

05:2013 WORKINGPAPER

CULTURAL CAPITAL IN CONTEXT:
HETEROGENEOUS RETURNS TO CULTURAL CAPITAL ACROSS
SCHOOLING ENVIRONMENTS

SFI – THE DANISH NATIONAL CENTRE FOR SOCIAL RESEARCH
DEPARTMENT OF SOCIOLOGY, UNIVERSITY OF COPENHAGEN

CULTURAL CAPITAL IN CONTEXT: HETEROGENEOUS RETURNS TO CULTURAL CAPITAL ACROSS SCHOOLING ENVIRONMENTS

Ida Gran Andersen
Mads Meier Jæger

THE DANISH NATIONAL CENTRE FOR SOCIAL RESEARCH, COPENHAGEN;
DEPARTMENT OF SOCIOLOGY, UNIVERSITY OF COPENHAGEN, DENMARK

Working Paper 05:2013

The Working Paper Series of The Danish National Centre for Social Research contain interim results of research and preparatory studies. The Working Paper Series provide a basis for professional discussion as part of the research process. Readers should note that results and interpretations in the final report or article may differ from the present Working Paper. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including ©-notice, is given to the source.

Cultural Capital in Context:

Heterogeneous Returns to Cultural Capital across Schooling Environments

Ida Gran Andersen^{1,2} and Mads Meier Jæger^{2,1}

¹ The Danish National Centre
for Social Research
Herluf Trolles Gade 11
1052 Copenhagen K
Email: iga@sfi.dk

² Department of Sociology
University of Copenhagen
Øster Farimagsgade 5, Building 16
1014 Copenhagen K
Email: mmj@soc.ku.dk

24 January 2013

Abstract:

This paper analyzes the extent to which the effect of cultural capital on academic achievement varies across high- and low-achieving schooling environments. We distinguish three competing theoretical models: Cultural reproduction (cultural capital yields higher returns in high-achieving schooling environments than in low-achieving ones), cultural mobility (cultural capital yields higher returns in low-achieving environments), and cultural resources (cultural capital yields the same returns in different environments). We analyze PISA data from six countries and find that returns to cultural capital tend to be higher in low-achieving schooling environments than in high-achieving ones. These results support the cultural mobility explanation and are in line with previous research suggesting that children from low-SES families benefit more from cultural capital than children from high-SES families.

Word count: 7,210 (main text and footnotes, excluding list of references), five tables.

Keywords: Cultural capital, educational success, schooling environment, PISA, multilevel mixture model.

Introduction

Pierre Bourdieu's theory of cultural reproduction offers an influential explanation of the mechanisms that generate intergenerational inequalities in educational and socioeconomic outcomes. Bourdieu famously argued that parents transmit cultural capital to children, children convert their acquired cultural capital into academic success and, as a consequence, families who possess cultural capital have a comparative advantage which helps them reproduce their privileged socioeconomic position (Bourdieu 1977, 1984; Bourdieu and Passeron 1990). The theory of cultural reproduction has motivated a large empirical literature, most of which has identified positive correlations between measures of cultural capital and educational success (e.g., Aschaffenburg and Maas 1997; Cheadle 2008; De Graaf, de Graaf, and Kraaykamp; DiMaggio 1982; DiMaggio and Mohr 1985; Dumais 2002; Jæger 2009; Roscigno and Ainsworth-Darnell 1999; Sullivan 2001; van de Werfhorst and Hofstede 2007; Xu and Hampden-Thompson 2012; Yamamoto and Brinton 2010).

Although previous research demonstrates positive correlations between cultural capital and educational success, we know only little about the institutional contexts that generate these correlations. Bourdieu argued that the educational system is intrinsically biased towards valorizing cultural capital and that it ascribes positive qualities onto individuals who possess it. However, thus far only little research has focused on potential differences across institutional contexts in the ways in which cultural capital is converted into educational success. Four strands of research provide suggestive evidence that institutional contexts matter. One strand of research focuses on social class differences in the ways in which parents "work the system" and use their cultural capital in interactions with institutional gatekeepers to negotiate advantages on behalf of their children (e.g., Lareau 2003; Lareau and Horvat 1999; Lareau and Weininger 2003, 2008). A second strand of research analyzes the ways in which children actively use their cultural capital to

shape teachers' perceptions of their academic ability (e.g., Dumais 2006; Wildhagen 2009). A third strand of research identifies cross-country differences in the effect of cultural capital on educational success (e.g., Barone 2006; Evans et al. 2010; Park 2008; Tramonte and Willm 2010; Xu and Hampden-Thomson 2012). Finally, a fourth strand of research demonstrates that cultural capital plays a different role for educational success in non-Western societies (notably in Southeast Asia) compared to in Western societies (e.g., Buyn, Schofer, and Kim 2012; Lee and Rouse 2011; Yamamoto and Brinton 2010). Together, results from these different strands of research suggest that the institutional contexts in which cultural capital is converted into educational success are important and warrant explicit attention.

This paper contributes to existing research by analyzing whether the effect of cultural capital on academic achievement varies systematically across schooling environments characterized by high and low academic achievement. Our theoretical motivation for analyzing whether returns to cultural capital vary across schooling environments stems from Bourdieu's contention that economic, cultural, and social capital carry different weight in different institutional contexts (what Bourdieu calls *fields*; Bourdieu 1986). Our empirical motivation stems from previous research demonstrating that returns to cultural capital vary by students' socioeconomic status (SES), which suggests that students who belong to diverse schooling environments differ in the extent to which they are able to convert cultural capital into educational success (e.g., Aschaffenburg and Maas 1997; DiMaggio 1982; Dumais 2006). Building on these motivations, we argue that returns to cultural capital should vary across schooling environments characterized by high and low academic achievement and, furthermore, by different SES and levels of cultural capital. We also argue that returns to different aspects of cultural should vary across schooling environments. For example, familiarity with legitimate culture and eloquent speech might be more rewarding in a high-achieving schooling environment typically populated by students and teachers that appreciate this

type of cultural capital compared to in a low-achieving environment that does not appreciate this capital. Similarly, simply having access to basic educational resources such as a dictionary or a computer might make a student stand out relative to her peers in a low-achieving schooling environment which tends to be populated by low-SES students.

We extend previous research by directly measuring high- and low-achieving schooling environments from empirical data and by analyzing whether the effect of four aspects of cultural capital (highbrow cultural possessions, reading habits, cultural communication, and educational resources) on academic achievement varies across schooling environments. We test three competing theoretical models which predict different rates of return to cultural capital in high- and low-achieving schooling environments: cultural reproduction, cultural mobility, and cultural resources. The *cultural reproduction* model predicts that returns to cultural capital are higher in high-achieving schooling environments than in low-achieving environments because the former is populated by students and teachers who appreciate cultural capital (Bourdieu 1977). By contrast, the *cultural mobility* model predicts that returns to cultural capital are higher in low-achieving schooling environments than in high-achieving ones because, in the former, cultural capital makes a bigger impression (DiMaggio 1982). Finally, the *cultural resource* model predicts that cultural capital benefits everybody equally and, as a consequence, there should be no differences across schooling environments in the rate of return to cultural capital (Xu and Hampden-Thomson 2012).

