship between the level of skills for a country and its socioeconomic gradients. This means that youth from relatively advantaged backgrounds tend to have high literacy scores in every country, whereas the average levels of skills of youth from less advantaged backgrounds vary considerably among countries.

The same is true of states within the US, and provinces within Canada (Figure 3). In this analysis, there was also a relationship between gradients and latitude: states that were further north tended to have shallower gradients and higher scores (Willms 1999b). Also, the gaps between minorities and non-minorities in literacy scores

[2] The data were scaled on the full international sample, such that the mean score was zero, and the standard deviation was 1.0. The relationship between literacy scores and respondents' level of education suggest that an effect size of

were smaller in more northerly states. The results indicated that some of the inter-jurisdiction variation was attributable to the amount of time youth spent watching television, rather than participating in literacy activities at home and at work.

0.15 of a standard deviation is roughly equivalent to one additional year of schooling (Willms 1998).

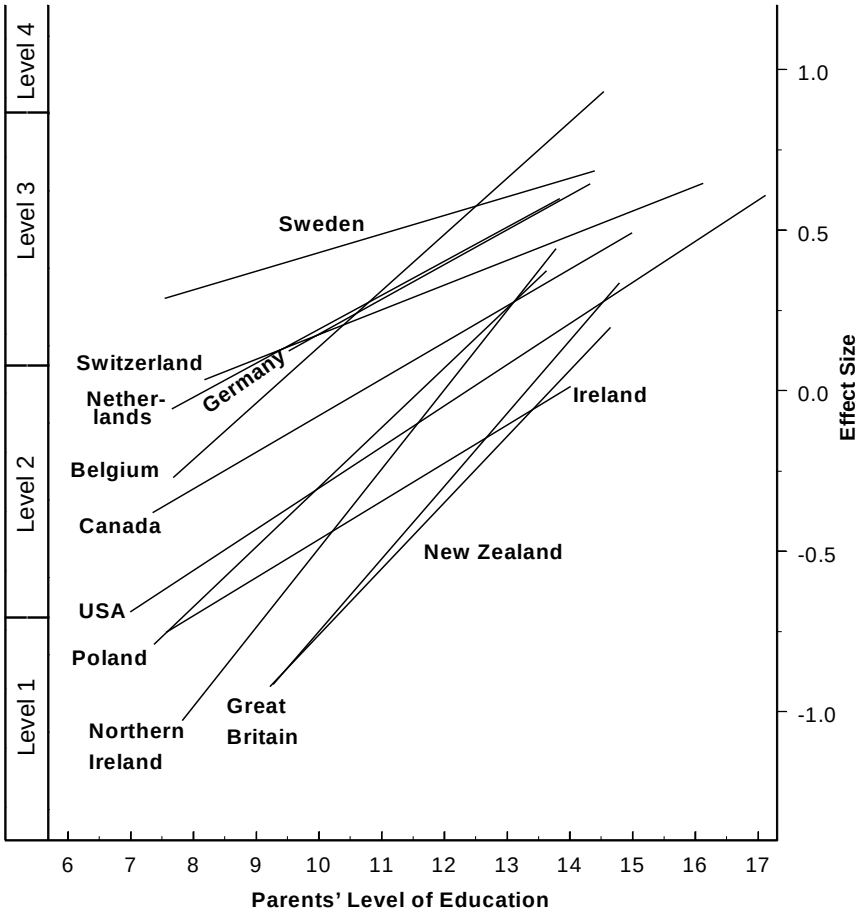
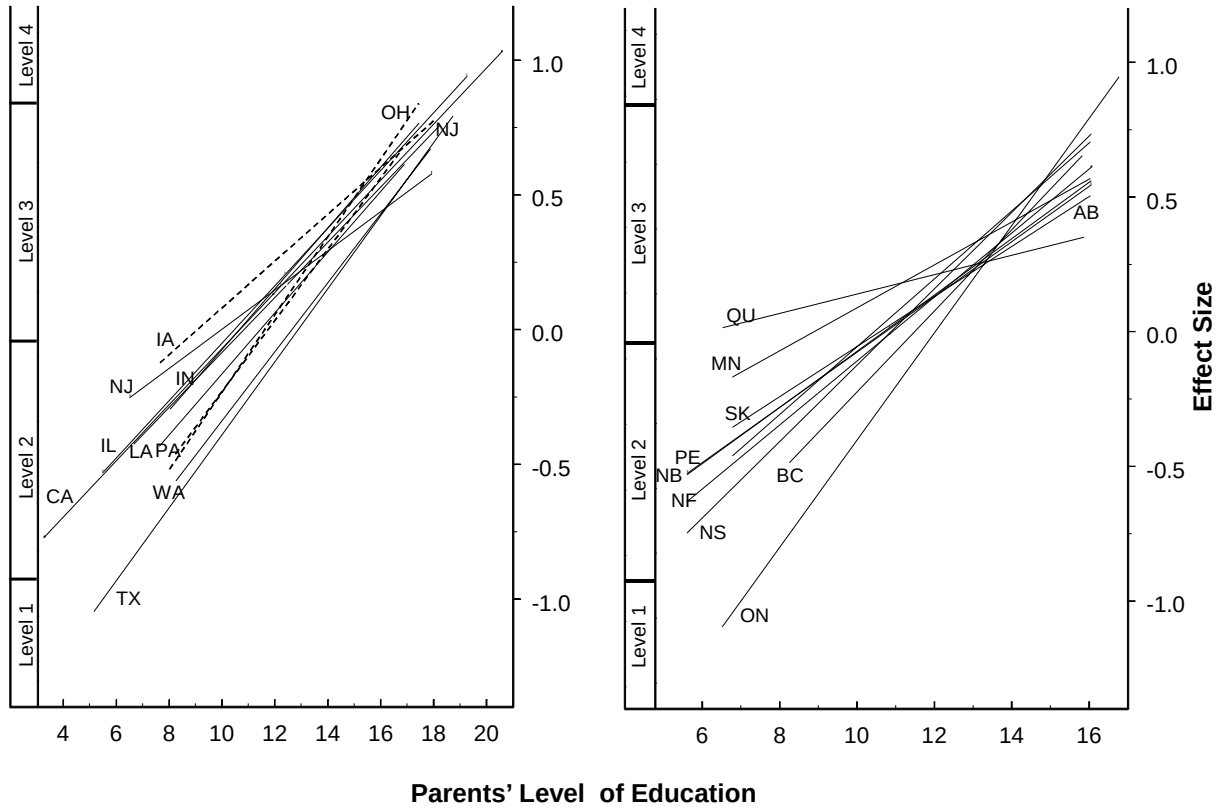


