Equity in Education

The Relevance of Home Language, Home Culture,
and School Belonging in Reading Achievement
Evidence from the Norwegian PIRLS 2016

by

Olaug Strand

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List of Abbreviations Used

EER	Educational Effectiveness Research
IDB	International Database Analyzer
IEA	International Association for the Evaluation of Educational Achievement
ILSA	International Large-Scale Assessment
JRR	Jackknife Repeated Replication
MI	Multiple Imputation
ML	Maximum Likelihood
MR	Multiple Regression
OECD	Organization for Economic Co-operation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Reading Literacy Study
SEM	Structural Equation Model
SES	Socioeconomic Status
SDG	Sustainable Development Goal
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific, and Cultural Organization

Preface

I truly believe that unfairness and the lack of equal opportunities in education are there to be broken. For many years, I was a teacher of young immigrant students. Many of them had come to Norway as unaccompanied refugees. They were on their own, with no possessions and no family around them. My job then was to teach these young people the Norwegian language as well as to help them adjust to the Norwegian school system and get on in the Norwegian society. I soon found out that these young people were nothing like what I had expected. They were strong, resilient, and full of ambitions and dreams. I quickly realized that the most important part of my job was to show them what opportunities they had, to plant a seed that would one day grow into a strong and distinctive plant. Children, no matter their circumstances or backgrounds, deserve an education system that will encourage their abilities, show them their opportunities, and help them reach their potential. This thesis is for all my former students. I want you to know that I still see you!

My main supervisor and co-author, Professor Åse Kari Hansen Wagner: thank you for guiding me through the second half of the project. Your positivity and support have been vital. Your excellence in text writing and your willingness to read my texts and ask critical questions—repeatedly—have been invaluable to me.

My co-supervisor and co-author, Professor Maria Therese Jensen: thank you for all your statistical and psychometric advice. Thank you for struggling your way through my texts and for never losing your spirit and optimism.

My first supervisor, Professor Egil Gabrielsen, who guided me through the first half of the project and without whom this thesis would never have come into being: thank you for being so calm and for believing in my project from the very beginning. The scientific

Summary

Under the United Nations' Incheon Declaration for Education 2030, Norway has committed itself to working toward Sustainable Development Goal number 4: *ensuring inclusive and equitable quality education and promoting lifelong opportunities for all* (United Nations, 2015). The findings of the present thesis add to our current knowledge of progress toward equity in education with regard to reading literacy. In addition, this thesis highlights the need to draw a more nuanced picture of the diverse student group to be found in 21st century classrooms; this may have implications for national education policy.

The Norwegian classrooms of the early 21st century are characterized by linguistic, cultural, and socioeconomic diversity. It is vital to know how such diversity affects equity in education with regard to reading literacy, so that we will be able to assess progress in students' reading achievement, find research-based solutions to promote equity in education, and close achievement gaps. The purpose of the work underpinning the present thesis was to gain increased knowledge about equity in education as reflected in scores on The Progress in International Reading Literacy (PIRLS) intended to measure reading comprehension in ten-year-olds. The notion of educational equity in this thesis is grounded in the framework set out by the Organization for Economic Co-operation and Development (OECD) in the Programme for International Study Assessment (PISA) (OECD, 2018) and by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the *Handbook of Measuring Equity in Education* (UNESCO UIS, 2018). Thus, this thesis considers the notion that associations between the cultural aspect of students' socioeconomic background, students' home language and students' reading achievement represent to some degree inequity in the education system.

The main theoretical perspectives applied were taken from Cultural Reproduction Theory and Literacy Theory. The data used derive

from the Norwegian PIRLS 2016 assessment, which has a cross-sectional design. The sample consisted of 4,232 fifth-graders (mean age 10.8 years) from 150 schools and 215 classrooms. The work conducted, was spread across four papers. Three aims were developed to guide the work: (1) to investigate the associations between students' home language, the cultural aspect of their family's SES, and their reading achievement; (2) to investigate the direct and indirect associations between students' home language, parents' education, students' sense of school belonging and reading achievement, and; (3) to investigate the direct and indirect associations between students' home language, parents' education, parents' academic expectations, parents' help with homework and reading achievement.

This thesis contributes to the existing body of reading literacy research in three ways. First, while quite substantial research on equity in education has been carried out in relation to older students in Norway, very few studies have investigated equity with regard to reading literacy in primary school. Findings from all four studies provide evidence that, even as early as in the fifth grade, students' reading achievement is associated to some extent with the cultural aspect of their SES and with how often they speak Norwegian at home, both as between students within schools and as between schools. This finding indicates the presence of inequity in students' outcome due to differences in SES and language backgrounds. However, the surprising thing about this finding is not that it corroborates the existence of these relationships (as this is in line with a massive body of research across countries and education systems), but rather in the small measurement sizes of these associations. In particular, the association between how often the students speak Norwegian at home and their levels of reading achievement was surprisingly weak.

Second, while papers 1 and 2 revolve around achievement differences in reading using the SES–achievement and language minority–achievement relationships as indicators of educational equity, Papers 3 and 4 investigated factors that may influence these

relationships. This is important because, in order to promote educational equity, these relationships must be weakened. In Paper 3, students' sense of school belonging was treated as a mediator variable through which the influence of students' home language and parents' education on reading achievement was considered to pass. Results revealed that the present data could not substantiate the assumption that students' sense of school belonging—a priority field in Norwegian education policy—can compensate effectively for possible achievement gaps in reading.

Third, while most of the extant research has been concerned with establishing that parental involvement has an impact on academic outcomes in general, and on reading achievement in particular, less effort has been devoted to establishing this relationship in the context of educational equity. Paper 4 links these associations to educational equity by testing the *optimism hypothesis* which assumes that in some immigrant families—and more frequently than in Norwegian native families—there exists an "extra educational drive". More specifically, immigrant parents have stronger educational aspirations for their children compared to non-immigrant parents and are often eager to help their children succeed academically by involving themselves in their children's schoolwork. In Paper 4, two types of parental involvement were investigated: parental academic expectations and parents' help with homework. The rationale behind studying this connection was that if some ethnic groups manage particularly well in the education system because of strong parental educational aspirations, it is reasonable to assume that this link may result in important implications on how to strengthen educational equity and reduce achievement gaps in reading.

The results revealed significant and positive direct and indirect associations from parents' education and students' home language via parents' academic expectations to reading achievement. By contrast, parents' help with homework was negatively associated both with parents' level of education and with students' reading achievement, although no statistically significant relationship was found between parents' help with homework and students' home language. Thus, the

data provided evidence that only partly supports the optimism hypothesis and suggest some degree of educational inequity with regard to reading literacy.

List of Papers

1. Strand, O., Wagner, Å.K.H., & Foldnes, N. (2017). Flerspråklige elevers leseresultater [Multilingual students' reading scores]. In E. Gabrielsen (Ed.), *Klar framgang! Leseferdighet på 4. og 5. trinn i et femtemårsperspektiv* [Clear progress! Reading skill in the fourth and fifth grades from a 15-year perspective] (pp. 75–95). Oslo: Universitetsforlaget.
2. Strand, O., & Schwippert, K. (2019). The impact of Home Language and Home Resources on Reading Achievement in ten-year-olds in Norway; PIRLS 2016. *Nordic Journal of Literacy Research*, 5(1), 1-17. https://doi.org/10.23865/njlr.v5.1260
3. Strand, O., & Jensen, T.M. (2021). The Interplay between Home Language, Parental Education, School Belonging and Reading Achievement in Norwegian PIRLS 2016. Submitted to *Social Psychology of Education*.
4. Strand, O. (2021). Parents' Academic Expectations and Parents' Help with Homework as Mediating Factors of Parents' Education and Students' Home Language on Students' Reading Achievement in Norway. Submitted to *Scandinavian Journal of Educational Research*.

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1   Introduction

In its 2015 Incheon Declaration for Education 2030, the United Nations (UN) set an ambitious goal for the next fifteen years. That goal was subsequently sanctioned as the UN's Sustainable Development Goal number 4 (SDG 4), according to which the UN member states will strive to *ensure inclusive and equitable quality education and promote lifelong opportunities for all* (United Nations, 2015, p. 7). For the first time in history, equity was placed at the heart of the international education agenda. Why? Because human mobility across borders has never been greater, and nor have the social and economic gaps between people (UNESCO, 2018). Promoting equity in education has never been harder, yet it is more urgent than ever before (OECD, 2018; United Nations, 2015). Hence, finding research-based solutions to promote equity in education and to close the achievement gaps in academic outcomes remains one of the pressing worldwide challenges of the 21st-century education sector (Frønes et al., 2020a; Holsinger & Jacob, 2008; Marks, 2014; OECD, 2018, 2019; Schleicher, 2018; United Nations, 2015). What the present thesis shows in this context is that the Progress in International Reading Literacy Study (PIRLS) can serve as a tool to monitor individual countries' progress toward SDG 4.

The attempts made in the present thesis to define the concept of "equity" draw on the theoretical notions of "fairness" and "inclusion" (Espinoza, 2007; Rawls, 1971) as well as "equality of educational opportunity" (Berne & Stiefel, 1984). These principles are implemented in the definitions and measures of equity in education used by key international large-scale assessments (ILSAs) such as PIRLS and the Program for International Student Assessment (PISA) (Field et al., 2007; Mullis & Martin, 2015; OECD, 2018; UNESCO & IEA, 2017). According to the most recent definition—that used in the international PISA 2018 report—equity in education prevails when "differences in students' outcomes are unrelated to their background or to

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socioeconomic and social circumstances over which students have no control" (OECD, 2018, p. 13). On this view, educational systems with high levels of equity are those characterized by small achievement gaps between students irrespective of their origin, gender, or social, cultural, or economic background (Blossing et al., 2014; Strietholt, 2014). Drawing on these perspectives, equity in education with regard to reading literacy is studied in this thesis by investigating the extent to which students' reading achievement was associated with their home language, here defined as how often they claimed to speak Norwegian at home, and the cultural dimension of their socioeconomic status (SES), as well as the ways in which these factors interacted with the students' sense of school belonging and their parents' level of involvement in their children's schoolwork.

Reading Literacy was deemed to be a particularly appropriate subject to be studied from the perspective of educational equity because reading literacy is one of the most important abilities that students acquire as they progress through their early school years. Reading is a key skill—for example, it is one of the five core elements (alongside writing, numeracy, oral skills, and digital skills) in the Norwegian national curriculum for compulsory school (grades 1–10) (Norwegian Directorate for Education and Training, 2017), and it is vital not only for achievement in all school subjects (Kern & Friedman, 2008; Perfetti & Curtis, 1986) but also for lifelong academic learning (Butler et al., 1985; Lonigan et al., 2000; Sénéchal & LeFevre, 2006). In the longer run, a person's reading ability will affect multiple areas of his or her life, including job opportunities and the ability to participate in society (Buckingham et al., 2013; Bynner & Parsons, 2010; Cunningham & Stanovich, 1998).

1.1 Purpose and Research Questions

The purpose of this thesis is to show how PIRLS can provide additional knowledge about equity in education with regard to reading literacy in a Norwegian school context. This is done by investigating, first, to what extent students' background characteristics: how often the students claimed to speak the language of the PIRLS test–Norwegian–at home (their home language) and the cultural aspect of their family's SES (measured as parents' level of education and the number of books found in the student's home) are related to reading achievement, and, second, how these factors relate to students' sense of school belonging and to parents' academic expectations and parents' help with homework.[1] By definition, equity is greater when the association between students' background characteristics and reading achievement is weaker. Hence the strength of the associations between students' background characteristics and their reading achievement gives an indication of the level of educational equity obtaining with respect to reading achievement.

Three research questions were developed to guide the work underpinning the thesis:

1. What are the associations between students' home language, the cultural aspect of their family's SES, and their reading achievement?
2. What are the direct and indirect associations between students' home language, parents' education, students' sense of school belonging and reading achievement?

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[1]Gender differences in reading achievement was reported in Study 1 and gender was included as a control variable in Study 2. Although gender differences in educational outcomes are a matter of considerable concern within the context of educational equity, the performance differences between boys and girls are not addressed in the present thesis. The reason for this is that gender inequality in education represent a different theoretical framework than the achievement differences related to students' home language, and home culture–which were the scope of this thesis.

3. What are the direct and indirect associations between students' home language, parents' education, parents' academic expectations, parents' help with homework and reading achievement?

Based on data from the Norwegian PIRLS 2016 assessment (n = 4,232 fifth-graders), four empirical studies were conducted to address the research questions.

1.2 Overview of the Papers

The investigation of educational equity with regards to reading literacy presented in the four articles that make up the main body of the present thesis was carried out using a sequential approach in which later articles draw upon statistical findings made in earlier ones. Article 1, which was part of the national Norwegian report on PIRLS 2016,[2] serves as an introduction to the main objective of the thesis, and also as a first introduction to the data. Hence Article 1 can be seen as a preliminary analysis paving the way for the subsequent Articles 2, 3, and 4. Article 2 then, investigates the relative contributions to the impact on students' reading achievement of their home language, their gender, and three different indicators of the cultural dimension of their family's SES: their parents' level of education, the number of books in their homes, and the accessibility of digital devices in those homes. Both Article 1 and Article 2 address the first research question and prove the statistical relationship between Norwegian fifth-graders' home language, the cultural dimension of their family's SES, and their reading achievement. Article 3 builds on this finding and addresses the second research question by investigating direct and indirect associations of students' home language and their parents' level of education through school belonging on reading achievement. The rationale for investigating students' sense of school belonging was that school factors that may contribute to promote students' opportunities to obtain educational equity must be identified.

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[2] This also explains why this paper was written in Norwegian rather than English.

Moreover, students' sense of school belonging was found particularly relevant to investigate because the Norwegian educational authorities have in the last decades launched several educational action plans focusing on students' well-being, including students' sense of school belonging as a means for social equalizing in elementary school (Meld. St. 19 (2014-2015); Meld.St. 6 (2019-2020); Meld.St. 16 (2006-2007)).

Finally, Article 4 addresses the third research question by investigating the direct and indirect associations between students' home language, parents' education, parents' academic expectations and help with homework and reading achievement. The rationale for focusing on parents' academic expectations and help with homework as indicators of parental involvement was firstly to investigate parental involvement in the context of equity. While parental involvement in general represents one of the most extensively studied aspects of schooling and instruction (Boonk et al., 2018; Buckingham et al., 2013; Hattie, 2009; Shute et al., 2011; Wilder, 2014), less effort has been made to establish this relation in the context of educational equity. Secondly, since the mid 90ties, researchers from a variety of fields have noted a paradox in Norwegian school contexts: immigrants' descendants often achieve higher educational attainment and educational degrees even if their families are of SES (Bakken, 2003; Bakken et al., 2016; Bakken & Hyggen, 2018; Hermansen, 2016; Kindt, 2017; Lauglo, 1996, 1999; Steinkellner, 2017). The optimistic hypothesis (Bakken, 2003) assumes that in some immigrant families–and more frequently than in native Norwegian families–immigrant parents' will have high academic expectations for their children, and they are eager to help their children succeed academically by involving themselves in their child's schoolwork (Bakken, 2003; Bakken & Hyggen, 2018). Therefore, a second aim in article 4 was to test the optimistic hypothesis.

An overview—including research questions and hypotheses addressed, data and statistical methods used, and main findings—of the papers making up the main body of the present thesis is presented in

Table 1

Overview of the papers included in the present thesis.

Paper 1	Strand, O., Wagner, Å.K.H., & Foldnes, N. (2017). Flerspråklige elevers leseresultater [Multilingual students' reading scores]. In E. Gabrielsen (Ed.), *Klar framgang! Leseferdighet på 4. og 5. trinn i et femtemårsperspektiv* [Clear progress! Reading skill in the fourth and fifth grades from a 15-year perspective] (pp. 75–95). Oslo: Universitetsforlaget.
Research questions (Here translated into English from the original language Norwegian)	(1) What does the PIRLS 2016 assessment tell us about discrepancies in reading achievement between multilingual and monolingual students? (2) How are students' home language and their social background associated with their levels of reading achievement?
Data	PIRLS 2016 data: Norwegian fifth-graders (mean age: 10.8 years), n = 4,232; Norwegian fourth-graders (mean age: 9.8 years), n = 4,354.
Statistical methods	Descriptive statistics, Linear regression analysis. The analysis was conducted on student level.
Main findings	– Multilingual students (5th and 4th grades), on average, have a significantly lower reading achievement in PIRLS 2016 than monolingual students. – The reading achievement of both monolingual and multilingual students, in both grades, was better in the Norwegian 2016 cycle than it was in the previous cycles in 2001, 2006, and 2011. – The differences in reading achievement between multilingual students and monolingual students were statistically significant, albeit small, after controlling for gender, number of books at home, and parents' level of education.

Paper 2	Strand, O. & Schwippert, K. (2019). The impact of Home Language and Home Resources on Reading Achievement in ten-year-olds in Norway; PIRLS 2016. *Nordic Journal of Literacy Research*, 5(1), 1-17. https://doi.org/10.23865/njlr.v5.1260
Research question	What are the relations between home language, resources for learning to read available in the home, and reading achievement?
Data	PIRLS 2016 data: Norwegian fifth-graders (mean age: 10.8 years), n = 4,232.
Statistical method	Hierarchical regression analysis The analysis was conducted on student level.
Main findings	– Home resources for learning to read (measured by the number of books in the students' homes, their parents' level of education, and the presence of digital devices in the students' home) exert a stronger impact on reading achievement than does students' home language, but the association between students' home language and their reading achievement is also statistically significant after controlling for all other variables, including gender. – The regression model used revealed that 12.2% ($R^2 = .122$) of the variance in reading achievement was explained by the independent variables in the model. Only 1% was explained by how often the students speak Norwegian at home.

Paper 3	Strand, O. & Jensen, T. M. (2021). The Interplay between Home Language, Parental Education, School Belonging and Reading Achievement in Norwegian PIRLS 2016. Submitted to *Social Psychology of Education*.
Data	PIRLS 2016 data: Norwegian fifth-graders (mean age: 10.8 years), n = 4,232.
Hypotheses	1: a) Students' home language (how often they speak Norwegian at home) is negatively related to reading achievement[3] b) parents' educational level is positively related to students reading achievement. 2: a) parents' educational level is positively related to students' sense of school belonging, b) students' home language is negatively related to students' sense of school belonging, and c) students' sense of school belonging is positively associated with students' reading achievement. 3: Parents' educational level and students home language are indirectly related to reading achievement through school belonging.
Statistical method	Structural equation modeling (SEM) The analysis was conducted on school level.
Main findings	– The associations between students' home language, their parents' level of education, students' sense of school belonging, and their reading achievement was significant in the positive direction. This result demonstrates the presence of inequity in students' reading achievement between schools. – Parents' educational level was significant and positively related to students' sense of school belonging and students' home language was significant and negatively associated with students' sense of school belonging. This indicates that students coming from well-educated homes where Norwegian is the primary spoken language have a higher sense of school belonging compared with their peers who do not come from well-educated homes where Norwegian is the main language. Finally, The indirect association of students' home language and their parents' level of education through school belonging on reading achievement was not statistically significant.

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[3] Higher score on the home language-variable indicates less Norwegian spoken at home.

Paper 4	Strand, O. (2021). Parent's Academic Expectations and Parents' Help with Homework as Mediating Factors of the Associations between Parents' Education and Students' Home Language on Students' Reading Achievement in Norway. Submitted to *Scandinavian Journal of Educational Research*
Data	PIRLS 2016 data: Norwegian fifth-graders (mean age: 10.8 years), n = 4,232.
Research question	What are the direct and indirect associations between students' home language, parents' education, parents' academic expectations, help with homework and reading achievement?
Statistical method	Manifest path analysis The analysis was conducted on student level.
Main findings	– Path analysis revealed significantly and positively direct associations between parents' education, both types of parental involvement and reading achievement. Indirect associations or parents' education, students' home language through parents' education on reading achievement were significant in the positive direction. Direct association in the positive direction between students' home language, parents' academic expectations and reading achievement were found, however, the associations between students' home language and parents' help with homework was non-significant. Thus, the indirect association between students' home language and their reading achievement, running through their parents' help with homework, was not statistically significant. - The findings described above partly supported the *optimism hypothesis* which claims that youth with an immigrant background do better in the Norwegian education system than their family's socioeconomic status would suggest.

1.3 Relevance of the Thesis

Over the past two decades, the proportion of 6–15-year-olds in Norway who have an immigrant background has more than doubled: from 6 percent in 2000 to 16 percent in 2017 (Sandnes, 2017; Steinkellner, 2017). This demographic change has profoundly affected the linguistic and cultural diversity of Norwegian classrooms (Steinkellner, 2017). What is more, this increase in immigration has been accompanied by rising inequality of income (Omholt, 2019). The poverty rate as measured by family income[4] increased from 9.6 percent in 2011 to 11.2 percent in 2017 (Omholt, 2019). Family SES has been empirically linked to a migration background (Van de Werfhorst & Mijs, 2010) in that immigrants and immigrant families more often have a persistently low income. However, it should be noted that poverty is increasing within the ethnic-Norwegian group as well (Omholt, 2019). Substantial social and economic inequalities in a society may be reflected in students' educational outcomes (Goldthorpe, 2014; Ross, 2009), meaning that growing social and economic inequality may yield greater disparities in academic achievement as measured using standardized test scores. School in Norway—and in the other Nordic countries—is based on the concept of *education for all*, and the principles of equity, equal opportunities, and inclusion have been at the heart of education policy for more than a century (Blossing et al., 2014; Telhaug et al., 2006). Hence it is not surprising that concern about growing social differences in educational outcomes has prompted proposals for action in several Norwegian policy documents (Meld.St. 6 (2019-2020); Meld.St. 16 (2006-2007)). One feature common to all of these policy measures is that they seek to help counteract social differences in academic performance by raising the academic level of the weakest students. It is legitimate to conclude that these policy measures reflect the idea that students' home

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[4] The poverty rate is defined as the percentage of families whose total income is less than 60 percent of the average family income in the country over a period of three years (Omholt, 2019).

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background exerts a considerable influence on their academic achievement (Hansen, 2011). Concretely, one underlying assumption seems to be that children from homes with lower socioeconomic backgrounds lack the opportunity to fully develop their innate abilities. This thesis helps to increase our knowledge about how students' social background and students' home language associates with reading achievement, which is obviously needed in order to maximize the impact of such policy measures.

In the context of Nordic and Norwegian educational research, an approach that has been gaining momentum in recent years involves framing large-scale studies such as PISA and the Trends in International Mathematics and Science Study (TIMSS) in an equity perspective (Frønes & Jensen, 2020; Frønes et al., 2020a; Nilsen et al., 2018). Quite a few studies have been carried out on the basis of data from TIMSS and PISA in the context of educational equity (e.g., Gustafsson et al., 2018; Jensen et al., 2020; Mittal et al., 2020; Nilsen et al., 2018; Scherer, 2020), whereas only one study, investigating the impact of parents' own reading on reading achievement in an equity-perspective, was based on PIRLS-data (Støle et al., 2020). To advance our understanding of how students' background characteristics are associated with reading achievement in young children, those studies need to be supplemented by more in-depth studies of equity-related issues based on PIRLS data. The present thesis contributes to this endeavor. In fact, PIRLS not only provides data on reading comprehension in ten-year-olds but also extensive background information about the home and school contexts, obtained through questionnaires distributed to all participating students, their parents/guardians, teachers, and principals. No other study provides such a wealth of comparable reading-literacy data at the primary-school level. Those data can both be used by researchers and help inform educational policy. Gaining more knowledge about equity in the early years of reading education, for example by using PIRLS data, is important not only to ensure that we cover all the years of schooling but also, and perhaps especially, because if difficulties can be detected when students

are younger, interventions can be made earlier and so be more effective. In this context, the present thesis helps to provide knowledge about the average level of reading achievement in young students.

Finally, PIRLS data provide substantial depth when it comes to questions of equity in education with regard to reading and may thus enable important contributions to the measurement of progress toward the UN's SDG 4 (Mullis & Martin, 2015, p. 8; UNESCO & IEA, 2017). The present thesis contributes an in-depth analysis of PIRLS data that can be used to measure progress toward global education targets and used to design national measures in the field of education development. Hence, the conclusions drawn from the findings and implications of this thesis have the potential to inform educational policy internationally and nationally.

2 Definition of Concepts

This chapter begins with a section intended to shed some light on how the terms 'equity' and 'equality' have been conceptualized and studied in relation to reading literacy in educational contexts. Various approaches to measuring equity are discussed, and an account on how equity was defined and interpreted in this thesis is presented (2.1). Then, an outline is given of the definition and operationalization of reading literacy used in PIRLS (2.2), the term Student's home language is defined next (2.3), further a conceptualization of SES is outlined (2.4), followed by a section on the definition of school belonging (2.5), a section defining parental involvement (2.6), and finally a brief overview of the Norwegian school model in the context of educational equity is given (2.7).

2.1 Defining Equity and Equality in Educational Contexts

The terms "equity" and "equality" are sometimes used interchangeably in the context of educational research, which may cause confusion and ambiguity in the research literature (Buchholtz et al., 2020; Espinoza, 2007). This is unfortunate because the implementation of one versus the other may consequently lead to different outcomes for marginalized students (see, e.g., Espinoza, 2007; Holsinger & Jacob, 2008; Wiborg, 2009). In general, the concept of *equality* in education revolves around equal treatment, equal access to resources, and equal educational opportunities (see Espinoza, 2007; Jacob & Holsinger, 2008; Roemer & Trannoy, 2016). More precisely, the core sense of equality is "sameness in treatment," which essentially means that all students enjoy the same conditions, regardless of where they come from or what needs they might have (Espinoza, 2007; Wiborg, 2009). By contrast, *equity* in education takes such individual circumstances and needs into consideration (Espinoza, 2007). According to some of the leading thinkers in the field

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of justice, fairness, and equality of opportunity (including; Gans, 1973; Rawls, 1971), whereas the concept of equity demands fair competition but tolerates unequal results; the situation is the opposite for the concept of equality, because "more 'equity' may mean less 'equality'" (Espinoza, 2007, p. 346). On this interpretation, equity does not mean that all students should obtain equal education outcomes, but it does mean that, to enable fair competition in the educational arena between students from different backgrounds, those students should be treated unequally because they have different needs. This idea about how to equalize social differences has been referred to as the principle of "equity through diversity" (Solstad, 1997). This is further discussed in Section 2.7 of this chapter.

Equality can be assessed quantitatively by, for example, counting how many students in a given society have accesses to educational demanded goods such as computers or books. Equity, however, is more complicated to measure, as it involves both a quantitative assessment and a moral judgement of how distributions of resources should be done. Adding complexity to equity assessments are the different notions attached to the concepts of fairness and justice in education policy and assessment frameworks intended to measure equity in education such as the PISA-framework (see e.g., Bøyum, 2014; Harvey & Klein, 1985). Because of these challenges, efforts have been made to turn the concept of "equity in education" into something more concrete and measurable. The now-predominant ways of defining and measuring equity and equality in education are closely connected to the Incheon Declaration and Framework for Action for Education 2030 (United Nations, 2015) and to the UN's Sustainable Development Goal for education (SDG 4) (SDG-Education 2030 Steering Committee Secretariat, 2020). The UN's Dakar Framework for Action, with its six education goals for 2000–2015, focused on quality education, excellence for all, and equitable access to learning at all levels (World Education Forum, 2000). In 2015 it was concluded that those education goals had not been achieved (Rose, 2015; UNESCO, 2015), and—as pointed out in the Global Monitoring

Report (UNESCO, 2015)—it was considered that future educational goals should be more concrete in nature. The new post-2015 targets, which are included in SDG 4, have a strong focus on equity in education and aim to ensure that the most disadvantaged children and young people will have the same opportunities as everybody else. One of the challenges in this context is to provide robust evidence, driven by solid data, that will enable countries to monitor their progress toward SDG 4 (Rose, 2015). Hence the Education 2030 Framework for Action called for the development of new indicators, statistical approaches, and monitoring tools for the assessment of progress toward SDG 4 (UNESCO, 2015). Part of the answer to this call was the publication in 2018 by the UNESCO Institute for Statistics (UIS) of the *Handbook on Measuring Equity* (UNESCO UIS, 2018). This handbook provides conceptual frameworks for equity and suggests methodological approaches to measuring equity.

In the past few decades, education policy has become increasingly global (Lingard & Sellar, 2013). This is due in part to ILSAs: findings from studies based on ILSA data have undoubtedly exerted a significant impact on education policies and systems in a large number of countries across the world over the past 25 years (Grek, 2009; Schwippert & Lenkeit, 2012; Strietholt et al., 2014). Equity is central to the frameworks underpinning ILSAs, and the discourse on how equity is conceptualized and measured has been strongly influenced not only by the above-mentioned UNESCO publication but also by the corresponding publications of the International Association for the Evaluation of Educational Achievement (IEA), which is in charge of PIRLS and TIMSS, and of the OECD, which is in charge of PISA (Field et al., 2007; Mittal et al., 2020; Mullis et al., 2015; OECD, 2018). Both IEA and OECD-publications have clearly documented over several decades that school attainments of children are determined by their SES, their origins (ethnicity, cultural background, or language), but also have revealed significant variations between countries in the patterns of associations and their strength (Goldstein, 2004; Marks et al., 2006b;

Mittal et al., 2020). These results emphasize the relevance of inequity as a problem in education worldwide.

A great many international empirical studies have been carried out on the topic of equality and equity in education, and the literature is vast. Some of the most prominent works of relevance to the present thesis were found in a review entitled *Inequality in Education: Comparative and International Perspectives* (Holsinger & Jacob, 2008). Further, a useful overview of the literature on the importance of educational equity in the United States is given in a PhD thesis entitled *Using PIRLS 2006 to Measure Equity in Reading Achievement Internationally* (Trong, 2008). In the following, a selection of some of the most prominent research on equity and equality in education is presented.

The starting point for this selection must inevitably be the Coleman Report (Coleman et al., 1966). In many ways, Coleman and his team set the standards not only for the future study of public education but also for evidence-based education policy (Hill, 2017). The central finding presented in the report was that a student's family background is a more important predictor of that student's educational performance than school itself. This shocked both educational researchers and policymakers at the time, and the report received massive public attention (Hill, 2017). Fifty years on, this finding still holds, and it is now supported by a much larger body of solid empirical evidence (Rodríguez-Hernandez et al., 2020; Sirin, 2005; White, 1982). With respect to equity versus equality, it was pointed out in the Coleman Report that, while resources per student provided to schools might be relatively equal, educational outcomes were not. In particular, poor children—of all colors and races—tended to lag behind their more economically privileged peers in terms of academic results. The systematic disparities found in standardized-test scores between groups of students such as Black and White or rich and poor would later become known under the name of the "achievement gap" (Ladson-Billings, 2006). However, what makes the Coleman Report a foundational document for education-policy research is not only the interpretations made and conclusions

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drawn in it. In fact, that report fundamentally changed how schools were assessed. Before the Coleman Report, what was a good school was defined on the basis of its inputs, i.e., expenditure per student, school size, and curriculum and textbook quality, etc. After it, good schools instead tended to be identified on the basis of their outputs or outcomes, i.e., what their students learned and what their students' long-term earning power looked like (Hill, 2017).