We use data from six countries (Canada, the United Kingdom, Germany, France, Norway, and Denmark) from the 2000 Programme for International Student Assessment (PISA) study to identify high- and low-achieving schooling environments and to test for differences in returns to cultural capital across schooling environments. PISA focuses on 15-year old students and samples multiple students from the same school. The nested data structure in PISA allows us to identify latent schooling environments which differ with regard to academic achievement. We use

multilevel mixture regression models to identify two latent schooling environments in each country which are characterized by respectively high and low academic achievement and by high and low variance in achievement. We also demonstrate that high-achieving schooling environments are characterized by a higher concentration of cultural capital and parental SES than low-achieving environments. Our main finding from the empirical analysis is that, across the six countries which we study, cultural capital tends to have a stronger effect on academic achievement in low-achieving schooling environments than in high-achieving environments. This result supports the cultural mobility model which predicts that returns to cultural capital are highest in low-achieving schooling environments in which there is only little cultural capital and in which it is easier for students to “show off” their cultural capital. By implication, our analysis provides little support for the cultural reproduction model.

Theoretical Background

Our theoretical framework has three components. First, we introduce the concept of cultural capital and discuss its role for educational success. Second, we present two models which predict heterogeneous returns to cultural capital across schooling environments: cultural reproduction and cultural mobility, and a third model, the cultural resources model, which predicts homogenous returns. Third, we discuss how the impact of different aspects of cultural capital might differ across schooling environments.

The Concept of Cultural Capital

Bourdieu (1977, 1984, 1986) defined cultural capital as familiarity with the dominant cultural codes inscribed in a society. He argued that cultural resources constitute an immaterial type of “capital” which should be regarded on equal terms as material economic resources (referred to as *economic*

capital) and social networks (referred to as *social capital*). Cultural capital is possessed by families and individuals and is transferred from parents to children through investments and socialization. In addition to being a resource in its own right, cultural capital is a generalized currency which can be exchanged into economic and social capital. Lamont and Lareau (1988:156) offer an influential definition of cultural capital, and its function, as “(...) institutionalized, i.e., widely shared, high status cultural signals (attitudes, preferences, formal knowledge, behaviors, goals, and credentials) used for social and cultural exclusion.” This definition, which we follow in this paper, highlights the fact that cultural capital is a scarce resource which can be invested to create more (or other types of) capital and which fundamentally serves to exclude others from advantaged social positions.

Cultural Capital and Educational Success

According to Bourdieu, cultural capital exists in three states: *embodied* (linguistic competence, mannerisms, cultural knowledge, etc.), *objectified* (cultural goods, pictures, books, etc.), and *institutionalized* (educational credentials) (Bourdieu 1977, 1986; Bourdieu and Passeron 1990), and it promotes educational and socioeconomic success in all three states.

First, parents transmit cultural capital to children, either passively via children being exposed to parents’ objectified and embodied cultural capital in the home, or actively via parents’ investments in transmitting their cultural capital to children (Cheung and Andersen 2003; Lareau 2003). Children inherit parents’ cultural capital, which becomes an integral part of their endowments and dispositions, i.e., what Bourdieu labels their *habitus*.

Second, Bourdieu argues that cultural capital is a particularly valuable resource within the field of education (Bourdieu 1977, 1984; Bourdieu and Passeron 1990). The educational system is intrinsically biased towards valorizing cultural capital, and it ascribes positive qualities such as academic brilliance onto those who possess it. Compared to those who do not possess cultural

capital, children who possess cultural capital are more familiar with “the rules of the game” in the educational system and, as a consequence, they are better equipped to present a false impression of academic brilliance. Returns to cultural capital materialize through academic performance, first, because children who possess cultural capital appear more talented than they actually are and, second, because these children share the norms and values of the educational system (*habitus*) which provide them with better opportunities to learn. Consequently, children’s embodied cultural capital (inherited from parents) is converted into educational success (institutionalized cultural capital), which in turn promotes socioeconomic success, thus completing the process of social reproduction.

Schooling Environments and Educational Success

The educational system plays a key role in the theory of cultural reproduction because it represents the institutional mechanism through which cultural capital is converted into educational success. Most previous research assumes that cultural capital yield the same rate of return throughout the educational system. This assumption is reflected in the fact that most research estimates the (mean) effect of cultural capital on educational success based on samples of students who attend potentially very different school types (for example public or private schools) or educational tracks (for example academic or vocational tracks) (e.g., Aschaffenburg and Maas 1997; Cheadle 2008; De Graaf, de Graaf, and Kraaykamp 2000; DiMaggio 1982; Dumais 2002; Jæger 2011; Sullivan 2001). However, most educational systems are internally stratified even at the same grade or level (Kerckhoff 1995), and returns to cultural capital is likely to vary across schooling environments characterized by different levels of academic achievement and cultural and socioeconomic resources. In the following sections we present three models that predict different returns to cultural capital in respectively high- and low-achieving schooling environments.

Cultural Reproduction

Bourdieu argues that cultural capital is a resource which is used principally by socioeconomically advantaged groups to promote social reproduction. As a consequence, socioeconomically disadvantaged groups are assumed not to possess any cultural capital and, if they do possess cultural capital, they are assumed not to be equally capable of benefiting from this capital. This argument implies that children from advantaged families are particularly likely to be in schooling environments that appreciate and reward cultural capital. These schooling environments are characterized by high-SES peers, an academically oriented learning environment, and high academic achievement. By contrast, children from less advantaged family backgrounds are likely to be in low-SES and low-achieving schooling environments in which there is little (appreciation of) cultural capital. Accordingly, it follows from Bourdieu that one of the reasons why children from high-SES families are more successful in the educational system compared to those from low-SES families is not only due to having more cultural capital, but also because the rate of return to cultural capital is higher in the schooling environments typically occupied by high-SES children.

Cultural Mobility

DiMaggio (1982; DiMaggio and Mohr 1985) proposes an alternative explanation. He argues that cultural capital is not possessed exclusively by those in advantaged socioeconomic positions. Rather, cultural capital may be possessed by everyone and, if possessed, it benefits everyone equally. This model implies that the rate of return to cultural capital is not higher in high-achieving schooling environments than in low-achieving ones. However, because students still need to “show off” their cultural capital in school in order to benefit from it, and because there is generally less cultural capital in low-achieving environments than in high-achieving environments, children in

low-achieving environments who possess cultural capital have better opportunity to capitalize on their cultural capital. Consequently, the cultural mobility model makes the opposite prediction of that proposed by the cultural reproduction model: returns to cultural capital should be higher in low-achieving schooling environments than in high-achieving environments.

