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A multilevel analysis of Swedish and Norwegian students' overall and digital reading performance with a focus on equity aspects of education

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Abstract

Background: Influence of external factors in general, and socioeconomic background factors in particular, on traditional reading performance has been extensively researched and debated. While traditional reading is well investigated in this respect, there is a lack of studies on equity aspects related to digital reading achievement, in spite of the fact that time spent on reading from digital devices such as computers, tablets, and smart phones without doubt is increasing all over the world. In the hope of contributing to an area that up until now to a great extent has been left unresearched, the present study aims at investigating to what degree external factors, such as cultural and economic capital, parental pressure, and school choice, are related to 15-year-old students' achievement in digital reading and in overall reading on both the student level and the school level in Norway and Sweden.

Methods: To conduct the analysis, multilevel structural modeling techniques have been used on PISA data from the two countries.

Results: The results for the Norwegian as well as for the Swedish sample showed that overall reading achievement was related to cultural capital in both countries, as expected, and in line with previous research. An identified digital reading factor, representing the unique aspects of digital reading achievement when overall reading was controlled for, was less influenced by the external factors of cultural and economic capital, and by parental pressure and school type, compared to performance in overall reading. Interestingly, on the school level, it was found that the external factors, school choice, and parental pressure related to overall reading achievement differently in the Norwegian and Swedish samples. School choice influenced overall reading in the Swedish data but not in the Norwegian data, and the opposite pattern was found for parental pressure.

Conclusion: In conclusion, it is suggested that the results indicate aspects of inequity in the school systems in Norway and Sweden. However, no influence of background factors on the unique aspects of digital reading ability was found, and a tentative interpretation could be that digital reading ability is not (yet) perceived as a part of a cultural capital.

Keywords: Digital reading, Traditional reading, Cultural capital, Economic capital, Structural equation modeling, Multi-level analysis

Background

More and more often, it is considered not only that education is something that governments should provide to their citizens but also that it is the government's responsibility to ensure that it offers an equitable education for all (Gorard and Smith 2004). Thus, it is desirable to constantly evaluate the level of equity in education. A substantial body of past research has shown that the most underprivileged students are the least successful in school in terms of academic performance (Fernald et al. 2013; Heath 1989; Schiff and Ravid 2012). Studies of traditional reading achievement have also come up with results in the same vein (see, e.g., Kieffer 2010; Nicholson 2003). However, even though the area on the whole seems rather well researched with respect both to general school performance and traditional reading performance, there is a lack of corresponding investigations regarding digital reading. In this article, I explore reading performance among 15-year olds in Sweden and Norway with respect to student and school performance and some background factors, with a special focus on digital reading, using data from the Programme for International Student Assessment (PISA) 2009. Conducting parallel analyses on data from two rather comparable neighboring countries can be regarded as a means to validate the tested models in addition to an opportunity to compare the results with respect to similarities and differences.

Investigations of equity in an educational system have usually been conducted using indicators of students' socioeconomic (SES) background as predictors. In this research, the SES concept has been used in different ways. A very early definition formulated by Chapin (1928), as an outset in his attempts to measure SES status, includes four dimensions. "Socio-economic status is the position that an individual or a family occupies with reference to the prevailing average standards of cultural possessions, effective income, material possessions, and participation in group activity of the community" (p. 99).

Concepts recognized and commonly used today are economic and cultural capital, included in Bourdieu's (1986) theory of how an educational system helps choosing and forming the elite as well as how it eliminates those who lack the right disposition. Bourdieu noted that structural and power relations pervade all everyday activities as well as the forming of what he labels the individual's *habitus*, which has to do with how the individual orients and perceives the world. When studying the macro level, Bourdieu used the concept *field*. The field is a system of relations between positions and those holding positions (institutions or individuals). It is dynamic and its structure changes, as there is a constant struggle of power and positions (Bunar 2001). With regard to the macro level Bourdieu turned his interest toward the sociology of education as a part of his overall focus on social and cultural phenomena. He stated that the educational system contributes to the reproduction of relations in the social world. Apart from an interest in the educational system, Bourdieu's main ambition was to capture and explain the mechanisms behind relations in the social world. He wanted to explain why certain people or institutions hold respect, credence, and prestige in a society and used the concept *symbolic capital* to describe this phenomenon. What is perceived as symbolic capital is decided by social groups and is hence not fixed and constant but rather relational. A recurrent example in Bourdieu's texts involves teachers who identify some students as gifted and talented. These students hold certain symbolic assets that the teachers define as valuable. The teachers have gained their sets of values through their lives and judge the

students accordingly. Examples of symbolic capital, that is to say, experience of objects highly valued in a western society, are familiarity with classical music, poetry, and literature. These examples belong to the most crucial subsection of the symbolic capital, which is *cultural capital.* Cultural capital is impactful and prestigious to hold, as many or all groups in a society perceive it as desirable. Bourdieu's theory also includes the concepts *social capital* and *economic capital*. Social capital refers to assets in the form of family relations, connections, and contacts with, for example, former school peers, whereas economic capital simply refers to economic assets in an ordinary sense, such as money and property. Broady (1990), interpreting Bourdieu, suggested that economic capital could be seen as the opposite of cultural capital in the sense that you may belong to the upper class even if you lack economic assets. Thus, cultural capital is symbolic assets that are coveted and can be stored, due to the development of the art of writing, in the form of exams, titles, laws, and written documents, for example (Broady 1990). Furthermore, Bourdieu declared that cultural capital occurs in three "states": the *embodied state,* the *objectified state,* and the *institutionalized state*. The embodied state is the capital situated in peoples' minds and bodies, for example taste, "bildung," and actions (i.e., habitus), whereas the objectified state has to do with the materialized form of capital as possessions of art, instruments, and books, for example. Examples of the institutionalized state of capital are exams, qualifications, or titles. Bourdieu (1986) maintained that the theory should be considered in its whole and that the different capitals and the three states of cultural capital could not be understood independently. However, when these terms are used as a conceptual tool in an empirical study, reductions are sometimes necessary. In correspondence with available data in the present study, only two forms of capital will be discussed, namely economic capital and cultural capital in its objectified state.

Bourdieu (1976) claimed that an educational system is developed in favor of those having cultural capital, at the same time as the official policy states that the educational system should be equal and give everybody the same opportunities. However, in explaining why there is a lack of equity, despite the official policy, Bourdieu (1994) argued that those possessing symbolic power are interested in preserving the existing power structure by, for example, conceptualizing the world and thus making those who lack capital accept their inferior position as a matter of course. In my understanding, Bourdieu suggested that those lacking symbolic power believe that they have the same chances and possibilities as everybody else and thus attribute failure in education to their own abilities without recognizing the inequalities built into the structure of the system. The complex processes at work that Bourdieu pinpointed seem applicable to both Norway and Sweden (Bunar 2001; Hjellbrekke and Korsnes 2009), even though policies of today declare a goal of equity in educational systems (OECD 2012a). This implies a need for continuous evaluations of schools and educations. The issue of how equity in education can be approached and investigated may be discussed. However, commonly used methods are measuring the effect of SES background on academic performance and differences between schools in relation to, for instance, social composition of schools (Alegre and Ferrer 2010), grades, and outcomes of large-scale tests, or national assessments (Brown 1991; Schiff and Ravid 2012; Yang and Gustafsson 2004).

Below, selected research examining the effect of SES-background, cultural, and economic capital on literacy and reading performance will be reviewed. This is followed by a review of the small number of studies available on performance in digital reading.

Previous research

A vast amount of research has shown a positive correlation between students' literacy development and achievement and their SES-background. Students with low-SES background show, on average, lower levels of language skills than students with a more fortunate background (see, e.g., Brown 1991; Dickinson and Snow 1987; Fernald et al. 2013; Huttenlocher et al. 2010; Nicholson 2003; Pungello et al. 1996; Rowe 2008; Schiff and Ravid 2012; Walker et al. 1994).