Among the works published after the Coleman Report, the first to be mentioned is Bronfenbrenner (1973), whose contribution on the topic of equality and equity in education research has been highly significant (Jacob & Holsinger, 2008); Bronfenbrenner distinguishes equality, which refers to quantity, from equity, which refers to the fairness or social justice of the distribution of education. Next, Gerwitz, Ball, and Bowe (1985) distinguish equality from equity by defining equality as education based on facts and equity as education based on values. Espinoza (2007) proposed an "equality–equity model" which acknowledged that each of these two concepts includes several dimensions and suggested new directions for analysis and research, including how the two concepts could be treated and measured in educational research. Finally, Berne and Stiefel (1984) developed a framework for conceptualizing equity which offers a useful way to organize different approaches to this concept. In their view, equity can be defined in three ways: as horizontal equity, vertical equity, and equal opportunity. Horizontal equity is equality between different groups within a society—sometimes referred to as "equal treatment of equals"—and means, in the context of education, that each student receives an equal share of the resources available. Vertical equity—or "unequal treatment of unequals"—would mean acknowledging that children are different and should receive an appropriately different treatment based on their differences. Here Berne and Stiefel were aware that researchers studying equity need to make certain value-laden choices. For example, what kinds of differences between children make them unequal, and what level of inequality is appropriate to use when grouping children?

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Finally, equal opportunity would mean that students' academic success should not be prevented by differences among students in terms of personal characteristics (such as ethnicity or household income).

The number of studies on equity and equality in education carried out in Norway and the other Nordic countries is also substantial. For example, there are several publications dealing with ILSAs that deserve to be mentioned. First, a recent anthology entitled *Equity, Equality and Diversity in the Nordic Model of Education* (Frønes et al., 2020a) is the first to gather international comparative studies in order to compare the Nordic education systems in the light of equity, equality, and diversity. Second, the Norwegian PISA 2018 results were presented in an anthology framed by an equity and equality perspective (Frønes & Jensen, 2020). Third, Nilsen, Bjørnsson, and Olsen (2018) drew on TIMSS and PISA data to summarize how equity in education evolved in Norway between 1995 and 2015 in a book chapter. Further, NOVA, a Norwegian social-research institute, has been studying the issue of equity and equality in Norwegian education for fifteen years, focusing in particular on how students' immigrant background and socioeconomic status influence their academic achievements (e.g., Bakken, 2003; Bakken, 2014; Bakken & Hyggen, 2018). In addition, many other Nordic studies have investigated the relationship between students' social background and their academic achievement without explicitly addressing the issue of equity and equality; overviews of those studies are given in the relevant sections later on in this chapter.

2.1.1 Approaches to Measuring Equity

Over the past forty years the field of Educational Effectiveness Research (EER) has not only made a significant contribution to the study of equity in education but also raised the standards for measuring quality and equity in education (Creemers & Kyriakides, 2008). The central tenet of EER is that "[s]chools matter, that schools do have major effects upon children's development and that, to put it simply, schools make a difference" (Reynolds & Creemers, 1990, p. 1). However, it must be

stressed that EER does not suggest that schools by themselves are able to neutralize the powerful impact of social disadvantage (Sammons, 2006). The issue of whether schools are equally effective for different groups of students, such as girls, boys, students from different socioeconomic groups, and students from immigrant backgrounds, has gained greater prominence in the 21st century. This issue is at the core of the concept of equity in education, and it also demonstrates the connection between EER and equity studies—effective schools simply cannot be promoted unless the equity dimension is heeded (Creemers, 2005; Sammons 2006, Kyriakides & Creemers, 2011). Within EER, studies seek to disentangle the complex links between the students' background factors such as their mix of abilities, prior attainments, and personal and family factors, which any student brings to the educational setting, from their educational experiences; the school factors, and explore the way these jointly influence their academic achievement, progress, and development (Creemers et al., 2010; Teddlie & Reynolds, 2000).

School performance is one of the main criteria against which developed countries' education systems are tested for equity (UNESCO, 2018). When measuring equity within the framework of ILSAs, researchers have taken different methodological approaches. For example, many researchers in the quantitative tradition have investigated student underachievement by using statistical measures to identify relative differences in achievement between various social or ethnic groups (Sammons & Anders, 2015). Relative-risk ratios have also been used to measure equity in reading achievement in PIRLS (Trong, 2008). Mittal and colleagues (2021) identified four common methodological approaches to the study of equity within ILSAs: (1) analysis of the variation in students' academic performance between and within schools, using estimated standard deviations, (2) estimation of the extent of inequality between groups, using bivariate multigroup analysis, (3) establishment of the correlation between educational outcomes and students' social, economic, and/or cultural capital, using bivariate or

multivariate analysis, and finally (4) identification of different mediating and moderating mechanisms, represented by individual and school-level factors underlying or affecting the relationship between SES and achievement (Mittal et al., 2020, p. 50). The studies included in this thesis represent approaches (3) and (4).

Similarly, to publications related to various ILSAs, UNESCO's publications have also set standards for how equity is to be measured. As previously mentioned, following the failure to attain the Education for All (EFA) goals set for the years 2000–2015, UNESCO called for more measurable and concrete goals (Rose, 2015). This call was answered by the *Handbook on Measuring Equity in Education* (UNESCO UIS, 2018), which provides conceptual frameworks for educational equity, suggests methodological approaches to measuring equity, and includes examples of various types of statistical analysis that can be undertaken. Section 2.3 of this handbook outlines five equity concepts with their related equity norms and corresponding methods of analysis: (1) *minimum standard* (Gordon, 1972); (2) *equality of condition* (i.e., the educational variable is the same for everyone); (3) *impartiality* (close to the concepts of horizontal equity and equality of opportunity as presented by Berne & Stiefel, 1984); (4) *meritocracy* (i.e., educational achievement is positively related to ability but not related to other characteristics (Van den Branden et al., 2011); and (5) *redistribution* (also known as vertical equity in the framework of Berne and Stiefel (1984); i.e., educational inputs is positively related to disadvantage).

The methods used in the present thesis to measure equity are closest to the third concept, that of impartiality. As noted above, this concept is similar to the concept of horizontal equity in Stewart (2002) and Berne and Stiefel (1984), and it includes the concept of equality of opportunity as discussed within their framework. Assessing equity in education based on the impartiality concept involves investigating whether different population groups have an equal chance of gaining access to educational opportunity. Importantly, this means that impartiality measures can be used to identify the most disadvantaged

groups in a society, which can then be targeted by policy measures. The above-mentioned UNESCO handbook served as a helpful source in the choice of methodological approaches for the four studies included in the present thesis, as will be further elaborated upon in Chapter 5.

2.1.2 How was Educational Equity Defined and Interpreted in the Current Thesis?

The interpretation of equity with regard to reading literacy used in the present thesis relies on recent wordings relating to equity within PIRLS (Mullis et al., 2015; UNESCO & IEA, 2017) and PISA (Field et al., 2007; OECD, 2018). A central aspect of the OECD's and IEA's perspective on equity is that differences in students' learning outcomes should be unrelated to their background or to their socioeconomic and social circumstances (PIRLS see; Mullis et al., 2015, pp. 8-9; PISA see; OECD, 2018, pp. 21-22). The OECD's most recent definition of educational equity, which is given in the PISA 2018 report, is the following:

> *Equity in education means that schools and education systems provide equal learning opportunities to all students. As a result, students of different socio-economic status, gender or immigrant and family background achieve similar levels of academic performance in key cognitive domains, such as reading, mathematics and science, and similar levels of social and emotional well-being in areas such as life satisfaction, self-confidence and social integration, during their education.* (OECD, 2018, p. 22)

2.2 Defining Reading Literacy

The PIRLS framework for assessing reading literacy draws upon the first international assessment measuring only reading comprehension in primary-school students: the Reading Literacy Study (Elley, 1992). The first version of that framework was developed for the first PIRLS

assessment carried out in 2001 (Mullis & Martin, 2015). In the 2001 edition of the framework, "reading literacy" was defined as "the ability to understand and use those written language forms required by society and/or valued by the individual" (Mullis et al., 2015, p. 11). The framework has since then been updated for each PIRLS cycle and that definition has undergone several transformations. The 2016 version reads as follows:

> *Reading literacy is the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment.* (Mullis & Martin, 2015, p. 12)

Inherent in this definition is the idea that a reader can learn from— and enjoy—texts of all types, including not only traditional written forms such as books and newspapers but also more recent, digital forms such as text messages and websites using multimedia formats (e.g., Reuda, 2013). Further, the current definition used for PIRLS reflects theories where reading literacy is seen as a constructive and interactive process: "[r]eaders are regarded as actively constructing meaning as well as knowing effective reading strategies and how to reflect on reading" (Mullis et al., 2015, p. 12). This expanded notion of what reading literacy means is reflected in the assessment design, which is quite ambitious. First, the PIRLS framework focuses on the two overarching purposes of reading: reading for literacy experience and reading to acquire and use information. PIRLS devotes half of the assessment passages to each of the purposes for reading (see Table 2). In addition, it targets four comprehension processes within each of those two purposes: (1) focusing on and retrieving explicitly stated information, (2) making straightforward inferences, (3) interpreting and integrating ideas and information, and (4) evaluating and critiquing content and textual elements (Mullis et al., 2015, p. 13). To assess students' mastery of these skills, in the 2016 version of PIRLS they were presented with a literary

(fiction) text such as a short story or a fable and an informational (non-fiction) text such as a scientific article or a biographical account. Each text was followed by a series of reading-comprehension questions (12–17 items) designed to assess those four processes. Table 2 shows a breakdown with regard to how the two reading purposes and four reading-comprehension processes are assessed in PIRLS, as described in the PIRLS 2016 Assessment Framework (Mullis et al., 2015, p. 14).

Table 2

Percentages of the PIRLS assessment devoted to reading purposes and comprehension processes

Purposes for reading	
1. Literacy experience	50%
2. Acquire and use information	50%
Processes of comprehension	
1. Focus on and retrieve explicitly stated information	20%
2. Make straightforward inferences	30%
3. Interpret and integrate ideas and information	30%
4. Evaluate and critique content and textual elements	20%

A complete overview of the PIRLS 2016 assessment design is provided in section 5.2 Booklet Design and Scaling Methodology.

2.3 Defining Students' Home Language

As previously noted, in the present thesis *students' home language* refers to how often the students claimed to speak the language of the PIRLS test—i.e., Norwegian—in their homes. Norwegian is also the language of instruction for the assessed students, hence sometimes this variable refers to how often the students speak the language of instruction[5]. International reports which have measured equity within the framework of ILSAs commonly focus on the academic achievement of immigrant

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[5] In the four studies, this information was retrieved from the student questionnaire.

students, or students who frequently speak the language of test at home or of students whose home language is different from the dominant language of instruction at school (OECD, 2019; UNESCO & IEA, 2017). The available information on students' language background in PIRLS 2016 was limited. Only one item in the student questionnaire and one item in the parent questionnaire, ask about how often the students speak the language of test, i.e., Norwegian, at home. In addition, one item in the parent questionnaire has the wording "What language did your child speak before he/she began school". In the Norwegian assessments, the respond categories are limited to "Swedish", "Danish" or "other".[6] Information about the parents' or child's ethnicity or country of origin was not included in 2016.

The students of particular interest in the present thesis are those who reported in the PIRLS student questionnaire that they do not always speak Norwegian at home i.e., students whose home language is different from the dominant language of instruction at school. Note, however, that throughout the four articles, these students are categorized differently, and do not correspond to the same term. The reason is partly contextual and partly methodological. In study 1, in order to report trend results and comparing results with the other Nordic countries, descriptive statistics (means and percentages) was reported for all four respond categories for this variable, i.e., *always*, *almost always*, *sometimes* and *never* speaking Norwegian at home. In the regression analysis the variable was dichotomized, and the students were categorized as monolingual students (students who claimed always speaking Norwegian at home) and multilingual students (students who claimed almost always, sometimes, or never speaking Norwegian at home). This categorization is in accordance with the definition of multilingual students used in Official Norwegian Reports (NOU, 2010: 7, p. 24). In study 2, the

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[6] While in the previous Norwegian PIRLS cycles (2001, 2006 and 2011) different language backgrounds were specified as respond categories to this specific item, only the category «others» was an obtion, next to "Swedish" and "Danish" in the parent questionnaire in Norwegian PIRLS 2016.

students were categorized as native Norwegian speakers (students who claimed always and almost always speaking Norwegian at home) and language minority learners (students who claimed sometimes and never speaking Norwegian at home). Language minority learners here refers to students who come from homes in which a language other than the societal language is primarily used (August & Shanahan, 2006; Kieffer, 2011). These terms were used because they corresponded better with the background theory used in that study, and the fact that the achievement differences between students who always and almost always spoke Norwegian at home were on average only 6 points, however statistically significant, was an argument for merging those two categories. In study 3 and 4, the path analyses include the full range of how often the students speak Norwegian at home. Not losing any of the variance minimizes the risk of error in the variance estimation (standard error). To avoid confusion, the different terms are not used in the discussion of the thesis results, it is rather referred to the frequency of Norwegian spoken at home.

It must be kept in mind that students whose home language is different from the dominant language of instruction at school are very heterogeneous. For instance, the time they have spent in Norway varies greatly—some of them were born there, others were not—and it is well established that the time of exposure to the language used in a test will affect students' performance on that test (Bakken & Hyggen, 2018; Cummins, 2011; Heath & Kilpi-Jakonen, 2012).

2.4 Conceptualization of Socioeconomic Status

A family's socioeconomic status (SES) represents the social standing of an individual or group and traditionally comprises measures pertaining to one or more of three indicators: household income, parental level of education, and parental occupation (Cowan et al., 2012; Willms & Tramonte, 2019). The idea that there are multiple dimensions—a cultural, an economic, and a social one—is far from new (Bloom, 1976;

Keeves, 1972). The multidimensional aspects of the SES concept is reflected in the many conceptualizations and definitions used in research; for example, Cowan and colleagues define SES broadly as "[…] one's access to financial, social, cultural, and human capital resources" (Cowan et al., 2012, p. 4).

The finding that SES plays a prominent role in education and exerts a strong impact on children's academic achievement goes back approximately 100 years (Thomson, 2018). The consensual view is that SES continues to be one of the most powerful predictors of a child's achievement in virtually all education systems around the world (Harwell et al., 2016). However, the different conceptualizations of family SES and the different ways of measuring SES across different studies have caused considerable variation in estimates of the SES effect as well as ambiguity in interpretations of research results (Jerrim et al., 2019; Marks, 2014; Mittal et al., 2020; Sirin, 2005). According to Scherer (2020), referring to a substantial collection of meta-syntheses (Broer et al., 2019; Harwell et al., 2016; Sirin, 2005; White, 1982), the effect size of the relationship found between SES and achievement ranged from small ($r = .12$) to moderate ($r = .32$) and varied across studies, samples, and measurement characteristics (e.g., gender, country and types of achievement measures). One of the factors that determine the strength of the relationship seen between family SES and reading achievement is the unit of observation—specifically, whether a study is based on group-level data or individual-level data (Cowan et al., 2012; Yang Hansen & Gustafsson, 2019; Yang & Gustafsson, 2004). Research has shown that the relationship between SES and achievement tends to be stronger at school level than when the individual student is the unit of observation. (e.g., Mittal et al., 2020; Sirin, 2005; Yang Hansen & Gustafsson, 2019; Yang, 2003; Yang & Gustafsson, 2004). According to Yang and Gustafsson (2004), this finding is most likely attributable not only to family SES as such but also in part to the socioeconomic environment constituted by the neighborhood in which students live (See also, Van Ewijk & Sleegers, 2010). Palardy (2008) interpreted the

stronger effect of school-level SES as an expression of a self-reinforcing environment: schools with a high proportion of students whose SES is low form an educational milieu which is not optimal for learning.

2.4.1 SES–A Three-Dimensional Concept

Numerous studies have explored different SES indicators representing the economic, cultural, and social dimensions. As previously noted, in status-attainment studies, family SES is traditionally measured using one or several of three indicators: household income, parental level of education, and parental occupation (Cowan et al., 2012; Duncan et al., 1972; Sirin, 2005; White, 1982). In addition, indicators reflecting the possessions found in the home have been empirically established as a measure of SES (Sirin, 2005). Regarding the *social* dimension, the *social* networks of a family, and the subjective social status, is found to influence children's intellectual development during their school years (Lee & Bowen, 2012). When it comes to the *economic* dimension, household income has been found to have a small but statistically significant relationship with literacy skills (Dickerson & Popli, 2012; Blanden & Gregg, 2004; Fergusson et.al., 2008). Also, the possessions and material resources available in the home—such as cars, sports equipment, vacations, etc.—explain a relatively small unique portion of the variance in literacy (Blanden & Gregg, 2004; Fergusson et al., 2008; Yang & Gustafsson, 2004). Indicators representing the *cultural* dimension of family SES, such as the number of books found in the family home (Evans et. al, 2014), the parents' level of education (Myrberg & Rosén, 2009; Yang Hansen & Gustafsson, 2018) and early reading literacy activities in the homes such as parents reading for their children (Myrberg & Rosén, 2009; Hemmerechts et. al., 2016) have bean found to be clearly related to students reading achievement. Parental involvement may also be considered as representing the cultural dimension of SES because the fact that the academic success of children from well-educated homes may, to some extent, be attributable to their parents' investment in their schooling. It is for example well documented

that well-educated parents transfer their preferences to their children and invest time and involvement in their children to ensure that they will succeed in school (Castro et. al., 2015). In PIRLS, additional items intended to measure students' home reading resources such as home possessions (e.g., internet-connection, study room etc.) are employed. For the purpose of investigating the cultural dimension of SES in this thesis, the above-mentioned variables; number of books in the students' homes, parental education and two types of parental involvement: parents' academic expectations for their children and parents' helping with homework were used.

2.5 Defining Student's sense of School Belonging

School belonging is defined in this thesis as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment" (Goodenow & Grady, 1993, p. 80). It is operationalized by means of a construct developed in PIRLS which "[s]eeks to capture students' feelings toward their school and their sense of connectedness with the school community" (Martin, Mullis, Hooper, et al., 2017, pp. 1-2). This construct involves many of the same items used in the Psychological Sense of School Membership Scale (PSSMS) developed by Goodenow (1993), which is a widely used instrument for assessing middle- and high-school students' sense of belonging in school and which is used to operationalize the definition of Goodenow and Grady (1993) (Alkan, 2016). The PIRLS construct also captures those three operational aspects of school belonging— (1) school-based relationships and experiences, (2) student–teacher relationships, and (3) students' general feelings about school—that are the most commonly shared aspects of school belonging across studies (Allen et al., 2016). The clear similarities between the batteries of items measuring school belonging in the PSSMS scale and the PIRLS scale, respectively, strengthen construct validity; and this would seem to represent the "state of the art" when it comes to school belonging.

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2.6 Defining Parental Involvement

For school-age children, most formal learning takes place in the classroom. However, the influence of parental involvement on academic outcomes is still considerable, as children also acquire skills and competencies in their families (Buckingham et al., 2013; Castro et al., 2015). Grolnick and Slowiaczek (1994) describe parental involvement widely as "the dedication of resources by parent to the child" (p. 238). By contrast, more specific definitions are used by others, who define parental involvement as parental activities at home and in school that are related to children's learning in school (Hoover-Dempsey & Sandler, 1997). The great complexity of the concept makes it difficult for a single study to address all aspects of parental involvement, which is why many studies have focused on individual aspects of this phenomenon (Castro et al., 2015). In Study 4, two specific types of parental involvement were focused on: parents' academic expectations and parents' help with homework. The reason for selecting these two indicators was that immigrant parents in general are more optimistic about their children's educational carrier and they are more likely to maintain high academic aspirations for their children than are native-born parents (Raleigh & Kao, 2010, Kindt, 2017). Immigrant parents have a fundamental belief in the importance of education and positive attitudes towards school (Bakken & Hyggen, 2018; Fekjær, 2010; Lauglo, 2010; Portes & Rumbaut, 2001; Raleigh & Kao, 2010; Suárez-Orozco et al., 2009). Many immigrant parents translate these educational aspirations into high expectations and sustained effort to achieve them (Bakken & Hyggen, 2018; Lauglo, 2010; Leirvik, 2010; Portes & Rumbaut, 2001). These aspirations are important because parents' educational aspirations directly and indirectly influence children's levels of attainment (Hermansen, 2016; Bakken & Hyggen, 2018).

2.7 *The Norwegian School Model*

The principle of a unitary school system, often referred to as a "school for all," whose main aim is to provide equal educational opportunities for all, has been at the heart of the Norwegian education model for more than a century (Blossing et al., 2014; Telhaug et al., 2006). For example, students having equal access to educational resources is considered a matter of course. Hence many of the issues related to equity in education have concerned whether curricula should be varied in accordance with individual abilities or cultural conditions in order to promote equality of student achievements. Another central concern in Norwegian education policy relates to adapted training for students with special needs. This aspect of equity was launched in Norwegian education policy in the 1980s and came to be known as "equity through diversity" (Blossing et al., 2014; Solstad, 1997).

Both on the global level and locally, such as in Norway, the increased awareness of equity in education that has been seen in more recent times can be attributed to globalization processes, including demographic change due to increasing cross-border mobility (OECD, 2018). As a result of such demographic change, the cultural and linguistic diversity of Norwegian classrooms has increased, particularly in the past decade (Steinkellner, 2017). Hence, Norwegian education policy at the beginning of the 21st century addressed the increasingly urgent issue of how the Norwegian education system would cope with a more diverse student population. In particular, a white paper (Meld. St. 49 2003-2004) and a strategic plan (Strategiplan 2004-2009) brought new perspectives into education policy by acknowledging student diversity while proposing strategies for equal educational opportunities through adapted education. Government officials began to emphasize "equity through diversity" rather than "equity through equality," which had driven education-policy reforms for decades (Solstad, 1997). In all policy documents and with regard to all school levels, the target group was specifically identified as consisting of "language-minority

students." This term is often used in policy contexts because membership of that group entailed a legal right to adapted education (Education Act, 1998). In the early 2000s, considerable space was devoted in education-policy documents to discussing the associations between social background, immigrant background, and school results, and it was made clear that a disadvantaged social background and an immigrant background were two sides of the same coin (NOU 2010:7, Chapter 4). At this time, it was often claimed that the core of the Norwegian education model—equal opportunities for all, with its aim for inclusion and fairness for all students—was at stake.

Around the turn of the century, a pedagogic "crisis" hit not only Norway but also its Nordic neighbors Sweden, Denmark, and Iceland (Blossing et al., 2014). This was due to what Norwegians call the "PISA shock": two ILSAs, TIMSS and PISA—which were carried out in many countries in 1995 (TIMSS), 1999 (TIMSS), 2000 (PISA), and 2003 (both)—revealed that those Nordic countries' students performed at a mediocre level.[7] The unsatisfactory ILSA results left a strong imprint on education-policy debate in Norway (and elsewhere in the Nordics) in the years that followed. In 2006 a new school reform, *Kunnskapsløftet* (commonly known in English as the "Knowledge Promotion Reform"), was implemented in Norway. Its central aim was to raise the quality of education in compulsory school (grades 1–10) and upper-secondary school. Like in all previous education reforms, there was broad political agreement that diversity in school was a challenge that needed to be addressed, and that schools had an important role to play when it came to equalizing social differences (Bakken & Elstad, 2012).

In recent years, the Norwegian government has drawn up action plans to enable schools and kindergartens to offer opportunities for all

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[7] It is worth noting that things were different in the fifth Nordic country, Finland, which ranked among the top countries for reading and mathematics in PISA 2003; interestingly, the excellent Finnish results were partly attributed by some educational experts in other Nordic countries to the small percentage of immigrants in the Finnish population (Telhaug, 2006).

(cf., e.g., (Meld.St. 21 (2016-2017)). A recent white paper (Meld.St. 6 (2019-2020)) addresses the United Nations' sustainable-development goals for 2030 (United Nations, 2015), placing special emphasis on inclusion and early intervention in order to ensure an inclusive, equitable and good education for all (Section 1.1). Early intervention, inclusion, and adapted provisions are highlighted–even stronger than before–as key principles underpinning the plan presented in that white paper to ensure more equitable education for children in kindergarten and compulsory school (see e.g., Buchholtz et al., 2020; Frønes et al., 2020b).

3 Research Background

In this chapter, overviews are given of the research background to the various empirical associations investigated in the present thesis (3.1–3.4).

3.1 Associations between Students' Home Language and Reading Achievement

Students whose home language is different from the language of instruction often experience the dual challenge of developing their literacy skills while at the same time acquiring the language of instruction (August & Shanahan, 2006; Kieffer & Vukovic, 2012). The development of language minority learners' reading comprehension may be delayed if there are large differences between their home language and the language of instruction (Cummins, 2011; Kieffer & Vukovic, 2012b). Further, gaining full proficiency in the language of instruction is considered to be especially challenging for language minority learners, as they often face additional disadvantages related to their socioeconomic status (e.g., Buckingham et al., 2013; Heppt et al., 2014; Kieffer & Vukovic, 2012; Sirin, 2005). The PIRLS and PISA-reports have highlighted that according to comparable international assessments, students in most countries who do not speak the language of the test at home obtain a lower average reading achievement in PIRLS than those who do (Mullis et al., 2017, Exhibit 4.3), and the same trend can be seen for the PISA test (OECD, 2016a, p. 256; 2019, p. 185). However, for more than 30 years, research has provided evidence that linguistic differences between the home language and the school language cannot by themselves, explain such empirical data (August & Shanahan, 2008; Cummins, 2015; Dolson & Burnham-Massey, 2011). Rather, language differences between home and school intersect with students' family SES and with patterns of power relations in society, which are of central importance for students' academic performance (Cummins, 2011, 2015).

In Norway, ever since the 1990s, a great deal of research has been carried out into the relationship between school achievement and an immigrant background (e.g., Birkelund & Mastekaasa 2009; Reisel 2014; Steinkellner 2017; Lauglo, 1996; Støren, 2009; Bakken & Hyggen 2018). Despite the considerable heterogeneity characterizing the group of immigrant children and young people (in terms of country of origin, linguistic background, cultural background, etc.), these studies show that, on average, immigrant children's academic achievements are lower than those of Norwegian students without an immigrant background, and that immigrant children more often drop out of upper-secondary school (Bakken & Elstad, 2012; Steinkellner, 2017). Prior Norwegian studies have found that students who speak Norwegian more frequently at home obtained a higher average score on the PIRLS reading test than students who speak Norwegian less frequently at home in each of the previous PIRLS cycles: in 2001 (Wagner, 2004), in 2006 (Van Daal et al., 2007) and in 2011 (Gabrielsen, 2013). With regard to the results of the PISA 2018 survey, Jensen and colleagues (2020), who defined minority students as students both of whose parents were born outside of Norway (p. 226), found that minority students had a lower average reading achievement than majority students (students both of whose parents were born in Norway) after gender and SES had been controlled for—and that the difference between these groups was smaller in Norway and Denmark than in the other Nordic countries: Finland, Iceland, and Sweden (Jensen et al., 2020).

3.2 Associations between the Cultural Aspect of SES and Reading Achievement

Several research syntheses have agreed upon a statistically significant relationship between family SES and academic achievement across SES measures and academic achievements (Broer et al., 2019; Harwell et al., 2016; Scherer & Siddiq, 2019; Sirin, 2005; Thomson, 2018; Van Ewijk & Sleegers, 2010; White, 1982). While reviewing this large body of

research is beyond the scope of this thesis, this section brings to attention the cultural aspect of SES and its relationship to reading achievement from an equity perspective.

Studies exploring more than one dimension of SES have generally found students' academic achievement in general, and reading achievement specifically, to be more strongly related to the cultural dimension—that is, the cultural resources and atmosphere in the home—than to the family's economic or financial status (see Buckingham et al., 2013; Rodríguez-Hernandez et al., 2020). Most research indicates that family income and material resources explain a relatively small portion of the variance in reading literacy, while parent education is found to have the strongest influence (Buckingham et al., 2013; Marks, 2008; Marks et al., 2006a). This holds true for the Nordic countries as well (Turmo, 2004; Yang Hansen & Gustafsson, 2019; Yang & Gustafsson, 2004). For example, Gustafsson and Yang (2004) found that the statistical relationship between the cultural dimension of SES and reading was stronger than between the economic dimension of SES and reading across 23 countries (in the case of Norway, the cultural factor was $\beta = .33$ and the economic factor was $\beta = -.07$. Hill and Tysen (2009) argued that whether a child's parents promote academic values strongly affects that child's outcome. Rodríguez-Hernandez and colleagues (2020), in a literature review of 42 studies, found the cultural dimension of family SES to be the most important predictor of students' reading achievement. The reasons why the cultural dimension of SES appears to provide important academic advantages is not all clear. Some theories suggests that a scholarly-like culture in the home provides literary advantages because the child will learn the linguistic codes necessary to succeed academically (Gee, 2015). Reproduction-theories posit that culture signals children's elite status to teachers and other key persons in the education system, who then grant them advantages (Bourdieu & Passeron, 1990). Some have suggested that it may be that highly educated parents are able to provide their children with more varied cultural experiences, which may stimulate academic development

(Steinmyr, Dinger, & Spinath, 2012), whereas others have focused on the exposure to more complex language in well-educated homes as beneficial for academic outcomes (Bernstein, 1971; Cummins, 2011). Regardless of any theoretical explanations, the empirical findings describing the relationship between the cultural aspect of SES and academic outcomes and reading achievement, are part of the rationale for focusing on SES indicators representing the cultural dimension of SES in the present thesis.

In this thesis, the number of books in the students' homes and their parents' level of education are the indicators used to represent the cultural dimension of SES. Several studies suggest that it is reasonable to expect an effect of home-library size (the number of books in the family home) on scores on standardized reading-test scores (e.g., Evans et al., 2010; Myrberg & Rosén, 2009; Park, 2008). Evans, Kelly, and Sikora (2014) found the number of books in the family home to significantly influence students' academic performance across 42 education systems. In the present study, the number of books in the students' home was included in study 2 as an indicator of the cultural aspect of SES. Possessing a computer or tablet was also included in study 2 as an indicator of home possessions. However, whether this variable represent the cultural dimension, or the economic dimension (or both) is not clear. As in most Western countries, a rapid increase in the prevalence of computers at home has been observed among young people in Norway. Approximately 70 percent of children and youth between the ages of 9 and- 18 years old have their own computer, 22 % has access to a computer in the family home (Norwegian Media Authority, 2020).