Cultural Resources

A third model, labeled the cultural resource explanation (Xu and Hampden-Thompson 2012), begins from DiMaggio's (1982) contention that cultural capital benefits everyone equally. However, this model departs from DiMaggio by arguing that the link between socioeconomic position and cultural capital has diminished over time and, as a consequence, cultural capital is just one among several resources that promote educational success. Consequently, the prediction from the cultural resource model is that cultural capital promotes educational success and, moreover, returns to cultural capital do not vary across schooling environments.

The cultural reproduction, cultural mobility, and cultural resource models all make different assumptions on the role of the educational system in converting cultural capital into educational success. The cultural reproduction model treats the educational system as an inequality "multiplier" because those who possess cultural capital tend to be in schooling environments that reward this type of capital. The cultural mobility model assumes that the rate of return to cultural capital does not vary across schooling environments but, because of differences in the socioeconomic and cultural composition of students in different schooling environments, children in low-achieving environments who possess cultural capital face less competition and are better able to exploit their cultural capital. Finally, the cultural resource model assumes that returns to cultural capital are the same across schooling environments.

Returns to Different Aspects of Cultural Capital

Previous empirical research which has compared the cultural reproduction and cultural mobility models generally finds more support for the cultural mobility model than for the cultural reproduction model (e.g., Aschaffenburg and Maas 1997; De Graaf, de Graaf and Kraaykamp 2000; DiMaggio 1982; Dumais 2006). This research furthermore finds that some aspects of cultural capital are more important than others. Notably, familiarity with legitimate culture (measured by, for example, possession of works of art or participation in highbrow cultural events) has been found to have only little impact on educational success, while the family's literary environment, cultural communication and, to some extent, its educational resources have been found to have a large impact (e.g., De Graaf, de Graaf and Kraaykamp 2000; Downey 1995; Jæger 2009; Lareau and Weininger 2003). Consequently, not all aspects of cultural capital are equally important.

As argued in the introduction, a limitation in previous research on cultural capital is that it does not take into account the schooling environments in which cultural capital is converted into educational success. As a consequence, it is ill-suited for explaining why some aspects of cultural capital might be more important than others. We address this limitation by proposing that returns to different aspects of cultural capital may vary across schooling environments. For example, in addition to cultural capital in general having a higher return in high-achieving schooling environments than in low-achieving environments, the cultural reproduction model also hypothesizes that familiarity with legitimate culture has a higher return than other and more "practical" aspects of cultural capital (and vice versa in low-achieving environments). There is some empirical evidence to support this idea. For example, Jæger (2011) found that indicators of participation in legitimate culture (frequency of going to museums and concerts) and literary interests (how much the child reads for enjoyment) had larger effects on academic achievement in high-SES families than in low-SES families. By contrast, indicators of more practical aspects of

cultural capital (for example, whether parents encourage the child to take on a hobby) had a larger effect in low-SES families. These results suggest that different schooling environments may reward different aspects of cultural capital. We explore these ideas in the empirical analysis.

Hypotheses

In the empirical analysis we test if the effect of cultural capital varies across schooling environments. According to the *cultural reproduction model*, cultural capital has a stronger effect on academic achievement in high-achieving schooling environments than in low-achieving environments. The reason for this difference is that high-achieving schooling environments are more tuned towards valorizing cultural capital than low-achieving environments, and especially familiarity with legitimate culture. The *cultural mobility model*, by contrast, predicts that cultural capital has a stronger impact on academic achievement in low-achieving environments than in high-achieving environments. The reason for this difference is that low-achieving schooling environments are characterized by a paucity of cultural capital and, if possessed, cultural capital provides a comparative advantage. Finally, the *cultural resource model* predicts that there are no differences across schooling environments in the positive effect of cultural capital on academic achievement.

Data and Variables

Data

We analyze data from six countries from the 2000 PISA (Programme for International Student Assessment) study. PISA is a large-scale comparative study which provides internationally standardized assessments of academic achievement among 15-year olds (OECD 2000). In this paper we focus on students' reading ability. We use PISA for two reasons. First, in addition to measuring

students' reading ability, PISA also includes variables capturing different aspects of cultural capital and socioeconomic background. This information makes PISA particularly suited for analyzing the effect of cultural capital on academic achievement (e.g., Barone 2006; Xu and Hampden-Thompson 2012). Second, PISA samples several students from the same school, thereby providing multilevel data with students nested within schools. We exploit the nested data to identify latent schooling environments which differ with regard to mean academic achievement and the variance in achievement. Below, we provide further details on how we identify these schooling environments and how they differ with regard to students' cultural and socioeconomic resources.

We include six countries in the analysis: Canada, the United Kingdom, Germany, France, Norway, and Denmark. These countries differ substantially with regard to the structure of primary and secondary education. The main purpose of including six different countries is to assess the validity of our main results rather than to carry out a systematic comparative analysis (which is beyond the scope of the present paper).¹ Our analysis sample includes 56,746 respondents nested within 1,942 schools. In order to ensure reliable measurement of schooling environments, we exclude observations from schools with less than ten observations. Table 1 shows descriptive statistics for all variables used in the analysis.

– TABLE 1 HERE –

¹ We would have liked to include the United States in the analysis. Unfortunately, the sample size for the US PISA data is smaller than for the other countries and, furthermore, there is a substantial amount of missing data on some of the key family background variables (OECD 2000:191-193). Instead, we include Canada whose primary and secondary schooling system is similar to the US system and for which the sample size is the biggest among all the countries that participated in the 2000 PISA (see Table 1).

Dependent Variable

Our measure of academic achievement is the student's score on the PISA reading ability test. This test measures reading ability along three sub-dimensions: retrieving information, interpreting texts, and reflection and evaluation (OECD 2000). In the empirical analysis we use the weighted estimate of the student's reading ability calculated by the PISA team, which is considered to be the most reliable measure of reading ability. In order to simplify the presentation of the empirical results, we standardize the reading ability test score within each country to have mean zero and standard deviation one.

Cultural Capital

There is little consensus in the empirical literature on how to measure cultural capital (Kingston 2001; Sullivan 2002; Lareau and Weininger 2003). Early studies relied on indicators of highbrow culture, either possession of cultural objects (paintings, works of art, etc.) or participation in cultural events (arts, music, museums, etc., e.g., DiMaggio 1982; Aschaffenburg and Maas 1997). This approach has been criticized for being too narrow (Lareau and Weininger 2003) and has been supplemented by indicators of reading habits, cultural communication, home educational resources, and extracurricular activities (e.g., Covay and Carbonaro 2010). Together, these indicators capture different aspects of cultural capital that may be consequential for educational success. In this paper we include four indicators of cultural capital: possession of cultural objects, reading habits, cultural communication, and home educational resources. All four indicators are composite variables created and validated by the OECD (OECD 2000).