Yang (2003), drawing on Bourdieu's concepts, investigated the impact of cultural and economic capital on reading performance among 14-year-old students from 23 countries participating in the International Association for the Evaluation of Educational Achievement (IEA) Reading Literacy Study. A cultural capital factor with a relatively strong impact on the students' reading performance was identified at the student level. These results were later replicated in a similar study on reading achievement, using the same data conducted by Yang and Gustafsson (2004). However, in this latter study the school level was investigated as well. On the school level, a general capital factor was found to explain a large part of the between-school variance for reading performance (Yang and Gustafsson 2004). In another IEA investigation, Reading Literacy Study (PIRLS), performed in 35 countries with a sample of 9- to 10-year-olds, Myrberg and Rosén (2009) reported that cultural capital, measured as parents' educational level, number of books at home, and early reading activities, had an effect on the reading achievement of students. They also found that parents' early reading activities with their children mediated a large part of the effect on reading achievement by the number of books at home.

In addition to investigations like those cited above, there is a large body of research using more general socioeconomic concepts as alternatives to cultural and economic capital. Two Swedish studies will be addressed here. Klapp Lekholm and Cliffordson (2008) investigated how parental education at the school level and student level related to the grades from the end of school-year 9 (i.e., at the end of compulsory education) in Swedish, English, and mathematics, and achievement on a set of obligatory national tests in the same core subjects administered to ninth-grade students in Sweden. They separated achievement on the subject tests from the grade dimension in a structural equation model and found that parental education was related to subject achievement on the tests but not to grades. Thus, it can be suspected that social effects on grades and test results may be differently structured. In a study on reading achievement among Swedish third grade students in the Stockholm area, Damber, Samuelsson, and Taube (2012) found significant differences between over- and underachieving school classes on measures such as number of books at home, parents' education, family income, and another first language than Swedish. The authors concluded that controlling for SES and language is necessary in order to find other factors influencing differences between over- and underachieving school classes.

People of today typically spend a great amount of time reading on the Internet; consequently, the ability to read digital texts is becoming increasingly important and necessary.

Computers, electronic books, Internet tablets, and mobile devices have become essential, not to say indispensable, parts of our lives. This digital reading may be regarded as one of what is sometimes labeled "the new literacies," where it is claimed that the making of meaning of the semiotics in multimodal texts demands not only abilities that differ from those needed for reading traditional printed texts (Coiro et al. 2008) but also abilities that are unique for digital reading (Forzani 2013). Moreover, in a previous study on Swedish PISA data a factor representing unique aspects of digital reading, nested within an overall reading factor, was identified (Rasmusson and Åberg-Bengtsson 2015). These results indicate that digital reading differs, to some extent, from traditional reading in that additional skills seem to be required. The particular demands on digital reading are, for instance, argued to include skills needed to gather, read, evaluate, integrate, and communicate information online (Leu et al. 2013; Rasmusson and Eklund 2013). As a consequence of altered reading habits, it has been recognized in many countries that there is a need for teaching and evaluating these new literacies demanded for reading and learning on the Internet (Forzani 2013); the digital reading part in PISA 2009 can be seen as one way to meet this need.

In the following, "digital reading ability" will be referred to as a broad theoretical concept for skills needed for Internet reading. Students' proficiency in this aspect of reading literacy was measured in the digital reading test administered in PISA 2009 (OECD 2012b) and is used in the present as well as the previous study (Rasmusson and Åberg-Bengtsson 2015). Quite obviously, this includes both skills required for traditional print reading and particular requirements due to the Internet medium. The reading of a text is thus not considered to be digital reading simply because this text is presented on a screen. In the present study aiming at capturing the two constructs, traditional and digital reading ability, two different tests were administered, one paper-based and the other computer- and Internet-based; the design is described in detail below.

The school systems and computer habits in Norway and Sweden

A decade ago, Scandinavian countries had a higher level of equity in education compared to a sample of Anglo-Saxon and Eastern European countries according to investigations of reading performance results from PIRLS 2001 (Elijio 2007). However, later statistics indicate a decrease in equity in the educational systems in Sweden during recent years (Gustafsson and Hansen 2011; Katalys 2013). No similar trend has been found in Norway (Bakken and Elstad 2012). On the contrary, the influence of SES measures on mathematics performance in PISA lessened somewhat between 2003 and 2012 (Olsen 2013). In the following discussion a brief description of the school systems in the two countries, research on the equity aspects, as well as habits and availability of ICTs will be provided.

The school systems

The Norwegian and the Swedish school systems are similar in most respects but there are, nevertheless, also differences, some of which will be addressed below. Norway provides pre-school education, financed by the state, the municipalities, and the parents, for children aged 1–5 years. Children in Norway start compulsory school the year they become six. Compulsory school lasts for 10 years and thereafter all students are entitled to 3 years of upper secondary education. The upper secondary education offers two

overall choices: general studies and vocational studies. General studies lead to university admission certification, whereas vocational studies lead to a craft or journeyman's certificate. There are relatively few private schools in Norway. In 2007, Norway had about 150 private compulsory schools (Norwegian Ministry of Education and Research 2007) and only 2.4 % of compulsory school students attended private schools in 2009 (Utdannings forbundet 2013).

In Sweden municipalities are obliged to offer pre-school education to children 1–6 years of age. In 2012, 84 % of Swedish children in this age group were enrolled in a pre-school (The Swedish National Agency for Education, The Swedish National Agency for Education 2013a). At the age of six, all children can attend preschool class, which is a voluntary school form. Compulsory school covers nine school years and then students are entitled to another 3 years of upper secondary education (The Swedish National Agency for Education 2013b). Municipalities run the majority of compulsory schools (referred to as *public* schools in the present paper) but there are independent schools as well (referred to as *private* schools) run by companies, foundations, or associations. Sweden had about 750 private compulsory schools attended by 10.8 % of the students in compulsory education in 2009 (Siris 2013). Before an admission reform in 1992 students were assigned to the nearest school, but since then parents can apply for their children to be enrolled in any school of their choice.

Looking more closely into the oft-used measures of equity, influence of SES on performance and between-school variation, a change during recent years can be noted for Sweden regarding both of these measures. In PISA 2000, the influence of SES on reading performance was on the same level in the two countries. In PISA 2009, however, the influence of SES had increased slightly in Sweden, whereas no such change was seen in Norway (Bakken and Elstad 2012; The Swedish National Agency for Education 2010). Furthermore, there was no change in the effect of SES on Norwegian students' results on the national tests during the 2007–2011 test period (Bakken and Elstad 2012). However Olsen (2013) argued, there are alternative, so called, "high-brow culture" indicators of cultural capital—for example, poetry books—that seem to be better suited to capture the influence of background factors in the Nordic countries than the more general SES measures. Olsen (2013) compared different parts of the SES measure used in PISA 2012 and noticed that number of books had the largest effect of all of these parts on the results in mathematics.

The other oft-used measure of equity in education, the between-school variation, was lower in Sweden than in Norway in 2000, whereas it had become almost twice as large as the Norwegian variation in 2009, with respect to reading performance (Kjærnsli and Roe 2010). Hence, in Sweden this between-school variance more than doubled from 2000 to 2009 in the PISA assessment (The Swedish National Agency for Education 2010). In Norway the between-school variation has fluctuated but stayed mainly on the same level during the period 2000–2009, with regard to the reading results in PISA (Kjærnsli and Roe 2010). The trends have been analyzed and explanations have been asked for in the public debate.