Figure 2. Quantitative Literacy Scores for Youth Aged 16-25
International Adult Literacy Study, 1994

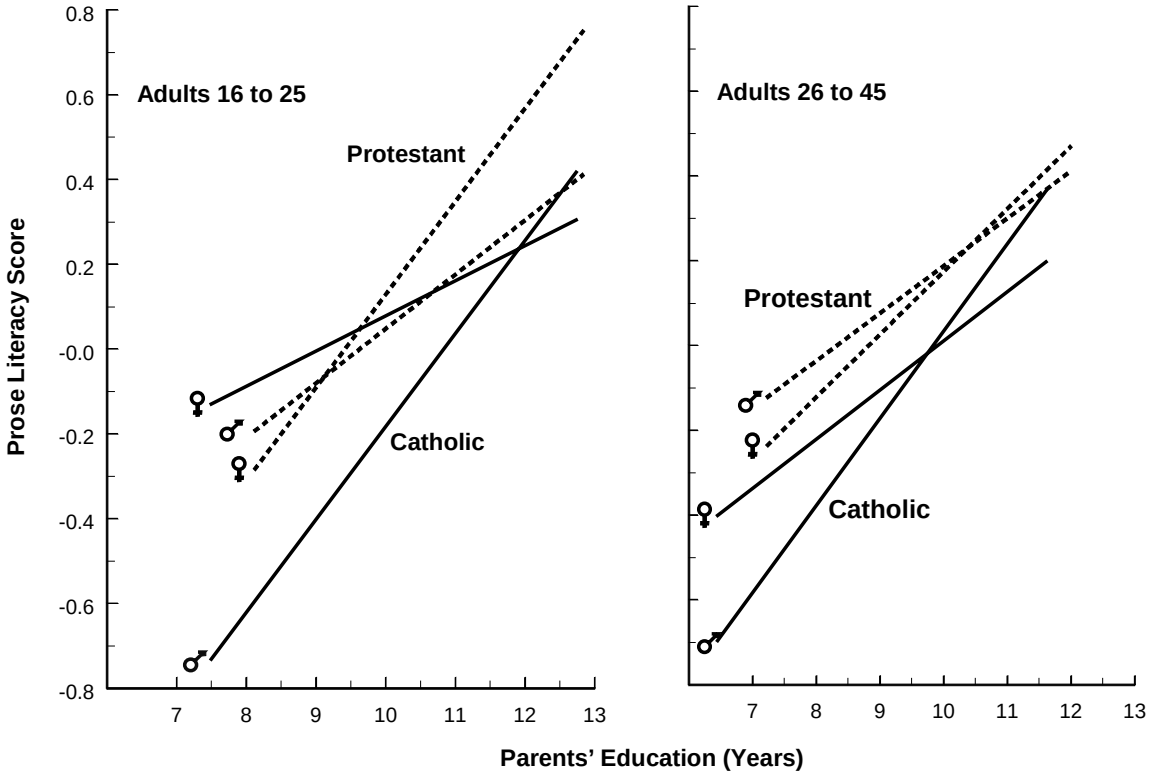
Figure 3
Relationship Between Quantitative Literacy Scores and Parents' Education (Adjusted for Sex, Immigration Status, and Ethnicity)



In other research based on the IALS, I examined differences in the socioeconomic gradients for Catholic and Protestant adults in Northern Ireland (Willms 1998). The results indicated large disparities in the skills of Protestants and Catholics, associated mainly with the relatively low literacy skills of Catholic males. The disparities were smaller for youth aged 16 to 25 than they were for older adults. If we can assume that these differences reflect secular changes in the educational experiences of youth in the two sectors over the past two decades, rather than some interaction between sector and age effects, it seems that the relative improvement of Catholics has been attributable to a flattening and a raising of the gradient for Catholic females, whereas the gradients for Catholic males has remained low and flat (see Figure 4).

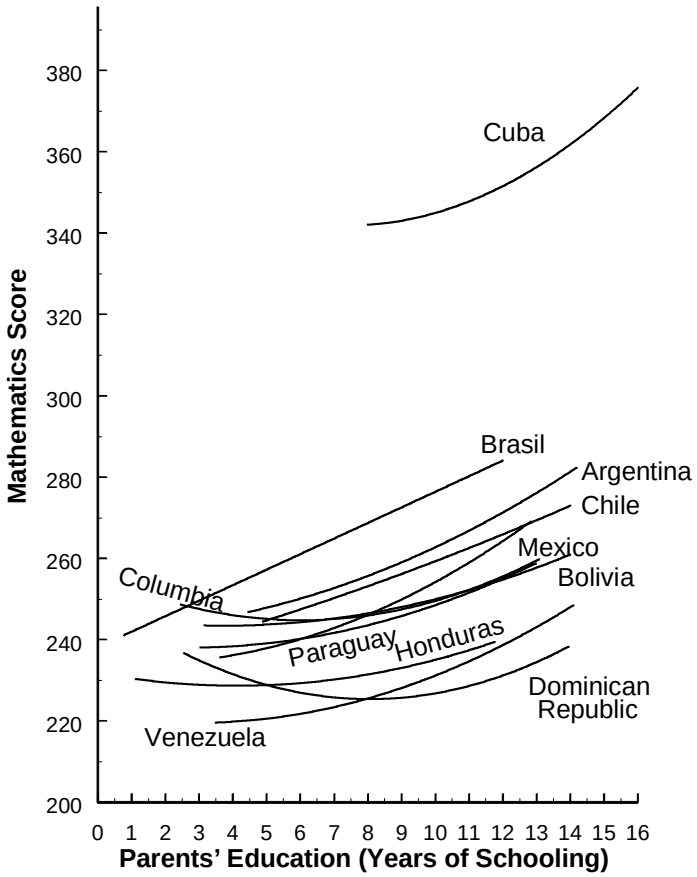
Figure 4. Sector Differences In Northern Ireland in Prose Literacy Scores