Our first indicator is the index of *family cultural possessions*. This indicator measures the presence of highbrow cultural objects in the home. Specifically, using the response categories 1 ("yes") and 0 ("no"), the respondent was asked to report whether she had the following items in her

home: (1) classical music, (2) books of poetry, and (3) works of art. A higher value on the index implies that more cultural objects are present in the home (e.g., DiMaggio 1982; Aschaffenburg and Maas 1997).

Our second indicator is the index of *engagement in reading*. This indicator measures the extent to which the respondent reads for pleasure. Specifically, using a response scale with four categories (1 = “Strongly disagree,” 2 = “Disagree,” 3 = “Agree,” and 4 = “Strongly agree”), the respondent was asked how much she agrees with the following statements: (1) “I read only if I have to,” (2) “Reading is one of my favorite hobbies,” (3) “I like talking about books with other people,” (4) “I find it hard to finish books,” (5) “I feel happy if I receive a book as a present,” (6) “For me, reading is a waste of time,” (7) “I enjoy going to a bookstore or a library,” (8) “I read only to get information that I need,” and (9) “I cannot sit still and read for more than a few minutes.” A higher value on the index implies a higher engagement in reading (De Graaf, de Graaf, and Kraaykamp 2000; Cheung and Andersen 2003).

Our third indicator is the index of *cultural communication*. This indicator measures the frequency of communication between the respondent and her parents on cultural and political issues. Specifically, using a five-point scale (1 = “Never or hardly ever,” 2 = “A few times a year,” 3 = “About once a month,” 4 = “Several times a month,” and 5 = “Several times a week”) the respondent was asked how often she did the following with her parents (or guardian): (1) discussed political or social issues, (2) discussed books, films, or television programs, and (3) listened to classical music. A higher value on the index implies a higher level of cultural communication (Cheung and Andersen 2003; Jæger 2009).

Our fourth indicator is the index of *home educational resources*. This indicator captures the availability of objects in the home that are used for educational purposes. Specifically, using the response categories 1 (“yes”) and 0 (“no”), the respondent was asked to report whether the

following was available in her home: (1) a dictionary, (2) a quiet place to study, (3) a desk for study, (4) text books, and (5) the number of calculators in the home. A higher value on the index implies that more educational resources were available to the respondent (Downey 1995; Roscigno and Ainsworth-Darnell 1999).

The correlation between the cultural capital variables ranges from .18 to .37. In order to facilitate easier interpretation, we standardize the cultural capital variables within each country in the empirical analysis.

Control Variables

We include a set of variables to account for basic demographics and the respondent's socioeconomic background. These variables include (1) parents' level of education measured through the ISCED (International Standard Classification of Education) educational classification with six ordered categories, (2) family SES measured through the OECD HISEI (highest socioeconomic status) scale, (3) number of siblings, (4) family structure (with a dummy variable for the respondent living in a single parent family) and (5) the student's sex (with a dummy variable for girls) (OECD 2000).

School-Level Variables

We include several variables measured at the school level to capture differences between schools in their cultural and socioeconomic composition. To capture between-school differences in cultural capital, we calculate variables which summarize the mean of the four cultural capital variables (cultural possessions, engagement in reading, cultural communication, and home educational resources) across all respondents within a school. To capture differences in socioeconomic composition, we calculate school-level variables which measure mean parental education (both

father and mother) and family SES. As explained below, we use these variables to characterize the cultural and socioeconomic composition of the different latent schooling environments.

Analytical Strategy

The aim of the empirical analysis is to investigate if returns to cultural capital vary systematically across schooling environments characterized by respectively high and low academic achievement. Our PISA data have a two-level structure consisting of students nested within schools. This data structure allows us to identify latent schooling environments in each country that differ with regard to students' mean academic achievement and the variance in achievement.

We employ a multilevel modeling strategy to jointly estimate the characteristics of the schooling environments in which students are nested and the effect of cultural capital on academic achievement within each environment. We are interested in identifying qualitative rather than quantitative differences between schooling environments and, as a consequence, we use a multilevel mixture approach in which we approximate between-school differences in academic achievement by means of a number of latent categorical groups (e.g. McLachlan and Peel 2000; Muthén and Asparouhov 2009). These latent groups differ along two dimensions: students' mean academic achievement and the variance in achievement. Thus, each latent group captures a distinct schooling environment.

We use a multilevel mixture regression model in which the random intercept and slope of a linear regression of reading ability on cultural capital for individual i in school j are allowed to vary across the latent groups of a school-level latent class variable C with K categories (labeled c , with $c=1, \dots, K$). The latent class variable C is intended to capture latent schooling environments which differ with regard to academic achievement. We write

$$y_{ij} | C_{ij=c} = \beta_{0cj} + \beta_{1cj}x_{ij} + \beta_2k_{ij} + r_{ij}, \quad (1)$$

where y is reading ability, x is the vector of cultural capital variables, k is the vector of control variables, and r is a normally-distributed residual whose variance is assumed to vary across latent classes, $r_{ij} \sim N(0, \sigma_c)$. We incorporate heterogeneous returns to cultural capital by allowing the effect of the cultural capital variables to vary across the different schooling environments captured by the latent class variable C . Specifically, in Equation 1 we treat the intercept β_{0cj} and the coefficients on the cultural capital variables β_{1cj} as random effects which are allowed to vary across the latent classes of C .² We write

$$\beta_{0cj} = \gamma_{00c} + u_{0j}, \quad (2)$$

$$\beta_{1cj} = \gamma_{10c} + u_{1j}, \quad (3)$$

where γ_{00c} is a random intercept and γ_{10c} are random coefficients, all of which vary across levels of C , and where u_{0j} and u_{1j} are normally-distributed residuals.

Our empirical analysis is divided into three steps. First, for each country we estimate a series of null models to identify the number of latent schooling environments needed to account for the observed between-school variance in academic achievement. In practice, we estimate Equation 1 without any explanatory variables (i.e., leaving out the x and k variables) and gradually increase the number of latent classes until we account for all the observed between-school variance in academic achievement. As is convention in the literature on mixture models, we use the Bayesian

² To keep the model feasible, and because we have no explicit interest in these variables, we treat the effects of the control variables as fixed effects that do not to vary across the latent classes.

Information Criterion (BIC) and the Akaike Information Criterion (AIC) to select the appropriate number of latent classes (McLachlan and Peel 2000). From this analysis, we identify a number of latent schooling environments that differ with regard to mean reading ability (γ_{00c}) and the individual-level variance in reading ability (σ_c).