Parents' level of education as an indicator of the cultural dimension of SES has proven to be a strong and stable determinant of students' outcomes (Cheadle, 2008; Jerrim et al., 2019; Marks et al., 2006b; Mittal et al., 2020; Myrberg & Rosén, 2009; Yang Hansen & Gustafsson, 2019; Yang & Gustafsson, 2004), and it has been found to be the most commonly used proxy for SES (Sirin, 2005). In the present

thesis, a pragmatic choice to use that indicator was made in Studies 3 and 4. There were several reasons for this choice. The first reason is empirical in nature: parental education has been the preferred measure in many earlier large-scale inequality studies, so choosing that measure for the present thesis would make it consistent with much of the wider evidence base (Bradbury et al., 2015; Gustafsson & Yang Hansen, 2018; Jerrim et al., 2019; Sirin, 2005). This, in turn, is due to the fact that information about parents' level of education is often available in ILSAs and tends to be based on the ISCED system, which enables comparison across countries. The second reason is theoretically based. Many theoretical perspectives, such as reproduction theories (Bourdieu & Passeron, 1990; Goldthorpe, 2014), view education as a driver of economic inequality in that reproduction takes place across generations, recognizing that well-educated parents tend to ensure their children's future earnings by providing them with a favorable learning environment, which is highly likely to help them obtain a better education and better jobs. For example, Bourdieu (1986) conceptualized the different dimensions of family background in terms of economic, cultural, and social capital (Bourdieu, 1986). The theoretical perspective on SES will be further elaborated upon in Chapter 4 below.

3.2.1   The SES–Achievement Relationship in the Context of Equity in Education

One of the most commonly used indicators of the degree of educational equity is the relationship between different aspects of students' family background and their academic achievement (Marks, 2014). As noted above, in educational research these aspects are typically referred to as socioeconomic status (SES) (e.g., Gustafsson & Yang Hansen, 2018). Marks (2014) reviewed the literature on changes across countries and over time in the relationship between SES and academic achievement, concluding that the problem of neutralizing the impact of students' SES on their academic achievement has not been solved at the global level. Such a conclusion is persuasive in newer research as well (e.g., Jerrim et

al., 2019; Mittal et al., 2020; OECD, 2019; Yang Hansen & Gustafsson, 2019). In Norway and the other Nordic countries, across different operationalizations and measures, students' SES explains a significant part of the variation in their achievement (e.g., Bakken & Hyggen, 2018; Frønes & Jensen, 2020; Yang Hansen & Gustafsson, 2019), although the SES–achievement relationship tends to be weaker there than in most other OECD–countries (OECD, 2018, 2019). According to the most recent PISA results, from 2018 (OECD, 2019, Annex B1.2), 7.5 percent of the variance (R^2) in reading achievement was explained by socioeconomic status in Norway. This is less than in many other countries compared to Sweden (10.7%) and Denmark (9.9%), and it is also below the average for the other OECD countries (12%). These PISA-results have been quite stable for some time (OECD, 2012, 2016a). Based on TIMSS 2015 data, relating to mathematical skills in fourth-graders, Mittal and colleagues (2020) found that how SES was operationalized influenced the ranking of the Nordic countries (Norway, Sweden, Denmark and Finland) by level of educational equity. For example, SES operationalized as a latent variable that included the number of books at home and the parents' highest level of education had a stronger relationship with student achievement in mathematics in all of these countries than SES operationalized as a composite of five indicators (number of books and number of children's books at home, study support in the home, parental education, and parental occupation), or as a single variable. In contrast to PISA, and regardless of how SES was measured, the SES–achievement relationship was strongest in Norway–compared to the other Nordic countries Sweden, Denmark and Finland–at the student level but not at the school level: the latent SES variable accounted for 19 percent at the student level in Norway, compared with 12 percent in Denmark, 16 percent in Finland, and 17 percent in Sweden (Mittal et al., 2020, p. 57). In PIRLS 2011 and 2016, Norway was the highest-ranking country for "home resources for learning" (Mullis et al., 2017, Exhibit 4.1), a compound variable comprising the number of books in the home, the amount of study

support in the home, the number of children's books in the home, and the highest level of education of either parent. Even so, the difference in reading achievement between students with many and few "home resources for reading", respectively, was statistically significant in 2011 (Gabrielsen, 2013,; Mullis et al., 2017, Exhibit 4.1).

3.3 School Belonging in Educational contexts

Despite a variety of conceptualizations and operationalizations of the concept of school belonging across studies, several meta-syntheses agree that school belonging is an important factor for both academic and psychological outcomes across educational contexts, subject areas, and countries (Allen et al., 2016; Korpershoek et al., 2019; Sari, 2012; Slaten et al., 2016; Wilder, 2014). Regarding academic outcomes, a large body of research shows that students' sense of school belonging is significantly and positively related to academic motivation and achievement throughout elementary school (Furrer & Skinner, 2003; Goodenow & Grady, 1993; Sirin & Rogers-Sirin, 2004), high school (Gillen-O'Neel & Fuligini, 2013; Korpershoek et al., 2019), and university (Guiffrida, Lynch, Wall, & Abel, 2013). Meta syntheses also provide evidence of a statistically and positive association between school belonging and reading achievement (Hughes et al., 2015; Korpershoek et al., 2019). In relation to psychological outcomes, school belonging has been associated with higher levels of happiness, psychological functioning, self-esteem and self-identity (Allen et al., 2016). However, while numerous of themes have been linked to school belonging, the causal direction of associations is not clear (Allen et al., 2016). For example, a student's level of academic achievement may stem from a sense of school belonging, but the level of achievement also influences the extent to which a student feels that he or she belongs in school (Anderman, 2003; Goodenow & Grady, 1993; OECD, 2018).

Students' sense of school belonging may vary in strength across different groups of students, such as language-minority speaking

students versus native-speaking students, immigrant students versus non-immigrant students or students from weaker versus stronger socioeconomic backgrounds (Hughes et al., 2015; Wang et al., 2012). For example, immigrant students may feel more uncertain about whether they belong socially to mainstream institutions such as school, because they may be unsure whether they will develop positive relations in the settings concerned (Walton & Cohen, 2007; Wang et al., 2012). Successful adjustment among immigrant students appears to be linked to the quality of the relationships they establish in their school setting, because social relations in school, such as school belonging, are crucial for the academic adjustment of students in general and immigrant students in particular (Portes & Rumbaut, 2001; Suárez-Orozco et al., 2009). For example, the results from PISA 2015 showed that, on average in all OECD countries, students with low SES and first-generation immigrant students (merged into one category) were 7.7 percentage points less likely than other students to report that they felt that they belonged in school (OECD, 2016b). Interestingly, socioeconomic differences in students' sense of school belonging disappear when students' achievement is accounted for (OECD, 2018, p. 70). This suggests that students with low SES levels have as strong a sense of school belonging as their similarly performing peers from higher SES-levels. In PISA's framework of equity in education, students' sense of school belonging is included as one of the education outcomes in which the level of equity is measured (OECD, 2018, pp. 54-55). School belonging is considered part of the PISA framework for educational equity because socioeconomically disadvantaged[8] students and immigrant students not only tend to perform worse academically than more advantaged students but are also less likely sense that they belong in school (OECD, 2018). However, as noted previously, in most countries, including Norway, the disparity between these groups of

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[8] "Socioeconomically disadvantaged" is defined in PISA as those whose values on the index of economic, cultural, and social status are among the bottom 25 percent within the country or economy (OECD, 2019).

students is not large because most students with low levels of SES and an immigrant background actually feel that they belong in school too (Mullis et al., 2017, Exhibit 6.6; OECD, 2018, p. 71).

3.3.1   The mechanism of school belonging in educational research

Identifying school-related factors influencing established relationships that may threaten the level of educational equity, such as that between SES and achievement or that between membership of a language minority and achievement, is vital in order to increase educational equity (e.g., Caro et al., 2014; Gustafsson et al., 2018; Scherer, 2020). Therefore, merely describing achievement differences in reading related to the students' background characteristics is not sufficient to move the research field forward in order to find research-based solutions that promote equity in education. However, not many studies have investigated the mediating and moderating role of school factors including school belonging with regard to such relationships (Caro et al., 2014; Gustafsson et al., 2018; Strietholt et al., 2019). Those who have done so do not provide much evidence for the assumption that school culture can reduce achievement differences between low- and high-SES students or between minority- and majority-language students on a student level. For example, using TIMSS 2011 data (8th grade) to study whether variables pertaining to school climate (emphasis on academic success, bullying, student–teacher relationship, and discipline) have a stronger effect on low-SES than high-SES students, Sandoval-Hernández and Bialowolski (2016) did not find any evidence of heterogeneity in the effects of such school-climate variables.

A number of large-scale studies have found that school-level SES has an effect on reading literacy above and beyond the effect of student-level SES (Buckingham et al., 2013). Similarly to individual SES, school-level SES seems to influence reading mostly indirectly, through its associations with other school variables (Sirin, 2005). However, variables mediating the relationship between SES and achievement have not often been studied, meaning that this appears to represent a relatively

new approach to understanding the emergence of achievement differences (Gustafsson & Rosén, 2014). Volume II of the PISA 2015 results (OECD, 2016) identify some factors that are related to student performance and to the SES profile of schools, on average across OECD countries. These factors include aspects of the school environment such as student behaviour in school, class size, and school policies and practices. Mediating models revealed different results across different education systems, indicating a need for further research on the mediating role of school factors with regard to the relationship between SES and achievement.

Finally, very few studies have investigated the determinants of the SES–achievement relationship in primary school—most studies have been conducted in secondary school (Strietholt et al., 2019). To the best of my knowledge, no previous studies have examined the interplay between home language, parental education, school belonging, and reading achievement in young students. From a policy perspective, it seems to be especially important to identify school factors that may prevent inequity at an early stage, so that action can be taken.

3.4 Parents' Academic Expectations and Parents' Help with Homework in Educational Research

Educational research and policy have long taken an interest in the positive effect that parental involvement may have on students' academic achievement in general and on reading achievement in particular (Boonk et al., 2018; Buckingham et al., 2013; Castro et al., 2015). It is generally deemed particularly valuable to study parental involvement in young students, since parents tend to be more involved in their children's schooling when they are young (Graves et al., 2011). However, research has yielded inconsistent results when it comes to the association between parental involvement and students' academic

achievement (Boonk et al., 2018; Castro et al., 2015). Some of that inconsistency is due to the fact that the concept of parental involvement has been operationalized, measured, and applied in many different ways (Boonk et al., 2018; Wilder, 2014). For example, Castro and colleagues (2015) concluded in their meta-analysis of 37 studies in kindergarten, primary school, and secondary school that the average size of the effect of parental involvement (including seven types of parental involvement: general parent participation, communication with children on school issues, parental supervision/help with homework, parental expectations, reading with children, parental attendance at and participation in school activities, and parental styles) on academic achievements including reading was .124, which is moderate at best (Baumert et al., 2006). In a review of 75 studies on the relationship between parental-involvement indicators (19 in total) and academic achievement, Boonk and colleagues (2018) concluded that the association between the various indicators of parental involvement and children's academic achievement was small to medium. The meta-analysis of Sénéchal and Young (2008) investigated the impact of parental involvement on children's reading acquisition; the 16 studies included revealed that the largest effect size (.65) was associated with programs that trained parents to teach their children to read. Prior studies based on PIRLS data have found that parents who practice early reading activities with their child at home contribute to their child's reading achievement in school (Hemmerechts et al., 2016; Myrberg & Rosén, 2008). Other parental-involvement factors that have been shown to determine reading achievement include parents' educational aspirations and expectations as well as their encouragement of intellectuality (Wilder, 2014). In conclusion, despite the idea seemingly held by many educators and policymakers that parental involvement in general will enhance students' achievement, the effect of parental involvement appears to be smaller than traditionally believed. However, more knowledge is needed to disentangle the effects of the various indicators on different academic outcomes.

3.4.1 Parents' Academic Expectations and Aspirations

Parents' academic expectations and aspirations refer to "[t]he degree to which parents presume that their child will perform well in school, now and in the future" (Boonk et al., 2018, p. 18). Among the different types of parental involvement, parents' academic expectations have been found to have the strongest effect on academic achievement, including reading achievement (Boonk et al., 2018; Buckingham et al., 2013; Castro et al., 2015). Fan and Chen (2001), in a meta-analysis, found an overall correlation of $r = .40$ between parents' aspiration and expectation and children's educational outcomes. Further, they concluded that the positive effect of parents' academic expectations on students' academic achievement was consistent across ethnic groups. Lee and Bowen (2006) examined the impact of five types of parental involvement on outcomes in reading and mathematics, above and beyond the effects of demographic variables. In line with Fan and Chen (2001), they found that parental expectations were the strongest predictor ($\beta = .23$) of both mathematical and reading outcomes compared with the other aspects of parental involvement. One reason why parents' expectations have a positive impact on reading achievement may be that this type of involvement is linked to the development of children's motivation to read (Petscher, 2010) and their capacity for self-regulated learning (Xu et al., 2010). Another reason might be that parents' expectations are associated with another type of parental involvement, namely parent–child communication about school. This is a reasonable assumption, given that having parents who manage to communicate to their child the value of education for future opportunities in life has been found to be predictive of academic achievement (Boonk et al., 2018).

3.4.2 Parents' Help with Homework

The second type of parental involvement studied in the present thesis—parents' help with homework—refers to how often parents help their child with homework. Results with regard to this particular type of

involvement in relation to academic achievement have been inconsistent in prior studies (Boonk et al., 2018). Wilder's (2014) meta-synthesis of the results of nine meta-analyses suggested that there was no positive relationship between parents' help with homework and students' academic achievement, causing her to conclude that students are not likely to benefit much from this type of involvement (Wilder, 2014, p. 392). One plausible explanation for why many studies have found that helping one's children with homework is not statistically significantly related to their academic achievement, or sometimes that this is even negatively correlated with their achievement (Hill & Tyson, 2009), is that most parents are not skilled to teach or are not familiar with appropriate teaching methods (Wilder, 2014). By contrast, Tam and Chan (2009) found that parents' help with homework was indeed positively associated with the academic development of children. Other studies have indicated that whether parents' help with homework is beneficial for students' outcomes depends on the type of involvement. For example, Moroni and colleagues (2015) found that when homework involvement was perceived as supportive, it was positively associated with students' achievement, but when parents were perceived as intrusive and controlling in the homework process, their help was negatively associated with students' achievement. Interestingly, students with low reading achievement reported more parental control ($\beta = -.12$). Finally, the research synthesis of Patall and colleagues (2008) serves as a useful summary of the relationship between parents' involvement and students' academic achievements in that the authors concluded that the overall effect size of parental involvement in homework varied across grade level, type of parental involvement, and subject.

3.4.3 The mechanism of parental involvement in educational research

While the relationship between SES and achievement is one of the most investigated topics in educational research, less is known about the mechanisms through which relative effects pass—that is, mediating factors (Gustafsson et al., 2018; Myrberg & Rosén, 2009). Myrberg and

Rosén (2008) investigated mediating factors pertaining to parents' education (as an SES indicator) in relation to students' reading achievement in seven countries including Norway. Despite variation in effect estimations across countries, they found the home library, early reading activities, and early reading ability to mediate the relationship between parental education and reading achievement on the PIRLS 2001 test. In a later study by the same authors (Myrberg and Rosén, 2009), they found that the number of books in the students' home, early reading activities, and early reading ability also mediated the relationship between parental education and reading achievement on the PIRLS test for third-graders in Sweden. An early meta-analysis by Iversen and Walberg (1982) with regard to the home learning environment of school-age children concluded that sociopsychological processes of the home have a stronger association with academic ability and achievement than family SES. This conclusion suggests that parental involvement is a stronger predictor of children's academic achievement than, for example, parental level of education (Buckingham et al., 2013). In recent years, many researchers, as well as educators and policy makers, have subscribed to that opinion, but—as Shute and colleagues (2011) out it— "[l]ess is known about [parental involvement] than is commonly assumed" (p. 1). To the best of my knowledge, while several studies have investigated mediating variables pertaining to the relationship between SES and academic achievement, including reading achievement, no previous studies have examined the direct and indirect associations of parents' education and students' home language on reading achievement through parents' academic expectations and parents' help with homework. Thus, there is a need for more research on this topic.

4 Theoretical Perspectives

Various theories can be used to explain, from different perspectives, the relationship between social background and academic achievement. Two types of theories are particularly relevant in this context. First, the reproduction theories from the field of sociology (Boudon, 1974; Bourdieu & Passeron, 1990), which have had a tremendous impact on research into educational inequality in Europe and in the United States (Van der Werfhorst, 2010), argue that the family class background into which a child is born will be reflected in the child's academic performance (see e.g., Kingston, 2001). Second, theories developed within the sociolinguistic and sociocultural paradigms emphasize language and culture in their explanations for the persistent achievement gaps in education (e.g., Cummins, 2011; Gee, 2015).

In the following, a presentation of the theories applied in the present thesis will be given, starting with the concept of cultural capital and the theory of cultural reproduction (Bourdieu & Passeron, 1990) (4.1). This will be followed by a brief presentation of other reproduction theories that have been highly influential in research on equity and equality (Bernstein, 1971; Boudon, 1974) (4.2). Then literacy perspectives (Gee, 2015) from the sociolinguistic tradition will be discussed (4.3). Finally, an attempt will be made to integrate the various concepts, and the aims of the papers included in the present thesis will be introduced (4.4).

4.1 Cultural Capital and the Theory of Cultural Reproduction

In the English-speaking world, the French sociologist Pierre Bourdieu came to be known as a "sociologist of education" in the 1970s, and his work has been tremendously influential on research into educational inequality (e.g., Kingston, 2001; Lamont & Lareau, 1988; Van de Werfhorst & Mijs, 2010; Wildhagen, 2009). Bourdieu's theories and

concepts are fairly current in Norwegian educational studies as well (e.g., Andersen & Hansen Nordli, 2012; Bakken, 2009; Lauglo, 2010; Mittal et al., 2020; Rosenlund, 2000; Toft & Flemmen, 2019). According to Grenfell (2019), it is paradoxical that Bourdieu should have become such an authority in educational research in the English-speaking world, for two reasons. First, Bourdieu wrote a great deal about many different institutions of the modern state (particularly the French one), and education was only one of them. Second, he actually doubted the possibility of change in education systems. Nevertheless, Bourdieu's discoveries and conceptual terms do offer researchers powerful tools for analyzing and understanding national education systems, in particular practical contexts within them (Grenfell, 2019).

Bourdieu's most influential contribution when it comes to educational inequality is his theory of cultural reproduction, according to which social reproduction is realized through cultural reproduction (Bourdieu & Passeron, 1990). A key concept in this context is *capital*, which is defined as "a valued resource that has the potential capacity to produce profits and reproduce itself in identical or expanded forms" (Bourdieu, 1986, p. 242). Capital comes in three fundamental guises: economic capital (e.g., money and property), cultural capital (e.g., educational degrees, books, mastery of language, etc.), and social capital (e.g., social networks between people). A child's first socialization takes place in his or her home. Children inherit their parents' cultural capital, which becomes an integral part of their "dispositions"—their attitudes, values, and behavior, which Bourdieu (1986) calls their *habitus*. Parents transmit cultural capital to their children, either passively as the children are exposed to their parents' cultural capital in the home or actively through parents' investments in transmitting their cultural capital to their children (Lareau & Weininger, 2003). Cultural capital exists in three forms. The first one is "the embodied state," i.e., linguistic competence, cultural knowledge, cultivation, values, and behaviors (a family's social origin), or in Bourdieu's (1986) words: "the form of long-lasting dispositions of the mind and body" (p. 18). The second form of cultural

capital is "the objectified cultural state," i.e., cultural goods such as books, paintings, musical instruments, and the like as well as daily practices such as leisure activities. The third and final one is "the institutionalized form," which includes educational qualifications such as educational degrees.

Bourdieu and Passeron considered cultural capital to be more important than economic or social capital for educational success (Bourdieu, 1986; Bourdieu & Passeron, 1990). According to Bourdieu, cultural capital consists of familiarity with the dominant culture in a society, especially the ability to understand and use a cultivated or educated language (Bourdieu, 1986; Bourdieu & Passeron, 1990). Reproduction theories argue that achievement gaps between privileged and non-privileged students arise because these students come from different class backgrounds. Bourdieu (1990, 1997) noted that dominant social groups tend to impose their culture and values onto the education system, meaning that subordinate social groups will be at a disadvantage in learning environments that require their children to learn and adapt to a culture different from their own. Central to reproduction theories is the idea that school is not a neutral institution but part of the power structures of a society. Achievement differences arise because school rewards those students who come from a culture which resembles the school culture. Children whose culture does not—who thus lack the relevant cultural capital—will find it more difficult to adapt to school culture, will perform worse, will be rewarded less by the teachers, and will also be less likely to earn higher educational degrees (Bourdieu, 1977; Bourdieu & Passeron, 1990).

In the context of the present thesis, the concept of cultural capital and cultural-reproduction theory were deemed particularly relevant because cultural capital can be operationalized through two of the indicators available in the dataset—the number of books in the students' home and their parents' level of education—which are indicators representing the cultural dimension of SES (Andersen Gran & Jæger, 2015; Evans et al., 2014; Van der Werfhorst, 2010; Yang & Gustafsson,

2004). A further key variable in the present thesis, also reflecting the cultural aspect of students' SES, is their home language. Bourdieu claims that language has a central role in cultural reproduction (Bourdieu, 1990) because mastering the dominant language in a society, and being able to decode the teachers' language into something meaningful, will give a student an academic advantage (Bourdieu, 1990). Hence knowledge of the dominant language in a society may enhance students' likelihood of success in school (Bourdieu & Passeron, 1990). On a final note, it should be pointed out that the concept of "capital" is no stranger to the field of international migration when it comes to explaining mechanisms of social mobility or migration-related decision-making, nor when it comes to helping immigrants obtain an education (Kim, 2018). For the reasons outlined above, the concept of cultural capital in many ways offers a valuable approach to the study of equity in education in our globalized society, not least because cultural capital in the "body and mind" (Bourdieu, 1986, p. 18) represents resources that people will bring with them to their new country even when everything else has been lost (Igarashi & Saiti, 2014; Kim, 2018).

4.2 Equity in Education in the Light of Other Reproduction Theories

Other theories from the sociology field should also be mentioned here because, like the work of Bourdieu, they have had a huge impact on educational-inequality studies in the Western world and because they offer frameworks that can be used alongside those of Bourdieu (see, Bernstein, 1971; Boudon, 1974; Goldthorpe, 2014).

In the theory of Bernstein (Bernstein, 1971), the use of language is central. It is assumed that achievement gaps between students are due to the extent of difference between the languages used in a student's home and in school. Given that language is the vehicle for the transmission of social and cultural structures between generations, Bernstein holds that children who grow up in different classes will

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develop different "language codes". For example, middle-class children will develop what he calls an "elaborated code", which is a type of language with a well-developed vocabulary, correct grammar, and complex syntax. By contrast, working-class children develop a "restricted code" which is less formal and more oral in nature, meaning that it is less compatible with the language used in school. With regard to education, Bernstein (1971) argued that different positions or groups in the society are associated with different language-use patterns that influence the ability of members of these groups to succeed in school.

The theoretical contribution of Boudon (1974) to the study of inequality in education is linked to differences in values between social classes. According to this theory, students' achievements are influenced by the norms and values they bring with them from their homes. For example, young people from the working class will traditionally tend to take vocational subjects in school and aim for practical professions, whereas young people from the middle class will typically be more academically orientated. Goldthorpe (2014) provides a framework—Rational Choice Theory—for describing and formalizing the social and economic behavior of individuals, such as the choices parents and children make in education. The underlying assumption is that different educational paths represent a different value to different social classes. For example, according to Goldthorpe (2014), it is more difficult for a child from the working class to aspire to higher education because parents who do not hold a university degree themselves may not have the knowledge required to help their children along or may not see the value of higher education for their children. On the other hand, for middle-class children, it is considered risky not to obtain an education, because this would entail a risk of downward class mobility.

While all of these sociological theories could have been useful in this thesis about educational equity in a Norwegian context, it should be pointed out again that Bourdieu's (Bourdieu, 1986) concept of cultural capital and the cultural reproduction theory was chosen, for the reasons outlined above. In fact, Norway provides an interesting case due to the

combination of diverse immigrant population and the presence of strong welfare state institutions, and relatively high intergenerational mobility among natives and immigrant descendants (Hermansen, 2016; Steinkellner, 2017). Nevertheless, despite a strong welfare state and a school model with long traditions grounded in the principle of a unitary school system, there is still polarity between young people from privileged families and those who do not have formal qualifications, limited job opportunities and therefore disadvantaged and socially excluded. Particularly immigrant children face substantially heightened risk of persistent low-income, and not earning an educational degree compared to Norwegian native-born children (Hansen, 2011; Hermansen, 2016; Omholt, 2019). Not only are socioeconomic inequalities present in the Norwegian society, they are widening (Omholt, 2019). Hence, children in Norway have different experiences of growing up due to a variety of factors, class could be considered being one of them, also in so called egalitarian societies like the Norwegian (Hansen, 2011; Hansen & Wiborg, 2019)

4.3 Investigating Equity through the Lens of Literacy Theory

As stated above, reproduction theories explain differences in students' achievement as the result of inequality related to the position in society of their respective families in terms of class. Other theories emphasize the importance of differences in the students' linguistic and cultural background as influential factors for academic achievement. The present thesis focuses in particular on students who do not primarily speak Norwegian at home. It is a legitimate assumption that many of these students also carry with them, to some extent, a culture different from the Norwegian one. The sociocultural paradigm emphasizes the impact of language and cultures, assigning a central role to challenges regarding differences between a child's first and second languages and differences between the home culture and the school culture (Cummins, 2011, 2015),

which is an important part of the reason why theoretical perspectives drawing upon that paradigm were chosen for the present thesis. It should be emphasized that reproduction theories, sociolinguistic theories, and sociocultural theories are not necessarily exclusive, but rather complementary.

James Paul Gee's literacy perspectives offer explanations for why some groups of students seem to succeed academically while others have a more troublesome academic journey (e.g., Gee, 2015; Gee & Hayes, 2011). Gee's ideas about language and literacy center on the notion of *Discourses* (with a capital "D") (Gee, 2015, p. 2). A Discourse is "a socially accepted association among ways of using language, of thinking, and of acting that can be used to identify oneself as a member of a socially meaningful group or social network" (Gee, 1989, p. 18). Hence a Discourse is composed, among other things, of distinctive ways of speaking, reading, and writing that are associated with distinctive identity traits such as behaviors, values, beliefs, and thoughts, and even with various objects, tools, and technologies. In relation to the topic of the present thesis, the relevant identities might be that of a fifth-grade student in a Norwegian classroom or school, that of a language-minority student in school, or that of a student from a family with a low-SES background. However, according to Gee, the list of identities is endless, because "Discourses are all about how people 'get their acts together' to get recognized as a given kind of person at a specific time and place" (Gee, 2015, p. 172).

Discourses exist in all kinds of settings, and Gee identifies special "marks" that may help us understand how Discourses work (see, Gee, 2015, pp. 178-180). In the present thesis, the most important mark has to do with social power and hierarchical structure. According to Gee, Discourses are closely related to the distribution of social power and hierarchical structures in a society. Having control over certain Discourses can lead to the acquisition of social goods such as money, power, and status in society. Such Discourses will empower similar Discourses, which, in turn, will merge into the dominant Discourses in

the society, causing others to be excluded from the dominant Discourse. The school Discourse is a good example of a Discourse which is controlled by the dominant Discourses: traditionally, the children of people with social and economic power tend to have easier access to school and tend to master the school Discourse better.

Gee distinguishes between "primary" and "secondary" Discourses (e.g., Gee, 1989; 2015, Chapter 14). Primary Discourses are those characterizing the first social settings that children are exposed to early in life, usually in their family. This is where the first socialization takes place. Secondary discourses are those characterizing settings where socialization takes place outside of the home or family. These settings are more public in nature; they may be associated with institutions such as school. A secondary Discourse always builds on the use of language, values, attitudes, and beliefs acquired as part of one's primary Discourse. As in Bourdieu's theory of social and cultural reproduction (Bourdieu, 1973), there is also an aspect of reproduction between generations in Gee's theory of Discourse (2015). However, Gee explains achievement differences in general literacy and reading literacy as related to differences between a person's first and secondary Discourse rather than as related to the social class into which the child is born. Hence Gee's view represents a more positive perspective on inequality in education: people are not "stuck" in their Discourse to the same extent as they are "stuck" in their social class, because it is possible to move between Discourses and to be part of many Discourses at the same time. For example, many social groups borrow aspects of highly valued secondary Discourses into the socialization of their children (Gee, 2015). One example of this would be for parents to use "school-type" language and practice "school-type" activities such as reading with their children in order to prepare them for school. Even so, the consequence of Gee's ideas (2015) is that children whose primary Discourse is more similar to the school Discourse in terms of language, practices, values, and behaviors will have a greater chance of succeeding academically. Gee's thinking (2015) may be particularly applicable in countries where the

boundaries between the social classes are rather diffuse, such as Norway (Chan et al., 2011).

4.4 Integration of Concepts and Aim of Papers

As already mentioned in the introduction part, the purpose of the thesis was to contribute to existing reading research by investigating equity in reading literacy. Based on this purpose three specific research questions were developed.

1. What are the associations between students' home language, the cultural aspect of their family's SES, and their reading achievement?

Equity studies must start by investigating the extent to which differences in achievement are actually related to various equity-related indicators. Hence the associations—at student level—among students' home language, their gender, the cultural dimension of their family's SES, and their reading achievement are the subject of Studies 1 and 2. Study 1 specifically examines multilingual students' results in the PIRLS 2016 assessment in a broad sense, mainly using descriptive statistics. The aim of Study 2 was to determine the relative effect on students' reading achievement of the variables of students' home language (how often they speak Norwegian at home), their gender, the number of books in their homes, their parents' level of education, and students' access to digital devices. The two variables relating to the number of books in the home, the parents' level of education are used as indicators of the cultural aspect of family SES, although this is referred to as "home resources" in the respective articles.

Study 3 addresses the second research question:

2. What are the direct and indirect associations between students' home language, parents' education, students' sense of school belonging and reading achievement?

Previous research has shown that students' sense of school belonging is positively associated with their reading achievement and SES (Allen et

al., 2016). Study 3 adds new knowledge to this field by including the students' home language in the analysis in a Norwegian school context. Since this study was conducted at school level and used data from relatively young students (ten-year-olds), it will provide entirely new information, considering that other studies investigating school belonging using a Norwegian sample, were conducted at the student level and on older students (tenth-graders (Bakken & Hyggen, 2018) and fifteen-year-olds in PISA (OECD, 2019)).

Finally, Study 4 addresses the third research question:

3. What are the direct and indirect associations between students' home language, parents' education, parents' academic expectations, parents' help with homework and reading achievement?

This study concerns the potential opportunities to be found in the students' homes. Previous research has found that, despite an immigrant background and a low family SES, immigrant parents have high academic expectations for their children and are eager to manifest parental involvement of various types (Bakken & Hyggen, 2018; Lauglo, 2010). However, this finding has not previously been investigated with regard to such young students in a Norwegian context.