In Norway in 2006, a new curriculum, *Kunnskapsløftet* ("The Knowledge Promotion Reform") was introduced in all primary and secondary schools, aiming towards an increase in the level of knowledge and the basic skills among all students. Bakken and

Elstad (2012) suggest that the reform has put more emphasis on knowledge that students with well-educated parents are better able to handle than students with less-educated parents. Furthermore, they note that the curriculum proposes cooperation between parents and school, which may contribute to inequalities due to varying opportunities among parents to engage in their children's education. When the new curriculum was evaluated after 4 years it was found that equity in Norwegian education had not increased, but rather decreased to some extent (Bakken and Elstad 2012). However, Norway has not introduced a liberalized school choice as in Sweden. Instead, students are enrolled in a school in the geographical area where they live (Kunnskapsdepatrementet 2013) and that could contribute to explaining the smaller between-school variation in Norway compared to Sweden. Researchers in Norway have also pointed out that in spite of Norway being one of the countries spending the most money and resources on education, there are still differences between students' outcomes, sometimes labeled "The Norwegian paradox" (Lyster 2007; Opheim 2004).

In Sweden, the trend of decrease in equity has tentatively been interpreted by, for example, Myrberg and Rosén (2006) as a possible effect of the free school choice. They found that Swedish third-grade students in private schools achieved better reading results than students in public schools. These researchers argued that the students' cultural capital accounted for the difference, as students in private schools had a larger cultural capital than students in public schools. Moreover, Andersson, Malmberg, and Östh (2012) analyzed changes in school distance for 15-year olds from 2000 to 2009. Their results showed that students with a less advantaged background did not have the same opportunity to choose a better school as students with more fortunate backgrounds. This trend was also seen in the upper secondary school. A reform that took place in 2000 eliminated all residence-based admission criteria, so that admission is now based only on grades from the last year of lower secondary education. Söderström and Uusitalo (2010) evaluated the effect of this reform and found not only an expected increase in segregation by ability, but also a significant increase in segregation by family background as well as between immigrants and native Swedes.

Computer availability and habits

According to surveys dating from the same time as the PISA survey in 2009, 97 % of the 16- to 19-year-olds in Norway (Medienorge 2009) and 98–100 % of the 12- to 18-year-olds in Sweden had access to the Internet at home (Findahl 2010). These figures are in line with the results reported from the PISA survey (OECD 2011).

At this point in time, 87–89 % of the 16- to -24-year-olds in Sweden and Norway used the Internet daily or almost every day (Nordicom 2012). However, a survey in 2011–2012 showed that students in neither of the two countries were frequent users of ICT at school compared to many other European countries (European Schoolnet 2012a, b). Only a third of the Norwegian students in Grade eight had teachers using information and communication technology (ICT) equipment in more than 25 % of the lessons (European Schoolnet 2012a). The corresponding number for Sweden was 40 % (European Schoolnet 2012b). OECD (2011) reported that socioeconomically advantaged students in Sweden were more likely to use computers at school than students disadvantaged in this respect, whereas, in Norway, no difference between these groups was found. Altogether, the

surveys referred to above indicate that young people in Sweden and Norway use ICTs to a fairly low degree during lessons at school.

In sum, the school systems in Sweden and Norway are similar in many respects but differ, for instance, with regard to the possibility of school choice. Research points towards increased inequity in education in Sweden, if accepting the above-cited studies as indicators of equity. Exploring equity aspects also in digital reading is necessary due to several reasons: The ability to read digital texts is becoming increasingly important, as, for example, many authorities communicate with the citizens through digital tools. Thus, possessing digital reading skills is a democratic issue in contemporary society. Consequently, investigating equity aspects in digital reading is needed, along with investigations of these aspects in traditional reading, in order to evaluate if the educational system meets the demands of ensuring that all students possess good reading abilities.

Purpose

The increased difference between schools in academic achievement during the last decade, reported above, has been interpreted as a decrease in equity in education and has caused an animated debate in both Norway and Sweden. Because it is an area of great importance and vivid common interest, continuous and well-documented research on various aspects related to differences not only between individuals, but also between schools, is called for. It is noteworthy that digital reading—a domain within literacy performance that is becoming all the more important to master in contemporary society—so far is poorly investigated in these and other respects. The purpose of the present study was to contribute to the research in this field by investigating the influence of background factors on student and school differences in Norwegian and Swedish education with regard to reading performance with a particular focus on digital reading. To achieve this purpose the following questions were addressed:

- Can the two aspects of socioeconomic background be identified in these data on both the student and school level?
- Is it possible to find a relation between these aspects (if identified) and overall and digital reading respectively?
- Do type of school (public or private) and parental pressure have an effect on achievement on the school level?

In order to answer these questions, structural equation-modeling techniques were applied on data from the PISA 2009 survey. A student-level model with a digital reading factor nested within an overall reading factor, previously identified for the Swedish data (Rasmusson and Åberg-Bengtsson 2015), was assumed also to be valid for the Norwegian data and, if so, planned to be used as a baseline model for the present analysis.

Methods

The methodological aspects of the present study will be dealt with below. A brief overview of the PISA survey, theoretical considerations regarding structural equation modeling (SEM), and descriptions of data, preparation of data, sample, and analysis will be given.

The PISA survey

PISA 2009 was conducted among 15-year-olds in 65 countries; the main focus was on reading literacy. On this occasion, for the first time a digital reading test was offered as an option in addition to traditional reading (OECD 2010a). Thus, tasks were developed to measure reading performance in two different environments.

The traditional reading test was paper-based with a total of seven reading clusters placed in 13 booklets according to a rotated test design. Each booklet contained at least one reading cluster along with science and mathematics clusters. The clusters contained units with different stimuli (e.g., texts, tables, charts, figures, etc.) and tasks associated with each stimulus. Due to the design of the data collection, each student solved a block of tasks and no student had to deal with all tasks. The digital reading test was computer-based, also with a rotated design of clusters. The students had to navigate through a number of pages with hyperlinks to be able to solve the tasks. Consequently, the students were exposed to different texts depending on the navigational choices. (For further information and released tasks, see the OECD's PISA website http://www.oecd.org/pisa/pisaproducts/pisa2009/; see also, e.g., Rasmusson and Åberg-Bengtsson 2015.) The results of the PISA 2009 assessment for both Norway and Sweden showed that the students' average performance did not differ statistically from the OECD mean (34 countries) in traditional reading (503 and 497 points respectively). With regard to digital reading, the Norwegian students performed close to and the Swedish students significantly above the OECD mean (16 countries) with 500 and 510 points respectively (OECD 2010a).

In addition to the cognitive tests, two questionnaires were administered: a school questionnaire and a student-background questionnaire. The student questionnaire that was answered by all participating students asked for information about the students themselves, their schools, and their home conditions. The questions concerned, for example, computer habits, attitudes towards learning, possessions at home, and parents' education. The students' answers were given on a four-point Likert scale. This questionnaire took 20–30 min to complete. The principals in the participating schools answered the school questionnaire containing questions about type of school (i.e., if the school was public or private), the amount of pressure and engagement parents showed, computer availability, the teachers' educational levels, etc.

Method of analysis

A confirmatory factor analytic (CFA) approach (see, e.g., Brown 2006) using structural equation modeling (SEM) techniques was adopted for the study. The purpose of CFA is to identify latent variables that account for variation and co-variation among a set of observed, (i.e., manifest) variables. CFA models are tested with structural equation modeling technique (Jöreskog and Sörbom 1993; Gustafsson and Stahle 2000). The quality of a CFA model is assessed in part by the size of the parameter estimates and in part by a number of so-called "fit indices."

Norway and Sweden have been analyzed separately, but the same hypothesized model was assumed to fit both countries. The alternative of using multiple-groups analysis was disregarded because of the complexity of the data and because neither population heterogeneity nor measurement invariance (Brown 2006) was in focus in the present study.