Second, having established the number of latent schooling environments in each country, we use the cultural capital and SES variables measured at the school level to characterize the different schooling environments. Substantively, we are interested in analyzing whether high- and low-achieving schooling environment differ with regard to the composition of cultural capital and student SES. In order to carry out this analysis, we estimate the null model (i.e., Equation 1 without the x and k variables) and allow for membership of the different latent classes to depend on the school-level cultural capital and SES variables. We write

$$P(C_j = c) = \frac{\exp(a_c + b_c \bar{z}_j)}{\sum_{s=1}^K \exp(a_s + b_s \bar{z}_j)}, \quad (4)$$

where \bar{z} is the vector of school-level variables and a is a constant. The model in Equation 4 is a logit model in which the probability that the respondent belongs to a high- rather than a low-achieving schooling environment depends on the cultural and socioeconomic composition of the school in which the respondents in located. The vector of regression coefficients b captures the effect of the school-level variables on the likelihood of belonging to the high-achieving environment relative to the low-achieving one (the reference group).

Finally, in our main analysis we estimate the multilevel mixture model described in Equation 1 which includes the cultural capital and the control variables. For each of the cultural

capital variables, we test whether the effect of this variable varies across the latent schooling environments (as hypothesized by the cultural reproduction and cultural mobility models) or whether the effect is the same in each environment (as hypothesized by the cultural resource model).

We estimate all models by means of maximum likelihood using the *Mplus* software.

Results

We present results from the empirical analysis in three sections. In the first section we discuss results from the baseline models for the six countries under study. Here, we identify the number of latent schooling environments needed to account for the observed between-school variance in academic achievement in each country. In the second section we characterize each schooling environments with regard to differences in cultural capital and socioeconomic characteristics. Finally, in the third section we test for heterogeneous returns to cultural capital across high- and low-achieving environments and evaluate our results in relation to the cultural reproduction, cultural mobility, and cultural resource explanations.

Table 2 shows fit statistics for null models estimated in each of the six countries. The table summarizes the values of the BIC and AIC for models which use 2-4 latent classes to account for the between-school variance in reading ability test scores. Lower values of the BIC and AIC imply better fit. The main conclusion from Table 2 is that, for all countries, a model with two latent classes yields a considerably better fit to the data compared to a model with only one class (i.e., a model assuming no heterogeneity in schooling environments). However, in all countries adding a third (or fourth for Germany) latent class model leads to only a minor improvement in model fit and, consequently, our results suggest that we need only two latent classes to account for between-

school heterogeneity in reading ability.³ Two potential reasons why we need only two classes are that, first, we allow each latent class to have both its own mean and variance in reading ability (thus, our modeling strategy is quite flexible), and, second, in most countries there is only a limited number of schools from which to identify the latent schooling environments (thus, our ability to capture fine-grained differences in schooling environments is limited by the data).

– TABLE 2 HERE –

Table 3 presents results from the two-class null models in each of the six countries under study. For each country, the table distinguishes two latent schooling environments: a high-achieving environment and a low-achieving environment. We distinguish each environment on the basis of three parameters: (1) mean (standardized) reading ability for respondents belonging to this environment; (2) the variance in (standardized) reading ability; and (3) the proportion of respondents that belongs to each environment. The upper part of Table 3 shows our empirical estimates of these parameters, while the lower part shows results from null models in which, as shown in Equation 4, we allow the probability that students belong to the high-achieving schooling environment to depend on school-level cultural capital and SES. Below, we discuss results from these models.

– TABLE 3 HERE –

³ Even in Canada, in which we have close to 30,000 respondents nested within more than 1,000 schools, adding a third latent class does not change our results in any substantive way. Here, a third latent class captures a very small, high-performing schooling environment (to which less than .1 percent of the respondents belong). We observe the same trend in the United Kingdom, our second-largest sample, in which we observe 9,300 respondents nested within 360 schools.

Results in the upper part of Table 3 show two clear patterns. First, in all six countries respondents in the high-achieving schooling environment exhibit above-mean reading ability, while those in the low-achieving environment exhibit below-mean ability (reading ability is standardized, so mean ability is zero and the numbers in Table 3 are fractions of a standard deviation). Second, in all six countries we find that the variance in reading ability is at least twice as large in the low-achieving environment compared to in the high-achieving environment. Consequently, not only do respondents in high-achieving environments exhibit significantly higher reading ability compared to those in low-achieving environments, the dispersion in reading ability is also considerably smaller in high-achieving environments than in low-achieving environments.

The lower part of Table 3 shows results from our regressions of school-level cultural capital and SES on the likelihood that students belong to the high-achieving rather than the low-achieving environment. The idea in this analysis is to characterize the two schooling environments with regard to cultural and socioeconomic composition. For all countries we find that, compared to those in the low-achieving schooling environment, students in the high-achieving schooling environment belong to schools in which students on average have more cultural capital and come from more privileged socioeconomic backgrounds.⁴ Although not all of the school-level cultural capital and SES variables are significant (especially in the two Scandinavian countries Norway and Denmark), these results are line with our expectation that the high-achieving environments tend to

⁴ We exclude the school-level cultural capital variables in the model for France because including these variables lead to convergence problems. Two potential reasons why the model for France has problems converging are that, first, the school-level cultural capital variables are highly correlated with the school-level SES variables in this country (more so than in the other countries) and, second, France has the lowest number of schools among the six countries in our study (and, thus, we have a low number of level-2 observations).

be populated by students who possess cultural capital and who come from privileged socioeconomic backgrounds. Our three competing hypotheses argue that returns to cultural capital may across these schooling environments due to differences in the composition and valorization of cultural capital. We now turn to this question.

The cultural reproduction model predicts that the effect of cultural capital, and especially the effect of cultural possessions, engagement in reading, and cultural communication will be higher in the high-achieving environment than in the low-achieving environment. By contrast, the cultural mobility model predicts that the effect of all cultural capital variables will be higher in the low-achieving environment than in the high-achieving environment. The cultural resource model predicts no differences across schooling environments. We now run the multilevel mixture model shown in Equation 1 in each country and, for each of the cultural capital variables, we use likelihood ratio tests to test whether the effect of this variable on academic achievement varies in a statistically significant way across the high- and low-achieving schooling environments.⁵ Table 4 summarizes results.

– TABLE 4 HERE –

Table 4 shows that the effect of cultural capital on reading ability varies in statistically significant ways across schooling environments in 14 out of 24 cases (given the comparatively low number of schools at level 2 and the conservative testing method, we also include tests which are

⁵ Our testing procedure, which uses likelihood-ratio tests, is identical to that usually used to test for random coefficients in multilevel models. The only difference is that, in the context of mixture models, we use Satorra-Bentler (SB) corrected Chi-squares which correct for potential non-normality in the distribution of dependent variable (Satorra 2000). The SB corrected Chi-squares lead to more conservative tests than the usual approach.

significant at $p < .10$). These results suggest that the effects of different aspects of cultural capital on academic achievement vary across schooling environments, as hypothesized by the cultural reproduction and cultural mobility models. Table 4, however, does not provide any information on how the effect of cultural capital varies across contexts.