An overview of the central concepts and associations studied in the present thesis is given in Figure 1.

Figure 1

Integration of concepts in this thesis
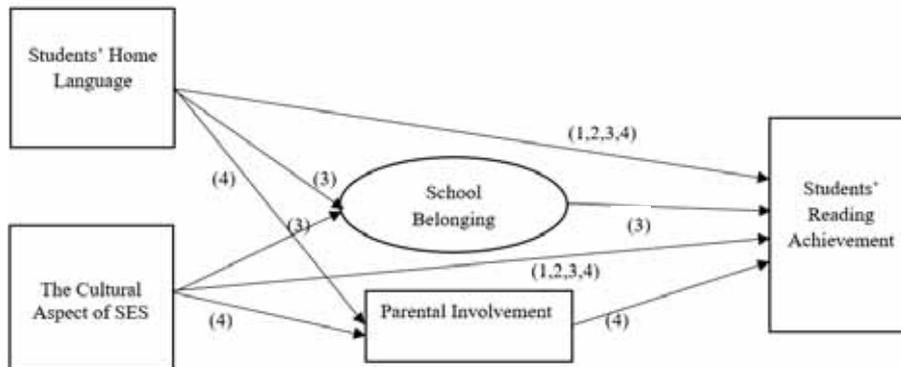
Note. The numbers in the parenthesis refers to papers 1, 2, 3 and 4, gender was included in study 1 and 2.

5 Methodology

Data Material, Target Population and Sampling Design

The four studies included in the present thesis rely on data from the Norwegian PIRLS 2016. PIRLS is an international large-scale assessment of students' reading achievement conducted by the International Association for Evaluation of Educational Achievement (IEA). PIRLS has been administered every 5 years since 2001, documenting worldwide trends in reading comprehension in ten-year-olds. The PIRLS database provides not only information about reading scores but also a wealth of background information from questionnaires administered to students, parents or other guardians, teachers, and school principals (TIMSS & PIRLS International Study Center Lynch School of Education Boston College, 2016). The background questionnaires solicited information within five broad areas: "National and community contexts," "Home contexts," "School contexts," "Classroom contexts," and "Student characteristics and attitudes toward learning" (Mullis et al., 2015, Chapter 2).

The target population of PIRLS is defined as follows: "[a]ll students enrolled in the grade that represents four years of schooling counting from the first year of ISCED Level 1, providing the mean age at the time of testing is at least 9.5 years"[9] (LaRoche et al., 2017, p. 3.3). However, when it comes to Norway, there is a need for clarification: in the PIRLS cycles 2006 and 2011, fourth grade was the main target population but a reduced sample of fifth grade was included in addition (Gabrielsen & Hovig, 2017, p. 33). In the 2016-cycle, Norway had representative samples from both the fourth (mean age 9.8 years) and the

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[9] ISCED level 1 refers to primary education with a duration ranging from four to seven years (Eurostat [2018]).

fifth grade (mean age 10.8 years)[10], the latter defined as the main target grade. Thus, the present thesis used only data from Norwegian fifth-graders in the studies 2, 3 and 4. Data from fourth-graders were included in the preliminary analysis (Study 1), but only for the provision of trend results.

PIRLS employs a two-stage random stratified-sample design (LaRoche et al., 2017). For the first sampling stage, a sample of schools within the country was randomly drawn. At the second sampling stage, one or more intact classrooms of students were selected from each of the sampled schools rather than individuals from across the grade level. In large schools (cutoff: >45 students per grade), two classrooms were sampled. In the Norwegian sample, design stratification by the written languages Bokmål and Nynorsk[11] was used to ensure proportional representation of the specific groups in the sample. Summarized in 2016, the Norwegian sample of fifth-graders consisted of 150 schools, 215 intact classes, and 4,232 students.

5.1.1 Coverage of target population: schools, and students of 5th grade

Application of the specific PIRLS school-level exclusion rules from national target population for Norway 5th grade, entailed that 2 percent of the schools selected were excluded (LaRoche & Foy, 2017, Exhibit, 5.2). These schools were excluded because of their small size (cutoff: <5 students per grade), they were special-needs schools or schools with Sami (one of the official minority languages of Norway) as the instructional language (LaRoche & Foy, 2017. Appendix 5A).

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[10] For PIRLS 2016 Norway's main target group was revised to students in their fifth grade to obtain better comparisons with Sweden, Denmark and Finland because grade 1 in Norway is considered the equivalent of a year in kindergarten in many other education systems. The fact that only fifth-graders (and not fourth-graders) will be in their fourth year starting from the year in which they have academic goals to attain was put forward as an argument in favor of letting fifth-graders only be Norway's target population (Gabrielsen & Hovig, 2017).

[11] These two, which are varieties of Norwegian, are two of the three official written languages in Norway; the third is Sami.

Specifically, 153 schools were originally sampled, 152 schools were found eligible, 145 schools in the original sample participated, and 5 replacement schools were needed. In total 150 schools participated in PIRLS 2016 from Norway (LaRoche & Foy, 2017, Exhibit 5.11).

Student-level exclusions amounted to 3.3 percent of the sampled students (LaRoche & Foy, 2017, Exhibit 5.2). These were as follows: First, 7 students with functional disabilities. According to the exclusion rules these students fitted the definition: "[s]tudents who have physical disabilities such that they cannot perform in the PIRLS testing situation" (LaRoche et al., 2017, p. 6). Second, 71 students with intellectual disabilities defined as [s]tudents who are considered, in the professional opinion of the school principal, or by other qualified staff members, to have intellectual disabilities or who have been tested as such. This includes students who are emotionally or mentally unable to follow even general instructions of the test" (ibid). And third, 61 non-native language speakers defined as "[s]tudents who are unable to read or speak the language(s) of the test and would be unable to overcome the language barrier in the test situation. Typically, a student who has received less than one year of instruction in the language(s) of the test should be excluded" (ibid).

To enable appropriate inferences at the country level (and across countries), participating countries are required to meet the sampling and participation standards with minimum deviations from the international sampling design. The guidelines require that at least 85 percent of both sampled schools and sampled students (or a combination rate of 75 percent) must have participated in the assessment. Norway's coverage of the target population was 100 percent in 2016 (LaRoche & Foy, 2017, Appendix 5A). One reason why the school-participation rate was so high was clearly that the Norwegian Directorate of Education had made participation in PIRLS 2016 mandatory for the selected schools. When it comes to questionnaire-response rates, 96 percent of the parents, 99 percent of the teachers, and 99 percent of the principals completed their respective questionnaire (Gabrielsen & Strand, 2017, p. 20). The

circumstances described above ensure that the conclusions drawn from the present study were based on a nationally representative sample of fifth-graders.

5.1.2 Weights

In PIRLS, sampling weights are used to accommodate the fact that some units (schools, teachers, or students) are selected with different probabilities (Rutkowski et al., 2010). To ensure that none of the units will be overrepresented in the estimates, each student response is adjusted to reflect the proportional occurrence of students with that student's specific characteristics in the overall population; these adjustments are called sampling weights. Appropriate weights must be applied in every analysis of PIRLS data. In the PIRLS database, five sets of weights are available. An account of the different weights in PIRLS and how to use them is given in Rutkowski, Gonzales, and Von Davier (2010). The sets are the following: (a) *total student weight*, which is appropriate for single-level student-level analysis; (b) *house weight*, which may be considered in analyses that are especially sensitive to sample size (e.g., chi-square tests); (c) *student-senate weight*, which should be used in analyses that combine more than one country, to prevent the results from being dominated by the country with the larger sample; (d) *teacher weight*, which should be used in analyses that include teacher variables; and finally (e) *school weight*, which should be used when the analysis is conducted at school level.

In Studies 1, 2, and 4 in the present thesis, total student weight was applied, as is appropriate for student-level analysis. In Study 3, since the unit of analysis was the school, a school weight was instead computed, in accordance with the recommended procedures (Rutkowski et al., 2010) (see Section 5.6.3 for information about how this was done).

5.1.3 Variance Estimation

Because of the stratified two-staged sampling design, the standard variance formulas for parameter estimates are not appropriate (Rutkowski et al., 2010). To estimate unbiased measures of the uncertainty associated with sampling, i.e., standard errors, PIRLS uses the Jackknife Repeated Replication (JRR) method (Foy & LaRoche, 2017, Chapter 4). Readily available variance estimation applicable to means, correlation and multiple linear and nonlinear regressions is available in the IEA International Database Analyzer (IDB Analyzer). The analysis conducted in the software Mplus followed the specific guidance for this software given by Asparouhov and Muthén in "Resampling Methods in Mplus for Complex Survey Data" (2010). (See also section 5.6 Statistical Procedures).

5.2 Booklet Design and Scaling Methodology

As described in section 2.2, PIRLS assesses reading comprehension in relation to two reading purposes: reading for literacy experience and reading to acquire and use information. Within each of those purposes, four comprehension processes are tested: (1) focusing on and retrieving explicitly stated information; (2) making straightforward inferences; (3) interpreting and integrating ideas and information; and (4) evaluating and critiquing content and textual elements. PIRLS achieves a broad coverage of reading comprehension by applying a matrix-sampling booklet design (Foy & Yin, 2017). Technically, the pool of texts (with their corresponding items) is divided into blocks or clusters of texts and items ("passages"). Each student is then given one of these blocks, meaning that each student receives only a subset of the entire PIRLS assessment pool. Concretely, this means that each student is given a single booklet that contains two texts, one fiction and one non-fiction text, with corresponding items eighter multiple-choice or constructed-response questions. Taken together, the items in each block should address the full range of PIRLS comprehension processes. In the PIRLS

2016 assessment design, there were twelve blocks distributed across sixteen booklets. To enable the measurement of trends in reading achievement, six of those blocks were "trend blocks" which had been included in previous PIRLS assessments. The sixteen booklets were distributed randomly among students in the participating classrooms, and the total testing time per student was 80 minutes.

The outcome variable used in all four studies included in the present thesis is the students' total reading-achievement score. The PIRLS achievement scores are computed in accordance with Item Response Theory (IRT) scaling methods (Foy & Yin, 2017). IRT scaling methods make it possible to calculate scores relying on a student's responses to the items pertaining to the relevant subset of the total assessment. Based on all the background information about students pluss their item scores, the IRT model determines probabilities with regard to how a student *would* respond to the items that he or she did not in fact answer. This yields an interval scale on which the student's score on the entire pool of assessment items is estimated. The relatively small number of items per block means that the accuracy of measurement at the individual level is lower in PIRLS than is commonly seen for individual tests of reading. Hence the PIRLS data are not suitable for assessing individual test scores or for drawing conclusions based on individual test scores—they should be used only to describe groups within a population of interest (Von Davier et al., 2009). Further, as each student responded only to a subset of the full test, there is considerable measurement error in the measurement of individual reading proficiency (Von Davier et al., 2009). To obtain unbiased group-level estimates, the PIRLS scaling approach uses a multiple-imputation technique that yields "plausible values." This technique permits multiple values representing the likely distribution of a single student's reading proficiency, so that the database will provide unbiased estimations for different groups of students. The plausible values are based on a combination of the students' responses to the subset of items presented to them with all

available background information about the students; this process is known as "conditioning" (Foy & Yin, 2017).

Although PIRLS provides a rich database, the complexity and structure of that database requires the use of specialized methods of statistical analysis to appropriately account for the features described above (e.g., Rutkowski et al., 2010). For example, the clustered structure of the data (with students nested within classrooms and schools, and schools within countries) frequently necessitates a multilevel approach to analysis; the nature of the sampling framework requires the use of sampling weights to produce unbiased parameter estimates; and the scaling methodology and the use of plausible values must be taken into consideration whenever the data are analyzed. Information about how these special features of the data set were dealt with in the analyses reported in the present thesis is explained in section 5.6. Statistical Procedures.

5.3 Description of the Sample Used in the Four Studies

The student sample used in the four studies consisted of 4,232 fifth-graders (mean age: 10.8 years) from 215 classes and 150 schools; 50.2 percent of them were girls. From the student questionnaires, the following information was retrieved: 68 percent reported *always* speaking Norwegian at home, 21 percent reported *almost always* speaking Norwegian at home, 10 percent reported *sometimes* speaking Norwegian at home, and only 1 percent reported *never* speaking Norwegian at home. From the parents' questionnaires, the following information was retrieved: 7 percent of the children were not born in Norway; 3 percent had come to the country when they were less than three years old while less than 1 percent were older than eight on their arrival. Further, according to the parents, 95 percent of the children had spoken Norwegian before first starting school while 1.6 percent had spoken Danish or Swedish and the remaining had spoken "other

languages." Information about the parents' level of education was also retrieved from their questionnaire: in 32 percent of the families, at least one of the parents held a university degree, while it was only the case for 5 percent of the families that one or both parents reported having received no schooling at all or having completed primary school only.

5.4 Instruments and Variables

The *student reading achievement scale* (variable name ASRREA01-05/ Overall Reading PV1 in the data set) was used as a dependent variable in all four studies. This is a continuous variable encompassing students' total scores for the four reading-comprehension processes: (1) focusing on and retrieving explicitly stated information; (2) making straightforward inferences; (3) interpreting and integrating ideas; and (4) evaluating and critiquing content and textual elements (see also section 2.2 above about the operationalization of reading literacy in PIRLS). The scale was developed using IRT scaling methodology (Foy & Yin, 2017, also see section 5.2 above), which yielded an interval scale ranging from 315.0 to 774.7 score points. The chronbach's alpha test reliability coefficient for the PIRLS overall reading achievement scale for Norway 2016 was .87 (Foy et al., 2017b, Exhibit 10.7). The coefficient is the median Chronbach's alpha reliablity across all PIRLS 2016 assessment booklets. Following the recommendations on how to use the reading-achievement scale in statistical analysis (Von Davier et al., 2009), the five plausible values were included in calculations in all analyses that included reading achievement (see also section 5.6, Statistical Procedures below).

Further, a variable called *students' home language* (variable name ASBG03 in the data set) was calculated on the basis of one item in the student questionnaire which had the following wording: "How often do you speak Norwegian at home?" The students responded using a four-point Likert-type scale where the options were the following: 1 = *I always speak Norwegian at home*; 2 = *I almost always speak Norwegian*

at home; 3 = *I sometimes speak Norwegian at home*; and 4 = *I never speak Norwegian at home*. This variable was used in all four studies (see also section 2.3 Defining Students' Home Language).

The variable *parents' level of education* was measured using two items in the parent questionnaire with the following wording: "What is the highest level of education completed by the child's father (or stepfather or male guardian)" (variable name ASBH18A in the data set), and "What is the highest level of education completed by the child's mother (or stepmother or female guardian)" (variable name ASBH18B in the data set) The education levels are based on the International Standard Classification of Education (ISCED) 2011 (UNESCO, 2012), which includes nine levels from ISCED level 0–Early-childhood education to ISCED level 8–Doctoral or equivalent level. The range used for this variable was the following: 1 = *Did not go to school*; 2 = *Some primary education* (ISCED level 1); 3 = *lower-secondary education* (ISCED level 2); 4 = *upper-secondary education* (ISCED level 3); 5 = *post-secondary, non-tertiary education* (ISCED level 4); 6 = *short-cycle tertiary education* (ISCED level 5); 7 = *Bachelor's or equivalent level* (ISCED level 6); 7 = *Master's or equivalent level* (ISCED level 7); and 8 = *Doctor or equivalent level* (ISCED level 8). This variable was used in all four studies as an indicator of the cultural aspect of students' family SES (see also section 2.4 Conceptualization of Socioeconomic status).

The variable *number* of *books at home* (variable name ASBH 13 in the data set) was calculated using one item in the parent questionnaire with the following wording: "About how many books are there in your home? (Do not count ebooks, magazines, newspapers, or children's books)" and the following response options: 1 = *0–10*; 2 = *11–25*; 3 = *26–100*; 4 = *101–200*; and 5 = *more than 200*. This variable was used in the analyses in Studies 1 and 2 as an indicator of the cultural aspect of students' family SES (see also section 3.2 Associations between the Cultural Aspect of SES and Reading Achievement).

The variable *access to a computer or laptop at home* (variable name ASBG05A in the data set) is a dichotomous variable retrieved from a student-questionnaire item with the following wording: "Do you have a computer or tablet at your home?", to which students could respond only *yes* or *no*. This variable was used as an indicator of the home resources for learning to read in study 2.

The variable *students' sense of school belonging* was computed using five items in the student questionnaire (variable names ASB612A-E in the data set). Those items asked students to indicate on a four-point Likert-type scale ranging from 0 *disagree a lot* to 3 *agree a lot* how strongly they agreed with (a) *I like being in school*; (b) *I feel safe when I am at school*; (c) *I feel like I belong at this school*; (d) *Teachers at my school are fair to me*; and (e) *I am proud to go to this school*. This variable was used in Study 3 (see also section 2.5 Defining Students' Sense of School Belonging).

The variable *parents' expectations for their child's educational achievement* (variable name ASBH19 in the data set) was assessed using one item in the parent questionnaire with the following wording: "How far in his/her education do you expect your child to go?" It was measured using a six-point scale where 1 = *finish lower-secondary education* (ISCED level 2); 2 = *finish upper-secondary education* (ISCED level 3); 3 = *finish post-secondary, non-tertiary education* (ISCED level 4); 4 = *finish short-cycle tertiary education* (ISCED level 5); 5 = *finish Bachelor's or equivalent level* (ISCED Level 5) and 6 = *obtain a postgraduate degree: Master's or Doctor* (ISCED level 7 or 8). This variable was used in Study 4 (see also section 2.6 Defining Parental Involvement).

Finally, the variable *parents' help with homework* (variable name (ASBH08B in the data set) was assessed using one item from the parent questionnaire with the following wording: "How often do you or someone else in your home help your child with homework?", to which parents responded using a five-point scale where 0 = *Never or almost*

never; 1 = *Less than once a week*; 2 = *Once or twice a week*; 3 = *three or four times a week*, and 4 = *every day*. This variable was used in Study 4 (see also section 2.6 Defining Parental Involvement).

Additionally, students' gender was used in the descriptive statistics in Study 1 and as a control variable in Study 2.

5.5 Methodological Considerations and Assumptions

One of the main focuses of this thesis is to investigate to what extent students' home language and their cultural family SES relate to their reading achievement. It was also of interest to determine the relative contribution of each SES-indicator on reading achievement. To do so, Multiple Regression (MR) analysis was applied, more specifically a linear regression analysis in Study 1 and hierarchical regression in Study 2. MR is a statistical technique used to predict the value of a dependent variable based on the value of two or more independent variables. It is also used to determine the variance of the model and the relative contribution of each of the independent variables to the total variance explained. MR techniques are often used to explain a causal relationship between two or more variables, for example that A predicts B over time and that A and B covary (e.g., Skog, 2004, p. Chapter 8). However, it should be noted that, because of the cross-sectional design of PIRLS, no causal inferences can be drawn from the present results. The data met the prerequisites for MR analysis. First, the dependent variable (students' reading achievement) was measured as a continuous variable at the interval level. Second, the hypothesized model included multiple independent variables. Third, scatterplots and variance analysis showed there to be linear relationships between the dependent variable and the independent variables.[12] Fourth, the correlation matrix showed that the

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[12] Since perfect linear relationships are very rare in the behavioral sciences, error terms will almost always occur when the regression line is fitted to the data (McDaniel, 2018).

independent variables were not too highly correlated with each other[13]. Fifth, MR requires the residuals of the continues variables to be approximately normally distributed (Skog, 2004, Chapter 6). In study 1 and 2, all the independent variables were binary or ordinal and treated as categorical and therefore dummy coded.

In Study 3, the aim was to investigate direct and indirect associations of students' home language and parents' education on reading achievement through school belonging. For this purpose, structural equation modeling (SEM) was found to be appropriate. Linear regression (which can be regarded as a restricted case of SEM for analyzing observed variables) was considered inadequate because a latent construct—*students' sense of school belonging*—needed to be included in the model. SEM is a suitable technique where the associations between variables are complex and where theories include hypotheses including both direct and indirect effects of the variables of interest (e.g., MacKinnon, 2008). In SEM, structural relationships between multiple dependent variables and multiple independent variables can be analyzed simultaneously. In addition, it is possible to test how well the model fits the data. Hence competing models can be compared to determine which of them fits the data best, and various constructs can be tested. A general (one-factor) confirmatory factor analysis (CFA) model, referred to as the "measurement model" in which the scale scores load onto a single common factor, was used to measure that latent construct. A CFA model is able to depict the relationships between the observed variables in the study and the latent variable (Kline, 2015). In Study 4, direct and indirect associations between students' home language, parents' educational level on reading achievement through two indicators of parental involvement were to be tested. Unlike in Study 3, the hypothesized model did not contain any

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[13]Pearson's r <.7 was used as a cutoff for multicollinearity (Skog, 2004). Multicollinearity makes it difficult to determine how much each of the independent variables contributes to the variance explained and also leads to technical issues in MR calculations (Choen, 2003).

latent constructs, only manifest variables. Hence a path model—which belongs in the SEM framework (see Kline, 2015)—was applied. Path models feature single-indicator measurements where each hypothetical construct is measured using a single manifest variable. Path analysis has the same advantages as SEM in that all parameters in the model are calculated simultaneously and model fit can be estimated (Geiser, 2013).

5.5.1   Model Fit Assessments

Model evaluation is to examine whether or not the model structure can represent the structure of the covariance matrix of the data. The maximum Likelihood (ML) estimator-method is the most widely used fitting function in the whole range of structural equation models and it is usually the default in Mplus (Kline, 2015, pp. 235-236). The ML-method estimates the likelihood that the data (the observed covariances) were drawn from this population. In SEM, model evaluation is essential, and model fit assessments applied in study 3 is described next. Dozens of fit statistics are described in the SEM literature. This thesis follows the recommended approach to fit evaluation by Kline (2015), who draws on some of the most widely cited theories in the literature on this field such as Bentler (1990) and Steiger (1990). In accordance with these recommendations the following fit statistics were reported for the CFA and SEM in study 3:

1. Chi-square test (χ^2) with its degree of freedom was applied. This tests the null hypothesis that the observed covariance matrix and the covariance matrix generated by the model are equal. A significant chi-square test leads to the rejection of the null hypothesis. Since χ^2 is likely to be oversensitive due to the large sample size it may suggest rejection of the model (e.g., Schumacker & Lomax, 2010). In order to eliminate the influence of sample size in a model evaluation, other absolute fit indices were applied.

2. The Root Mean Square Error of Approximation (RMSEA) which is a measure of approximate model fit. A cutoff value close to .06 for RMSEA indicates a good model fit (Hu & Bentler, 1999).

3. The Standardized Root Mean Square Residual (SRMR) is a standardized measure for the evaluation of the model residuals. Small SRMR values indicate that the observed variances, covariances, and means are appropriately reproduced by the model on average. A cutoff value close to .08 for RMSEA is needed for a relatively good fit between the hypothesized model and the observed data (Hu & Bentler, 1999).

4. The comparative-fit index (CFI) compares the fit of the hypothesized model with the null-model where 1.0 is the best result. Discussion in the literature on which other fit indices CFI should be combined with exists (see Kline, 2015, pp. 276-277). However, it seems that much literature agree that CFI should be close to .90 or above for a good model fit (Hu & Bentler, 1999).

In study 4, a manifest path analysis was applied. The model fit statistics described above do not apply to so-called saturated models. The estimated manifest model in this case has zero degrees of freedom. The reason is that all means, variances, and covariances of the manifest variables are used up in the model to estimate model parameters (this was the same issue with the manifest regression models in Study 1 and 2). One consequence is that the model does not contain any testable restriction and therefore fits the data perfectly (Cole & Preacher, 2014). In general, in a saturated model the judgement of the model fit focuses more on the estimated model parameters (path coefficients) and the obtained proportion of the explained variability in the endogenous variables (as measured by the R^2 value) rather than the global fit statistics (Geiser, 2013, pp. 66-68).

5.5.2   Analysis on Clustered Data

As described in section 5.1, PIRLS has a cluster sampling design. Ignoring the clustered nature of data may cause severe problems

conceptually and statistically. Using conventional statistics to analyse clustered data without proper adjustment can lead to biased results, in particular, the standard errors of the model parameters may be underestimated, because dependencies in the data due to clustering lead to an overestimation of the effective sample size (e.g., Cohen et al., 2003; Snijder & Bosker, 1999). In random samples (without cluster structure) the assumption of independence observation is met, while, in clustered samples, there often are dependencies among observations from the same cluster. For example, it is reasonable to assume that students within the same classroom or school have something in common, or they are more similar to each other, than students who belong to a different classroom or a different school. The reason is that the students in the same classroom and school are subject to some of the same influences. For example, they may have the same teacher, and they are part of a common class and school climate which will eventually affect the children's reading achievement. The conceptual problem is related to the interpretation of results analysing clustered data. For example, in many cases, variables at the individual level (e.g., students' characteristics such as their language or SES-level) as well as variables at the school-level (e.g., school belonging and school climate) are assumed to be predictors of reading achievement. Thus, one has to be cautious to draw cross-level inferences (Kim et al., 2014). Although Mplus enables some forms of multilevel modeling, and the technical part in the software is not very difficult, the implementation of the multilevel methodology is not straight forward due to the complexity of multilevel models and the complicated data structure of PIRLS. For example the clustered nature of the data adds complexity to the treatment of missing observations (see e.g., Kim et al., 2014). General ways to deal with multilevel data is to eighter aggregate or disaggregate variables to a common level. Even though these methods may face the problems of loss of statistical power in the case of aggregation, and overestimation of power in the case of disaggregation, they are useful in exploring the contextual effects on academic achievement at both individual level and collective level. Thus,

it is statistically appropriate to isolate the different levels' effect by aggregating or disaggregating a single level data when the research question focuses on the same level. Focusing on student level (disaggregated data) is also particular needed in equity-studies because it is desirable to measure equity levels also within schools and not only between schools or between countries (UNESCO UIS, 2018). It can be mentioned here that a two-level SEM was applied at first in Study 3. However, considering the research question which focuses on the school level factor: school belonging, and the theoretical rationale behind this variable (that the students clustered in the same school have something in common regarding their school environment), and that the results were quite tricky to interpret, we decided to go for the less complicated one-level model.

5.5.3 Handling Missing Data on Item Level

Missing data on item level may cause biased parameter estimates and weakened the generalizability of the results (Enders, 2010). Moreover, ignoring cases with missing data leads to loss of information which in turn decreases statistical power and increases standard errors. Yet, there is no established cutoff from the literature about an acceptable percentage of missing data on item level in a data set for valid statistical inferences. For example, Schafer (1999) suggested an acceptable cutoff of 5%, whereas Bennet (2001) suggested that statistical analysis is likely to be biased when more than 10% of data is missing. On the other hand, Tabachnick and Fidell (2013) argued that the missing data patterns have a greater impact on analyses results than does the proportion of missing data. Missing data on item level was in this thesis dealt with using the listwise deletion (Study 1) and the multiple imputation (MI) technique (Studies 2, 3 and 4). The frequency and percentages of missingness on the items used in the four studies are given in Table 3.

Table 3

Missing Data on Item-level

Variable	Frequency (total missing)	Percentage	Source
Gender	2	.04	Student questionnaire
Students' home language	54	1	Student questionnaire
Educational level of father	552	13	Parent questionnaire
Educational level of mother	584	13.8	Parent questionnaire
Number of books at home	200	4.7	Parent questionnaire
Possessing computer or tablet	43	1	Student questionnaire
I like being in school	67	1.6	Student questionnaire
I feel safe when I am at school	65	1.5	Student questionnaire
I feel like I belong at this school	78	1.8	Student questionnaire
Teachers at my school are fair to me	76	1.8	Student questionnaire
I am proud to go to this school	62	1.5	Student questionnaire
Parents' academic expectations	407	9.6	Parent questionnaire
Parents' help child with homework	222	5.2	Parent questionnaire

(n = 4,232)

Mplus can fit models using maximum likelihood (ML) estimations, but ML cannot handle missing data for the explanatory variables. Therefore, a MI approach was considered an option for studies 2,3 and 4. A multiple imputation approach is a method that involves replacing each missing

value with a value computed based on the information available about each case (Enders, 2010; Roderick & Rubin, 2002, Chapter 5). More specifically, Bayesian estimation techniques (i.e., interrelations between the variables and the information available about the cases) were used to impute the missing values for students' and parents' responses. The missing data mechanism assumed is missing at random, which implies that the missing values are independent of the unobserved data (see eg., Dong & Peng, 2013; Kim et al., 2014). Since plausible values are provided for students' reading achievement, no multiple imputation is needed for the outcome variable. In Study 1, missing data were dealt with using listwise deletion, meaning that all data were removed for those cases where one or more values were missing; this was a standard procedure used for the 2016 national PIRLS report, of which Study 1 was a part.

5.6 Statistical Procedures

Table 4 presents an overview of the statistical methods used in the different studies. Then more detailed descriptions are given of the methods in each study. Some of the statistical analysis described in this section supplements the statistics reported in the respective studies; this is particularly true for Study 1, which does not follow all the general conventions for a scientific paper.

Table 4

Overview of statistical techniques used in the different studies

Analysis	Study 1	Study 2	Study 3	Study 4
Intra Class Correlation		x	x	x
Multiple linear regression	x			
Hierarchical regression analysis		x		
Confirmatory factor analysis (CFA)			x	
Hypothetical structural model testing using structural equation modeling (SEM)			x	
Manifest path model				x
Bias-corrected bootstrap test of mediation with the use of confidence intervals			x	x
Use of sampling weights	x	x	x	x
Analysis of variance (ANOVA)		x	x	
Cross-tabulations				x
Cronbach's alpha			x	
Correlation (Pearson's *r*)		x	x	x
Two-tailed significance test	x	x	x	x
T-test	x	x		

5.6.1   Study 1

In Study 1, the objective was to investigate disparities in reading achievement between monolingual students, i.e., students who responded that they *always* spoke Norwegian at home, and multilingual students, i.e., students who responded that they *almost always*, *sometimes*, or *never* spoke Norwegian at home. Students' mean reading-achievement scores were calculated and a *t*-test was used to determine whether there was a statistically significant difference between the means of the two groups. In addition, a two-tailed test was used to test the level of statistical significance. Further, multiple linear regression was conducted to test the ability of the independent variable *students'*

home language to predict students' reading achievement while students' social background was controlled for (using the indicators *number of books at home* and *parents' level of education*).

Data preparation (merging the different data sets), descriptive statistics, and the regression analyses were conducted in the IEA IDB Analyzer. This software is designed to handle the PIRLS design (International Association for the Evaluation of Educational Achievement [IEA]). Specifically, it handles the sampling design properly by using the JRR technique to estimate correct standard errors, includes the estimations of the plausible values, and applies appropriate sampling weights as instructed. For descriptive statistics and regression analysis, it uses optimized algorithms for computing means, percentages, standard deviations, and regression coefficients. The software also has the capability to dummy code (contrast code) categorical variables and include these in the regression equation, which was done in Study 1.