With respect to methodology, the present paper had to consider two different hierarchical structures. First, there are different levels of generality in cognitive abilities; second, there are two levels in the data structure referring to the fact that students are enrolled in different schools with their own characteristics. The first hierarchy comes forth in the nested factor modeling conducted, whereas the latter structure is taken into account in a two-stage sampling procedure in the PISA data collection, which in turn asked for particular considerations when carrying out the present analysis. Moreover, when intra-class correlations (ICCs) were calculated for the five plausible values in digital reading for both countries, Norway had an ICC of 18.6 %, and Sweden had a higher ICC of 23.4 %, which supports the use of two-level modeling. OECD has estimated the between-school variance for digital reading for Norway to be 19.1 % and for Sweden to be 25.0 % (OECD 2011). Most likely, the slight deviation between the figures in the present study and the OECD report is mainly due to the fact that, in my study, a subsample (with those who took both tests) of the full PISA sample is used.

Preparing data for analysis

Preparation of the data was performed in SPSS Statistics 20 (IBM 2013). The Mplus 7 estimation program (Muthén and Muthén 2012) was used for analysis and for estimating the models. Conducting the SEM analysis, the *cluster* and the *stratification* options in Mplus were employed. Schools were regarded as clusters and the strata variable was used with the stratification option. The data imputation command in Mplus makes it possible to use all five plausible values offered for each student in the same computation, which renders appropriate standard errors and χ^2 estimates (Muthén 2013).

PISA provides both a student (within group) weight and a school (between groups) weight consistent with the two-stage stratified sampling design. However, as the original student weight also contains the school weight (OECD 2012b), in the present study, the original student weight was decomposed into a "within school weight" and a "between school weight" for the proper estimation (Asparouhov 2009).

As all students are assigned plausible values for reading performance, the reading variables contain no missing data. However, with regard to the questionnaire data, the students or the principals may have left questions unanswered. However, the attrition was small and ranged between 0.0 and 2.9 percent. In Mplus the default option, which was adopted in the present analyses, estimates a model applying missing data theory and thus using all available data (Muthén and Muthén 2012).

Sample

As stated above, a complex two-stage sampling process is applied in PISA. This is done to guarantee that the samples are representative of the national populations of 15-year-old students (for details, see OECD 2012b). Prior to sampling, the schools with 15-year-olds in a country were stratified into a sampling frame with respect to type of school, size, and other characteristics of their municipalities. Thereafter, in a first stage, the schools were sampled. For this procedure Sweden used 12 and Norway three stratification variables (OECD 2012b). In a second stage, students within these schools were chosen for the total national PISA student sample. At the same time, a subsample of students was selected for the digital reading assessment by the national PISA center in countries

that chose to use this option. Sampling software (KeyQuest) provided by the Australian Council for Educational Research (ACER) was used for this procedure (OECD 2012b). Because the students in these subsamples were the only ones that participated in both the traditional and the digital reading test in PISA 2009, they were chosen as subjects in the present study. (See Table 1 for details of number of schools and students.) Missing data theory was applied to handle the fact that not all questions in the questionnaires were answered (Muthén and Muthén 2012). Thus the number of observations in the analysis was the same as the number of students in the subsamples.

Indicators

PISA is assumed to measure three broad aspects of traditional reading. These aspects imply that the students should: (1) *Access and retrieve* information in the text; (2) *Integrate and interpret* what they read; and (3) *Reflect and evaluate,* which means, relate to your own experience (OECD 2010a, b p. 38). Plausible values[1] for students' performance on digital reading and on the three aspects of traditional reading were used as dependent variables in the present study, in addition to answers to seven questions from the student questionnaire as well as to two questions from the school questionnaire (Table 2).

The seven questions from the student questionnaire, used as indicators of cultural and economic capital, concerned possessions that the students had or did not have at home. As this information was built upon the students' own reports, it could, on one hand, be described as imprecise. On the other hand, the questions were concrete and on the whole rather easy to adequately answer. They were about possessing classic literature, books of poetry, and art, as well as about the number of books, cell phones, cars, and bathrooms at home.

From the school questionnaire, information was used about parental expectations towards the school and whether the school was public or private. Both items were coded as dummy variables. For the first question: "Which statement below best characterizes parental expectations towards your school?" the most far-reaching option ("There is *constant pressure* from many parents, who expect our school to set very high academic standards and to have our students achieve them") was given the code 1 and the other two options, indicating less pressure, were coded as 0. The school type variable was coded 1 for private school and 0 for public school (see Table 3 for descriptive statistics for the manifest variables). The parental involvement and pressure on the school may be seen as additional indicators of cultural capital. According to Broady (1990), Bourdieu maintains that persons rich in cultural capital and holding a position in the field strive to transfer these prerogatives to their children. Thus, good schooling is one way to assure this. In line with such reasoning the school choice is another possible way to accomplish this.

Equity in education is often measured by, for example, the effect of socioeconomic background (SES) on students' academic achievement and differences in outcomes between schools and students. Yang (2003) suggests that different aspects of the

[1] When computing a plausible value, a mathematical distribution around a reported value is first calculated and then each observation is assigned a set of random values drawn from this distribution (OECD, 2009b). Such a procedure reduces errors in the analysis on the population level, which, in accordance with the aim of such surveys, is valued higher than reducing errors on the individual level.

Table 1 Total national PISA samples and samples in the present study by country, schools, and students

	Sweden		Norway	
	Schools	**Students**	**Schools**	**Students**
National sample	189	4567	197	4700
Present sample	179	1921	180	1974

Table 2 The variables from the PISA 2009 databases, PISA section they are taken from, and descriptions of tasks/questions

Variable label	PISA section	Description
T_ACCESS	Traditional reading	Access and retrieve, plausible value
T_INTEGRATE	Traditional reading	Integrate and interpret, plausible value
T_REFLECT	Traditional reading	Reflect and evaluate, plausible value
DIG_READ	Digital reading	Composite measure, plausible value
CELL PHONES	Student questionnaire	Number of cell phones at home
CARS	Student questionnaire	Number of cars at home
ROOMS	Student questionnaire	Number of bath rooms/showers at home
CLASSICS	Student questionnaire	Have or do not have classic literature at home
POETRY	Student questionnaire	Have or do not have books of poetry at home
BOOKS	Student questionnaire	Number of books at home
ART	Student questionnaire	Have or do not have art (e.g. paintings) at home
2PRESSURE	School questionnaire	Much or little pressure from parents
2SCHOOL_TYPE	School questionnaire	Public or private school

Table 3 Number of observations, means and standard deviations for the manifest variables

Variable	Sweden			Norway		
	N[a]	**M**	**SD**	**N**[a]	**M**	**SD**
T_ACCESS	1921	511.4	101.4	1974	516.5	96.2
T_INTEGRATE	1921	501.0	100.7	1974	506.9	92.3
T_REFLECT	1921	509.3	98.3	1974	510.5	91.3
DIG_READ	1921	515.9	87.0	1974	502.5	81.7
CELL PHONES	1917	2.9	0.3	1967	3.0	0.3
CARS	1911	1.7	0.8	1961	1.8	0.8
ROOMS	1915	1.9	0.6	1961	1.8	0.8
CLASSICS	1865	0.6	0.5	1940	0.6	0.5
POETRY	1871	0.4	0.5	1940	0.5	0.5
BOOKS	1897	3.8	1.4	1947	3.7	1.4
ART	1895	0.8	0.4	1951	0.9	0.3
2PRESSURE	177	0.3	0.5	176	0.2	0.4
2SCHOOL_TYPE	179	0.1	0.3	177	0.02	0.1

[a] The number of observations for the student-level variables applies to number of students and for the school-level variables (2PRESSURE and 2SCHOOL_TYPE) to number of schools

socioeconomic index may relate differently to student outcomes and it is advisable to decompose this index in a way useful for the investigation. One way to achieve such decomposition is to use Bourdieu's concepts, cultural and economic capital (see, e.g.,

Åberg-Bengtsson 2005; Gustafsson 1998; Yang 2003). In the present study classic literature, books of poetry, art, and number of books were used as indicators of cultural capital; cell phones, cars, and number of bathrooms at home were used as indicators of economic capital.