Table 5 summarizes results from multilevel mixture regressions for the six countries under study. The upper part of the table shows parameter estimates for the effect of the (standardized) cultural capital variables on (standardized) reading ability. Note that Table 5 shows two estimates for the cultural capital variables whose effects vary across the high- and low-achieving schooling environment. The lower part of the table also summarizes estimates of mean reading ability and the variance in reading ability in each schooling environment after we include the cultural capital and the control variables. Table 5 shows three interesting results.

– TABLE 5 HERE –

First, we find that almost all of the cultural capital variables have a positive effect on reading ability in the six countries under study. This result fits previous research showing that cultural capital affects academic achievement over and above other family background factors. Similarly with previous research, we also find that our variable which measures cultural possessions, our indicator of legitimate culture, is the least important (both in terms of significance and effect size) among our four cultural capital variables (e.g., De Graaf, de Graaf, and Kraaykamp 2000; Barone 2006; Xu and Hampden-Thompson 2012).

Second, in all cases in which the effect of cultural capital varies across schooling environments, we find that cultural capital has a stronger effect on academic achievement in the low-achieving schooling environments compared to in the high-achieving environments. In some

cases, the positive effect of cultural capital on reading ability exists only in the low-achieving environment (for example, the effect of home educational resources in all countries except Norway and Denmark), while in other cases the positive effect exists in both schooling environments but is stronger in the low-achieving environment (for example, the effect of engagement in reading in Canada, Germany, Norway, and Denmark). In relation to our competing theoretical explanations, these results support the cultural mobility model and provide little support for the cultural reproduction model (results for the variables which do not vary across schooling environments support the cultural resource model). Consequently, and as hypothesized by the cultural mobility model, we find that returns to all four aspects of cultural capital are higher in low-achieving schooling environments than in high-achieving environments. These results fit the idea that, because low-achieving schooling environments tend to be populated by students with only little cultural capital, children who do possess cultural capital in these environments face little competition and are better able to “show off” their cultural capital. Furthermore, these findings, which are consistent across the six countries included in the analysis, are in line with previous findings that returns to cultural capital are higher for low-SES students than for high-SES students (e.g., Aschaffenburg and Maas 1997; DiMaggio 1982; Xu and Hampden-Thompson 2012).

Third, we find that including the cultural capital and control variables accounts for some (but not a lot) of the within-environment differences in reading ability, the variance in reading ability, and the proportion of students belonging to each environment (compare estimates from Table 3 and 5). Consequently, our observed variables account for only a minor part of the total within-environment differences in academic achievement.

Discussion

The aim of this paper is to test whether returns to cultural capital differ across schooling environments characterized by respectively high and low academic achievement and, furthermore by different levels of socioeconomic and cultural resources. The motivation for our analysis is Bourdieu's contention that returns to cultural capital may differ across subfields within the field of education and previous empirical evidence suggesting that returns to cultural capital are higher for low-SES students than for high-SES students. Our theoretical framework builds on the cultural reproduction, cultural mobility, and cultural resource models which make different predictions regarding the value of cultural capital in different schooling contexts. Our empirical analysis uses data from six countries from the 2000 PISA study.

The main conclusion from our analysis is that cultural capital has a positive effect on academic achievement, and furthermore that the positive effect of cultural capital tends to be stronger in low-achieving schooling environments than in high-achieving environments. This result exists for all four indicators of cultural capital included in the analysis and in all six countries under study. Substantively, this result is in line the cultural mobility model arguing that cultural capital has a particularly large return in low-achieving schooling environments in which students tend to possess only little cultural capital. By implication, our results provide little support for Bourdieu's cultural reproduction model.

Two limitations in our analysis and several suggestions for future research should be highlighted. First, the schooling environments which we identify are based solely on between-school variance in reading ability test scores. This variance arises from differences between schools in, for example, economic resources and teacher quality. We do not measure these differences directly and, as a consequence, we are unable to provide a qualitative description of the dimensions along which the high- and low-achieving environments differ. We do, however, find that students in schools which belong to the high-achieving environments on average possess more cultural capital

and come from more advantaged socioeconomic backgrounds than those in the low-achieving environments. Future research should aim to provide a richer characterization of different schooling environments and the ways in which they facilitate high or low returns to cultural capital.

Second, although we account for compositional differences in students' socioeconomic characteristics, we do not explicitly model selection into the high- and low-achieving schooling environments based on students' individual characteristics. Consequently, our results may reflect that high-SES students are more likely to be in high-achieving schooling environments than in low-achieving environments based on individual characteristics which we do not observe in the PISA data. However, given that our latent schooling environments are broadly defined, we do not expect bias from selection to be very strong.

In spite of these empirical limitations, the main contribution of this paper is to demonstrate that returns to cultural capital differ systematically across schooling environments. This finding supports the idea that we should pay explicit attention to the institutional contexts in which cultural capital is converted into educational success. Bourdieu also made this point, but our results for six countries with different institutional organizations of primary and secondary education suggest that cultural mobility (and cultural resource) rather than cultural reproduction is the predominant empirical trend. However, much more research, and in particular comparative research which explicitly tests for systematic cross-country differences in the effect of cultural capital on educational success, is needed to fully understand the ways in which cultural capital contributes to the process of social reproduction. We hope that our findings will stimulate research exploring these issues.

References

- Aschaffenburg, Karen, and Ineke Maas. 1997. "Cultural and Educational Careers: The Dynamics of Social Reproduction." *American Sociological Review* 62:573-587.
- Barone, Carlo. 2006. "Cultural Capital, Ambition and the Explanation of Inequalities in Learning Outcomes: A Comparative Perspective." *Sociology* 40:1039-1058.
- Bourdieu, Pierre. 1977. *Reproduction in Education, Society, and Culture*. Beverly Hills, CA: Sage.
- Bourdieu, Pierre. 1984. *Distinction. A Social Critique of the Judgement of Taste*. Cambridge, Mass: Harvard University Press.
- Bourdieu, Pierre. 1986. "The Forms of Capital." Pp. 241-258 in *Handbook of Theory and Research in the Sociology of Education*, edited by J. G. Richardson. New York: Greenwood Press.
- Bourdieu, Pierre, and Jean-Claude Passeron. 1990. *Reproduction in Education, Society and Culture*. London: Sage.
- Buyn, Soo-yong, Evan Schofer, and Kyung-keun Kim. 2012. "Revisiting the Role of Cultural Capital in East Asian Educational Systems: The Case of South Korea." *Sociology of Education* 85:219-239.
- Cheadle, Jacob E. 2008. "Educational Investment, Family Context, and Children's Math and Reading Growth from Kindergarten through the Third Grade." *Sociology of Education* 81:1-31.
- Cheung, Sin Yi, and Robert Andersen. 2003. "Time to Read: Family Resources and Educational Outcomes in Britain." *Journal of Comparative Family Studies* 34:413-433.
- Covay, Elizabeth, and William Carbonaro. 2010. "After the Bell: Participation in Extracurricular Activities, Classroom Behavior, and Academic Achievement." *Sociology of Education* 83:20-45.