International Adult Literacy Study, 1994



As a result of these and other analyses, I maintain that the hypothesis of converging gradients is worth testing to achieve a better purchase on the nature of human capital formation and the role of social capital. In some situations we have found that the hypothesis cannot be rejected. For example, I examined the gradients in literacy skills for youth in Poland across 49 administrative areas (Willms 1998). The results indicated that these local communities varied substantially in their literacy skills, but the hypothesis of converging gradients did not hold. Similarly, Marie-André Somers and I have examined the socioeconomic gradients in reading and mathematics scores for eleven countries in Latin America (Willms and Somers 1999). Here also, countries varied in the level of their performance, but the gradients did not converge. We did find, however, that the gradients in some countries were non-linear, and that there appeared to be a "premium" associated with completing secondary school. The results for mathematics are shown in Figure 5.

Figure 5
Socioeconomic Gradients for Mathematics Scores, for Eleven Latin American Countries



Before encountering the Latin American results, I had concluded that "the success of a society, as gauged by these types of indicators, depends on the extent to which it is successful in reducing inequalities" (Willms 1999b, p. 31). It may be that societies progress from relatively flat gradients, with low levels of social outcomes, to steep gradients with average levels of outcomes, and finally to shallow gradients with high levels of social outcomes, and

that progression depends on how social and human capital are invested. Nevertheless, both the examples and the counter-examples provide evidence that it is possible to achieve both high levels of social outcomes and equality of social outcomes among low- and high-status groups. The research indicating that gradients do converge in some cases has important implications for how we think about social capital:

There are social, economic, and historical factors associated with the culture of a society which shape and constrain people's behaviours in ways that determine its socioeconomic gradient. Thus, raising and flattening gradients may be a difficult and long-term process.

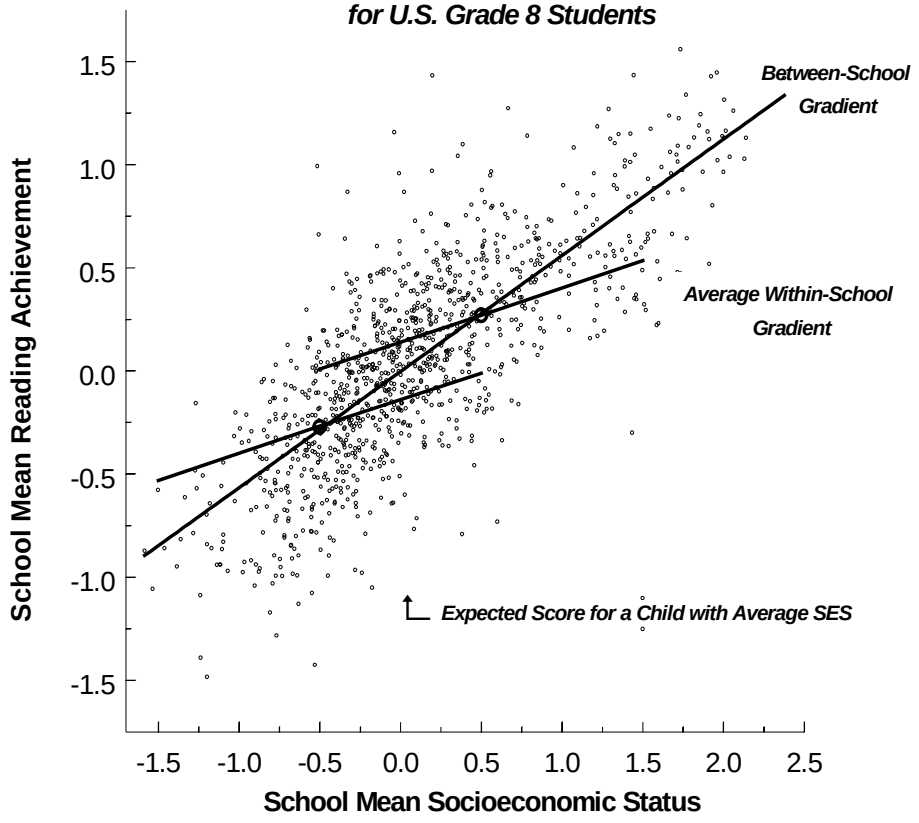
We require a better understanding of the structural and contextual features of societies and local communities that lead to greater equality. In high-income countries, success depends on investments in human and social capital which improve the social outcomes for its most vulnerable citizens.

The Hypothesis of Double Jeopardy

Research on schooling in several countries has suggested that there is a contextual effect associated with the demographic characteristics of a classroom or school, over and above the effects associated with an individual's family background. Generally, it indicates that while there is a positive effect associated with an individual's socioeconomic status, there is also a positive effect associated with the socioeconomic status of the school to which the individual belongs. This occurs when the average gradient *within* communities is shallower than the overall gradient *between* communities.

Figure 6 provides an example. It shows school mean reading achievement plotted against school mean socioeconomic status for nearly 1000 schools that participated in the U.S. National Educational Longitudinal Study. The heavy black lines indicate the between-school gradient and the average within-school gradient. Schools that scored above this line, on average, were performing better than expected, given the socioeconomic status of the students they served, whereas schools that scored below this line were performing worse than expected. The average *within-school* gradient is somewhat shallower. It has been depicted for two schools which are on the between-school

Figure 6.
School Mean Reading Achievment versus Socioeconomic Status for U.S. Grade 8 Students



gradient; that is, two schools which were not performing particularly well, or particularly poorly, given their socioeconomic intake. Note that the expected score for a child with nationally average socioeconomic status (a score of zero on the X-axis) is higher in the school with the higher average socioeconomic status. The "effect size" in this case is approximately one-quarter of a standard deviation (Ho and Willms 1996). In this example, the effect is similar for students with low or high socioeconomic status – on average both advantaged and disadvantaged students achieved better results when they attended schools with high average socioeconomic status.