5.6.2   Study 2

In Study 2, analyses of variance (ANOVAs) were run to investigate group differences in parents' level of education, in the number of books at home, and in the presence of digital devices at home between Native Norwegian Speaking Students, i.e., the students who responded that they *always* or *almost always* spoke Norwegian at home, and Language Minority Students, i.e., the students who responded that they *sometimes*, or *never* spoke Norwegian at home (see also section 2.3 about these terms). The intraclass correlation for overall reading achievement was calculated at the class level. Intercorrelations between all the variables in the study were tested using Pearson's *r*. Hierarchical regression analysis (five steps) was conducted to measure the relative contribution of each of the independent variables to the total variance in reading achievement explained by the hypothesized model. The parameters of the regression models were estimated using maximum-likelihood estimation, which is effective for large samples (Kline, 2015). These procedures were performed in Mplus version 8.1. To meet the requirements following

from the complex structure of the PIRLS data, several procedures were necessary. First, the different data sets were merged in the IEA IDB Analyzer. Second, preparation of the data for analysis in Mplus was carried out in an SPSS syntax file, which includes all the variable coding and the commands for preparing one data file for each plausible value (yielding a total of five data files). The remaining analysis was conducted in Mplus version 8.1. Since plausible values are not individual scores in the traditional sense, the reading-achievement scale should not be analyzed either as multiple indicators of the same score or as a latent variable (see Mislevy, 1993; Von Davier et al., 2009). Following the recommended procedures (Von Davier et al., 2009), all five plausible values for reading literacy were included in the calculations. This means that the statistics of interest need to be calculated using each of the plausible values and then averaged. This is done by using an imputation file in Mplus with all five measurements. That file provides a single joint result which is the mean of the five results for each plausible value. To properly compute the variance in reading achievement and to correctly estimate standard errors, all five plausible values must be used as expressed in the formula of Little and Rubin (Little & Rubin, 2002). Finally, the student-sampling weight (labeled TOTWGT in the data set) was specified in the syntax; the unit of analysis was student-level and the cluster option was student identification.

5.6.3   Study 3

In Study 3, intraclass correlations were calculated for the variables school belonging and reading achievement to determine dependencies in the nested data. ANOVAs were carried out to investigate group differences in students' sense of school belonging between students who primarily spoke Norwegian at home and students who did not, as well as between students from homes with a high and low parental level of education, respectively. Confirmatory factor analysis (CFA) was applied to test the fit of the proposed factor structure for students' sense of school belonging. To determine the internal consistency of measurements,

Cronbach's alpha was computed. Pearson's *r* was applied to determine correlations between that construct and the manifest variables. Means and standard deviations were estimated for all variables included in the model. Structural equation modeling (SEM) was applied to examine structural relationships between students' home language, parents' educational level, students' sense of school belonging, and reading achievement. Indirect effects were tested using the model indirect subcommand in Mplus (Kelloway, 2015, pp. 106-107) and type = complex. To test the significance of the indirect effects, we applied the bias-corrected bootstrap method (MacKinnon et al., 2004). Specifically, 1,000 bootstraps and 95% confidence intervals were applied. The analysis was conducted at school level, meaning that a weight variable had to be computed (Rutkowski et al., 2010). This was done using the following formula: weight factor 1 * weight adjusted 1. The first refers to the inverse of the school-selection probability while the second refers to the school's non-response adjustment (Martin et al., 2017, Chapter 3 p. 3.18-3.19). The cluster option was school identification. The plausible-value imputation method was handled in Mplus in the same way as in Studies 2 and 3. IEA IDB Analyzer 4.0.23 was utilized to merge the data files of students' reading results, parent questionnaire, and student questionnaire. Data preparation (writing the syntax file, variable coding and including the five plausible-value files) and the ANOVAs were performed in SPSS while the remaining analysis was conducted in Mplus version 8.1.

5.6.4 Study 4

Intraclass correlations were calculated for reading achievement. The analysis was conducted at student level and the cluster option was student identification. Cross-tabulation analysis was conducted to investigate the interrelationships between parents' level of education, students' home language, parents' academic expectations and parents' help with homework. Intercorrelations were tested using Pearson's *r*, means and standard deviations were estimated for all variables. A path

model was applied to investigate the mediating role between (a) parents' educational level and reading achievement, and (b) students' home language and reading achievement. Indirect associations were tested using the model indirect subcommand in Mplus (Kelloway, 2015, pp. 106-107). The statistical significance of the indirect associations were tested using the bias-corrected bootstrap method (MacKinnon et al., 2004). Specifically, 1,000 bootstraps and 95% confidence intervals were applied. The data specification in the Mplus syntax was the overall student sampling weight (totwgt). The plausible-value imputation method was handled in Mplus in the same way as in Studies 2 and 3.

5.7 Validity

Validity refers to the accurately a method measures what it is intended to measure (e.g., Kline, 2015). The validity of a measurement can be estimated on different types of validity (Kline, 2015, pp. 93-94). Construct validity and external validity will be discussed below, followed by a section concerning reliability.

5.7.1 Construct Validity

Construct validity refers to the extent to which scores measure a hypothetical construct, a latent construct, which can be measured only indirectly through its indicators (Kline, 2015, p. 93). Some authors argue that in ILSA research the decisions on what constructs are to be included in the assessments and its operationalization tend to rely on statistical criteria rather than on theories (Caro et al., 2014; Caro & Cortés, 2012). For example, operationalizing abstract constructs like SES cannot be assigned a quantity by direct observation or measurement, it is done by a battery of items which when combined "ad up" to proxy measures, rather than being robust validated scales (Caro & Cortés, 2012). One of the problems with this kind of practice is that the battery of items used for operationalization of such concepts vary across studies, and consequently will complicate interpretation (Chudgar et al., 2012;

Rutkowski & Rutkowski, 2013). In addition, the meaning of an indicator may be different depending on time, place and context where it is observed (Schwippert & Wendt, 2017; Yang, 2003). A typical example is that in the United States, researchers have commonly used the variable "free school-lunch" as an indicator of family SES, in Norway however, such a subsidy does not exist, and therefore such an indicator would not reflect the SES-construct. Such issues evolving around construct validity becomes particularly important in cross-country comparison such as PIRLS studies, because – for example - the questionnaire construction in cross-country surveys that data collected for each country has to be both nationally representative and internationally comparable (Schwippert & Wendt, 2017). A positive statistical relationship with reading achievement is an important aspect of validity for the PIRLS context questionnaire scales (Martin et al., 2014). Thus, item parameter estimates, and item and scale statistics are available for each of the PIRLS 2016 context questionnaire scales (Foy et al., 2017a, Chapter 14). In this thesis, single indicators are used as measures for the cultural aspect of family SES, namely, parental education and number of books in the students' home. Clearly these indicators do not capture all aspects of SES, however, in order to assign relative value to SES, single indicators was used, in addition the results are easier to interpret (see e.g., Yang, 2003, p. 26). Regarding the variable Students' home language, the definition of this variable is outlined in section 2.5, and potential pitfalls regarding the use of this variable is discussed in 8.3 Limitations and Recommendations for future research. Regarding this variables' validity, it should also be pointed out that this variable measure how often the students speak the language of test at home, solely.

In Study 3, the construct of *students' sense of school belonging* was measured using a scale developed in the context of PIRLS (Martin, Mullis, & Hooper, 2017, Chapter 14). This construct seeks to measure "[s]tudents' feelings towards their school and connectedness with the school community" (Martin et al., 2017, pp. 1-2). Being consious about the objections about construct validity from for example Caro & Cortés

(2012), one of the rationales for using this PIRLS-scale to measure school belonging was that this scale is comparable to the Psychological Sense of School Membership Scale (PSSMS) (Goodenow, 1993) which is grounded in the self-determination theory (Deci & Ryan, 1985). This represents a strength when it comes to construct validity because the PSSMS scale is a widely used instrument for assessing primary school students' sense of belonging in school (Alkan, 2016), hence in addition to compare results across other PIRLS-studies, the results from study 3 is also comparable with other studies which have used the PSSMS-scale to measure school belonging.

No single, definitive test of construct validity exist. Instead, measurement-based research usually concerns a particular aspect of construct validity. For instance, discriminant validity is supported if a set of indicators (items) presumed to measure different constructs are not too high which can be tested in Confirmatory Factor Analysis (CFA) (Kline, 2015). For the construct of Students' sense of school belonging, CFA was used to test the covariance among the indicators and to establish whether the indicators had hypothesized multiple dimensionalities. Fit statistics pointed to a one-factor solution rather than a two-factor solution for this construct. The Cronbach's Alpha reliability was at an acceptable level ($<.7$) (Cortina, 1993). The factor loadings of each questionnaire item were $<.6$, which is considered an acceptable cut-off in much literature (e.g., Awang, 2015).

5.7.2 External validity

External validity refers to the extent to which a result can be generalized to other contexts, situations, and groups (Skog, 2004). The PIRLS sampling procedure yielded a large Norwegian sample (N=4,232 fifth-graders), and the overall questionnaire-participation rate was 96 percent for both students and parents. To this should be added that approximately 96 percent of all Norwegian primary-school students are enrolled in public schools (Statistics Norway, 2016). The large sample size and the strict adherence to the PIRLS sampling methods together represent a

strength for the study in that these factors ensure that the sample mirrors the overall target population to a large extent. It seems reasonable to assume that the results of the present thesis are generalizable to the target population, namely Norwegian fifth-graders. In Studies 1 and 2 in the present thesis, statistically significant associations were found between the dependent and independent variables. The investigation of indirect associations in Studies 3 and 4 then relied on statistical assumptions based on the empirical associations established in Studies 1 and 2. However, it should be kept in mind that, since these studies rely on a single measurement point, they cannot be used to make predictions about development over time. Even so, since PIRLS assesses (different) students every five years, it also provides trend data allowing comparison over time of results between and within countries. This means that the results presented in this thesis can be compared with results from prior cycles and with results from other countries. When it comes to the issue of external validity, it should be noted that the conclusions drawn from the results of the present thesis do not contradict previous results based on other data sets investigating the same variables of interest (see Chapter 3 Research Background above) but rather coincide with them; this strengthens the validity of the results of the present thesis.

5.7.3 Reliability

As indicators of reliability the test reliability of PIRLS 2016 and the within-country scoring reliability is provided in "Methods and Procedures in PIRLS 2016" (Martin, Mullis, & Hooper, 2017, Chapter 10) for each country. The Cronbach's Alpha Reliability Coefficient for the PIRLS 2016 reading test (the median Cronbach's alpha reliability across all assessments booklets) for Norway was .87. The within-country scoring reliability for the constructed Response Items for Norway was .97.

5.8 Ethical Considerations

The PIRLS international database is publicly available online at the TIMSS & PIRLS official website (TIMSS & PIRLS International Study Center Boston College Lynch School of Education Boston College). In the processes of data managing in advance of making the data public, each participating country is responsible for an ethical data processing in accordance with the respective country's applicable rules. In the case of Norway, the 2016 PIRLS assessment was facilitated and directed by the Norwegian Education Directorate (UDIR), which has overall responsibility for carrying out the assessment in accordance with ethical procedures. All relevant ethical guidelines were prepared and agreed upon at the ownership level (UDIR). The Norwegian Reading Center was responsible for all management of data. The data for the survey were obtained in compliance with Section 2-4 of the Education Act and Section 2-4 of the Free Schools Act. All personal data were processed within the requirements of the Personal Data Act; cf. Section 28 of the Privacy Ordinance (Personal Data Act, 2018). In practical terms, the applicable rules ensured that the data from the students' reading tests and background questionnaires were linked with an ID number and did not contain any personal information. Moreover, in a first step, all traceable personal information of any nature was removed from the data files and replaced with ID numbers by the PIRLS research group at the Reading Center. In a second step, the original ID-numbers were replaced a second time by staff at Boston College in the United States to further reduce opportunities for tracing personal data. Finally, it should be noted that participation in PIRLS 2016 in Norway was made mandatory for the sampled schools by the Education Directorate.

6 Results

6.1 Summary of Study 1

Strand, O., Wagner, Å.K.H., & Foldnes, N. (2017). Flerspråklige elevers leseresultater [Multilingual students' reading scores]. In E. Gabrielsen (Ed.), *Klar framgang! Leseferdighet på 4. og 5. trinn i et femtemårsperspektiv* [Clear progress! Reading skill in the fourth and fifth grades from a 15-year perspective] (pp. 75–95). Oslo: Universitetsforlaget.

Systematic differences in reading achievement in the fourth and fifth grades between monolingual students (i.e., those who always speak Norwegian at home) and multilingual students (i.e., those who almost always, sometimes, or never speak Norwegian at home) persist in the 2016 Norwegian PIRLS assessment. However, the difference between those fifth-graders who *always* speak Norwegian at home and those who *almost always* and *sometimes* speak Norwegian at home shrank by 10 score points between 2011 and 2016.

Despite the fact that the category of multilingual students was differently defined in studies based on the previous Norwegian PIRLS assessments carried out in 2001 (Wagner, 2004), in 2006 (Van Daal et al., 2007) (Mullis et al., 2007), and in 2011 (Gabrielsen, 2013), and despite irregularities in the values for the home-language variable between the assessments, the results clearly showed that multilingual students consistently performed significantly worse in reading achievement than monolingual students. However, both Norwegian students in general and multilingual Norwegian students performed better on average in 2016 than they did in previous PIRLS assessments.

Regardless of the frequency with which students spoke Norwegian at home, the analysis revealed significant achievement differences between boys and girls. However, multilingual boys and girls also lagged behind monolinguals of the same gender. Boys who reported that they sometimes speak Norwegian at home performed on average 18

score points below boys who always speak Norwegian at home. One notable finding is that monolingual boys did not perform significantly better than girls who sometimes speak Norwegian at home.

The students' home language (i.e., how often they claimed to speak Norwegian at home) remained statistically significant after controlling for the number of books in the students' homes and their parents' level of education. The results also showed that the parents' level of education and the number of books in the students' homes were stronger determinants of reading achievement than was students' home language.

6.2 Summary of Study 2

Strand, O., & Schwippert, K. (2019). The impact of Home Language and Home Resources on Reading Achievement in ten-year-olds in Norway; PIRLS 2016. *Nordic Journal of Literacy Research*, 5(1), 1-17. https://doi.org/10.23865/njlr.v5.1260

The aim of study 2 was to investigate the relations between students' home language, resources for learning to read available in the home and reading achievement. (Gender was included as a control variable). A hierarchical regression technique was applied to measure the relative contribution of each of the independent variables to the total variance explained. In summary, the fifth and final regression model showed that the variable of students' home language changed from (standardized coefficients) $\beta = -.32$ ($p<.001$) in Model 1 to $\beta = -.15$ ($p = .023$) after inclusion of all the independent variables: parents' level of education, number of books in the students' home, access to digital devices, and gender. Approximately 12 percent ($R^2 = .122$) of the variance in reading achievement was explained by the variables included in the model. Notably, the achievement difference between girls and boys ($\beta = -.31$, $p<.001$ in Model 5) was larger than that between language-minority learners and native-Norwegian speakers. Also, the number of books in the students' home, their parents' level of education, and their access to

digital devices exerted a greater impact on reading achievement than did their home language.

6.3 Summary of Study 3

Strand, O., & Jensen, T.M. (2021). The Interplay between Home Language, Parental Education, School Belonging and Reading Achievement in Norwegian PIRLS 2016. Submitted to *Social Psychology of Education*.

The aim of study 3 was to investigate how parents' educational level and students' home language (i.e., how often the students claimed to speak the language of instruction, Norwegian, at home) associate with school belonging and reading achievement, and further, how school belonging relates to students' reading achievement at a school level. A second aim was to investigate how parents' educational level and students' home language relates to reading achievement indirectly through school belonging. SEM analysis revealed a significant and positive association between parents' educational level and reading achievement (β = .25, p <.001), meaning that the higher level of parental education, the higher level of students' reading achievement. A significant and negative relationship between students' home language and reading achievement was found (β = -.06, p <.01), meaning that the less Norwegian the students speak at home the lower reading scores on the PIRLS test. Regarding students' sense of school belonging, the analysis revealed a significant and positive relationship between parents' educational level and students' sense of school belonging (β = .07, p <.01), meaning that students coming from highly educated homes have a stronger sense of school belonging than students coming from lower educated homes. Moreover, a significant and negative association was found between students' home language and students' sense of school belonging (β = -.08, p <.01). This implies that students who do not primarily speak Norwegian at home have a lower sense of school belonging than students who more often speak Norwegian at home. Finally, a significant and

positive relationship between students' sense of school belonging and reading achievement (β = .14, p <.01) was found, meaning that the higher sense of school belonging, the higher score on the reading test. In this study, we also investigated whether school belonging mediated the associations between parental education and reading achievement, and home-language and reading achievement. However, contrary to expectations indirect associations were not found.

6.4 Summary of Study 4

Strand, O. (2021). Parents' Academic Expectations and Parents' Help with Homework as Mediating Factors of the Associations between Parents' Education and Students' Home Language on Students' Reading Achievement in Norway. Submitted to the *Scandinavian Journal of Educational Research*.

The aim of study 4 was to investigate the direct and indirect associations of students' home language (i.e., how often the students claimed to speak Norwegian at home), and parents' educational level on reading achievement through two types of parental involvement: parents' academic expectations and parents' help with homework. This was done to test the *optimism hypotheses* which claims that youths with an immigrant background do better in the Norwegian education system even if their families are of low socioeconomic status due to the strong educational aspirations that immigrant parents might have for their children.

The direct association between parental education and reading achievement was modest and significant (β = .13, p <.001), the total effect was larger (β = .26, p <.001). This indicates that there are indirect effects of parental education that runs through parents' educational expectations and parents' help with homework. The strongest effect goes through parents' educational expectations (β = .11, p <.001) on reading achievement, and the indirect effect via parents help with homework on

reading achievement was small (β = .02, p <.001). The direct effect of students' home language on reading achievement was small but significant (β = -.10, p <.001), the total effect was actually a bit smaller (β = -.09, p <.001). This was because the indirect effect via students' help with homework was not significant, and the indirect effect via parents' help with homework was positively significant albeit small (β = .02, p <.01). There was also a small but significant direct effect between parents' academic expectations and parents' help with homework (β = -.08, p <.001). Finally, approximately 26.2% (R^2 = .262) of the variability in parents' academic expectations, approximately 7% (R^2 = .007) of the variability in parents' help with homework and approximately 16% (R^2 = .164) of students' reading achievement can be explained.

These results have several indications. First, the less Norwegian students spoke at home the higher expectations their parents tended to have from them, and second, the higher the parents' level of education was, the higher academic expectations they would have from their children. Moreover, parental expectations were found to mediate the associations between students' home language and reading achievement, and the association between parents' education and reading achievement. Parents helping with homework were found to have a mediating role on the association between parents' education and reading achievement, but not between students' home language and reading achievement. Conclusively, this study partly provided evidence for the *optimism hypothesis* among 10-year-olds.

7 Discussion

The four studies summarized in the previous chapter addressed different aspects of the main objective of the present thesis: to study equity in education with regard to reading literacy among fifth-graders in Norway. In this chapter, the main findings relating to the three overarching research questions will be discussed. The research questions are repeated below:

1. What are the associations between students' home language, the cultural aspect of their family's SES, and their reading achievement?
2. What are the direct and indirect associations between students' home language, parents' education, students' sense of school belonging and reading achievement?
3. What are the direct and indirect associations between students' home language, parents' education, parents' academic expectations, parents' help with homework and reading achievement?

First and foremost, against the background of how equity was defined in the present thesis, namely as a state where "[d]ifferences in students' outcomes are unrelated to their background or to socioeconomic and social circumstances over which students have no control" (OECD, 2018, p. 13), the findings across the four studies consistently showed that students' reading-achievement were associated to their home language (how often the students claimed to speak the language of the PIRLS test–Norwegian–at home) and to the indicators of the cultural aspect of their family's SES (i.e., their parents' level of education and the number of books in their homes). This finding suggests that there is, to some extent, a lack of equity in Norwegian education as regards to reading literacy. This finding is not surprising, since it is well in line with a substantial body of research on educational equity in Norway (Gustafsson et al., 2018; Mittal et al., 2020; Scherer, 2020; Støle et al., 2020). Moreover,

the empirical relationship between SES and reading achievement has been documented both over time and across a wide range of countries (e.g., Buckingham et al., 2013; OECD, 2018; Sirin, 2005). Having a language-minority background is a circumstance found to exert an impact on students' reading achievement in virtually all countries studied (e.g., August & Shanahan, 2006; OECD, 2019). However, equity can be seen not only in absolute terms but also in relative terms. Equity is greater (or the ideal of equity is closer to being realized) when the association between students' background characteristics and their reading achievement is weaker. Hence, and in the interest of not making the best the enemy of the good, the above conclusion—that there is a lack of equity in Norwegian education—should be nuanced through comparison of the present findings with those from other studies.

7.1 Associations between Students' Home Language and Their Reading Achievement

This section addresses one part of the first research question. Various statistical analyses carried out in the four studies provided proof of a significant association in the negative direction between students' home language and their reading achievement. Meaning here that the less Norwegian spoken at home, the lower scores on the PIRLS reading test. This finding agrees well with previous studies which have investigated the impact of the language of instruction spoken in the students' home on academic achievement (e.g., Agirdag, 2014; Dronkers & Van der Velden, 2013; Hemmerechts et al., 2016; Heppt et al., 2014; Schnepf, 2007). In most countries and education systems, students who are native speakers of the language of instruction obtain, in average, higher scores on standardized tests of reading, mathematics and science compared to students whose home language is different from the dominant language of instruction at school (Mullis et al., 2017; OECD, 2019). In other words, the finding in this thesis that students who speak Norwegian less frequently at home have lower reading scores on the PIRLS test than

students who primary speak Norwegian at home is not surprising. What is noteworthy is rather the weak strength of the association and the surprisingly low R^2: only approximately 1 percent of the variance in reading achievement can be explained by how often students speak Norwegian at home (showed in Study 2). Given the weak association found, it may be questioned whether it has any practical significance at all for the level of reading comprehension whether students speak the language of instruction at home or not. From an equity perspective, this weak association between student's home language and their reading achievement must be interpreted as good news! It means that achievement differences between native speakers of Norwegian and language minority speakers are not very large in Norwegian fifth-graders, who all would seem to have good educational opportunities in the Norwegian school system. Moreover, as showed in study 2, the achievement differences between students who always or almost always spoke Norwegian at home and those who less frequently spoke Norwegian at home halved in size after controlling for the indicators of cultural family SES and for gender, which is also in line with previous research (e.g., Agirdag & Vanlaar, 2016; Hemmerechts et al., 2016).

ILSA-based studies have a substantial influence on national language policies in education (Agirdag & Vanlaar, 2016; Cummins, 2008, 2015; Schwippert & Lenkeit, 2012). Such language policies are often informed by studies that use ILSA data to compare the academic achievement of native speakers of the language of instruction with that of language minority speakers, i.e., students who come from homes in which a language other than the societal language is primarily used, where the latter tend to be outperformed on standardized tests by the former. Based on this correlation, some authors, particularly Cummins (2008, 2011, 2015) and Agirdag and Vanlaar (2016), have raised concern about some inferences that have been drawn about the potential consequences of speaking a minority language and of exposure to a minority language within the family or school context (see Agirdag & Vanlaar, 2016; Cummins, 2008, 2011, 2015). First, the home-language

variable cannot be used as a proxy for students' language skills (Agirdag & Vanlaar, 2016; Cummins, 2008) and hence cannot be used to examine the impact of students' linguistic competence on their reading achievement. In fact, the home-language variable might be a proxy for unmeasured immigration-related background characteristics such as ethnicity, linguistic diversity, or length of residence in the country (Agirdag & Vanlaar, 2016). This variable should simply be interpreted at face value, namely as a measure of how often students speak the language of test at home.[14] In the PISA 2015 international report, the disadvantage of not speaking the language of assessment at home is referred to as the "language penalty" because it is considered a disadvantage for the students and is associated with low performance (OECD, 2016a, p. 256). In an IEA report focusing on PIRLS data in the context of the UNs sustainable-development goals, the following is stated: "When children are taught in a language that they do not speak at home, they are at a disadvantage. Recognizing this factor is necessary to interpret the results of reading assessments" (UNESCO & IEA, 2017, p. 12). Further, the international PISA 2018 report shows that, in many countries, immigrant students who spoke the language of assessment at home scored higher for reading than those who did not. This is found to indicate that "[n]ot speaking the language of instruction represents an additional barrier to attaining high proficiency in reading—a challenge that would require support beyond the home environment" (OECD, 2019, p. 185).

Another concern related to the influence that ILSAs may exert on education policy is about the findings from ILSA-based studies may well have elicited a most unfortunate response from certain policymakers in Western countries, namely an increased sociopolitical pressure on

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[14] In international PIRLS reports the home language variable refers to how often the students speak the language of test at home (Mullis et.al., 2017, Exhibit 4.3). In PISA reports this variable sometimes refers to how often the students speak the language of instruction at home (OECD, 2019, Table 11.B1.9.2), and sometimes how often the students speak the language of assessment at home (OECD, 2016a, p. 256).

minorities to reduce the use of their own language within the family and school contexts (Pulinx et al., 2017). While such an apparent overreaction may not be reflected in current Norwegian education policy, there is no doubt that the achievement gap between language-minority students and students who are native speakers of Norwegian is a matter of great concern in Norwegian policy debate. For example, this is clear from the two above-mentioned recent white papers (Meld.St. 6 (2019-2020); Meld.St. 21 (2016-2017)), according to which language-minority students are considered "vulnerable students" and seen to be at risk of underperformance and school dropout. This assumption is underpinned by the persistent disparities in achievement seen between language-minority and language-majority students. However, it is crucial to keep in mind that these two groups are purely statistical constructs based (at least in this case) solely on whether the students speak Norwegian at home or not. The findings in the present thesis suggest that categorizing students based on whether they speak Norwegian at home may in fact not be the best approach if the aim is to identify struggling readers. This further implies that studies based on PIRLS are not very good at determining which groups of students are not doing so well and might need more support when it comes to reading instruction.

7.2 Associations between the Cultural Aspect of Family SES and Reading Achievement

This section addresses the other part of the first research question. The relationship between family SES and students' achievement is one of the most important indicators of the degree of equity of an education system (Jerrim et al., 2019; Yang Hansen & Gustafsson, 2019). The findings made in the present thesis have shown there to be significantly and positively associations between the different indicators of the cultural aspect of family SES and students' level of reading achievement, meaning that the higher students score on the SES indicators, the higher

they are likely to have scored on the reading assessment. This finding suggests that inequity prevails in Norwegian education.

Study 2 showed that the cultural aspect of SES explained approximately 8 percent of the variance in fifth-grade students' reading achievement. The analysis revealed significant positive associations between parental education and reading achievement at both student level (Study 4) and school level (Study 3). This is in line with what has been found in earlier Norwegian research (e.g., Bakken & Hyggen, 2018; Gabrielsen, 2013; Jensen et. al., 2020; Wiborg et al., 2011), and it is also in accordance with the findings presented in the PISA 2018 international report, where SES was measured using a combination of indicators: parental education, parental occupation, and a combined measure relating to various possessions found in students' homes, including books (OECD, 2019 Chapter 2). This composite SES measure used in PISA explained 7.5 percent of the variance in reading achievement in Norway—slightly less than in many other countries, including Sweden (10.7%) and Denmark (9.9%), and also below the average for all OECD countries (12%) (OECD, 2019, Appendix B1.2). However, there seems to be fewer in-depth studies investigating the relationship between SES and reading in Norway based on PIRLS data. Most such studies carried out to date have been descriptive in nature. Hence there are opportunities in future research to find out how the development of different SES indicators has influenced reading achievement over time in Norwegian primary-school children.

Although it is of course interesting in and of itself that there are clear associations between students' home language, the cultural aspect of family SES, and students' reading achievement, the most interesting question probably is why those associations are so *weak* in Norway? Considering the increases seen in immigration and socioeconomic inequality, those relations might well have been expected to be larger. First of all, the weak association seen between the students' home language and their reading achievement may have to do with the sample used (see Section 5.1.1). It is possible—indeed highly likely—that the

association would have been stronger and the achievement differences larger if *all* students had been assessed, that is, if those students who had received less than one year of Norwegian instruction had also been included. However, such "newcomers" were excluded from PIRLS in all countries, meaning that the effect of including them might not have made Norway look all that much different relative to other countries. Second, ever since immigration to Norway began in earnest in the late 1970s because the oil and gas sector needed labor, immigrants have mainly tended to be people with a solid job offer and hence with special expertise. Even today, most immigrants coming to Norway are "working immigrants" (Steinkellner, 2020). This may partly explain the small achievement differences seen between students from high and low cultural SES backgrounds, respectively. Third, Norway has manifested high levels of equity—particularly as reflected in the relationship between SES and achievement—for decades. This, in turn, needs to be interpreted within the framework of the Norwegian model of education and its central aim of reducing social inequality in student outcomes (Blossing et al., 2014). After all, the Norwegian (and Nordic) model of education has a century-long history of building on the concept of *education for all*, which includes the concepts of equity, equality, equal opportunities, and inclusion (Blossing et al., 2014; Telhaug et al., 2006).

Finally, in the present thesis, it was found that parental education and the number of books at home, which are deemed to be indicators of the cultural aspect of SES—or, in the words of Bourdieu (1986), of their cultural capital—exert an important determinant of students' reading achievement. Hence students' reading-achievement levels may be viewed as an expression of cultural reproduction. But the findings can also be viewed through the lens of literacy theory (see e.g., Gee, 2015, p. 98–99): the association between SES and reading achievement may be explained with reference to what goes on in the encounter between the students' home Discourse and the school Discourse. Hence the achievement differences between students with high and low cultural SES may also be due to the extent of the cultural and linguistic

differences between their home environments and school. The fact that immigration status and SES status are linked (Steinkellner, 2017) means that the association between students' home language and their reading achievement can be viewed through either, or both, of these theoretical lenses.