As mentioned in the introduction, parents' education is an oft-used measure of cultural capital. However, even though there is such a question in the student questionnaire, other indicators of cultural capital were chosen. This choice was made from the assumption that 15-year-olds give more reliable answers to questions about concrete possessions, such as number of books or artworks in the home, than to a question of parental education that may be perceived as more vague and ambiguous to a child of this age. Furthermore, the parents' education was included in an early stage of the analysis but the model broke down. In addition, as mentioned above, Olsen (2013) found that, in the Nordic countries, possessions representing so-called "highbrow culture" capture aspects of background factors important for academic achievement to a larger degree than other indicators. Moreover, this kind of indicator is customarily accepted for the same purpose in studies using data from other well-established large-scale tests like the IEA and PIRLS assessments (Myrberg and Rosén 2006; Yang 2003; Yang Hansen and Munk 2012).

Some reflections on the method

The management of the PISA program is well established and rigorous; thorough methods are used in all phases of the data collection (see OECD 2012b). Estimated reliability of the reading items used in the present study amounts to 0.95 and 0.96 for the Norwegian and Swedish data respectively (OECD 2012b). From the results below it may be argued that the hypothesized model is reasonable, and the fact that it fitted the data well in both countries may be seen as a validation. However, some critical reflections of the method may still be considered.

Even though the indicators for cultural and economic capital taken from the student questionnaire were used in previous studies, they still have limitations. In particular, there may be a need to find indicators suitable for a rapidly changing, contemporary society. To estimate economic capital is, for example, also problematic due to (a) relatively few indicators available and (b) the fact that most of the questions in the questionnaire are adapted to fit all participating countries in the PISA survey. In fairly affluent nations like Norway and Sweden, economic capital indicators must be chosen with care if they are to show variation in the sample.

Moreover, the subsamples of the national PISA samples in Norway and Sweden, used in the present study, was drawn by a special computer program developed by the OECD and it covers all schools selected for the total PISA samples in the two countries. Thus, it is possible to generalize the results to the populations.

Analysis and results

The models were calculated with the Mplus 7 estimation program (Muthén and Muthén 2012). Using the imputation option made it possible to include all five sets of plausible values in the same analysis. The testing of the models was accomplished with the "maximum likelihood estimator with robust standard errors" (MLR), the "two-level complex analysis," and "data imputation."

Below, a baseline model and a hypothesized two-level model are presented before the different steps of the modeling process are accounted for, each under its own subheading. Finally, a summary of the results is given.

In accordance with an oft-used way of labeling variables in SEM (see, e.g., Gustafsson and Stahle 2005) latent variables or factors (i.e., unobservable constructs) are denoted by upper and lower case letters and manifest (i.e., observed) variables by upper-case letters. In this study, to facilitate reading, capitalized lower-case letters in italics are used for latent variables. In figures, manifest variables are illustrated by rectangles and latent variables by ovals. Single arrows, starting at the independent variable, point out one-way relationships, whereas bent arrows with two heads indicate covariance. Variables measured on the student level and used as aggregated school-level variables are marked with the Fig. 2 before their names and so are the school-level factors.

The Baseline model

As mentioned above, the baseline student-level model (see Fig. 1) was adopted from a previous study on the Swedish data conducted within the same project (Rasmusson and Åberg-Bengtsson 2015) and was hypothesized to fit Norwegian data as well.

This model included two ability factors. An *Overall reading* factor assumed to influence all reading performance was related to the three manifest variables corresponding to the three aspects of traditional reading (T_ACCESS, T_INTEGRATE, T_REFLECT) as well as to the variable corresponding to digital reading (DIG_READ). A second factor, *Unique digital reading,* was introduced, nested within the *Overall reading* factor and assumed to underlie digital reading performance. The nested *Unique digital reading* factor was assumed to reflect those abilities unique to digital reading, for example the ability to navigate and handling the web browser and the computer. To accomplish this second factor, related to one manifest variable (DIG_READ) only, the residual in this digital reading variable was used to establish the latent digital-reading factor (*Unique digital reading*). In this baseline model, variation due to gender differences was found to affect not only performance due to the reading factors but also performance of one of the observed aspects (T_INTEGRATE) directly. The gender variable (GEND) was dichotomously coded (boys as 0 and girls as 1).

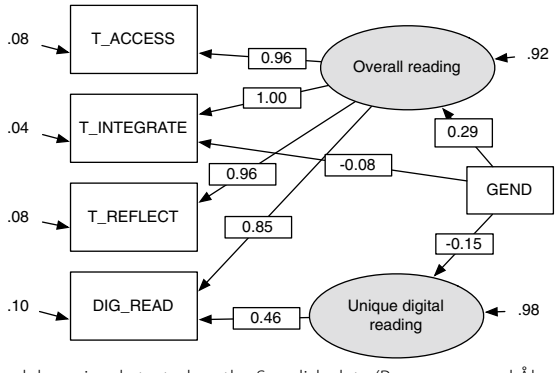

Fig. 1 The baseline model previously tested on the Swedish data (Rasmusson and Åberg-Bengtsson 2015)

The hypothesized model

Confirmatory factor analysis requires an empirical or conceptual foundation to guide the specification of a model. Drawing on previous empirical results and theoretically grounded assumptions, a hypothesized two-level model was posited (see Fig. 2) with point of departure in a baseline model previously identified (Fig. 1).

As Norway and Sweden are rather similar regarding, for example, the educational system, culture, and life conditions, the same hypothesized model was expected to fit the data for both countries.

The student-level part of the model

In the present study it was assumed that two latent factors, *Economic capital* and *Cultural capital*, would influence both overall reading performance and digital reading performance. As presented in Fig. 2, the latent variable *Economic capital* was related to three manifest variables referring to "material" home possessions, namely the number of cell phones (CELL PHONES), cars (CARS), and bathrooms (ROOMS) that the students reported in the questionnaire. The latent variable *Cultural capital* was related to five manifest variables indicating cultural possessions. These concerned whether or not they had classic literature (CLASSICS), books of poetry (POETRY), a piano (PIANO), and art (ART) at home as well as an estimation of the number of books (BOOKS).