The *Hypothesis of Double Jeopardy* holds that people from less advantaged backgrounds are vulnerable, but people from less advantaged backgrounds who also live in less advantaged communities are especially vulnerable. There is strong evidence that this hypothesis holds for school achievement when children are segregated,

either *between schools* through residential segregation or by the "creaming" of the most able pupils into selective schools (e.g. private schools or charter schools) (Brookover et al. 1978; Henderson, Mieszkowski and Sauvageau 1978; Rumberger and Willms 1992; Shavit and Williams 1985; Summers and Wolfe 1977), *between classes* through tracking or streaming (Willms 1985; Willms 1986; Gamoran 1991, 1992; Kerckhoff 1986, 1993), or *within classes* through ability grouping (Dar and Resh 1986; Dreeben and Gamoran 1986; Rowan and Miracle 1983; Slavin 1987; Sorenson and Hallinan 1984; Willms and Chen 1989): children from advantaged backgrounds do better, while those from disadvantaged backgrounds do worse. Whether the contextual effects associated with school mean socioeconomic status tend to be stronger for low socioeconomic groups than for high socioeconomic groups is still an open question, but in cases where there is an interaction between school mean socioeconomic status and individual-level socioeconomic status, it suggests that disadvantaged students fare worse. Consequently, segregation seems to be especially harmful for disadvantaged students – thus the term, "double jeopardy".

Sui-Chu Ho and I examined whether contextual effects were partially mediated by parents' involvement in school.[22] We used data from the National Educational Longitudinal Study to construct measures of parental involvement in school. Figure 7 portrays one of our findings. It displays the same set of schools as those shown in Figure 6, except that schools which had relatively high levels of parental involvement (the top 10%), as gauged by their participation in school governance and as volunteers, are denoted with crosses. Similarly, schools with relatively low levels of parental involvement are denoted with solid circles. The average within-school gradients for each set of schools – that is, those with low and high parental involvement – are depicted separately. The figure illustrates three important findings: (1) the schools with high levels of parental involvement tend to be high socioeconomic status schools, and *vice-versa*; (2) parental involvement has an overall positive effect on achievement (this is evident by comparing schools which have a mean socioeconomic status near the national mean); and (3) the gradients tend to be shallower in high involvement schools than in low involvement schools. Thus, increased parental involvement in the school seems to not only raise achievement levels, but also flatten the gradient.

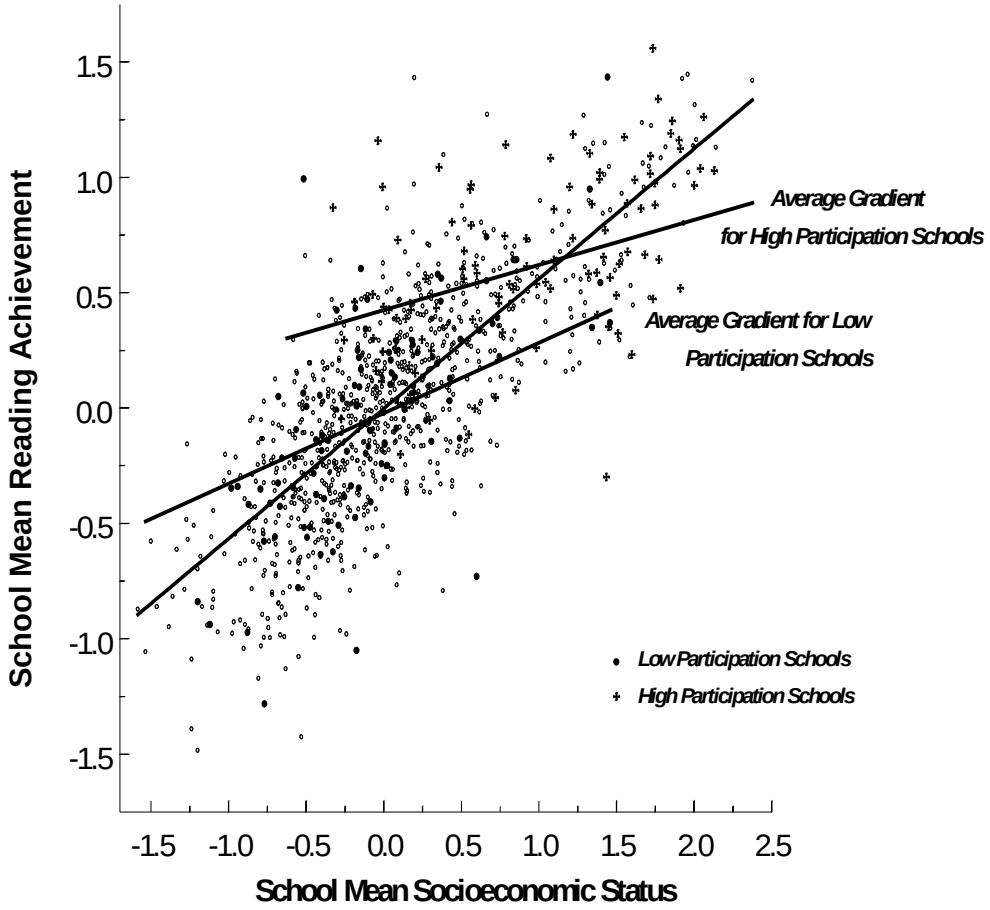
If we consider parental involvement in school as a potent form of social capital, these cross-sectional findings illustrate two important points with respect to the formation of social capital:

when people are segregated, either within or between communities, it is difficult for them to generate social capital; and

in communities where there is a high level of social capital, outcomes are improved and inequalities are reduced.

Figure 7.