- De Graaf, Nan D., de Graaf, Paul M., and Gerbert Kraaykamp. 2000. "Parental Cultural Capital and Educational Attainment in the Netherlands: A Refinement of the Cultural Capital Perspective." *Sociology of Education* 73:92-111.
- DiMaggio, Paul. 1982. "Cultural Capital and School Success: The Impact of Status Culture Participation on the Grade of U.S. High School Students." *American Sociological Review* 47:189-201.
- DiMaggio, Paul, and John Mohr. 1985. "Cultural Capital, Educational Attainment, and Marital Selection." *American Sociological Review* 90:1231-1261.
- Downey, Douglas B. 1995. "When Bigger is not Better: Family Size, Parental Resources, and Children's Educational Performance." *American Sociological Review* 60:746-761.
- Dumais, Susan A. 2002. "Cultural Capital, Gender, and School Success: The Role of Habitus." *Sociology of Education* 75:44-68.
- Dumais, Susan A. 2006. "Early Childhood Cultural Capital, Parental Habitus, and Teachers' Perceptions." *Poetics* 34:83-107.
- Evans, Maria D. R., Jonathan Kelley, Joanna Sikora, and Donald J. Treiman. 2010. "Family Scholarly Culture and Educational Success: Books and Schooling in 27 Nations." *Research in Social Stratification and Mobility* 28: 171-197.
- Jæger, Mads M. 2009. "Equal Assess but Unequal Outcomes: Cultural Capital and Educational Choice in a Meritocratic Society." *Social Forces* 87:1943-1971.
- Jæger, Mads M. 2011. "Does Cultural Capital really affect Academic Achievement? New Evidence from Combined Sibling and Panel Data." *Sociology of Education* 84:281-298.
- Kerckhoff, Alan C. 1995. "Institutional Arrangements and Stratification Processes in Industrial Societies." *Annual Review of Sociology* 15:323-347.

- Kingston, Paul. M. 2001. "The Unfulfilled Promise of Cultural Reproduction Theory." *Sociology of Education* Extra Issue:88-99.
- Lamont, Michele, and Annette Lareau. 1988. "Cultural Capital: Allusions, Gaps and Glissandos in Recent Theoretical Developments." *Sociological Theory* 6:153-168.
- Lareau, Annette. 2003. *Unequal Childhoods. Class, Race, and Family Life*. Berkeley: University of California Press.
- Lareau, Annette, and Erin McNamara Horvat. 1999. "Moments of Social Inclusion and Exclusion. Race, Class, and Cultural Capital on Family-School Relationships." *Sociology of Education* 72:37-53.
- Lareau, Annette, and Elliot B. Weininger. 2003. "Cultural Capital in Educational Research: A Critical Assessment". *Theory and Society* 32:567-606.
- Lareau, Annette, and Elliot B. Weininger. 2008. "Concerted Cultivation Continues: Class, Culture, and Child Rearing," Pp. 118-151 in *Social Class: How Does it Work?* Edited by A. Lareau, and D. Conley. New York: Russell Sage.
- Lee, Soojeung, and Roger C. Rouse. 2011. "The Impact of Prestige Orientation on Shadow Education in South Korea." *Sociology of Education* 84:212-224.
- McLachlan, Geoffrey, and David Peel. 2000. *Finite Mixture Distributions*. New York: Wiley and Sons.
- Muthén, Bengt, and Tihomir Asparouhov. 2009. "Multilevel Regression Mixture Analysis." *Journal of the Royal Statistical Society A* 172:639-657.
- OECD. 2000. *PISA 2000 Technical Report*. Paris: OECD.
- Park, Hyunjoon. 2008. "The Varied Educational Effects of Parent-Child Communication: A Comparative Study of Fourteen Countries." *Comparative Education Review* 52:219-243.

- Roscigno, Vincent J., and James W. Ainsworth-Darnell. 1999. "Race, Cultural Capital, and Educational Resources: Persistent Inequalities and Achievement Returns." *Sociology of Education* 72:158-178.
- Satorra, Albert. 2000. "Scaled and Adjusted Restricted Tests in Multi-Sample Analysis of Moment Structures." Pp. 233-247 in *Innovations in Multivariate Statistical Analysis. A Festschrift for Heinz Neudecker*. Edited by R.D.H. Heijmans, D.S.G Pollock, and A. Satorra. London: Kluwer Academic Publishers.
- Sullivan, Alice. 2001. "Cultural Capital and Educational Attainment." *Sociology* 35:893-912.
- Tramonte, Lucia, and J. Douglas Willms. 2010. "Cultural Capital and its Effects on Education Outcomes." *Economics of Education Review* 29:200-213.
- van de Werfhorst, Herman G., and Saskia Hofstede. 2007. "Cultural Capital or Relative Risk Aversion? Two mechanisms for Educational Inequality Compared." *British Journal of Sociology* 58:391-415.
- Wildhagen, Tina. 2009. "Why Does Cultural Capital Matter for High School Performance? An Empirical Assessment of Teacher-Selection and Self-Selection Mechanisms as Explanations of the Cultural Capital Effect." *The Sociological Quarterly* 50:173-200.
- Xu, Jun, and Gillian Hampden-Thompson. 2012. "Cultural Reproduction, Cultural Mobility, Cultural Resources, or Trivial effect? A Comparative Approach to Cultural Capital and Educational Performance." *Comparative Education Review* 56:98-124.
- Yamamoto, Yoko, and Mary C. Brinton. 2010. "Cultural Capital in East Asian Educational Systems: The Case of Japan." *Sociology of Education* 83:67-83.

Table 1. Descriptive Statistics

	Mean	Standard Deviation	N
Reading ability*	515.929	98.079	56,628
<i>Cultural capital:</i>			
Cultural possessions*	-0.149	1.021	55,327
Engagement in reading*	-0.062	1.056	55,627
Cultural communication*	0.010	0.965	55,637
Home educational resources*	0.009	0.989	55,542
<i>Controls:</i>			
Father's education*	4.767	1.330	52,228
Mother's education*	4.868	1.242	53,663
Family SES*	50.821	16.241	54,516
No. siblings*	1.896	1.294	55,799
Single parent family	1.896	1.294	55,799
Girl	0.495	0.500	56,746
<i>School-level variables:</i>			
Cultural possessions**	-0.0001	0.358	1,942
Engagement in reading**	-0.0009	0.259	1,938
Cultural communication**	-0.0009	0.273	1,939
Home educational resources**	-0.0003	0.278	1,942
Father's education**	-0.0068	0.360	1,941
Mother's education**	-0.0063	0.344	1,942
Family SES**	-0.0046	0.398	1,941

Note: * Variable is standardized within each country in the empirical analysis, ** Calculated from the standardized individual-level variable. Sample sizes: Canada (29,397), United Kingdom (9,329), Germany (5,016), France (4,641), Norway (4,138), and Denmark (4,238).