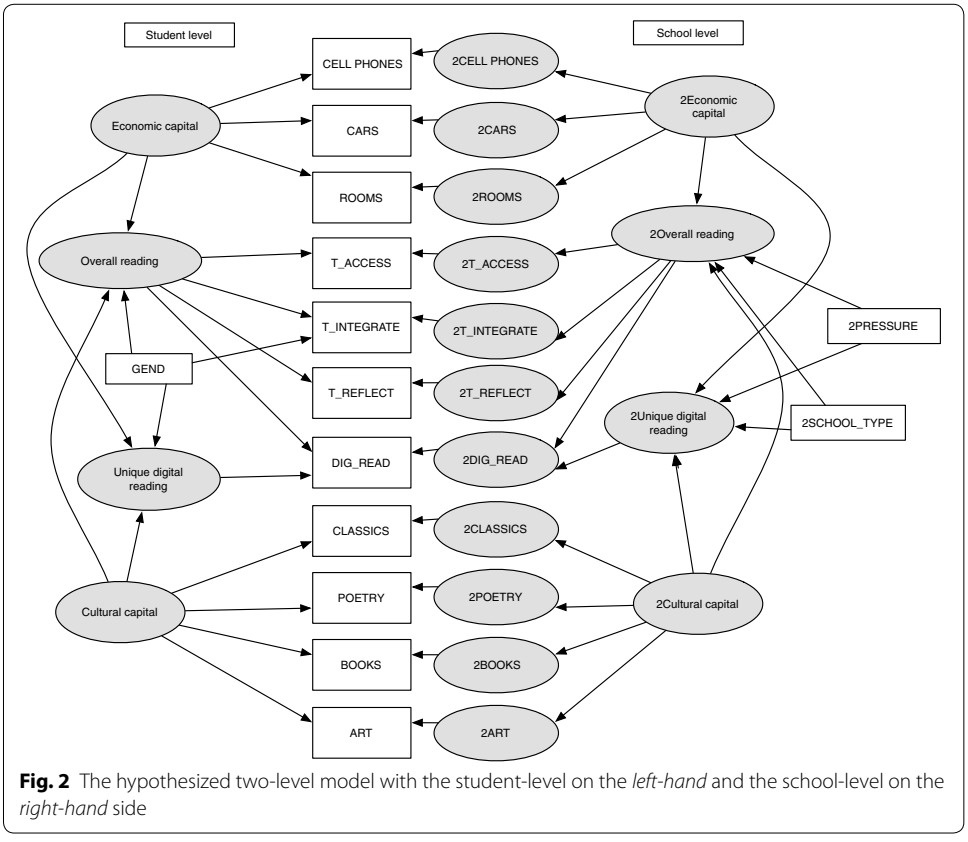

Fig. 2 The hypothesized two-level model with the student-level on the *left-hand* and the school-level on the *right-hand* side

The school-level part of the model

It was hypothesized that the group means of the student-level variables would be possible to identity as aggregated school-level factors corresponding to those at the individual level. Thus, two latent factors, *2Economic capital* and *2Cultural capital,* were assumed to influence both the overall reading performance and the digital reading performance in the school-level model. In addition to this, the two dichotomously coded, manifest variables 2SCHOOL_TYPE (private or public) and 2PRESSURE (much or little pressure from parents on the school), measured only at the school level, were expected to influence the two reading factors *2Overall reading* and *2Unique digital reading* at the school level.

Analyzing the hypothesized model

The analysis was conducted in three distinct steps and the Swedish and Norwegian data were analyzed separately. First, the student-level model was developed and tested with a saturated model specified for the school level. Second, the school-level model was elaborated on with a saturated model specified for the student level. Finally, the full models identified at the student and school levels respectively were combined into a two-level model. In the presentation of the results below, each of these steps will be presented under its own heading.

The student-level model

The baseline model presented in Fig. 1 was first set up and tested. It rendered satisfying fit indices for both the Swedish data [χ^2 (3) = 11.93, RMSEA = 0.04, CFI = 0.99, and TLI = 0.99] and for the Norwegian data [χ^2 (3) = 19.68, RMSEA = 0.05, CFI = 0.99, and TLI = 0.98]. The estimates were almost identical to those presented in Fig. 3 for the part included in the baseline model. It is noteworthy that the gender difference in digital reading in favor of boys was insignificant for Norway, whereas the Swedish boys performed significantly better than the Swedish girls in this nested factor. In all of the student-level models, a saturated model was set up for the school level, that is to say, the variables on the school level not used in the student level models were set to co-vary.

Next, two measurement models for the *Economic capital* and *Cultural capital* parts of the hypothesized student-level model were posited and tested. First, the three observed variables (CELL PHONES, CARS, ROOMS) were set to load on the factor *Economic capital*. The factor loadings for both countries ranged from 0.30 to 0.61 and the fit indices showed good fit: χ^2 (0) = 0.00 for Sweden and χ^2 (0) = 0.27 for Norway and for both countries: RMSEA = 0.00, CFI = 0.99, and TLI = 0.99. Second, the latent factor *Cultural capital* was related to the four manifest variables, CLASSICS, POETRY, BOOKS, and ART and the factor loadings ranged from 0.50 to 0.75. The fit indices for the Swedish data were good: χ^2 (2) = 1.62, RMSEA = 0.00, CFI = 1.00, and TLI = 1.00 whereas the Norwegian model did not show equally good fit: χ^2 (2) = 15.81, RMSEA = 0.06, CFI = 0.99, and TLI = 0.92. Third, the two factors, *Economic capital* and *Cultural capital,* were correlated and the relationship was found to be slightly larger for Sweden (0.18) than for Norway (0.15). Thereafter, these capital factors were set to influence the factors *Overall reading* and *Unique digital reading* (see Fig. 3 for factor loadings). This expanded model showed good fits for both the Swedish data

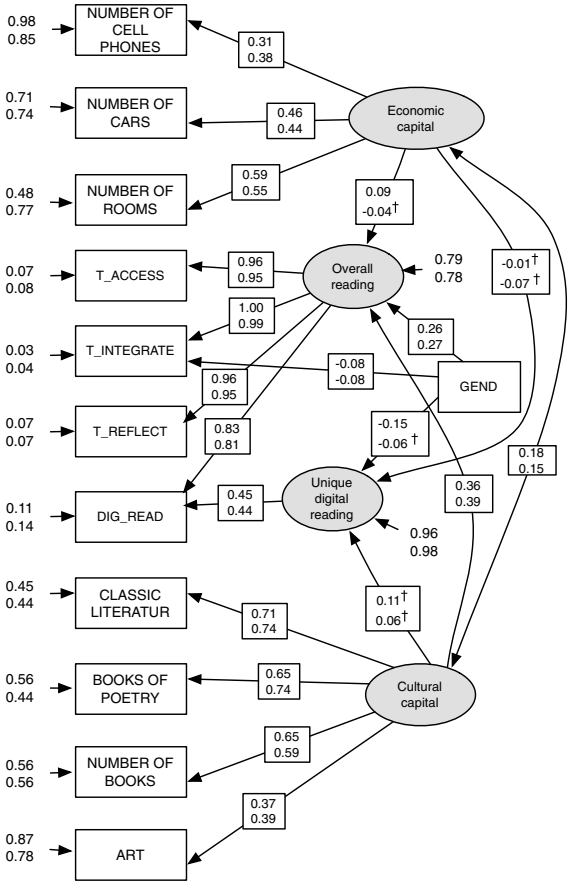

Fig. 3 The student-level part of the two-level four-factor model. The Norwegian estimates are placed *below* the Swedish estimates. A *dagger* indicates a non-significant value

[$\chi^2(45) = 184.97$, RMSEA = 0.04, CFI = 0.99, and TLI = 0.96] and for the Norwegian data [χ^2 (45) = 231.12, RMSEA = 0.05, CFI = 0.98, and TLI = 0.94].

In sum, the results on the student level show that, in both countries, cultural capital influenced overall reading performance but not digital reading performance when overall reading performance was accounted for. The two countries differed with regard to the economic capital factor's influence on overall reading, where a small influence was found for Sweden but no significant influence was found for Norway. No significant relation was found between economic capital and the nested digital reading factor in either of the countries.

The school-level model

The measurement models

First a school-level baseline model for the two reading factors *2Overall reading* and *2Unique digital reading* was specified and tested [Sweden: $\chi^2(30) = 217.35$, RMSEA = 0.06, CFI = 0.98, and TLI = 0.92; Norway: $\chi^2(30) = 106{,}86$, RMSEA = 0.04, CFI = 0.99, and TLI = 0.96]. The factor loadings ranged from 0.5 to 0.9. The countries differed in that a much smaller loading of 2DIG_READ on *2Overall reading* was found in the Norwegian data than in the Swedish data (viz., 0.55 and 0.89 respectively). The

reverse pattern occurred for the loading of 2DIG_READ on *2Unique digital reading*, which was 0.49 for Sweden and 0.83 for Norway.