7.3 Direct and Indirect Associations between Parents' Education, Students' Home Language, School Belonging and Reading Achievement

This section addresses research question 2. A number of studies have found that SES variables are stronger at the school level than the student level, which means that the mean SES of a school has a larger impact on students' achievement than their individual SES (Buckingham et al., 2013). Therefore, the unit of analysis determines the strength of the relationship between family SES and reading achievement (Cowan et al., 2012; Yang Hansen & Gustafsson, 2019; Yang & Gustafsson, 2004). Palardy (2008) interpreted the stronger effect of school-level SES as an expression of a self-reinforcing environment: schools with a high proportion of students whose SES is low form an educational milieu which is not optimal for learning. In study 3, the direct associations between the parental education, students' home language and reading achievement were found to be slightly stronger at the school-level than the measured coefficients at student level (found in study 4), which is in accordance with findings in the above-mentioned studies. Next, there was also found to be a statistically and significantly positive association between parents' level of education and students' sense of school belonging indicating that children from highly educated homes had a stronger sense of school belonging than their peers from homes with a lower level of parental education. This finding agrees well with other large-scale studies such as PISA (OECD, 2016b). The association between students' home language and their reading achievement was also statistically significant in the negative direction at school level,

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however slightly weaker than at student level (measured in study 4). Regarding the practical interpretation of this finding, it should (once again) be noted that the association was weak in general. The association between students' home language and their sense of school belonging was significant in the negative direction: children from homes where Norwegian was not the primary language spoken had a weaker sense of school belonging than children who spoke Norwegian at home more often. This is in line with prior research which have investigated school belonging across different groups of students, such as language minority speaking students versus native speaking students and immigrant students versus non-immigrant students. (Hughes et al., 2015; Wang et al., 2012). For example, immigrant students may feel more uncertain about whether they belong to school, because they may be unsure whether they will develop positive relations in the settings concerned (Walton & Cohen, 2007; Wang et al., 2012). Overall, the present study demonstrates the presence of inequity in education in regard to reading literacy. According to cultural-reproduction theory, children from socially privileged homes have an easier way through schools because they understand the codes, the academic language, and the attitudes, for which the school system rewards them (Bourdieu & Passeron, 1990). Children who do not "fit in" with the school codes may be more likely not to feel that they belong in school. Another plausible explanation can be found using the Discourse-perspective (Gee, 2015, Chapter 13): it is possible that some of the children who do not primarily speak the language of instruction at home will have a lower sense of school belonging because their home Discourse is very different from the school Discourse, both linguistically and culturally.

Further, Students' sense of school belonging was found to be significantly and positively associated with reading achievement, which is in line with a large body of research (Allen et al., 2016; Slaten et al., 2016). Specifically, this indicates that students who feel that they belong in school have better reading skills. Given research-based assumptions about the many positive effects of a sense of school belonging, initiatives

have been taken within Norwegian educational policy to support students' well-being, including their sense of school belonging. The rationale for the strong focus on students' well-being and their feeling of connectedness to their peers and teachers in school is that a universally strong sense of school belonging may help to even out social differences between students (e.g., Meld.St. 16 (2006-2007)), which is one of the core aims of the Norwegian school model (Telhaug et al., 2006). Issuing systematic reports and evaluating students' well-being have been on the educational agenda in Norway since the early 2000s (Meld.St. 16 (2006-2007)). The importance of including culturally and linguistically "diverse" young students in school was particularly emphasized in a recent white paper on early intervention and inclusive education in kindergartens, schools, and out-of-school-hours care (Meld.St. 6 (2019-2020)). Prior research has shown that a strong sense of school belonging can promote educational equity and narrow the achievement gaps between language minority speaking students and native speaking students (Flanagen, Cumsille, Gill & Gallay, 2007; Hughes et al., 2015) and between students with high and low SES (Buckingham et al., 2013; OECD, 2019). In addition, a strong sense of school belonging has been found to prevent students from dropping out of upper-secondary school (Neild, Stoner-Eby, & Furstenberg, 2008). In line with theory and previous research, we expected that the sense of school belonging would mediate the association between parents' educational level and students' reading achievement as well as that between students' home language and reading achievement. However, contrary to expectations, we did not find support for a mediating effect of school belonging. Study 3 discusses some implications of this for the understanding of educational equity in school contexts. Above all, the hope that students' sense of school belonging—which has been a priority field in Norwegian education policy for decades—can compensate effectively for possible achievement gaps in reading could not be substantiated on the basis of the present data. However, considering the many psychological and educational benefits associated with students' sense of school belonging,

the overall results of this study still support the ongoing work carried out to promote students' sense of belonging in school.

7.4 Direct and Indirect Associations between Parents' Education, Students' Home Language, Parents' Academic Expectations, Parents' help with homework and Reading Achievement

This section addresses the third research question. Research largely supports the idea that informal learning at home may supplement the formal instruction provided in school and help to reduce educational inequity by promoting equality in students' achievement (Shute et al., 2011; Strietholt et al., 2019). Enthusiasm for parental involvement is clearly expressed in education policies (Castro et al., 2015; Shute et al., 2011), and it has also been emphasized in Norwegian education policy (see e.g, Hansen, 2011; Meld.St. 6 (2019-2020); Meld.St. 16 (2006-2007)). However, both the direct impact of parental involvement on reading achievement and the interactional and mediating effects of parental involvement on the relationship between SES and achievement largely depend on the *type* of parental involvement (Boonk et al., 2018; Buckingham et al., 2013; Strietholt et al., 2019). To gain more knowledge about the mechanisms behind the association between family SES (as measured by parents' education), students' home language, and students' reading achievement, two types of parental involvement were investigated in Study 4 of the present thesis: parental academic expectations and parents' help with homework.

The results indicated that a substantial part of the total effect of parents' level of education on students' reading achievement is mediated by parents' academic expectations. Hence the overall effect of parental education on reading achievement confirmed in many studies (Boonk et al., 2018; Shute et al., 2011; Wilder, 2014) can be considered to be largely unexplained in cases where no indicator of parents' academic expectations of the child is included. In other words, having a person

with a high level of education in a family does not automatically lead to high levels of reading achievement for the children in that family. To some extent, the benefit that children gain from having highly educated parents is attributable to other factors, and Study 4 pinpointed the importance of parents' expectations. The fact that the academic success of children from well-educated homes may to some extent be attributable to the expectations of their parents, resonates well with cultural-reproduction theory: according to Bourdieu, well-educated parents will transfer their preferences to their children, and they will invest time and involvement in their children to ensure that they will succeed in school (Bourdieu, 1986, 1991).

Both a positive direct association and a positive indirect association (mediated by parental academic expectations) were found between students' home language and their reading achievement. In other words, the less Norwegian students speak at home, the higher expectations their parents will have for their future school career. Several other Norwegian studies have found that immigrant parents have higher expectations of their children's future school career than do native-Norwegian parents (Bakken, 2003, 2016; Bakken & Hyggen, 2018; Lauglo, 1999; Leirvik, 2010). This finding is also confirmed on other western countries (Basit, 2012; Raleigh & Kao, 2010). This finding has sometimes been interpreted as suggesting that some immigrant families have a strong desire for social mobility (Bakken, 2003, 2016; Leirvik, 2014), meaning that, regardless of family SES, parents tend to have strong aspirations for their children to succeed academically. In Norwegian educational research, this view is referred to as the "optimism hypothesis" and it has been used to explain why some students in Norway with an immigrant background perform well academically, despite poor SES levels (Bakken & Hyggen, 2018). This hypothesis marks an interesting contrast with reproduction theories claiming that "[s]chools are not transmitters of opportunities but active agents of social reproduction" (Kingston, 2001, p. 88). This optimistic view that students from low-SES backgrounds can succeed academically under the right

circumstances may not be unfounded: studies have shown that parental expectations are one of the determinants of the relationship between SES and achievement (Leirvik, 2014; Portes et al., 2005; Raleigh & Kao, 2010). The findings of Study 4 partly support this idea. Regarding the weak association between students' home language and parental expectations, and the strong association between parents' educational level and expectations, it may be that strong educational aspirations are more closely linked to family SES than to language background. More importantly, the present thesis adds new knowledge to the research field as prior studies finding evidence in support of the "Optimism Hypothesis" were all conducted on older students, in particular high-school children around fifteen years of age (Bakken, 2003, 2016).

The negative association found between parents' level of education and their help with homework was in line with the findings from most research where parents' help with homework was included in the analysis of the impact of parental involvement on reading achievement (Boonk et al., 2018; Wilder, 2014; Castro et.al., 2015). This finding may imply that most parents are not skilled to teach or are not familiar with appropriate teaching methods (Wilder, 2014). Another plausible explanation for why many studies have found a negative correlation between helping one's children with homework and academic achievement is that elementary schoolchildren who find schoolwork difficult tend to spend more time on their homework, and parents of these children tend to spend more time helping them (Pomerantz & Moorman, 2010; Tazouti & Jarlégan, 2014). The indirect negative association between parental level of education and reading achievement via parents help with homework, was found to be statistically significant, meaning that some of the total effect of parental education on reading achievement is explained by parents' help with homework—but in a negative direction. Plausible explanations for this may be some of those already mentioned above.

Finally, a last comment: the estimated measures and associations between the different variables in the four studies in this thesis can be

reduced to their empirical value and thereby easily compared to values of similar associations between countries. However, to truly understand what these associations means it is necessary to understand their relation to social, cultural, economic, and historical factors within the country the study was conducted (Schwippert & Wendt, 2017). The weak associations between students' background and their reading achievement must be interpreted in the context of Norway's 100-year long tradition of a unitary school for all, with its main goal of equalizing social differences and its meritocratic approach to educational equity (Blossing et al., 2014). Implications and limitations are discussed in the next chapter.

8 Concluding Comments

8.1 Conclusion

The aim of the present thesis was to gain increased knowledge about equity with regard to reading literacy among fifth graders in Norway. This was done by investigating to what extent students' reading achievement was associated with their home language (how often they speak Norwegian at home) and with the cultural aspect of their family's SES as well as how these factors related to the students' sense of school belonging and to their parents' involvement. Until now, studies in a Norwegian context focusing on these associations have been limited to older students. Hence there was a need in reading research for additional knowledge about the extent of equity in primary school with regard to reading literacy. It is particularly important to monitor equity with regard to reading literacy in young students, because research has established the importance of early intervention when it comes to helping students who struggle with reading (Menzies, Mahdavi and Lewis, 2008). In accordance with this finding, Norwegian education policy emphasizes the need for early intervention as part of an initiative to reduce systematic differences in academic achievements in school (Meld.St. 6 (2019-2020)).

Overall, the findings reported in the present thesis provide evidence that, to some extent, there is a lack of equity with regard to reading literacy—in particular when it comes to the association between the cultural aspect of SES and students' reading achievement. In addition, differences in students' reading achievement were also found to be related to how often they spoke Norwegian at home, but this association was very weak. Further, students from homes where Norwegian is not the primary spoken language and students from families with a low level of education have a weaker sense of school belonging than their Norwegian-speaking peers from highly educated families. The more students feel that they belong in school, the higher

their reading scores tend to be. While prior research has found evidence of a relationship between students' immigrant background and their reading achievement, neither the details of the association between students' home language and their sense of school belonging nor the relationship between these factors and reading achievement have been tested before. Hence this finding contributes to our present knowledge about equity with regard to reading literacy.

Parents' academic expectations of their children was directly and positively associated with students' reading achievement and with their parents' level of education. It was rather surprising that these associations were substantial in such young students. However, this is well in line with Bourdieu and cultural-reproduction theory, which sees cultural capital as being transmitted from parents to their children even that early in life (Bourdieu, 1986). Parents' academic expectations were more strongly associated with parents' level of education than with students' home language, and this may also be interpreted within the framework of cultural-reproduction theory as a result of the transmission of cultural capital. Thus, these results partly support the optimism hypothesis and suggest some degree of educational inequity with regard to reading literacy.

8.2 Implications

The benefits of large-scale assessments can be reaped only through reflective interpretation of results. Research based on ILSAs has the potential to shape and drive national and international education policy. Hence researchers bear a heavy responsibility for how the implications of their research are communicated to the educational community. The findings in the present thesis have practical implications for policymakers, teachers, and researchers working with primary-school students. Below is a summary of some of these implications.

- Rethink "who gets left behind"

According to the OECD's definition of equity, this concept includes two dimensions: fairness and inclusion (Field et al., 2007; OECD, 2018). In this view, equity in education implies that the education system must reduce the impact of students' background factors on their learning outcomes so that all students have a fair opportunity in education. This interpretation of equity goes hand in hand with the principles of the Norwegian model of education, which aims to equalize social differences and to promote inclusion and equal opportunities for all (Blossing et al., 2014; Telhaug et al., 2006). In Norwegian education-policy planning, there has been a shift in focus over the past decade from "equity through equality" to "equity through diversity" (Solstad, 1997). Following demographic changes in Norwegian society entailing an increase in linguistic and cultural diversity, several measures have been proposed to meet the challenges of diversity in classrooms and to reduce achievement differences. Education-policy documents have long focused on language-minority students and identified these students as at risk of being left behind their language-majority peers (Meld.St. 6 (2019-2020)). According to the Norwegian Education Act (1998), students in primary school (age 6–16) who have a mother tongue other than Norwegian, or Sami are entitled to receive adapted Norwegian training until they have sufficient proficiency in Norwegian to follow normal instruction (Education Act, 1998, § 2-8). If necessary, such students can also be given education in their home language, bilingual training in all subjects, or both. This means that having a mother tongue other than Norwegian or Sami is a prerequisite for being evaluated as a candidate for adapted Norwegian training. The findings from this thesis suggest that it is not appropriate to use students' language background as the sole criterion for the provision of adapted Norwegian-language training. In fact, there are various background factors that interact with each other, and they all need to be considered in the framework of efforts to strengthen students' reading comprehension. As students' SES background is a stronger determiner of their reading achievement than

their language background is, it seems reasonable to assume that initiatives found to be effective in compensating for disparities in reading achievement will be beneficial not only for students with a home language other than Norwegian but for students in general. It is also most likely that children, for example second or third generation immigrants, may be multilingual, meaning that they use two, three or even more languages daily. The language skills in their so-called mother tongue, may then not be adequate, which complex the Norwegian training even more.

At a time when Norwegian classrooms are growing more culturally and linguistically diverse while socioeconomic differences in society are widening, the task of monitoring equity in education is growing increasingly complex because additional background factors are coming into play. Hence research in the field of educational equity must strive to nuance the picture of who the underachieving students are. The present polarized view based on constructed student groups such as language-minority students and language-majority students may not represent the best way to shed light on the disparities seen in reading achievement.

Overall, the findings from this thesis support the recommendations given in a Norwegian white paper on early intervention for lifelong learning (Meld. St. 6 (2019-2020)), where it is emphasized that all teachers—not just language teachers—should support minority-language students in all subjects as part of their everyday practice. Implementing a focus on language in all subjects will benefit all students and eventually strengthen the reading skills of all students, not just those of language-minority students.

- School belonging matters for all children

Teachers and school managers should be aware of the significant impact that students' sense of school belonging exerts on their reading outcomes. Because of this influence, any attempt to strengthen students' positive feelings toward their school may contribute to better reading

skills. Further, students from homes where Norwegian is spoken only to a limited extent as well as students from homes with a low level of education reported a weaker sense of school belonging than their Norwegian-speaking peers from highly educated families. Teachers should be aware of this association, and action should be taken to prevent children at risk from falling behind both socially and academically.

- Involve the parents

The impact of parents' academic expectations on reading was clear. At the same time, it was evident that parents with a high level of education—i.e., parents who are familiar with the education system—are those who encourage their children to aim for higher educational degrees. This finding is well in line with those from Norwegian studies claiming that there are significant class differences in higher education (Hansen, 2011; Ekren, 2014). Children of highly educated parents are much more likely to earn an educational degree than children from families with a low level of education. From a reproduction perspective (Bourdieu, 1986), this class difference in education may be interpreted as a consequence of the fact that parents who are familiar with the academic system and see the value of earning an academic degree are likely to transfer this to their children. This indicates that, to be able to help enhance their children's educational outcomes, parents must be included in their children's school life and must know what educational opportunities are available. It is important for both parents and teachers to be aware that high expectations may boost a child's achievement. Hence the findings reported in the present thesis suggest that parental involvement is a factor affecting equity with regard to reading literacy because involving the parents may contribute to the reduction of differences in reading achievement.

- Monitoring Sustainable Development Goal 4

The findings in this thesis exemplify ways in which the analysis of PIRLS data can be used to monitor progress toward the United Nations' Sustainable Development Goal (SDG) 4, which aims to *ensure inclusive and equitable quality education and promote lifelong learning opportunities for all* (United Nations, 2015, p. 7). The present findings provide insights into how the Norwegian education system is performing on equity with regard to reading literacy in primary school. Further, the thesis shows that reading achievement is associated with particular factors that also need to be closely monitored. Specifically, these factors include students' home language, their home culture, and their sense of school belonging. Increased knowledge about how these factors interact with each other will bring reading research a little closer to understanding equity within the domain of reading literacy.

8.3 Limitations and Recommendations for Future Research

There are important reasons to study equity with regard to reading literacy within an international comparative framework such as PIRLS. International assessments present several methodological advantages over research carried out in single countries (see, e.g., Rutkowski et. al., 2014). For example, they provide internationally comparable indicators that enable comparison of results across countries and over time, and the methods used draw upon substantial developmental efforts ensuring the validity of results. Further, since the data are publicly available online, it is easier to replicate analyses in order to test the generalizability of research findings across countries. However, there are also important challenges related to the assessment design, and those must be addressed by any researcher using data from international assessments, because failure to handle such data appropriately can lead to incorrect results and interpretations (Rutkowski et. al., 2010; Rutkowski et. al., 2014). Issues of relevance in this context include the use of sampling weights, plausible values, and variance-estimation techniques (all of which are

addressed in Chapter 5 of the present thesis). Further, with regard to content-related interpretation of results, it is necessary to understand the relationship between the results and specific features of each country, because "[t]his kind of interpretation makes the difference between just numerous values and content related interpretations of differences in observations" (Schwippert & Wendt, 2017, p. 29).

There are also great financial and practical advantages to using data from PIRLS (and other international large-scale assessments or ILSAs). The international PIRLS database is publicly available online, free of charge (TIMSS & PIRLS International Study Center, 2016). Convenient literature such as codebooks, assessment frameworks, and data guides are also available online. Further, there is a large body of literature dealing with the ILSA field where guidance can be sought on issues such as statistics and psychometrics (e.g., Rutkowski et al., 2014). Obtaining the money and time necessary to collect a large amount of data for a research project may be a challenge, in that way, PIRLS offers opportunities for researchers who are interested in the determinants of reading achievement. However, despite these major advantages, again there are some limitations that need to be considered in the interpretation of the results.

First, PIRLS has a cross-sectional design. It is important to be aware of the predictive limitations of cross-sectional studies. The primary one is that, because exposure and outcome are assessed simultaneously, no evidence of causal relationships can be found. Without longitudinal data, it is not possible to establish a true cause-and-effect relationship (Skog, 2004, pp. 71-78).

Second, the measures of the independent variables used in the four studies reported in the present thesis were based on self-report questionnaires; this may increase the risk of common-method variance (Chang et al., 2010) in that the use of self-reported data can create false internal consistency. However, this concern is strongest when both the dependent and independent variables are perceptual measures derived from the same respondent (Podsakoff & Organ, 1986), and this was not

the case here because reading achievement (the dependent variable) was measured independently of the questionnaires in all four studies. See Section 5.7 for further discussion of different aspects of validity evaluation.

Third, a group of particular interest in the present thesis was that consisting of students who do not have Norwegian as their primary language. However, students with very limited proficiency in Norwegian were excluded from participation in the PIRLS assessment. Specifically, students who had received training in the Norwegian language for less than a year were excluded. The students excluded for this reason make up 61 children (which amounts to approximately 1% of the total sampled students), but it can definitely be discussed whether this has implications for external validity. In particular, this exclusionary practice in the sampling procedures may create bias in the results to the effect that the achievement disparities may (and probably will; the real question may relate to the extent of the bias) come across as smaller than they really are (e.g., Reynolds et al., 2014; UNESCO, 2014; Sammons, 2006). According to UNESCO's *Handbook on Measuring Equity* (UNESCO, 2014): greater equity in education can be achieved only when the data collected include the most marginalized student groups.

Further, it may be difficult to correctly identify the students who do not have Norwegian as their primary language among those not excluded for insufficient exposure to that language in school. The primary instrument used to identify those students was a student-questionnaire item relating to how often students spoke Norwegian at home. There is not much information about participants' linguistic background or country of origin to be gleaned from the PIRLS 2016 data, but some other items in the data set were deemed to reflect such circumstances to some extent and so could potentially be used as secondary instruments. To begin with, one item in the parent questionnaire related to whether the children had spoken Swedish, Danish or other before entering school. According to the parents' responses, less than 2 percent had done so while 95 percent had spoken

Norwegian, and the remaining 3 percent had spoken "other" languages. These figures do not match well with numbers from Statistics Norway (Steinkellner, 2017) in that only 3 percent of parents said that they spoke a non-Scandinavian language, and hence this variable was not used in the analysis. No additional information about students' or parents' specific geographical origin or languages was available in the data set, but the question "How often do you speak Norwegian at home?" was included not only in the student questionnaire but also in the parent questionnaire. Interestingly, according to the parents' responses, 86.6 percent of the children always spoke Norwegian at home while 8.5 percent almost always did, 4.5 percent sometimes did, and less than 1 percent never did. This differs significantly from the students' answers (68 percent always, 21 percent almost always, 10 percent sometimes, and 1 percent never). One can only speculate about the reasons for these clear differences, but it could be that the parents had a stronger desire than the students to give what they believed to be the most "correct" answer. At any rate, because the students' responses corresponded better with register data from Statistics Norway (Steinkellner, 2017), hence the student-questionnaire item was used in the analyses in the present studies. However, future studies should consider combining register-based information with self-reporting assessments on students' language background to ensure more accurate measurement of how this student characteristic relates to the cultural aspect of family SES and to students' reading achievement. Indeed, combining register-based information with self-reported information can be considered to boost the strength of all variables used in a study.

Finally, since the studies in this thesis were conducted on the basis of Norwegian data only, caution should be taken when the findings are generalized beyond the national borders of Norway. The findings reported in the present thesis are here interpreted in relation to the cultural, historical, economic, and financial frameworks characteristic of Norwegian society and the Norwegian model of education. Hence the measures used may not mean the same in other countries. Even so, the

present findings can to some extent be compared with findings relating to other countries, because of the use of established, internationally comparable indicators to study the relationships between students' home language, their home culture, and their sense of school belonging. Nevertheless, future studies should aim to investigate more thoroughly the relationship among these factors across different countries.

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Paper I

4
Flerspråklige elevers leseresultater

OLAUG STRAND, ÅSE KARI H. WAGNER OG NJÅL FOLDNES

SAMMENDRAG   Norske klasserom er preget av språklig og kulturelt mangfold. PIRLS 2016 dokumenterer prestasjonsforskjeller mellom norske enspråklige og flerspråklige elever på 4. og 5. trinn. For Norges del viser både enspråklige og flerspråklige elever framgang i leseskår. I denne artikkelen ser vi nærmere på resultatene for de flerspråklige elevene i Norge, og undersøker hva utvalgte bakgrunnsfaktorer har å si for resultater i lesing.

NØKKELORD   leseprestasjon | flerspråklige elever | enspråklige elever | kjønn | leseinteresse | sosial bakgrunn

ABSTRACT   Norwegian classrooms are characterised by linguistic and cultural diversity. PIRLS 2016 documents differences in performance level between Norwegian monolingual and multilingual students for 4th and 5th graders. In Norway, both monolingual and multilingual students show progression in reading results. In this article, we examine more closely the results of multilingual students in Norway and investigate how selected background variables impact on scores in reading literacy.

KEYWORDS   reading achievement | multilingual students | monolingual students | gender | reading interest | social background

STORT MANGFOLD I NORSKE KLASSEROM

Norske klasserom er preget av et større kulturelt og språklig mangfold enn for bare noen få tiår siden. Ved utgangen av 2016 var det i aldersgruppen 6–15 år 102 900 innvandrere[1] og norskfødte med to innvandrerforeldre, noe som tilsvarer 16 pro-

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1.   SSB definerer innvandrere som «(…) personer som er født i utlandet av to utenlandsfødte foreldre, og som har fire utenlandsfødte besteforeldre» (Statistisk sentralbyrå, 2017b).

sent av aldersgruppen totalt. Dette er en økning på syv prosentpoeng siden 2008 (Statistisk sentralbyrå, 2017b). I tillegg kommer en stor gruppe barn som har én forelder med annen språkbakgrunn enn norsk.[2]

Barnehage og skole er svært viktige aktører når det gjelder å tilrettelegge og inkludere mangfoldet av barn og elever på best mulig måte. Fra forskning vet vi også at leseferdigheter på opplæringsspråket har stor betydning, både for læring i skolealder, men også med tanke på videre utdanning, jobb og helse (Bynner & Parsons, 2008; OECD, 2016).

Leseundersøkelser som PIRLS gir grunnlag for å si noe om i hvilken grad den norske skolen lykkes i å gi et godt nok opplæringstilbud til hele elevmangfoldet. Tidligere resultater fra store internasjonale undersøkelser som PIRLS og PISA gir et ganske entydig bilde av at flerspråklige elever har svakere leseferdigheter enn enspråklige elever, noe som representerer en utdanningspolitisk utfordring det er viktig å følge tett (Mullis, Martin, Gonzalez & Kennedy, 2003; Mullis, Martin, Kennedy & Foy, 2007; Mullis, Martin, Foy & Drucker, 2012; Kjærnsli & Olsen, 2013; Kjærnsli & Jensen, 2016).

I denne artikkelen ser vi på PIRLS-resultatene til flerspråklige elever. Vi ser nærmere på prestasjonsforskjellene mellom enspråklige og flerspråklige elever i den norske delen av PIRLS 2016 for 4. og 5. trinn, og på resultater for denne elevgruppen over tid. Videre sammenlikner vi resultatene til flerspråklige elever i norsk skole med samme elevgruppe i de andre nordiske landene Danmark, Sverige og Finland. Vi undersøker hva tid i barnehage, leseinteresse og kjønn har å si for leseprestasjon, og til slutt diskuterer vi betydningen av bakgrunnsfaktorene foreldres utdanningsnivå, antall bøker i hjemmet og flerspråklighet.

DEFINISJON AV ENSPRÅKLIGE OG FLERSPRÅKLIGE ELEVER I PIRLS 2016

Flerspråklige elever utgjør en mangfoldig gruppe: fra Mohamed som kom til Norge i 2. klasse og som har to foreldre med arabisk som morsmål – til Sonia, som er født i Norge med norsk far og thailandsk mor, og som bruker både norsk og thai hjemme. Deres sosiale, kulturelle og språklige bakgrunn vil variere kraftig.

Flerspråklige barn har likevel i prinsippet det til felles at de i hverdagen forholder seg til mer enn kun det norske språket. I gjeldende offentlige dokumenter defineres *flerspråklige* som «En person som er vokst opp med to eller flere språk og som identifiserer seg med disse språkene og/eller en person som identifiserer seg

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2. Hverken SSB eller andre norske institusjoner med rapporteringsansvar på demografiske forhold har offisielle tall på elevgruppen 6–15 år i grunnskolen som har én forelder med annen språkbakgrunn enn norsk.

med flere språk og bruker flere språk i sin hverdag, selv om språkbeherskelsen ikke er like god på alle språk» (Barne-, likestillings- og inkluderingsdepartementet, 2012, s. 49).

Barns språksituasjon hjemme har betydning for deres språklige prestasjoner i skolesammenheng (Rydland, 2007; Melby-Lervåg & Lervåg, 2011). Tidligere undersøkelser har også vist at hvor mye elevene bruker dette språket, i vårt tilfelle norsk, har relativt stor betydning for deres rapporterte leseferdigheter på opplæringsspråket (Hvistendahl & Roe, 2004; Rydland, 2007; Melby-Lervåg & Lervåg, 2011; OECD, 2016; Mullis, Martin, Foy & Hooper, 2017).

I definisjonen av enspråklige og flerspråklige elever i PIRLS 2016 har vi derfor valgt å ta utgangspunkt i elevenes egne svar på spørsmålet om *hvor ofte de snakker norsk hjemme*, da forstått som en indikasjon på hvor mye elevene bruker opplæringsspråket utenom skolen. På dette spørsmålet kan de velge mellom følgende svaralternativer:

◗ «Jeg snakker *alltid* norsk hjemme»
◗ «Jeg snakker *nesten alltid* norsk hjemme»
◗ «Jeg snakker norsk *av og til*, og av og til snakker jeg et annet språk hjemme»
◗ «Jeg snakker *aldri* norsk hjemme»

Elever som har krysset av for *alltid*, omtales i denne artikkelen som enspråklige elever. Enspråklige refererer da kun til oppgitt enspråklig hjemmesituasjon (og ignorerer således det faktum at elevene for eksempel lærer engelsk på skolen).

Elever som har krysset av for *nesten alltid*, *av og til* eller *aldri*, kommer i kategorien flerspråklige elever. Med forbehold om de potensielle feilkildene som alltid ligger i spørreskjemadata generelt og elevrapporteringer spesielt, mener vi at en slik vid definisjon av flerspråklige elever best fanger opp mangfoldet. Flerspråklige elever vil ofte bruke opplæringsspråket, i vårt tilfelle norsk, i kommunikasjon med foreldre hjemme, selv om (en av) foreldrene gjerne benytter morsmålet sitt. Det er derfor riktig å innlemme også kategorien *nesten alltid* blant de flerspråklige.[3]

Det totale utvalget for Norge i PIRLS 2016 var 4232 elever på 5. trinn, og 4354 elever på 4. trinn. Gruppeinndelingen etter *språk snakket i hjemmet* gir en størrelsesorden som vist i tabell 4.1:

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3. Den korrekte termen må dermed også være flerspråklige og ikke minoritetsspråklige elever, slik tidligere norske PIRLS-rapporter har benyttet (Gabrielsen & Solheim, 2013), da sistnevnte term kun omfatter en del av det flerspråklige mangfoldet vi finner i skolen, det vil si barn med annen språk- og kulturbakgrunn enn norsk (NOU 2010: 7, 2010, s. 24), og elever med annet morsmål enn norsk og samisk (Barne-, likestillings- og inkluderingsdepartementet, 2012, s. 49).

TABELL 4.1. Størrelse i utvalg etter spørsmålet om hvor ofte elevene snakker norsk hjemme i PIRLS 2016.

	Totalt utvalg	Snakker alltid norsk hjemme		Snakker nesten alltid norsk hjemme		Snakker av og til norsk hjemme		Snakker aldri norsk hjemme	
		Antall elever	Elever i prosent	Antall elever	Elever i prosent	Antall elever	Elever i prosent	Antall elever	Elever i prosent
5. trinn	4232	2783	68	889	21	450	10	56	1
4. trinn	4354	2742	64	910	21	562	13	74	2

Prosenttall er rundet av.

Tabell 4.1 viser at flerspråklige elever utgjør 32 prosent på 5. trinn og 36 prosent på 4. trinn. På grunn av den kompleksiteten som ligger i det å formidle flerspråklige elevers resultater i PIRLS, har vi i videre analyser noen ganger valgt å rapportere på alle fire gruppene (*alltid* norsk, *nesten alltid* norsk, *av og til* norsk og *aldri* norsk).[4] Andre ganger bruker vi de mindre presise samlebetegnelsene enspråklige og flerspråklige elever.