Table 2. Summary of Results from Baseline Multilevel Mixture Models

Latent Classes		Canada	United Kingdom	Germany	France	Norway	Denmark
1	BIC	83,209	26,431	14,213	13,172	11,744	12,025
	AIC	83,192	26,423	14,200	13,159	11,731	12,012
2	BIC	82,930	26,318	14,118	13,112	11,555	11,910
	AIC	82,930	26,298	14,085	13,080	11,524	11,878
3	BIC	82,838	26,299	14,113	13,133	11,532	11,912
	AIC	82,771	26,267	14,061	13,081	11,481	11,861
4	BIC	82,957	26,355	14,113	13,138	11,541	11,932
	AIC	82,882	26,290	14,054	13,080	11,485	11,875

Note: BIC = Bayesian Information Criterion, AIC = Akaike Information Criterion.

Table 3. Mean Reading Ability and Variance by Schooling Environment and Country. School-Level Predictors of School Being in High-Achieving Environment

<i>Schooling environment:</i>	Canada		United Kingdom		Germany		France		Norway		Denmark	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Mean reading ability	.238 (.047)***	-.152 (.026)***	.189 (.064)**	-.289 (.088)**	.355 (.081)***	-.294 (.092)**	.294 (.075)***	-.191 (.073)**	.272 (.069)***	-.610 (.166)***	.142 (.047)**	-.475 (.164)**
Residual variance	.545 (.052)***	1.232 (.055)***	.659 (.076)***	1.385 (.136)***	.492 (.067)***	1.231 (.097)***	.458 (.085)***	1.257 (.093)***	.570 (.075)***	1.422 (.161)***	.675 (.069)***	1.797 (.292)***
Percentage of students	.40	.60	.61	.39	.45	.55	.39	.61	.70	.30	.77	.23
ICC	.163		.255		.517		.447		.076		.136	
Log-Likelihood	-29,264		-13,144		-7,037		-6,535		-5,757		-5,934	
<i>N</i> students	29,314		9,310		5,003		4,636		4,133		4,232	
<i>N</i> schools	1,065		360		212		169		173		225	
<i>Predictors of high vs. low environment:</i>												
Cultural possessions	.865 (.267)**		-.004 (.501)		.188 (1.038)		-		1.699 (.676)*		1.101 (.733)	
Engagement in reading	1.119 (.273)***		2.263 (.497)***		3.659 (.759)***		-		1.527 (.792)		.243 (.552)	
Cultural communication	.115 (.289)		1.321 (.523)*		-.316 (1.086)		-		-.037 (.629)		1.202 (.673)	
Home educational resources	1.179 (.244)***		1.753 (.490)***		3.031 (.944)**		-		1.367 (.592)*		2.134 (.746)**	
Father's education	.478 (.298)		-1.214 (.501)*		3.466 (.778)***		7.118 (2.981)*		.182 (.640)		-.122 (.642)	
Mother's education	.257 (.303)		1.250 (.467)**		-.430 (.955)		8.866 (7.994)		-.535 (.608)		1.907 (.686)**	
Family SES	1.301 (.259)***		2.666 (.522)***		2.802 (1.033)**		11.914 (5.815)*		.127 (.695)		.608 (.631)	

Note: $p < .05$, ** $p < .01$, *** $p < .001$. Estimates in lower panel are log-odds estimates with standard errors in parenthesis.

Table 4. Results for Likelihood Ratio Tests for Random Coefficients on Cultural Capital Variables

	Canada	United Kingdom	Germany	France	Norway	Denmark
Cultural possessions		*			*	*
Engagement in reading	#		#			**
Cultural communication	**			**		
Home educational resources	*	***	*	#	***	**

Note: # $p < 0.10$, $p < .05$, ** $p < .01$, *** $p < .001$. Likelihood Ratio Tests are based on Satorra-Bentler scaled Chi-Squares. Models also include all the control variables.

Table 5. Results from Multilevel Mixture Models of Reading Ability. Parameter Estimates with Standard Errors in Parenthesis

<i>Schooling Environment:</i>	Canada		United Kingdom		Germany		France		Norway		Denmark	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Cultural possessions	.025 ^a (.006)***		.015 (.016)	.066 [#] (.035) [#]	-.008 (.013)	^a	.044 ^a (.014)**		.025 (.017)	.187 (.081)*	.008 (.026)	.058 (.054)
Engagement in reading	.307 (.010)***	.353 (.018)***	.238 (.009)***	^a	.148 (.025)***	.255 (.031)***	.135 (.012)***	^a	.256 (.020)***	.405 (.139)***	.226 (.028)***	.459 (.104)***
Cultural communication	.052 (.011)***	.067 (.021)***	.079 (.010)***	^a	.041 (.011)***	^a	-.018 (.020)	.245 (.199)	.088 (.018)***	^a	.116 (.015)***	^a
Home educational resources	-.011 (.015)	.095 (.022)***	.015 (.022)	.243 (.043)***	-.053 (.045)	.119 (.027)***	.043 (.044)	.163 (.089) [#]	.119 (.018)***	^a	-.020 (.022)	.147 (.083) [#]
<i>Schooling Environment:</i>												
Mean achievement	.054 (.022)*	-.170 (.025)***	.132 (.030)***	-.159 (.056)**	.082 (.046) [#]	-.051 (.049)	-.059 (.048)	-.004 (.108)	.110 (.051)*	-.619 (.202)**	.139 (.037)***	-.142 (.085) [#]
Residual variance	.421 (.026)***	1.040 (.081)***	.371 (.032)***	.955 (.111)***	.179 (.043)***	.567 (.057)***	.350 (.043)***	.790 (.214)***	.460 (.044)***	1.374 (.298)***	.401 (.052)***	1.059 (.151)***
Percentage of students	.66	.34	.70	.30	.40	.60	.81	.19	.86	.14	.73	.27
Log-Likelihood	-32,007		-8,799		-4,178		-4,008		-4,275		-4,184	
<i>N</i> students	26,168		7,573		3,993		3,756		3,577		3,551	

Note: [#] $p < 0.10$, $p < .05$, ** $p < .01$, *** $p < .001$, ^a same effect as in high-achieving environment. Models also include all the control variables.