Thereafter, the hypothesized factors at the school level, *2Economic capital* and *2Cultural capital,* were tested in two separate measurement models, in which the indicators used in the models were aggregated group means of lower-level student variables. The analysis of the measurement model for *2Economic capital* did not converge and thus broke down for both countries. The measurement model for *2Cultural capital* rendered a rather poor fit for the Swedish model [$\chi^2(29) = 251.41$, RMSEA = 0.06, CFI = 0.98, and TLI = 0.90] and a good fit for the Norwegian model [$\chi^2(29) = 85.70$, RMSEA = 0.03, CFI = 0.99, and TLI = 0.97]. The Norwegian measurement model for cultural capital rendered a good fit, but the indicator 2BOOKS did not load on the factor *2Cultural capital*. The Swedish measurement model for cultural capital rendered a rather poor fit, and the indicator 2ART did not load on the factor *2Cultural capital*.

In all of the school-level models described, a saturated model was set up for the student level, that is to say, the variables on the student level that were not used in the measurement model were set to co-vary.

Testing cultural capital with the reading-factor model

The factor *2Cultural capital* was set to influence the reading-factor model described above. The analysis for Sweden rendered a poor fit (RMSEA = 0.07) as well as insignificant relations between factors, and although the analysis for Norway rendered a good fit (RMSEA = 0.03) it gave statistically insignificant estimates. Thus this relationship was disregarded in the subsequent modeling. A general capital factor, containing the indicators used in the economic capital factor together with those used in the cultural capital factor, was also tested. However, although the fit estimates were good (Norway: RMSE = 0.03 and Sweden: RMSEA = 0.04), the model with this general capital factor did not give significant estimates and was thus not included in the further analysis.

Testing type of school in the model

The manifest variable 2SCHOOL_TYPE is observed at the school level only. It indicates whether a school is public or private. The variable was set to influence the two school-level factors *2Overall reading* and *2Unique digital reading*. In this computation, all of the other manifest variables on the school level, as well as those on the student level, were set to co-vary. This model rendered a rather poor fit for Sweden and an acceptable fit for Norway [Sweden: $\chi^2(40) = 204.19$, RMSEA = 0.05; CFI = 0.98, and TLI = 0.94; Norway: $\chi^2(40) = 302.44$, RMSEA = 0.06; CFI = 0.97, and TLI = 0.91]. The Norwegian model showed no effect of school type on either of the two reading factors, whereas it had a significant effect of 0.35 on *2Overall reading* but not on *2Unique digital reading* for Sweden. This implies that the overall reading literacy in the Swedish private schools was somewhat better than in public schools, while there was no difference between schools in digital reading in either of the countries.

Testing parental pressure in the model

The school-level manifest dummy variable 2PRESSURE measures parental pressure on the school as perceived by the principal. The variable was tested in the model and was

set to influence the two reading factors. As in the previous model all other manifest variables on the school level, as well as those on the student level, were set to co-vary. Fit indices were acceptable [Sweden: $\chi^2(41) = 213.57$, RMSEA = 0.05, CFI = 0.98, and TLI = 0.94; Norway: $\chi^2(41) = 152.99$, RMSEA = 0.04, CFI = 0.99, and TLI = 0.96]. The effect of 2PRESSURE on the *2Overall reading* factor in the Norwegian model was substantial (0.60) whereas no such effect was found in the Swedish results. No significant influence on the digital reading factor in the two countries was found. For Norway, the amount of parental pressure affected the overall reading but not the digital reading on the school level; no such effect was found in the Swedish data.

Merging the school-level models

The manifest independent variables 2PRESSURE and 2SCHOOL_TYPE were set to influence the two reading factors *2Overall reading* and *2Unique digital reading*. The fit indices were better for the Swedish model than for the Norwegian model [Sweden: $\chi^2(51) = 216.15$, RMSEA = 0.04, CFI = 0.98, and TLI = 0.95; Norway: $\chi^2(51) = 351.39$, RMSEA = 0.06, CFI = 0.97, and TLI = 0.91]. As in the two separate models above, the manifest variable school type had an effect on the overall reading factor in the Swedish data on the school level but not on the factor in the Norwegian data. The variable PRESSURE influenced the overall reading factor for Norway but had no effect in the Swedish model. Neither PRESSURE nor SCHOOL TYPE influenced the factor *2Unique digital reading* in either of the two countries.

Specifying the full two-level model

In the final step, the student-level model and the school-level model were combined into a single two-level model (Fig. 4). The model fitted the data well in both countries [Sweden: $\chi^2(96) = 334.82$, RMSEA = 0.04, CFI = 0.98, and TLI = 0.96; Norway: $\chi^2(96) = 445.37$, RMSEA = 0.04, CFI = 0.96, and TLI = 0.95]. At both levels the factor loadings were, on the whole, similar for the two countries. However, one distinct exception occurred on the school level, where the Norwegian and Swedish reading factors related to the 2DIG_READ variable differed considerably. While there was a substantial factor loading on *2Unique digital reading* and a smaller loading on *2Overall reading* in the Norwegian model, the reverse pattern was found in the Swedish model. Thus, a larger part of the school-level variance in the indicator 2DIG_READ was explained by the *2Overall reading* factor in the Swedish than in the Norwegian data, whereas the opposite was the case with respect to the *2Unique digital reading* factor. This means that Norwegian schools differ more than Swedish schools in the unique ability represented by the factor *2Unique digital reading*.

In addition, it could be mentioned that on the student level, the Swedish boys performed better than the Swedish girls in the particular aspects of digital reading represented by the nested factor, *Unique digital reading*, whereas no such gender difference was found for the Norwegian students.

Summary of the results

The student-level model, previously identified for the Swedish data (Rasmusson and Åberg-Bengtsson 2015), was verified for the Norwegian data and then used as the

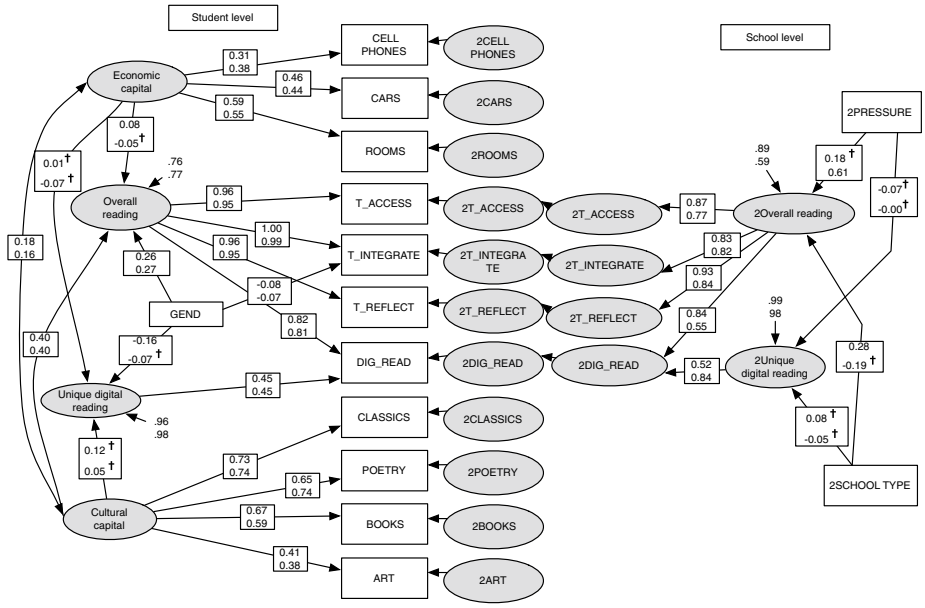

Fig. 4 The final two-level model with the student-level model on the *left-hand* and the school-level model is on the *right-hand side*. Norwegian estimates are placed *below* the Swedish estimates. A *dagger* indicates a non-significant value

baseline model in the present analysis for both countries. The factor loadings on the student level were almost identical for Norway and Sweden with one exception. There was no gender difference found in the nested *Unique digital reading* factor in the Norwegian case corresponding to the relative better performance in favor of boys for Sweden.