The Effects of Parental Involvement on School Mean Reading Achievment



A Multilevel Framework for Testing the Three Hypotheses

In most cases, the hypotheses presented in the examples above have been tested formally using multilevel regression models. Multilevel modeling, or hierarchical linear modeling (HLM), is a particular regression technique designed to take into account the hierarchical structure of nested data, such as when students are nested within schools, patients within hospitals, or citizens within communities (Bryk and Raudenbush 1992; Goldstein 1996). An assumption underlying traditional regression approaches is that the observations are independent; that is, the observations of any one individual are not in any way systematically related to the observations of any other individual. This assumption is violated, for example, if some of the observed subjects are from the same family, or, as in the examples above, from the same schools or communities. The use of traditional approaches usually yields biased estimates of the relationships among variables, and standard errors that are too small.

Multilevel modeling also provides a useful framework for incorporating aspects of human and social capital at more than one level. For example, when individuals participate in social clubs and form networks, this social capital may lead to a collective action that affects all members of a community, but it may also contribute to improving individuals' efficacy and sense of belonging, resulting in increased participation at home and at work. Multilevel models provide a structure for thinking about such effects at different levels, and a means for testing relevant hypotheses. In educational research, researchers used to debate whether the student, the classroom, or the school was the appropriate level for analysis. But they realized that this was the wrong question, and called for techniques that explicitly modeled the multilevel structure of the data (Burstein 1980; Cronbach, Deken and Webb 1976). This "level-of-analysis" problem has been solved through advances in statistical theory and computing, and now computer programs that can be used to analyse multilevel data are widely accessible. With respect to social capital and its effects on sustained economic growth and well-being, these methods allow us to explicitly model different forms of social and human capital, conceptualized and measured at different levels of aggregation to estimate their effects on individuals' social outcomes. In this section, I present the multilevel models pertaining to the three hypotheses described above.

Hypothesis of Community Differences. The first hypothesis asks whether communities vary in their outcomes after taking account of individuals' socioeconomic status. In a multilevel formulation, a separate regression model is fit to the data for each community:

$$Y_i = \beta_0 - \beta_1 X_i + \varepsilon_i$$ Within-Community Equation (1)

where $\boldsymbol{Y_i}$ is a person's outcome score, $\boldsymbol{X_i}$ is their score on some covariate, such as socioeconomic status. The parameter $\exists_1$ is the regression slope, or what has been referred to above as the socioeconomic gradient. It is an estimate of the expected change in the outcome score $\boldsymbol{Y}$ for a one-unit change in $\boldsymbol{X}$. The intercept, $\exists_0$, can be thought of as the expected outcome score for a person who has a score of zero on $\boldsymbol{X}$. In most multilevel models, $\boldsymbol{X_i}$ is "centred" on a particular value, such as the national mean, so that a value of zero on $\boldsymbol{X}$ refers to a hypothetical person with a particular set of characteristics. The parameters, $,_i$, are the residuals; that is, the deviation of each person's score from the regression line. When we have *j* different communities, we can write j such equations:

$$Y_{ij} = \beta_{0j} + \beta_{1j} X_{ij} + \varepsilon_{ij}$$ A Set of Within-Community Equations (2)

where the subscript *j* has been added to each element. Thus, we now have a set of j different $\exists_0$'s, one for each community, and j different $\exists_1$'s. Note that the $\exists_0$'s represent the expected score for a person with average background in each community, and the $\exists_1$'s are the socioeconomic gradients.

The $\exists_{0j}$'s are expressed as an average $\exists_0$ plus the deviation of each community from that average:

$$\beta_{0j} = \Phi_{00} + \mathbf{U}_{0j}$$ Among-Community Equation for Levels of Outcome (3)

where M_{00} is the grand mean, or the mean of the community means, and U_{oj} is the deviation of a community's mean from the grand mean. Although it is conceptually easier to think about multilevel models as having within- and between-community equations, the estimation of multilevel models entails the substitution of equation 3 into equation 2 to produce an equation with both individual- and community-level residuals. Such equations can be easily fit with available software.

The hypothesis of community differences posits that communities vary in their average scores, after taking account of individuals' family background. Thus, in this formulation, the hypothesis in its null form is:

$$\mathbf{H_0:\ Var\,(U_{0j}) \neq 0}$$ Hypothesis of Community Differences (4)

Hypothesis of Converging Gradients. In the same way, the socioeconomic gradients, that is, the $\exists_1$'s, are expressed as an average $\exists_1$ plus the deviation of each community's gradient from that average:

$$\beta_{1j} = \Phi_{01} + \mathbf{U}_{1j}$$ Among-Community Equation for Socioeconomic Gradients (5)

where M_{01} is the mean of the within-community gradients, and U_{1j} is the deviation of each community's gradient from the mean gradient. A test of converging gradients requires that there are statistically significant differences among gradients, which is expressed in null form as:

$$\mathbf{H_o:\ Var(U_{1j}) \neq 0}$$ Hypothesis of Community Difference in Gradients (6)

The hypothesis of converging gradients posits that there is a negative correlation between the intercepts and gradients, which is expressed as a test of the statistical significance of the covariance (or correlation) between the U_{0j} and the U_{1j}:

$$\mathbf{H_o: Cov(U_{0j}, U_{1j}) < 0}$$ Hypothesis of Converging Gradients (7)

Hypothesis of Double Jeopardy. The hypothesis of double jeopardy is an hypothesis about the effect of group-level characteristics. In the sociology of education, the "contextual effect" has traditionally been operationalized as the group mean socioeconomic status, $0_{j.}$ This is entered into the multilevel model at the second level by extending equation 3:

$$\beta_{0j} = \Phi_{00} - \Phi_{01}\overline{\mathbf{X}}_{\mathbf{j}} + \mathbf{U}_{0j}$$ Among-Community Equation with Contextual Effect (8)

where M_{00} is the intercept indicating the average $\exists_{0j}$, after adjusting for 0_j , M_{01} is an estimate of the "contextual effect" of group mean socioeconomic status, and U_{0j} are the group-level residuals, referred to as the residual parameters. The hypothesis of double jeopardy is concerned with whether M_{01} is statistically significant (*i.e.* at least twice its standard error). A test of whether the "contextual effect" varies for people with differing socioeconomic status is achieved by also including 0_j in the model for the gradients:

$$\beta_{1_j} = \Phi_{10} + \Phi_{11}\overline{X}_j + \mathbf{U}_{1j}$$ Among-Community Equation for Gradients with Contextual Effect (9)

where M_{11} indicates the effect of the interaction between individual-level socioeconomic status and group mean socioeconomic status.