TIDLIGERE UNDERSØKELSER AV FLERSPRÅKLIGE ELEVERS LESERESULTATER

Selv om elevgruppen er definert og betegnet noe forskjellig i ulike undersøkelser, tegner tidligere forskning likevel et ganske entydig bilde av at flerspråklige elever har svakere leseferdigheter enn enspråklige elever. Allerede i Reading Literacy Study[5] fra 1991, forløperen til både PIRLS og PISA, ble det rapportert om prestasjonsforskjeller i alle de nordiske landene (Gabrielsen & Solheim, 2013). Prestasjonsforskjellen er videre dokumentert i samtlige av de foregående norske PIRLS-rundene, det vil si i 2001, 2006 og 2011 (Wagner, 2004; Daal, Solheim, Gabrielsen & Begnum, 2007; Gabrielsen, 2013). Denne norske trenden samsvarer med PIRLS-funn rapportert fra andre vestlige land det er interessant å sammenlikne seg med, inkludert Finland, Sverige og Danmark (Mullis et al., 2003; Mullis et al., 2007; Mullis et al., 2012). De norske PISA-undersøkelsene, som måler 15-åringers ferdigheter i matematikk, naturfag og lesing, rapporterer også om svakere prestasjoner blant flerspråklige elever innenfor samtlige av fagområdene (Kjærnsli & Olsen, 2013; Kjærnsli & Jensen, 2016).[6] Videre viser de nasjonale

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4. Denne rapporteringen er i tråd med Mullis et al., 2017.
5. Reading Literacy Study målte leseferdighetene til 9-åringer og 14-åringer. 32 land deltok i 1991.
6. Lesing var hovedområde i 2000 og 2009.

prøvene i lesing, regning og engelsk på 5. trinn at elever med innvandrerbakgrunn, inkludert både første og andre generasjons innvandrere, er overrepresentert på det laveste mestringsnivået. Forskjellene er størst i lesing[7] (Statistisk sentralbyrå, 2017a). Prestasjonsforskjeller mellom enspråklige og flerspråklige elever er også godt dokumentert i andre store nasjonale og internasjonale rapporteringer (se for eksempel Bakken, 2003; Bakken & Elstad, 2012; OECD, 2016).

RESULTATER FOR FLERSPRÅKLIGE ELEVER I NORGE I PIRLS 2016

Hovedtendensen i den norske delen av PIRLS 2016 er at flerspråklige elever (elever som svarer at de *nesten alltid*, *av og til* eller *aldri* snakker norsk hjemme) skårer gjennomsnittlig lavere enn enspråklige elever (elever som oppgir at de *alltid* snakker norsk hjemme), se tabell 4.2.

TABELL 4.2. Gjennomsnittskårer i lesing for elever etter hvor ofte de snakker norsk hjemme. Data er hentet fra elevskjema.

	Alltid norsk		Nesten alltid norsk		Av og til norsk		Aldri norsk	
	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)
Norge 5. trinn	68	563 (2,5)	21	557 (3,2)*	10	542 (4,5)*	1	533 (12,1)*
Norge 4. trinn	64	521 (1,9)	21	521 (3,5)	13	499 (4,3)*	2	496 (11,5)*
Internasjonalt nivå etter hvor ofte elevene snakker test-språket hjemme	63	511 (0,5)	14	520 (0,7)	17	504 (0,8)	5	433 (1,9)

Stjerne indikerer signifikant forskjell sammenliknet med «alltid norsk»-gruppen.
*: p<0,05. Standardfeil i parentes, tallene er rundet av.
Tall for internasjonal sammenlikning er hentet fra Mullis et al., 2017.

Vi ser i tabell 4.2 at det er sammenheng mellom hvor ofte det snakkes norsk hjemme, og gjennomsnittlig skår i lesekompetanse. Elever som oppgir at de alltid snakker norsk hjemme, har en høyere skår enn elever som rapporterer at de sjeldnere snakker norsk hjemme. På 5. trinn er gjennomsnittlig skår i gruppene *nesten alltid*, *av og til* og *aldri* signifikant lavere sammenliknet med skåren i *alltid*-gruppen.

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7.   Resultatene rapporteres i gjennomsnittskårer, signifikansen er ikke oppgitt.

Forskjellene utpeker seg særlig i negativ forstand for elevene som *av og til* eller *aldri* snakker norsk hjemme, sammenliknet med *alltid*- eller *nesten alltid*-gruppene. Henholdsvis 21 og 30 poeng skiller disse to gruppene fra *alltid*-gruppen. For 4. trinn er det ingen forskjell i prestasjon mellom *alltid* og *nesten alltid*-gruppene, men også her er forskjellene i gjennomsnittsskår mellom de øvrige gruppene større og signifikante.

For internasjonal sammenlikning har vi satt inn et samlet gjennomsnittsresultat for de andre deltakerlandene i PIRLS 2016. I de internasjonale resultatene ser vi at elevene som har oppgitt at de *nesten alltid* snakker testspråket hjemme, har en høyere skår enn elevene som *alltid* snakker testspråket[8] hjemme. Denne nyanseringen illustrerer hvor kompleks gruppen flerspråklige elever er.

Det vil være mange grunner til at flerspråklige elever snakker mer eller mindre norsk hjemme, som for eksempel forhold knyttet til familiens språkvaner eller til botid i landet, og man skal vokte seg for å dra bastante slutninger på grunnlag av disse funnene. Funnene skal heller ikke forstås som en anbefaling om at flerspråklige familier bør snakke norsk hjemme. Imidlertid er det klart at det å høre og selv ta i bruk mye nok og variert nok norsk, spiller en rolle for leseferdigheter i skolesammenheng (Wagner, Strömqvist & Uppstad, 2008; Melby-Lervåg & Lervåg, 2011).

Videre er det interessant å se på gjennomsnittsresultatene til elevene etter om de er født eller ikke født i Norge. Vi ser tydelige forskjeller i leseprestasjon, se tabell 4.3.

TABELL 4.3. Gjennomsnittsskår for elever født i Norge og ikke født i Norge. Data er hentet fra foresattes spørreskjema.

		n	**Elever i prosent**	**Gjennomsnittsskår (s.e)**
5. trinn	Født i Norge	3764	93	561 (2,2)
	Ikke født i Norge	282	7	546 (5,4)*
4. trinn	Født i Norge	3838	93	520 (1,9)
	Ikke født i Norge	276	7	499 (7,0)*

*: p<0,05. Standardfeil i parentes, tallene er rundet av.

Det er en relativt liten prosentandel av elevene som har oppgitt at de ikke er født i Norge, kun syv prosent på begge trinn. I tabell 4.3 ser vi en betydelig forskjell i

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8. Testspråket er terminologien som brukes i PIRLS internasjonale rapport (Mullis et al., 2017) om språket undersøkelsen gjennomføres på i de enkelte landene.

prestasjonsnivået mellom elevgruppen *født i Norge* og gruppen *ikke født i Norge* både på 4. og 5. trinn. På 5. trinn skårer elevene som er født i Norge, 15 poeng bedre enn elever som ikke er født i Norge. På 4. trinn er differansen på 21 poeng. Forskjellene er signifikante for begge trinn.

HVORDAN SKÅRER FLERSPRÅKLIGE ELEVER PÅ DE ULIKE DELKOMPETANSENE?

I PIRLS måles leseforståelse etter prinsippet om at lesing hovedsakelig har to formål: (1) å lese for å tilegne seg litterær erfaring og (2) å lese for å tilegne seg og bruke informasjon (Mullis & Martin, 2015, Mullis et al., 2017). Leseprøven i PIRLS består av både litterære tekster og faktabaserte tekster. Definisjonen av leseforståelse i PIRLS er forankret i teorien om at fire prosesser virker sammen for å utvikle leseforståelse. Disse er: (1) finne og hente ut eksplisitt informasjon fra teksten, (2) trekke enkle slutninger, (3) tolke og sammenholde informasjon og (4) vurdere språk, innhold og virkemidler i teksten. I PIRLS' prøvedesign måles disse fire prosessene i begge tekstsjangrene.[9] Tabell 4.4 viser hvordan flerspråklige elever skårer på de forskjellige prosessene og teksttypene sammenliknet med enspråklige elever. I oversikten er de fire prosessene slått sammen til to: finne og bruke eksplisitt informasjon og tolking og vurdering.

TABELL 4.4. Gjennomsnittsskårer på formål og leseforståelsesprosesser på 5. trinn etter hvor ofte elevene snakker norsk hjemme.

	Elever i prosent	Lese fakta-baserte tekster	Lese litte-rære tekster	Finne og bruke eksplisitt info.	Tolking og vurdering
Alltid	68	563 (2,7)	565 (2,8)	566 (2,6)	562 (2,7)
Nesten alltid	21	555 (3,9)*	559 (3,4)*	563 (3,4)	554 (3,1)*
Av og til	10	544 (5,0)*	540 (4,9)*	540 (5,1)*	546 (4,4)*
Aldri	1	531 (11,8)*	534 (11,8)*	534 (12,9)*	535 (11,9)*

Stjerne indikerer signifikant forskjell sammenliknet med «alltid norsk»-gruppen.
*: p<0,05, standardfeil i parentes, tallene er rundet av.

Tabell 4.4 viser prestasjonsforskjeller mellom enspråklige og flerspråklige elever på 5. trinn i alle prosessene og i begge sjangrene.[10] I PIRLS' design for utvikling

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9. Se artikkel 1 (Gabrielsen og Strand) i denne boken for redegjørelse av prøvedesignet i PIRLS.
10. Samme mønster sees også på 4. trinn.

av tekstene er hensynet til kulturell bias nøye overveid. Tekstene skal ikke inneholde utpreget kulturspesifikk kunnskap, nettopp fordi de skal kunne fungere i deltakerland med ulike skoletradisjoner og på tvers av kulturelle forskjeller (Mullis & Martin, 2015). Det er derfor lite sannsynlig at selve utformingen av PIRLS-tekstene bidrar til prestasjonsforskjeller mellom enspråklige og flerspråklige elever. De flerspråklige elevene strever ikke mer med én sjanger enn med den andre, og mestrer heller ikke én leseforståelsesprosess bedre eller dårligere enn andre.

HAR ANDELEN FLERSPRÅKLIGE ELEVER PÅ SKOLEN NOE Å SI FOR RESULTATENE?

I PIRLS blir rektorene spurt om hvor mange prosent av elevene ved skolen som har norsk som morsmål.[11] De aller fleste norske skoler har et betydelig flertall av elever med norsk som sitt morsmål. 63 prosent av elevene på 5. trinn går på skoler hvor 90 prosent av elevene har norsk som sitt morsmål. 32 prosent av elevene går på skoler hvor over halvparten av elevene har norsk morsmål, og kun fem prosent av elevene går på skoler hvor færre enn 50 prosent har norsk som sitt morsmål. Se tabell 4.5. For Norges del er forskjellene i leseprestasjon ubetydelige mellom de tre skolekategoriene, noe som også var tilfellet i 2011 (Gabrielsen, 2013). Vi ser altså ingen tydelig sammenheng mellom andel flerspråklige elever (her forstått som de som ikke har norsk som morsmål) ved skolene og leseresultat. Funnet støttes av andre store norske og svenske studier som har undersøkt sammenhengen mellom immigrasjonsbakgrunn og skoleprestasjoner i videregående skole (Hermansen & Birkelund, 2015; Brandén, Birkelund & Ryszard, 2016).

Resultatene er en indikasjon på at selv skoler med en høy andel flerspråklige elever i stor grad henger med resultatmessig i PIRLS, et funn som gir grunn til optimisme. Når det er sagt, har vi lite informasjon fra PIRLS om hvem de flerspråklige elevene er. For å få mer innsyn i dette funnet er det nødvendig å undersøke hva som kjennetegner skoler med høy andel flerspråklige, sammenliknet med skoler med liten andel flerspråklige elever. Vi registrerer at det er behov for mer forskning innen dette feltet.

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11. I den internasjonale PIRLS-rapporten for 2016 brukes det engelske begrepet «native language», som vi her har oversatt til morsmål.

TABELL 4.5. Gjennomsnittsskårer etter andelen elever som har testspråket som sitt morsmål. Data er hentet fra rektorenes spørreskjema.

Land	Skoler hvor over 90 % av elevene har testspråket som sitt morsmål		Skoler hvor 51–90 % av elevene har testspråket som sitt morsmål		Skoler hvor 50 % eller færre har testspråket som sitt morsmål	
	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)
Norge 5. trinn	63	559 (2,9)	32	560 (3,8)	5	551 (4,8)
Norge 4. trinn	62	518 (2,6)	32	518 (3,1)	5	503 (6,0)
Danmark	60	553 (2,7)	31	541 (3,4)	9	532 (8,3)
Sverige	47	563 (3,3)	37	550 (3,1)	16	541 (8,3)
Finland	82	570 (1,8)	16	553 (6,1)	2	~~
Internasjonalt	63	512 (0,5)	20	515 (1,1)	18	493 (1,9)

~~ = For få observasjoner.
Standardfeil i parentes, tallene er rundet av. Tall for nordisk og internasjonal sammenlikning er hentet fra Mullis et al., 2017.

RESULTATER FOR FLERSPRÅKLIGE ELEVER OVER TID I NORGE

PIRLS gir mulighet for å følge trenden i lesekompetanse over tid. Utviklingen i elevenes lesekompetanse er en viktig indikator for å kunne si noe om hvorvidt elevene har de ferdighetene som er forventet i lesing på 4. og 5. trinn. På lik linje med framgangen i de generelle leseresultatene for norske elever viser også de flerspråklige elevene framgang.[12]

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12. Se artikkel 2 (Gabrielsen og Hovig) i denne boken for hovedresultater.
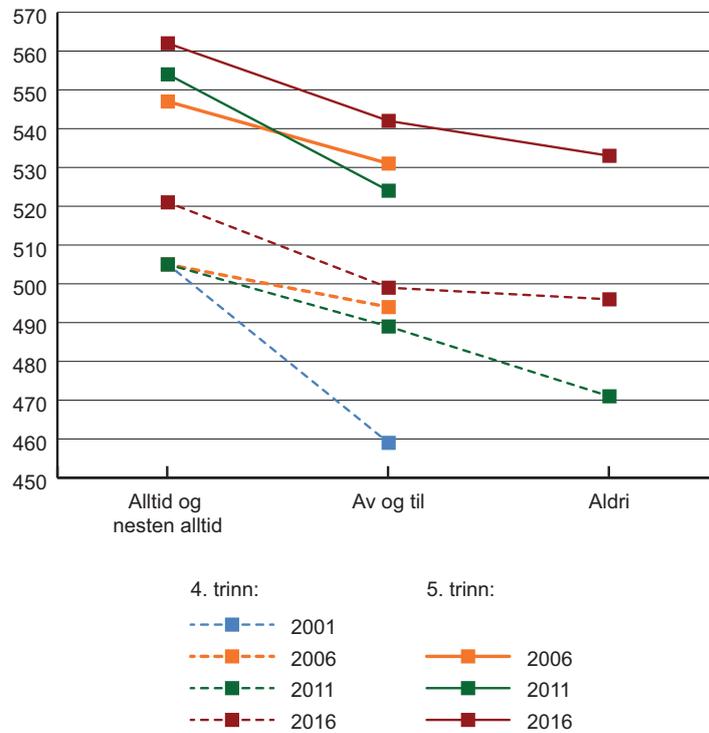
FIGUR 4.1. Sammenlikning av gjennomsnittlige leseskårer for elever etter hvor ofte de snakker norsk hjemme i PIRLS 2001, 2006, 2011 og 2016. Data er hentet fra elevenes spørreskjema.

Det kan være problematisk å sammenlikne leseresultatene de fire gangene Norge har deltatt i PIRLS. Utvalget har ikke en helt lik sammensetning de forskjellige årene, og variablene (spørsmålene) i spørreskjemaene har endret seg noe mellom syklusene. På spørsmål til elevene om hvor ofte de snakker norsk hjemme, er det i 2016 fire svaralternativer: *alltid, nesten alltid*, *av og til* og *aldri*. I 2011 og 2001 var derimot alternativene *alltid* og *nesten alltid* slått sammen, mens PIRLS 2006 opererte med *alltid*, *av og til* og *aldri*. Variasjonen gir således en uregelmessighet knyttet til verdien *nesten alltid*, og i figur 4.1 har vi dermed måttet slå kategoriene *alltid* og *nesten alltid* sammen. Ulempen med en slik sammenslåing er at vi dermed mister den relativt store gruppen flerspråklige elever som *nesten alltid* snakker norsk hjemme, jamfør diskusjonen innledningsvis i denne artikkelen.

Vi ser i figur 4.1 at gruppene *alltid og nesten alltid*, *av og til* og *aldri* (der skåren er oppgitt) har hatt framgang i gjennomsnittsresultat fra 2001 til 2016. Blant elevgruppen som oppgir at de *av og til* snakker norsk hjemme, ser vi en økning på 18 poeng fra 2011 til 2016 på 5. trinn. Utvalget på 5. trinn var i 2011 noe begrenset, og det er derfor ikke ønskelig å trekke konklusjoner basert på dette trinnet i 2011 (Gabrielsen, 2013). 4. trinn var hovedtrinnet med fullt utvalg i 2011, og sammenlikner vi med 4. trinn i 2016, som også hadde fullt utvalg, ser vi en differanse på ti poeng. Denne forskjellen er signifikant.

Fra 2006 til 2011 så vi faktisk en liten nedgang i resultat i *av og til*-gruppen på begge trinnene. Rapporteringen fra 2006 må sees i sammenheng med at flere skoler med høy andel flerspråklige elever benyttet seg av reservasjonsretten, og valgte å ikke delta i PIRLS. I utvalget for norske PIRLS 2006 finnes ikke skoler med mer enn 50 prosent flerspråklige elever (Daal et al., 2007; Gabrielsen, 2013).

Vi ser at prestasjonsforskjellene mellom de enspråklige og de flerspråklige elevene blir mindre på 5. trinn. Med utgangspunkt i elevene som har svart at de *alltid* og *nesten alltid* snakker norsk sammenliknet med elever som *av og til* snakker norsk hjemme, ser vi at forskjellen i poeng har gått ned fra 30 til 20 poeng på 5. trinn. På 4. trinn har forskjellene økt med seks poeng fra 2011 til 2016.

SAMMENLIKNING MELLOM DE NORDISKE LANDENE

Figur 4.2 viser en sammenlikning av gjennomsnittlige leseresultater for enspråklige og flerspråklige elever i Norge, Danmark, Sverige og Finland i PIRLS 2016. Opplysningene er basert på elevenes svar på hvor ofte de snakker testspråket hjemme.[13]

Vi ser i figur 4.2 at de norske enspråklige elevene (de som svarer at de *alltid* snakker norsk hjemme) skårer tilnærmet likt som de svenske enspråklige elevene, noe høyere enn danske og litt lavere enn de finske. Når det gjelder de flerspråklige elevene (de som svarer at de *nesten alltid* eller *av og til* snakker norsk hjemme), er to positive forhold verd å merke seg: For det første er Norge det landet i Norden med minst sprik i resultatene mellom de tre gruppene (*alltid*, *nesten alltid* og *av og til*) samlet sett. De norske forskjellene er på 6 og 16 poeng mellom kategoriene, mot danske 6 og 26, svenske 12 og 19 og finske 2 og 27. For det andre ser vi i 2016 en generelt positiv utvikling for flerspråklige elever i Norge og Sverige.[14]

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13. Den nordiske sammenlikningen er gjort mellom landenes hovedtrinn, det vil si 5. trinn i Norge og 4. trinn for de øvrige landene. For en redegjørelse for alderssammensetningen i PIRLS se artikkel 1 (Gabrielsen og Strand) i denne boken.

14. Resultatene må sees i sammenheng med de nordiske hovedresultatene, hvor både Norge og Sverige viser en markant, positiv utvikling. Se artikkel 2 (Gabrielsen og Hovig) i denne boken.
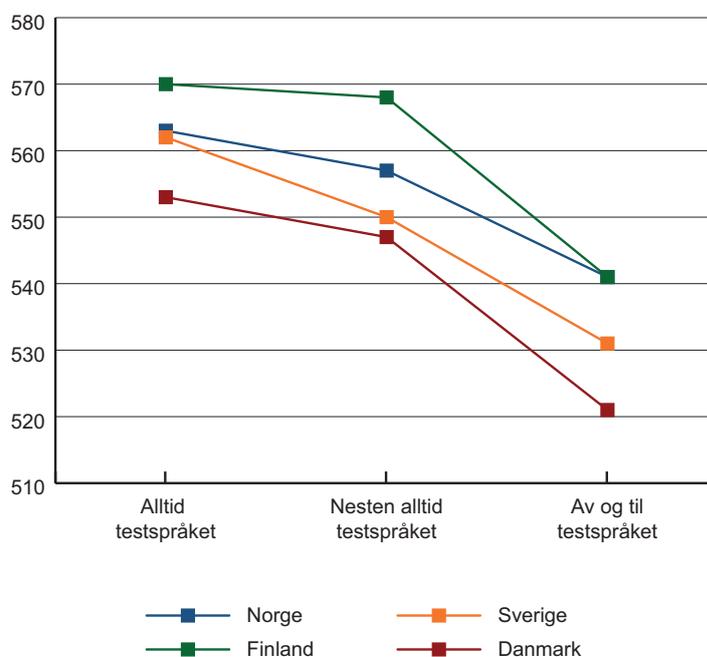
FIGUR 4.2. Gjennomsnittsskårer i de nordiske landene etter hvor ofte elevene snakker testspråket hjemme i PIRLS 2016. Data er hentet fra elevenes spørreskjema. Gruppen aldri er for liten til å rapportere på.

HVORDAN FORSTÅ FUNNENE I PIRLS?

Man kan ikke på bakgrunn av PIRLS-data trekke slutninger om årsakssammenhenger. Det er likevel mulig å se på hvordan faktorer samvarierer. Å si at der det er en sammenheng mellom leseinteresse og leseskår, er for eksempel ikke det samme som å si at leseinteresse er årsaken til økt prestasjon. Med dette som bakgrunn er det likevel mulig å stille noen interessante spørsmål som kan belyses fra ulike vinkler med funn fra PIRLS-data. Mange nasjonale og internasjonale studier har undersøkt hvorfor det er prestasjonsforskjeller mellom enspråklige og flerspråklige elever (se for eksempel Bakken, 2003, 2016; Leirvik, 2014; Hermansen & Birkelund, 2015; Brandén et al., 2016; OECD, 2015). Dette er et komplekst tema som krever større plass og andre typer analyser enn vi har rom for i denne omgang, men vi skraper litt i overflaten av en svært interessant tematikk.

For å tilstrebe en inkluderende skole hvor opplæringen imøtekommer det mangfoldet vi har i klasserommet, er det viktig å ha bred kunnskap om forhold som er knyttet til elevenes leseferdigheter. Det betyr ikke bare lesekompetansen målt i skårer, men også faktorer i elevenes hjemme- og skolemiljø som kan ha betydning for deres leseutvikling. Den store datamengden i PIRLS gir oss informasjon både om elevens mestringsnivå i lesing samt viktig tilleggsinformasjon fra både elevene selv, elevens foresatte, lærere og skoleledelse.[15] I avsnittene under ser vi på noen interessante faktorer som kan ha noe å si for elevenes leseprestasjon. Vi konsentrerer oss her om 5. trinn. Vi minner om at enspråklige elever utgjør 68 prosent av utvalget på 5. trinn, flerspråklige elever 32 prosent. Gjennomsnittskåren til de flerspråklige elevene er 552 poeng, mot enspråklige elevers 563. Prestasjonsforskjellen på 11 poeng er signifikant (p<0,001).[16]

TID I BARNEHAGE OG LESESKÅR

I PIRLS 2016 ser vi at det ikke er entydige sammenhenger mellom tid i barnehage og leseskår målt på 5. trinn. Våre funn er dermed helt i tråd med hva som ble rapportert om tid i barnehage fra norske PIRLS 2011 (Gabrielsen, 2013).

TABELL 4.6. Sammenheng mellom tid i barnehage og gjennomsnittlige leseskår for 5. trinn.

	Tid i barnehage	**Elever i prosent**	**Gjennomsnittsskår (s.e)**
Enspråklige elever	Ikke deltatt	2	566 (12,6)
	1 år eller mindre	2	557 (10,9)
	Mellom 1 år og 3 år	12	549 (5,0)
	Mer enn 3 år	82	567 (2,5)
Flerspråklige elever	Ikke deltatt	5	524 (10,3)
	1 år eller mindre	2	544 (16,4)
	Mellom 1 år og 3 år	15	527 (5,9)
	Mer enn 3 år	77	561 (3,1)

Standardfeil i parentes, tallene er rundet av.

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15. Se artikkel 1 (Gabrielsen og Strand) i denne boken for en nærmere beskrivelse av mestringsnivåer og PIRLS-spørreskjemaer.
16. Når vi videre i artikkelen oppgir resultater som signifikante, snakker vi om det konvensjonelle 5 %-nivået.

Elever som har gått mer enn tre år i barnehagen, har gjennomsnittlig høyere lese-skår enn elever som har tilbrakt kortere tid i barnehagen. Dette mønsteret gjelder både for enspråklige og flerspråklige elever. Vi ser dessuten at flerspråklige elever som har gått over tre år i barnehage, skårer nesten like godt som de enspråklige elevene i samme kategori, noe som kan tyde på at tid i barnehage har større effekt på flerspråklige elevers leseprestasjon. Tallene må likevel tolkes med varsomhet, da ikke alle forskjellene mellom gruppene av tid-i-barnehage er signifikante. Det er dessuten stor forskjell på gruppene i størrelse. Der er dermed knyttet usikkerhet til hvor mye barnehagetid egentlig har å si for utviklingen av leseforståelse.

HVILKEN BETYDNING HAR LESEINTERESSE FOR LESEPRESTASJON?

Leseinteresse som motivasjonsfaktor har i flere studier vist seg å være en sterk prediktor for leseprestasjon (Ecalle, Magnan & Gibert, 2006; Wigfield & Cambria, 2010; Malloy, Marinak, Gambrell & Mazzoni, 2013). Dette finner vi også i norske PIRLS 2016, hvor vi ser en tydelig sammenheng mellom leseinteresse og leseprestasjon for både enspråklige og flerspråklige elever. Forskjellene er signifikante. Leseinteresse ser ikke ut til å være av større betydning for den ene eller den andre elevgruppen. I skolesammenheng er det derfor viktig å stimulere alle elevers leseinteresse.

TABELL 4.7. Sammenheng mellom leseinteresse og leseprestasjon. Data er hentet fra elevspørreskjema.

	Jeg liker å lese	Elever i prosent	Gjennomsnittsskår (s.e)
Enspråklige elever	Helt enig	45	584 (2,6)
	Litt enig	31	559 (3,0)*
	Litt uenig	14	543 (4,1)*
	Helt uenig	10	517 (5,2)*
Flerspråklige elever	Helt enig	44	571 (3,9)
	Litt enig	34	547 (4,2)*
	Litt uenig	13	533 (5,5)*
	Helt uenig	9	504 (7,3)*

Stjerne indikerer signifikant forskjell sammenliknet med gruppen «helt enig».
*: $p < 0,05$. Standardfeil i parentes, tallene er rundet av.

BETYR KJØNN NOE FOR LESEPRESTASJONER?

Det er grundig dokumentert både gjennom nasjonale og internasjonale leseunder-søkelser at jentene presterer bedre enn guttene gjennom hele skoleløpet (Mullis et al., 2012; Lundetræ & Solheim, 2013; Kjærnsli & Jensen, 2016). De norske resultatene i PIRLS 2016 følger denne trenden.[17]

Når vi sammenlikner resultatene for flerspråklige jenter og gutter, er historien den samme som for hele det norske utvalget. Vi finner at flerspråklige jenter (elever som har svart at de *nesten alltid* eller *av og til* snakker norsk hjemme)[18] skårer bedre enn flerspråklige gutter. Forskjellene er signifikante. Verd å merke seg er at flerspråklige jenter som har svart at de *nesten alltid* snakker norsk hjemme, skårer 18 poeng bedre enn enspråklige gutter. Flerspråklige jenter som svarer at de *av og til* snakker norsk hjemme, skårer kun 3 poeng under enspråklige gutter. Hva dette funnet faktisk betyr, vil kreve flere dybdeanalyser.

TABELL 4.8. Gjennomsnittlig skår i lesekompetanse, jenter og gutter.

Hvor ofte snakker du norsk hjemme?	Jenter		Gutter	
	Elever i prosent	Gjennom-snittsskår (s.e)	Elever i prosent	Gjennom-snittsskår (s.e)
Alltid norsk	70	573 (2,8)	65,00	553 (3,1)
Nesten alltid norsk	20	571 (4,5)	22,00	545 (3,5)
Av og til norsk	9	550 (5,9)	12,00	535 (6,3)

Standardfeil i parentes, tallene er rundet av.

HAR SOSIAL BAKGRUNN BETYDNING FOR LESEPRESTASJON?

Det er godt forskningsmessig belegg for å hevde at elevenes sosiale bakgrunn har noe å si for deres skolefaglige utvikling (Grøgaard, Helland & Lauglo, 2008; Bakken, 2009; Wiborg, Arnesen, Grøgaard, Støren & Opheim, 2011; Bakken & Elstad, 2012). Ett eksempel er at barn av foreldre med høy utdanning viser seg å skåre høyere på vokabulartester, noe som blir tolket som at språkmiljøet i disse familiene stimulerer barnas vokabular bedre enn i familier der foreldrene har lavere utdanning (Segers, Damhuis, Sande & Verhoeven, 2016). Under ser vi derfor på hvilken betydning bakgrunnsfaktorene *antall bøker i hjemmet, foresattes*

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17. Se artikkel 10 (Solheim og Gourvennec) og artikkel 2 (Gabrielsen og Hovig) i denne boken.
18. Gruppen *aldri* er for liten til å rapportere på.

utdanningsnivå og *tid brukt på norsk hjemme (flerspråklighet)* har å si for eleve-nes prestasjoner i lesing.

Antall bøker i hjemmet er ofte brukt som indikator for sosial bakgrunn, og flere internasjonale studier har vist at antall bøker i hjemmet har en klar sammenheng med skoleprestasjon og leseinteresse (Mullis et al., 2012; Mullis et al., 2017, Segers et al., 2016).

TABELL 4.9. Sammenhengen mellom leseskår og antall bøker i hjemmet.

	Antall bøker hjemme	Elever i prosent	Gjennomsnittsskår
Enspråklige elever	0–25 bøker	13	534 (4,4)*
	26–100 bøker	27	551 (3,6)*
	101–200 bøker	59	577 (2,6)
Flerspråklige elever	0–25 bøker	20	529 (4,8)*
	26–100 bøker	31	546 (4,4)*
	101–200 bøker	48	568 (3,9)

Stjerne indikerer signifikant forskjell sammenliknet med gruppen for 101–200 bøker.
*: p<0,05. Standardfeil i parentes, tallene er rundet av.

Vi ser av tabell 4.9 at det er en lineær sammenheng mellom antall bøker i hjemmet og elevenes gjennomsnittlige skår i leseresultat. Det vil si at elever som kommer fra hjem med mange bøker, oppnår bedre leseresultater. Sammenhengen er like sterk for flerspråklige som for enspråklige elever.