With respect to the purpose of the present study, namely to investigate the influence of background factors on student and school differences in Norwegian and Swedish education with regard to reading performance with a particular focus on digital reading, the capital factors were found on the student level for both the Swedish and the Norwegian sample, while on the school level none of the capital factors were possible to identify in the present data. A significant relationship was found between cultural capital and the *Overall reading* factor on the student level for both countries, whereas economic capital did not influence any of the reading factors for Norway and had only a small influence on *Overall reading* for Sweden.

On the school level, the hypothesized nested digital reading factor, *2Unique digital reading,* was identified for both Norway and Sweden, which means a remaining difference between schools regarding digital reading achievement when overall reading was accounted for. For Norway, parental pressure had a substantial effect on the *Overall reading* factor on school level, while no such effect was found for Sweden. For Sweden, however, school type was related to the *Overall reading* factor on school level, a relationship that did not exist in the Norwegian data.

Discussion

According to Bourdieu (1986), the educational system contributes to preserving the existing power relations in society in favor of those having a background rich in symbolic

capital in general and cultural capital in particular. Furthermore, Bourdieu maintained that most official policies state that education should give equal opportunities to everyone. Thus, when OECD (2012a) points out that the equity aspect of education is a topic of constant interest in many countries, this is in line with Bourdieu's conclusion. Such an interest in equity aspects in education turns out to be the case also in Norway and Sweden (see, e.g., Katalys 2013; Lyster 2007).

In contemporary society, technological development has contributed to a change in reading habits, and the reading of digital texts has become a prevalent activity as both an alternative and a supplement to reading on paper. Thus, equity in education is important with regard to both traditional reading and digital reading. This is, however, a domain that still lacks research. The current study investigated the influence of background factors on reading performance with a focus on digital reading on both the individual student level and on the collective school level. Hereinafter, in the subsequent reflections on the results, the concept "digital reading" will refer to the unique abilities represented by the nested digital reading factor when overall reading is accounted for, which is in accordance with how the construct is used in the structural equation modeling above.

Interestingly, on the student level, the results presented above show no influence of the cultural and economic capital factors on students' digital reading performance. On the school level, the models including cultural and economic capital factors gave insignificant relationships and were thus excluded in the further analysis, while the addition of the manifest variables "parental pressure" and "school type" rendered interpretable models. When, consequently, none of the capital factors were included, these two variables may be interpreted as reflecting the cultural capital of the family, in line with Broady's (1990) interpretation of Bourdieu, that parents from the dominating layers of society want to make certain that their offspring increase their cultural capital and that this is partly accomplished by assuring a high-quality education.

The type of school and parental pressure variables did not influence the school-level digital-reading factor. The lack of influence of these background measures on digital reading performance, on the student as well as the school level, may be a sign that digital reading is less valued than traditional reading in the light of cultural capital standards. In other words, digital reading may not belong to the activities and artifacts representing a desirable cultural capital in contemporary society in Norway and Sweden. Bourdieu claims that only resources recognized as possessing respect and prestige are important to preserve and maintain in order for people having symbolic power to protect their positions in the dynamic system of relations termed as the "field" by Bourdieu (Broady 1990; Bunar 2001). Digital reading is a fairly new phenomenon and one can only speculate on whether it will be included in the range of resources that define cultural capital in the future. However, symbolic and cultural capitals are relational (Bourdieu 1986; Broady 1990) and social groups of tomorrow, rich in symbolic power, may very well recognize this aspect of reading as important. The Internet has given more people better opportunities to reach out with their opinions, messages, and information, and this new forum may be predicted to become of increasing importance as a mediating tool in the struggle of power in social relations. Control of the instruments used to select who will get a position within a field, and who will not, is crucial in social power relations according to Bourdieu (1986).

On the student level, an effect of cultural capital on overall reading performance was found, as expected, for both Norway and Sweden. These results are in line with Bourdieu's theory, as the students who reported being rich in cultural capital are performing better than those reporting less cultural capital, and are in addition supported by a substantial body of previous studies (e.g., Damber et al. 2012; Yang 2003). With respect to overall reading performance, the educational systems in Norway and Sweden may very well, interpreted from the view of Bourdieu's theory, contribute to reproduce the relations in the social world. It may be argued that cultural capital, as measured in the present study, is an indicator of an underlying construct representing a home environment rich in literacy activities and with good access to reading materials, among other things (see, e.g., Sénéchal and LeFevre 2002; Rowe 2008; Willms 1999). When background factors, such as cultural capital of the family, influence academic performance, this is a nonfulfillment of the goal stated by, for example, OECD (2012a) of giving all students the same opportunities in school.

In the current results, economic capital had an effect neither on students' overall reading nor on their digital reading performance for Norway. For Sweden, a small influence on the overall reading performance for Sweden was found. This is in line with Bourdieu's findings (1974) that differences in economic capital are of less importance for educational outcomes than differences in cultural capital. The difference between Norway and Sweden, regarding the influence of economic capital, could tentatively be ascribed to the fact that the correlation between cultural and economic capital is slightly higher for Sweden. In turn, this might be related to the significantly improved economy for Norway during the last decades (The National Mediation Office in Sweden 2013) and would thus explain the weaker relationship between economic wealth and cultural capital in Norway. That is to say, being rich in economic capital in Norway may not be related to education and other cultural indicators to the same degree as in Sweden. A possible limitation of the factor for economic capital is a ceiling effect in the variable CELL PHONES as 96 % of the students in both countries had three or more cell phones at home. However, the other two variables loading on economic capital, CARS and ROOMS, have a larger variance; thus, the factor may be assumed to catch the underlying construct to a reasonable extent.

Further, on the school level, the results showed an influence of parental pressure for Norway and of school type for Sweden on the overall reading factor. This may be interpreted as parents displaying their cultural capital in being active in choice of school for their children (as in the Swedish case) or in being active, engaged in, and exerting pressure on their children's school (as in the Norwegian case). The results most likely are two different expressions of the same phenomenon. In Norway, the curriculum proposes cooperation between parents and schools; in line with what Bakken and Elstad (2012) found, that may contribute to inequalities due to varying possibilities among parents to engage in their children's education. Similarly, in Sweden the results can be seen as a possible effect on differences between school performance due to the free school choice, in accordance with, for example, Myrberg and Rosén's (2006) results.

A final reflection

Bourdieu's theory is not optimistic regarding equity in education, because it is relational and the mechanisms for selecting those who get important positions in a field is changing and adjusts if there is inflation in, for example, higher education. When higher education becomes available for more people it will devalue (Bourdieu 1980): "Un titre qui devient plus fréquent est par là même dévalué, mais il perd encore de sa valeur parce qu'il devient accessible à des gens 'sans valeur sociale'" (p. 4). The present study indicates that there is still a considerable influence of background factors on students' reading performance in both Norwegian and Swedish education and that the school systems, to a great certain extent, still lack the desirable leveling effect.

However, in spite of his rather depressing pronouncement, Bourdieu and Passeron (1964) also gave a gleam of hope when stating that an educational system could potentially have a leveling effect and give more equal opportunities to all students. After all, there are forces acting towards more equity in education both in the Nordic and other OECD countries. A recent report from OECD (2012a) identifies and aims at eliminating system-level obstacles to equity, to give one example. It recommends, among other things, that national educational policy makers remove grade repetition, avoid early tracking, and manage school choice to avoid segregation.

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Competing interests
The author declares that she has no competing interests.

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