Specifying the Effects of Social Capital. Questions about the effects of social capital can be specified in this framework by extending either the individual-level model, or the models regarding intercepts or slopes. An important consideration is whether the construct represents an individual-level of community-level phenomenon. Consider parental involvement: if parents are involved in their child's education at home, by reading regularly to the child or helping with homework, for example, one would expect their efforts to bolster their child's achievement. Thus, a variable denoting parental involvement at home, measured at the individual level, would be added to the within-school model (equation 2). The hypothesis would be that the coefficient for this variable would be positive and statistically significant, and would explain some of the variation in the individual-level residuals; that is, reduce Var(,$_{ij}$). We would also expect that it would partially explain variation among communities, resulting in a decrease in Var(U_{0j}). We might also hypothesize that the effect of parental involvement is greater for children of lower socioeconomic status, and enter it alongside an interaction term (parental involvement by socioeconomic status) at the individual level. If this were the case, we might also see a reduction in the correlation between intercepts and gradients.

But parental involvement at school, such as volunteering in the classroom or participating in school governance, is likely to have an effect primarily at the level of the classroom or school. In this case we could operationalize the construct as the percentage of parents participating, and enter it as a community-level variable in

equations 3 and 5. The coefficient for this variable in equation 3 would indicate whether parental involvement had a significant effect on achievement, over and above the effects associated with individual students' socioeconomic status; the coefficient for parental involvement in equation 5 would indicate the effects of parental involvement in mediating the gradients. This is precisely the model fitted by Ho and Willms (1996), and presented graphically in Figure 7 above. The effect of mean participation on the adjusted school means (i.e. equation 3) was 0.08 of a standard deviation; its effect on socioeconomic gradients (equation 5) was -0.056, indicating shallower gradients at higher levels of participation.

Evidence of Community Effects Relevant to Social Capital

Education

The concept of social capital has received considerable attention and some empirical analysis in the field of education. Glenn Loury used the term as early as 1977 to capture aspects of family and community resources which bolster children's academic and social development (Loury 1977). Prior to his seminal 1988 article, Coleman and his colleagues used the concept to explain differences in achievement between the public and Catholic schools (Coleman, Hoffer and Kilgore 1982; Coleman and Hoffer 1987). He believed that Catholic schools outperformed public schools because there were higher expectations for achievement, especially for minority and disadvantaged students, stemming from the religious doctrine that all children were precious in the eyes of God (Coleman 1990). Catholic schools were also deemed effective because the parents and staff all knew each other – a construct he called "social closure" – and the parents knew their children's friends – called "intergenerational closure" – which reinforced norms and encouraged student learning. Later Coleman (1990) elaborated the concept of social capital to include aspects of social structure that enable individuals to realize their interests.

The role of social capital in educational research has been heavily influenced by the work of Annette Lareau (1989), who integrated social capital with the concept of cultural capital (Lamont and Lareau 1988), as elaborated by the French sociologist Pierre Bourdieu (Bourdieu 1977). Her thesis was that schools are middle-class institutions with middle-class rules, organizational structures, and communication patterns. Parents who possess a knowledge of high status culture, and a disposition towards certain linguistic and social competencies – that is, Bourdieu's cultural capital – are comfortable relating to teachers and participating in the life of the school. Thus, middle-class parents

are more likely to achieve social closure. Similarly, middle-class children possess the "cultural capital" that enables them to appreciate the curriculum and adapt to school life. Lareau (1989) found that middle-class parents of first-grade children were more likely to be involved in their child's schooling than working class parents.

Consequently, empirical studies of the effects of social capital have emphasized the role of parental involvement, and the notion of social closure (Carbonaro 1988; Morgan and Sorenson 1999). Morgan and Sorensøn (1999) found that the social closure of parents within the public sector had a *negative* effect on children's learning gains in mathematics, after controlling for the density of children's networks. They distinguished between *norm-enforcing* schools, consistent with contemporary definitions of social capital, and *horizon-expanding* schools. The latter were characterized by parents and other adults using information available in their social networks. They constructed two variables to measure this construct: one denoting the extent to which parents worked together to support school policy, and another indicating whether parents had adequate say in school policy. They found that these two variables had significant positive effects supporting the notion of horizon-expanding schools. Although they tested their models in a multilevel framework, as described in the previous section, they did not try to discern the effects of their social capital constructs on socioeconomic gradients.

Carbonaro (1998) attempted a direct assessment of the concept of intergenerational closure, using data from the National Educational Longitudinal Study. His measure of closure described the extent to which parents knew the parents of their children's friends. He found significant positive effects of closure on staying on in school, and on learning gains in mathematics, but not on gains in reading, history, or science. The effect on learning gains in mathematics diminished when the measures of parental communication and participation constructed by Ho and Willms (1996) were added to the model, and became statistically insignificant when four measures describing students' absenteeism, skipping of classes, suspensions, and association with friends who had dropped out of school were added. Together, these results provide modest support for the effects of social closure. Perhaps what is particularly important is that it revealed a close connection to more direct measures of parents' investment of time and energy in their children's schooling.

If we are to understand the role of social capital on children's development, we need to understand how it relates to some of the more proximal variables affecting children's achievement. An important point, relevant to the hypothesis of community differences, is that most of the action is at the classroom level. For example, in a study of

children's schooling outcomes in New Brunswick, I partitioned an array of schooling outcomes into district, school, classroom, and student-level components. The majority of variation was among students within classrooms, which is consistent with several studies of school effectiveness. However, for every outcome measure examined, there was considerably more variation among classrooms within schools, than among schools, or among school districts. For example, 7 percent of the variation in mathematics scores was among classrooms, compared with only 4.7 percent among schools, and 1.8 percent among school districts. The results for reading, science, and writing scores indicated even greater variation among classrooms and less variation among schools. The same results were evident for affective outcomes describing children's self-esteem, sense of belonging, general well-being, and general health. Thus, in trying to understand the role of social capital, we might look first at classroom "communities".

Research on schooling that has emphasized the importance of the learning environment in the classroom has identified several factors relevant to the role of networks and norms. A review of this literature by Scheerens (1992) identified "structured teaching" and "effective learning time" as the most important factors. These two aspects of successful schools are captured by the term "academic press", which is used in the literature to describe schools where principals and teachers project the belief that all students can master the curriculum (Anderson 1985). Their high expectations are manifest in a number of teaching practices and school routines, including homework practices, the content and pace of the curriculum, and how time and resources are used in the classroom (Anderson 1985; Dreeben and Gamoran 1986; Plewis 1991).

The research has also emphasized the importance of parental involvement, as discussed in the examples above. However, apart from Carbonaro's work, there has been little emphasis on the role that social capital might play on children's behaviour. One of the most significant factors associated with classroom achievement is the disciplinary climate of the classroom (Willms and Somers 1999), but usually this is treated as having to do with the teacher's management skills, rather than peer networks or parents' support of school norms. Also, we know relatively little about how social capital is distributed in segregated schooling systems, such as those where there is tracking or streaming.

Researchers have not paid much attention to variation among schools in their socioeconomic gradients, or the hypothesis of converging gradients. Lee and Bryk (1989) found that U.S. secondary schools differed significantly in their socioeconomic gradients, and in the achievement gap between minority and non-minority students. They

attributed the variation to various aspects of academic organization, including the extent to which schools differentiated students into various course-taking patterns. Small schools with less differentiation, on average, had shallower gradients. Alan Kerckhoff and I used hierarchical linear models to estimate the socioeconomic gradients for 148 Local Education Authorities (LEAs) in the U.K., based on data from the National Child Development Study (NCDS) (Willms and Kerckhoff 1995). We found significant positive effects associated with lower pupil-teacher ratios and less selective LEAs, but these factors were unrelated to socioeconomic gradients. In our analysis of the Canadian TIMSS data, Frempong and I found that classrooms varied significantly in their socioeconomic gradients. Higher achievement was found in classrooms where there was less ability grouping and smaller class sizes (Frempong and Willms, in press). We found a significant but modest negative correlation (-0.14) between adjusted levels of achievement and gradients. To summarize, there is strong evidence that gradients vary among classrooms, schools and school districts, but there have been only a few efforts to test the hypothesis of converging gradients at various levels of the schooling system. One of the problems is that it is difficult to achieve a powerful enough research design to discern why gradients are steep or shallow in certain classrooms or schools.

Researchers have devoted considerable effort to testing the hypothesis of double jeopardy, because it is relevant to questions about how students are allocated to schools, classrooms and instructional groups. There is unequivocal evidence that the average socioeconomic status of a child's class or school has an effect on his or her outcomes, even after taking account of (individual-level) ability and socioeconomic status (Brookover et al. 1978; Henderson, Mieszkowski and Sauvageau 1978; Rumberger and Willms 1992; Shavit and Williams 1985; Summers and Wolfe 1977; Willms 1985, 1986; Gamoran 1991, 1992; Kerckhoff 1986, 1993; Dar and Resh 1986; Dreeben and Gamoran 1986; Rowan and Miracle 1983; Slavin 1987; Sorenson and Hallinan 1984; Willms and Chen 1989). Sociologists have attributed contextual effects to peer interactions, and one could easily extend the idea to stress the importance of social capital. I have a relatively simple explanation. Suppose that roughly one-quarter of the students in a community are vulnerable because of cognitive or behavioural problems. If one segregates the majority of these students into one side of the system through residential segregation, streaming, special programs for gifted students, or charter schools and private schools, then for teachers in that side of the schooling system, about one-half of their students (about 12 to 15 students in a classes with 24 to 30 students) will have special needs.

In such circumstances, it is more difficult to effectively use support from parents, maintain high expectations, establish a positive disciplinary climate, and have positive student-teacher interactions – all of the factors embodied in the concept of social capital.

Health

Recent research on health outcomes has provided convincing evidence that people's health status varies significantly among countries, among states and provinces, among health authorities, and among neighbourhoods (Wilkinson 1996, 1992; Kaplan, Pamuk, Lynch, Cohen and Balfour 1996; Wolfson et al. 1999; Boyle and Willms 1998; Duncan, Jones and Moon 1993; Hart, Ecob and Davey Smith 1997). The health of societies is related to overall levels of income and wealth, but what is striking is that health status is also related to the level of income inequality in a society (Wilkinson 1996, 1992; Kaplan, Pamuk, Lynch, Cohen and Balfour 1996; Wolfson et al. 1999). Underlying this finding is the notion that a feeling of relative deprivation leads to poor health. Consistent with this hypothesis is that people who have demanding jobs, but little control over the processes of their work, are at greater risk of disease (Syme 1996). Researchers have also emphasized the importance of social integration, especially being married or having close friendships if one is unmarried, and the quality of social support (House, Williams and Kessler 1987; Orth-Gomer, Rosengren and Wilhelmsen 1993; Seeman 1996; Furstenburg and Hughes 1995; McLanahan and Sandefur 1994). Thus, greater emphasis has been placed on the quality of social relationships than the size or structure of social networks.

An important aspect of the socioeconomic gradient for health outcomes is that it appears to be curvilinear. In the U.S. for example, an increase in income is associated with markedly better health outcomes for adults earning less than $20,000 annually, but above this threshold, income has a weak relationship with health status (Epelbaum 1990; House et al. 1990; Mirowsky and Hu 1996). The income gradient in Canada is also curvilinear, but the rate at which the effects of rising income diminish is not as pronounced (Wolfson et al. 1999; Boyle and Willms 1998). Researchers have also shown that health status is related also to levels of education and literacy, and have argued that these probably serve as alternative resources for income in affecting health status (Mosley and Cowley 1991). Sen has noted that this is especially important in low-income countries, where levels of maternal literacy affect life expectancy at birth and the health of newborns (Sen 1993).

Curvilinear gradients, and the effects that income inequalities have on the distribution of health outcomes somewhat complicate the hypotheses of converging gradients and double jeopardy. Researchers have not systematically examined gradients in a multilevel framework to discern whether gradients rise more sharply for low-income adults in some communities than in others. However, there is strong support for the converging gradient hypothesis at the macro level, based on data for Sweden and the UK. Vagaro and Lundberg compared the death rates and socioeconomic gradients for men aged 20 to 64 in the UK (England and Wales only) and Sweden (Vagaro and Lundberg 1989). Swedish men had considerably lower death rates than British men at all levels of social class, and, consistent with the hypothesis of converging gradients, the differences in death rates between Sweden and the UK were more stark at lower levels of social class. Results pertaining to infant mortality rates in the UK and Britain revealed a similar relationship (Leon, Vagero and Otterblad Olausson 1992).

Concluding Comments

There are at least six themes running throughout this paper relevant to our understanding of how social capital might affect sustained economic growth and well-being. First, it is a multilevel problem. Social capital is about *relationships* among people, and these directly affect the distribution of social outcomes at the micro level. Thus, before we can make much progress at the macro-level, we need to understand how investments in social capital affect the social outcomes of individuals within the family, classroom, workplace, and neighbourhood. But social capital is also about *collective actions* derived from relationships, and these affect the distribution of social outcomes at micro- and macro-levels. Bringing the two perspectives together requires a multilevel framework. Second, children's outcomes during the early years are the foundation of social and human capital for a society. Differences among communities in children's cognitive and behavioural outcomes can be discerned as early as age 7, and probably earlier. We need a better understanding of how investments in social capital can be used to strengthen this foundation. Third, successful societies are those that are successful in improving the social outcomes of their most vulnerable citizens. We need a better understanding of how investments in social capital are related to raising and flattening socioeconomic gradients. Fourth, the segregation of people along social class lines, or among racial and ethnic groups, affects the distribution of social outcomes. Given that social capital is about relationships among

people, we need a better understanding of how it is formed and used in segregated and desegregated societies. Fifth, the *quality* of social relationships appears to be more important than *quantity*. An understanding of the role of social capital requires an assessment of how social networks affect the *processes* that are proximal to social outcomes, such as social integration, social support, family functioning, intergenerational closure, and micro-level personality variables (e.g. self-efficacy and self-esteem). Sixth, social capital is embedded in the culture of a society, and, therefore, affected by social, economic, and historical factors. Achieving some purchase on the effects of social capital will require us to incorporate these factors into analyses. Progress in this vein would likely be furthered by assessments that enable us to understand how social capital and its relationship with social outcomes are distributed geographically within and between communities.

The macro-level analyses of the effects of social capital on economic growth and well-being have used rather crude indicators of social capital, such as "trust" and "transience", and have been based mainly on data aggregated at a macro-level (e.g. states and countries). My concern is that such indicators are highly correlated at these levels with other constructs that could give us a better purchase on how social and human capital affect economic growth and well-being. If we believe that social networks and collective actions affect social outcomes by increasing social support and social integration, or by reducing alienation and giving people a greater sense of control, then these are the constructs we need to measure. Moreover, the macro-level analyses do not capture the important processes at the levels of family and community where social capital is invested and transformed into other forms of capital that bear on social outcomes.

I believe that there are several ways that the OECD and its member countries can strengthen their large-scale assessments and monitoring programs to address this issue. Most of these are not expensive. First, we require an integrated set of longitudinal surveys which cover the life span from conception to old age. We are close to this in Canada with a set of about four or five longitudinal surveys being conducted by HRDC and Statistics Canada. Second, we need studies that also track "communities", defined in different ways. For example, consider the Programme of Indicators of Student Achievement (PISA), an OECD study of 15-year old youth that will be conducted this year in over thirty countries. Canada is integrating this study with its Youth-in-Transition Study (YITS), thereby creating a longitudinal study that is anchored in an international study. There is an opportunity for a

sample design which sampled "communities" (geographically defined) at the first stage, and schools and students within those communities. When the next wave of PISA data is collected three years hence, we would want to select our sample of 15-year old youth from the same communities. This would not only enable us to examine levels and gradients at the level of community; we could also discern the stability of these estimates. This can be achieved by fitting multilevel models that extend the models presented in this paper by incorporating time as an element (Willms and Raudenbush 1989). These could give us a powerful purchase on the effects of social capital because they would allow us to ask whether *changes* in intercepts and gradients are related to *changes* in social capital, at the level of local communities. I do not believe that such modifications would be particularly expensive, and would not unduly compromise the accuracy of provincial or national estimates. Third, we need to better integrate geography into our analyses. In virtually all of the research on school effectiveness we have treated schools as independent entities, without attention to their relationship to other schools in the community. I believe we could make a giant leap forward in this area if we had sufficient geographical data to conduct two kinds of analyses. One involves incorporating geography into the analysis to estimate spatial auto-correlation. The second entails estimating regressions at the local level to assess the extent of spatial non-stationarity, essentially by fitting a regression model separately within each local area (Fotheringham, Charlton and Brunsdon 1997). For example, imagine the power of a map of Canada and the US which displayed the relationship between social capital and health status, adjusted for socioeconomic status, across local areas. Fourth, we need to think harder about opportunities for natural experiments and case studies that borrow strength from and build upon the findings of our large-scale studies. For example, given the large disparities in mathematics achievement between Quebec and the rest of the country, I am curious whether these differences would be evident if we compared schools in close proximity but on opposing sides of the Quebec-New Brunswick and the Quebec-Ontario borders. Over-sampling these schools would enable a more powerful analysis, but we would probably learn more through case studies of particular communities.

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