PIRLS 2016 viser på linje med foregående runder (Gabrielsen, 2013) at for-eldres utdanningsnivå har en sterk sammenheng med leseskår.[19] Vi finner også her en lineær sammenheng, sterkere enn mellom antall bøker i hjemmet og leseskår, for både enspråklige elever og flerspråklige elever. Heller ikke her får vi noen indikasjoner på at sammenhengen er sterkere i den ene eller andre gruppen.

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19. Fra foresattes spørreskjema får vi informasjon om begge foresattes utdanningsnivå. Vi har laget en ny variabel der vi har slått sammen informasjonen fra begge foresatte, og dermed ikke sett på om for eksempel mors utdanningsnivå har mer å si for barnets prestasjon enn fars.

TABELL 4.10. Sammenheng mellom leseskår og foresattes utdanningsnivå.

	Foreldres utdanningsnivå	Elever i prosent	Gjennom-snittsskår (s.e)
Enspråklige elever	Maks grunnskole	2	511 (13,1)*
	Høyere utdanning uten bachelorgrad	35	547 (3,1)*
	Høyere utdanning med minimum bachelorgrad	63	577 (2,6)
Flerspråklige elever	Maks grunnskole	5	518 (10,8)*
	Høyere utdanning uten bachelor	38	533 (4,6)*
	Høyere utdanning med minimum bachelorgrad	56	572 (3,4)

Stjerne indikerer signifikant forskjell sammenliknet med gruppen «høyere utdanning med minimum bachelorgrad».
*: $p < 0{,}05$. Standardfeil i parentes, tallene er rundet av.

TABELL 4.11. Multippel lineær regresjonsanalyse som viser sammenheng mellom hjemmefaktorer, flerspråklighet og leseskår.

	B (reg.koef.)	B (s.e.)	t
(KONSTANT)	582,66*	2,62	222,39
Maks grunnskole	–44,88*	7,6	–5,91
Høyere utdanning uten bachelorgrad	–24,88*	3,22	–7,72
0–25 bøker	–28,68*	3,97	–7,23
26–100 bøker	–16,82*	3,22	–5,23
Flerspråklighet	–5,93*	2,98	–1,99

$R^2 = 0{,}10$
*: $p < 0{,}05$

I tabell 4.11 er elevenes sosiale bakgrunn kontrollert for ved hjelp av regresjons-analyse. «Konstant» refererer til enspråklige elever som har foreldre med det høyeste utdanningsnivå (minimum bachelorgrad), og som bor i et hjem med flere enn 100 bøker. Kontrollert for foreldres utdanningsnivå og antall bøker i hjemmet finner vi at hvor mye norsk elevene oppgir å snakke hjemme, har noe å si for deres leseprestasjoner. Flerspråklige elever skårer i gjennomsnitt seks poeng lavere enn enspråklige elever når vi kontrollerer for foreldres utdanningsnivå og antall bøker i hjemmet. Det er en reduksjon på fem poeng, sammenliknet med de elleve poen-

gene som skiller gruppene når vi kun ser på poengskår. Vi ser altså at «gapet» nærmest halveres mellom enspråklige og flerspråklige elever når vi tar høyde for bakgrunnsfaktorene.

Dette kan illustreres på følgende måte: Dersom enspråklige Truls og flerspråklige Amy kommer fra hjem hvor det er like mange bøker, og hvor foreldrenes utdanningsnivå er likt, forventer vi at forskjellen i leseprestasjon er på bare seks poeng, altså nærmest ubetydelig.

De estimerte effektene på leseprestasjon i tabell 4.11 viser i tillegg at effekten av bakgrunnsfaktorene, både antall bøker i hjemmet og foreldres utdanningsnivå, på leseprestasjon er større enn effekten av flerspråklighet. For eksempel vil effekten av å ha foreldre med maks grunnskole være en reduksjon i forventet leseprestasjon på 44 poeng relativt til å ha foreldre med minimum bachelorgrad.

Tilgang til og bruk av mye nok og variert nok norsk er fremdeles viktig, og argumentet om at flerspråklige barns norskopplæring må styrkes, gjelder fortsatt. Nyanseringen er likevel at både enspråklige og flerspråklige elever får en fordel som gir utslag i leseprestasjon dersom foreldrene har høy utdanning, og man kommer fra et hjem med mange bøker.

OPPSUMMERING

I PIRLS 2016 ser vi at flerspråklige elever fortsatt skårer gjennomsnittlig lavere enn enspråklige elever, i tråd med trenden fra 2001, 2006 og 2011. Prestasjonsforskjellene finner vi også i samtlige av de nordiske landene som har deltatt i PIRLS, og når vi foretar en internasjonal sammenlikning (Mullis et al., 2017).

Det er likevel grunn til optimisme. De flerspråklige elevene gjør det bedre enn i de foregående PIRLS-syklusene, et mønster som samsvarer med de enspråklige elevenes framgang i 2016.

Vi finner at flerspråklige jenter leser bedre enn flerspråklige gutter, og flerspråklige jenter som nesten alltid snakker norsk hjemme, skårer også bedre enn enspråklige gutter. Når det kommer til hvor godt elevene liker å lese, kan vi slå fast at leseinteresse som motivasjonsfaktor har tydelig sammenheng med leseprestasjon for både enspråklige og flerspråklige elever.

Til sist finner vi, ved å undersøke utvalgte bakgrunnsfaktorers betydning for prestasjon i leseforståelse, at bøker i hjemmet og foreldres utdanningsnivå er sterkere prediktorer for leseprestasjon enn flerspråklighet.

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Paper II

The impact of Home Language and Home Resources on Reading Achievement in ten-year-olds in Norway; PIRLS 2016

Olaug Strand[1]★ og Knut Schwippert[2]
[1]Norwegian Reading Centre, University of Stavanger and [2]University of Hamburg

Abstract
The aim of the current study was to examine the associations between a child's home language, home resources for learning to read and reading achievement. Whereas the role of a child's first language in second language learning and literacy skills has shown contradictory results, there is an established body of empirical evidence documenting the relationship between home resources and academic achievement. The study was conducted to extend existing knowledge on the relative contribution of home language and home resources on reading achievement. Using data from the Norwegian participation in Progress in International Reading Literacy Study (PIRLS) 2016, fifth grade, mean age 10.8 years (n = 4232), regression analysis reveals, overall, that home resources is more strongly related to reading achievement than a child's home language. In the search for extended knowledge about the complex mechanisms behind achievement differences, we argue that several factors in addition to home language need to be considered, so that any initiative that is identified as effective to compensate for diversity will be beneficial for all students who need additional support in their reading development.

Keywords: *Language Minority Learners; Reading Achievement; Home Resources for Learning to Read; Achievement gap*

Introduction

Norway, a country with approximately 5.2 million inhabitants, is experiencing a demographic change. One main reason for this change in its population composition is the last decade's increase in immigration (Dzamarija, 2017). In 2016, children with an immigrant background[1] aged between 6 and 15 years formed 16% of the

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[1]Including children born in the country with two parents born abroad, and children not born in the country with both parents born abroad.

★Correspondence to: Olaug Strand, Universitetet i Stavanger, Postboks 8600 Forus, 4036 Stavanger. Epost: olaug.strand@uis.no

student population enrolled in compulsory schools (Steinkellner, 2017) as compared to 10.4% in 2011 (Bakken & Elstad, 2012, p. 133). Moreover, the settlement patterns of immigrants have changed during the last five years. Whereas people with immigrant background were more likely to settle in urban areas, there is now a more equal immigrant settlement between urban and rural areas and in schools (Bakken & Elstad, 2012; Stambøl, 2013). In light of these demographic changes, it is worrying that large-scale school comparison studies indicate that language minority (LM) learners[2] in Norway demonstrate lower levels in reading achievement than their native Norwegian-speaking peers; for example, in PIRLS[3] (Strand, Wagner, & Foldnes, 2017), in PISA[4] (Kjærnsli & Jensen, 2016; Roe & Hvistendahl, 2009), and in National Tests in Reading, Math and English[5] (Statistics Norway, 2018). The Norwegian situation is far from unique. The achievement gap between LM learners and native-speaking students is an ongoing debate topic within educational science, not only in Norway but also in other European countries as well as in the U.S. and Canada. (Ladson-Billings, 2006; NCES, 2015; OECD, 2015; Kieffer, 2011; Lesaux, Koda, Siegel, & Shanahan, 2006).

Whereas research on the role of a child's first language in second language acquisition and literacy skills has shown contradictory results (for a review, see Melby-Lervåg & Lervåg, 2011b), there is an established body of empirical evidence arguing that a child's social background is strongly associated with educational achievement (e.g., Bakken, 2014; Kieffer, 2011; Lauglo, 2010; Sirin, 2005). However, the relative contribution of home language and social background on reading achievement is not all clear (e.g. Kistemaker & Broeder, 2014; Randen, 2015). Hence, the current study seeks to extend the existing research by providing a nuanced description of the relative importance of students' home language and student's home resources for learning to read on reading achievement in Norwegian ten-year-olds.

LM learners and the theory of discourses

It is well known that many LM learners; students who come from homes in which a language other than the societal language is primarily used, experience the dual challenge of developing sophisticated literacy skills while at the same time acquiring the language of instruction (August & Shanahan, 2006). Developmental views of reading suggest that reading growth is cumulative, that is, later skills build on earlier skills (e.g., Snow, Bruns, & Griffin, 1998). Developing fundamental precursors to reading in early childhood and before starting formal reading instruction facilitates learning to decode words, which further facilitates development of word reading (RAND Reading Study Group, 2002). Fluent word reading offers opportunities to gain language

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[2] We define LM learners as those students who come from homes in which a language other than Norwegian is the primary language spoken. See next paragraph for further descriptions.
[3] Progress in International Reading Study.
[4] Programme for International Student Assessment.
[5] National tests assessing reading, math and English in Norwegian in grades 5, 8 and 9.

knowledge that is important for understanding texts (Kieffer, 2011; RAND Reading Study Group, 2002).

According to sociolinguistic approaches embedded in New Literacy Studies, the development of reading literacy skills is not only dependent on cognitive processes but also on social processes such as relationships in a child's home environment and social background (Cummins, 1991). Embodied in a New Literacy Study theoretical framework, "Literacy has no effect – indeed, no meaning – apart from particular cultural contexts in which it is used and it has different effects in different contexts" (Gee, 2015, p. 90). The term "discourse" is elaborated in, among others, Gee's epoch-making article *What is literacy?* (1989).

According to Gee's theory of discourses, a primary discourse refers to where we learn our first things and what these are, usually related to the social and cultural interactions happening in the home and in the family. A secondary discourse is what we develop outside our homes and primary discourses, e.g., the school (Gee, 1989). According to Gee, discourses are highly related to the distribution of social power and hierarchical structure in society. Mastering the dominant discourse can lead to the acquisition of benefits, e.g., academic results. Hence, a gap between primary and secondary discourses may be a useful theoretical approach to investigate achievement differences in school between LM learners and native-speaking students. A growing body of research indicates that the complex achievement gap between LM learners and native-speaking students is not only about the language background, but also intertwines with a student's social background (e.g., Bakken & Hyggen, 2018; Ladson-Billings, 2006; Lesaux & Kieffer, 2010).

The role of home language in reading achievement

Differences between the child's home language and the required school language, are often seen as a source of problems with the linguistic diversity in second-language learners (e.g., August & Shanahan, 2006; Cummins, 1991; Rydland, 2007). Research interests concerning the role of the first language in second-language learning and literacy skills have produced a large number of cross-sectional studies providing ambiguous findings; hence there are disagreements in the literature on the magnitude of cross-linguistic transfer (for a review, see Melby-Lervåg & Lervåg, 2011a, 2011b).

Few longitudinal studies have been conducted with LM learners (Lesaux et al., 2006), so it is unclear how these learners grow in second-language reading as they move beyond the primary grades and through the educational system. However, Kieffer (2011) examined the roles of LM status and English proficiency in English reading development across the elementary (grade 1–3) and middle school (grade 3–8) years. One of his findings was that reading trajectories in LM learners with initially limited English proficiency remain below national averages but converge with the results of their peers from similar socioeconomic backgrounds during middle school. Kieffer and Vukovic (2012) conducted a longitudinal study to examine the relative

contributions of coding-related and linguistic comprehension skills through first, second and third grade. The results showed no significant differences between LM learners and native English speakers. Sikiö and colleges (Sikiö, Siekkinen, & Holopainen, 2015) examined literacy development from first to second grade in the Finnish language in native-speaking children, LM children and children at risk for developing reading difficulties. The main finding was that LM children's reading and writing skills development corresponded better with the development in Finnish-speaking children than the development in children in the at-risk group.

Home resources and reading achievement

Literacy acquisition practices and the impact of a child's home environment have been documented in numerous studies (Kieffer, 2011; Myrberg & Rosén, 2009; Sikiö et al., 2016; Sirin, 2005). In the USA as well as in most European countries, LM-learner status is closely intertwined with socioeconomic status (SES) (Bakken & Hyggen, 2018; Capps et al., 2005; OECD, 2015). LM learners are more likely to come from low-income families (Kieffer, 2011; OECD, 2015; Schnepf, 2004), raising the question of whether LM learners' low achievement can be explained by SES factors. This question is highly relevant in the case of Norway, first, because of the changing demographic situation and, second, because gaps between and across students from varying socioeconomic backgrounds tend to increase as students get older (Caro, McDonald, & Williams, 2009; Condron, 2007), insinuating an important issue into the debate about how the educational system can compensate for student inequality.

Research with nationally representative data sets show that controlling for SES at the student and school levels leads to more similar reading developmental trajectories (e.g., Kieffer, 2008; Lauglo, 2010). Since the 1990s, various studies have documented that in Norway, the effects of a child's SES level on academic achievement applies to some extent also to LM learners (Lauglo, 1996, 2010). In compulsory school (1–10 grade), LM learners perform almost equally to the majority of students when controlling for SES (for a review, see Lauglo, 2010). The relationship between SES and success in school in students with an immigrant background is confirmed in Bakken's recent study of 68,000 Norwegian students in upper secondary school (Bakken & Hyggen, 2018). Parental educational level is considered the most important proxy for socioeconomic influence on academic performance in general (e.g. Capps et al., 2005; Lauglo, 2010; Yang & Gustafsson, 2004) and on reading achievement (August & Shanahan, 2006; Hemmerechts, Kavadias, & Agirdag, 2016; Myrberg & Rosén, 2009). Additionally, a home library provides educational advantages for children independent of parents' educational level, occupation and economic class (Evans, Kelley, & Sikora, 2014; Kern & Friedman, 2008). Evans and her colleagues documented that the strong effect of the number of books at home ('home library') and the intellectual environment those volumes reflect- on academic achievement prevailed across 42 nations, and evidence of the benefits of a large home library is even greater for children who grow up in families with a low educational level and low-status

occupations (Evans et al., 2014). Moreover, the number of books at home is conside-red a robust factor for predicting reading achievements (e.g. Myrberg & Rosén, 2009; Van Bergen, Van Zuijen, Bishop, & De Jong, 2016).

In the modern Norwegian context, possessing a computer or tablet is considered absolutely natural among ten-year-olds. However, research on how home compu-ter use exactly affects students' academic performance and reading achievement has yielded contradictory results (e.g., Ponzo, 2011; Rosén & Gustafsson, 2016).

The Norwegian language situation

In Norway, Norwegian and Sami are the official languages used as languages of instruction in schools. In 2017, only 849 out of 633 029 compulsory students (grades 1 to 10) were registered with Sami as their first language in school (Statistics Nor-way, 2017). In PIRLS, assessment students with Sami as their first language did not attend. In terms of Norwegian as a formal written language, the situation is unique because of its two very closely related variants, 'nynorsk' and 'bokmål'. Approxima-tely 12% of the students enrolled in primary school having 'nynorsk' as their written language in 2017 (Statistics Norway, 2017). Language is one of the primary condi-tioning variables used in the psychometric scaling in PIRLS[6]. The procedure is des-cribed in Methods and Procedures (Martin, Mullis, & Hooper, 2017, Chapter 12).

The importance of LM learners enrolling in the ordinary Norwegian educational system and learning the Norwegian language has been a hallmark of the education policies in Norway. These policies include the rights and obligations of ten years' compulsory schooling for all children between 6 and 18 years of age staying in the country for longer than three months and, subsequently, the right to attend upper secondary school (18–24 years of age). In the case of Norway, it is quite common that LM learners receive language training for one or two years in separate schools, pre-paring them for ordinary Norwegian schools. When enrolled in a Norwegian compul-sory school, according to the Education act (Opplæringslova, 1998, § 2–8), they are entitled to additional language training until they master the language of instruction at a level that makes ordinary tuition possible. As a consequence of this integrating system, none of the participating students in PIRLS assessment can be classified as absolute beginners in Norwegian, the language of the test.

The Current Study

To further investigate the association between a student's home language and reading achievement, we examined the relative contribution of a student's home language and home resources for learning to read on reading literacy. This study addresses the following research question: What are the relations between home language, the available resources for learning to read and reading achievement?

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[6]In Norway's case, three primary conditioning variables are used: the class mean, gender and lan-guage.

Method

Our research question is addressed by secondary analysis using the Progress in International Reading Literacy Study (PIRLS) 2016 data for Norway. In this section, we describe the data and variables, followed by a description of the analytical procedures.

Data and sample

This study draws upon PIRLS -a cross-sectional survey assessing reading literacy and related factors in ten-year-olds in cycles of five years. For a design description, see PIRLS 2016 assessment framework (Mullis & Martin, 2015).

The analyses in the current study are based on the representative grade 5 sample (average age 10.8.years) of Norway. The instruments used in this study are reading tests, a parent questionnaire and a student questionnaire. Selected variables are described in Tables 1 and 2. In total, 4232 students in fifth grade participated in PIRLS for Norway. The respondent rate for the background questionnaires was 95% of students participating and 96% of parents participating. We omitted one student from the dataset because all background information was missing in the student and parent questionnaires. The applied sample size, including missing values, consist of 4231 cases.

The sample design and sampling implementations, including national characteristics, are described in detail in Methods and Procedures in PIRLS 2016 (Martin et al., 2017, Chapters 3 and 5 and Appendix 5A). Norwegian data collection procedures are documented in Gabrielsen & Strand (2017). Missing values was imputed based

Table 1. Indicators of student's home language, home resources for learning to read and reading achievement.

Variables	Question/Information	Source
Home language	How often do you speak Norwegian at home? Four alternatives: always, almost always, sometimes, never	Student
Parental educational level (either parent)	What is the highest level of education completed by the child's father (guardian) and mother (guardian)? Eight alternatives: Did not go to school, some primary education, primary education, upper secondary education, postsecondary education, university education less than 3 years, Bachelor's or equivalent, Master's or Doctor degree	Parent
Books at home	About how many books are there in your home? Five alternatives: 0–10, 11–25, 26–50, 51–100, more than 100	Parent
A computer or tablet at home	Do you have any of these things at home? Two alternatives: yes, no	Student
Students' reading achievement	Overall achievement on PIRLS 2016 scores (mean of five plausible values)	Student

Table 2. Valid N, range, item respondent rate (%) and missing (%) for the covariates and outcome variable used in the study.

Variables	N	Range	Item respondent rate (%) or pooled mean (standard error)	% imputed values for missing
1. Home language	4231			1
Sometimes or never speaking Norwegian at home		0–1	12.1	
2. Gender	4231			-
Male gender of the child		0–1	49.80	
3. Parental educational level of either parents	4231			10.56
Completed primary school		0–1	3.5	
Completed upper secondary school		0–1	34.2	
Completed bachelor's degree		0–1	28.3	
Completed master's or doctor's degree		0–1	34.1	
4. Books at home	4231			4.75
0–25 books		0–1	15.2	
26–100 books		0–1	27.8	
More than 100 books		0–1	57.00	
5. Child doesn't have a computer or tablet at home	4231	0–1	0.70	0.78
6. Students' reading achievement grade 5 (PV1–5)	4231		558.99 (1.96)	-
PV1		315.0–781.8		
PV2		277.8–764.0		
PV3		288.7–781.7		
PV4		291.2–789.6		
PV5		324.2–774.7		

Note. PV = Plausible value; variable 1–5 are contrast coded from the original variables.

on the multiple imputation (MI) approach (Rubin, 2008). In MI, the interrelations between the variables and the available information of cases are used to impute the missing data. All background variables which are used for the analysis (described in the next section) were included in the imputation process to generate five imputed datasets without missing values. Each of these datasets is combined with one of the five plausible values. The data on Reading Literacy, our only dependent variable, has no missing values. After using multiple imputation we got a total sample size of 4231 students without missing information for the analysis described below.

PIRLS uses a random stratified two-stage cluster sample design (LaRoche, Joncas, & Foy, 2017, Appendix 5A). In terms of Norway, for the first sample stage, schools were selected (150 in total) with a probability proportional to size (i.e., the selection probability of large schools is higher than for small schools). Within these schools 215

classes in the fifth year of formal schooling were selected randomly. Explicit stratification was implemented for the two variants of the Norwegian language, "bokmål" and "nynorsk" (Martin et al., 2017, Appendix 5A).

Variables

For a student's home language, we used the indicator frequency of Norwegian spoken at home from the student questionnaire with a 4-point response scale: always, almost always, sometimes or never. We dichotomized this variable (0 = Always or almost always 1 = Sometimes or never). For home resources for learning to read, we used the indicators highest educational level of either parent (i.e. highest level of education in the family), number of books at home and accessibility of child's own computer or tablet. The parental educational level (based on the International Standard Classification of Education (ISCED) classification) derived from parents' questionnaire was recoded from its original eight-response categories measured from not completed primary school to Doctor's degree down to four: completed primary school, completed upper secondary school, completed bachelor's degree and completed master's or doctor's degree. Books at home retrieved from parent's questionnaires were recoded from the original five categories (0–10, 11–25, 26–50, 51–100, 101–200 or more than 200) to three categories: 0–25 books, 26–100 books and more than 100 books. The accessibility of a computer or tablet at home was recoded as 0 (yes) and 1 (no). Gender was recoded as 0 (female) and 1 (male). Given that all covariates were binary or ordinal, we treated all covariates as categorical in the regression analysis and dummy coded in the data preparations (see Tables 1 and 2 for variable information).

The outcome variable is the overall reading achievement score; for technical details, see Methods and Procedures in PIRLS 2016 (Martin et al., 2017). Not to overburden the students, the participants completed a selection of test blocks within a multimatrix design which increases the reliability of the overall scale. PIRLS uses item response theory; to receive appropriate estimates for the populations, the measurement of student proficiency is calculated by probabilistic scaling methods using a multiple imputation methodology: plausible values. Further, the achievement results are combined with students' background questionnaires (conditioning-procedure) to enhance the reliability of the scores (Foy & Yin, 2017; Laukaityte & Wiberg, 2017).

Analytical procedures

Approaching and operationalizing the research question relies on the theory of discourses (Gee, 1989). That is, the students' home language and home resources are seen as a part of children's primary discourse, whereas the reading outcome represents a part of the children's secondary discourse: the school. We used regression analysis in which we included covariates over different analytical stages (five stages).

The form of the equation used is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \ldots + \beta_j X_{ji} + \varepsilon_i$$

Where in this study:

Y_i = Reading achievement (dependent variable) of student "i"

β_0 = Constant variable (intercept)

β_j = Regression coefficient of the controlled variable "j"

X_{ji} = Controlled variables "j" of student "i" (see Table 3)

ε_i = Residual (error) term of student "i"

i = index of students (1 to n)

j = index of control variables (1 to k)

We estimated five linear regression models with a random intercept. Variables were added step by step to provide information on additional variables explained when including a new variable into each model. In the first step (Model 1), home language was included as the only independent variable. Students who always or almost always speak Norwegian at home is the reference category. In the second step (Model 2), we included gender. Girls with Norwegian as their primary home language is the reference category. In the third step (Model 3), the highest educational level of either parents was added. The reference category is girls with Norwegian as their primary home language with parents with a master's or doctor's degree. In the fourth step (Model 4), the explanatory variable 'books at home' was added. The reference category is girls with Norwegian as their primary home language, with parents with a master's or doctor's degree and more than 100 books at home. In the fifth and final step, the full model, we included the independent variable computer or tablet at home. The reference category is girls with Norwegian as their primary home language with parents with a master's or doctor's degree and more than 100 books at home and who have access to a computer or tablet at home.

We used MPlus 8.1 for data analysis, IEA IDB Analyzer 4.0.21 for preparing the syntax for data preparation and analysis and, finally, SPSS 25 for conducting data preparations and descriptive analysis. To meet the requirements of the complex PIRLS data structure MPlus was used to take into account sampling weights (called TOTWGT in the PIRLS data-set). The hierarchical nature of the data was handled in Mplus by indicating complex model specifications.

The calculation of the regression parameters is based on the robust maximum likelihood estimation approach. All five plausible values (PVs) of reading literacy were included in the calculations using an imputation file in MPlus with all five measurements that provided a single joint result. Analysis with plausible values was repeated for each plausible value (five times); the point-estimates are the mean of the five results, and the standard errors are combined using the formula of Rubin (2008), which takes the variance of the estimates and the between PV-variance into account.[7]

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[7]Since only manifest variables are used in the model the model fit indicate show as: Root Mean Square Error of Approximation (RMSEA) = 0.00, Comparative Fit Index (CFI) = 1.00, Tucker-Lewis Index (TLI) = 1.00.

Results

Intraclass correlation

In the data, students are clustered in classes and classes in schools. The intraclass correlation coefficient (ICC) for the overall reading achievement was on class-level 0.11. This means that 11% of the observed variance of the reading achievement is based on systematic differences between classes. However, our research question focuses on the general effects in the observed population and not on average classroom effects. Hence, we chose a one-level model.

Correlations and regression analysis

Table 3 shows the Pearson correlations between the variables in the study: home language, computer or tablet at home, books at home, highest educational level of either parents, gender and reading achievement. The correlation between books at home and highest educational level of the parents ($r = 0.44$) indicates a medium effect size. Nevertheless, the correlation is not so high that the variables should be interpreted as redundant. Both variables have enough specific variance, which is interesting to consider in the following analysis.

Table 3. Means (M), standard deviations (SD) and intercorrelations for the study variables (n = 4231).

Variable	M	SD	1	2	3	4	5
1. Home language	0.12	0.33					
2. Computer or tablet at home	0.01	0.08	0.04*				
3. Books at home	1.42	0.74	−0.15***	−0.02			
4. Highest educational level of either parent	1.93	0.90	−0.09***	−0.03	0.44***		
5. Gender	0.50	0.50	0.06***	−0.01	−0.01	−0.01	
6. Reading achievement (overall reading PVs 1–5)	558.99	65.50	−0.11***	−0.07*	0.27***	0.26***	−0.16***

Note. *p < 0.05, **p < 0.01, ***p < 0.001 Two-tailed significance test; weighted coefficients (weight = totwgt).

Table 4 shows the results from the regression analysis, with students' reading achievement as the dependent variable.

In the following we focus on the regular (unstandardized) regression coefficient, however the standardized coefficient is included in the table for comparative purposes. In the first step (Model 1), shown in Table 4, the significant regression coefficient for home language (B = −20.90, p <0.001) solely reflects the achievement differences between students with Norwegian as their primary home language and students who 'sometimes' or 'never' speak Norwegian at home. This result indicates that students who do not have Norwegian as their primary home language are on average 21 score points behind students with Norwegian as their primary home language in reading achievement. Home language only accounts for 1% of the variance in reading (R^2 = 0.011, p = 0.010).

Table 4. Regression analysis in five analytical steps for prediction of reading achievement with a random intercept: parameters and standard errors.

Model	Variables	Unstandardized Coefficients		Standardized Coefficients		
		B	S.E	Beta	t-value	Two-tailed P-value
0	Intercept	558.99	1.96			<.001
	(n = 4231)					
1	Intercept	561.43	2.04			<.001
	Sometimes or never speaking Norwegian	−20.90	4.09	−0.32	−5.11	<.001
	R²	0.011				.010
	(n = 4231)					
2	Intercept	571.55	2.33			<.001
	Sometimes or never speaking Norwegian	−19.41	4.08	−0.30	−4.76	<.001
	Gender (boy)	−20.67	2.43	−0.32	−8.50	<.001
	R² (ΔR²)	0.035 (0.024)				<.001
	(n = 4231)					
3	Intercept	590.36	2.84			<.001
	Sometimes or never speaking Norwegian	−14.32	4.12	−0.22	−3.47	<.001
	Gender (boy)	−20.45	2.48	−0.31	−8.25	<.001
	Parental edu. level: primary school	−56.05	7.51	−0.86	−7.46	<.001
	Parental edu. level: upper secondary school	−36.70	3.14	−0.56	−11.68	<.001
	Parental edu. level: Bachelor's degree	−13.85	3.78	−0.21	−3.66	<.001
	R² (ΔR²)	0.100 (0.065)				<.001
	(n = 4231)					
4	Intercept	593.67	2.81			<.001
	Sometimes or never speaking Norwegian	−10.16	4.29	−0.16	−2.37	.020
	Gender (boy)	−20.46	2.44	−0.31	−8.38	<.001
	Parental edu. level: primary school	−42.10	7.57	−0.64	−5.56	<.001
	Parental edu. level: upper secondary school	−27.90	3.36	−0.43	−8.30	<.001
	Parental edu. level: Bachelor's degree	−10.52	3.82	−0.16	−2.75	<.001
	0–25 books at home	−25.55	3.94	−0.39	−6.48	<.001
	26–100 books at home	−15.70	3.10	−0.24	−5.06	<.001
	R² (ΔR²)	0.119 (0.02)				<.001
	(n = 4231)					

(*Continued*)

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Table 4. (*Continued*)

Model	Variables	Unstandardized Coefficients		Standardized Coefficients		
		B	S.E	Beta	t-value	Two-tailed P-value
5	Intercept	593.77	2.81			<.001
	Sometimes or never speaking Norwegian	−9.77	4.30	−0.15	−2.27	.023
	Gender (boy)	−20.51	2.45	−0.31	−8.37	<.001
	Parental edu. level: primary school	−41.49	7.45	−0.63	−5.57	<.001
	Parental edu. level: upper secondary school	−27.76	3.38	−0.42	−6.92	<.001
	Parental edu. level: Bachelor's degree	−10.39	3.78	−0.16	−2.75	.006
	0–25 books at home	−25.53	3.98	−0.39	−6,41	<.001
	26–100 books at home	−15.50	3.12	−0.24	−4.97	<.001
	Don't have a computer/tablet at home	−42.74	17.73	−0.65	−2.41	.016
	R² (ΔR²)	0.122 (0.003)				<.001
	(n = 4231)					

Note. Weighted coefficients (totwgt); Reading achievement (Intercept) consists of 5 imputed data sets; Model 1: 'Always or almost always speaking Norwegian' is the reference category (ref.cat.); Model 2: Girls with Norwegian as their primary home language is the ref.cat.; Model 3: Girls with Norwegian as their primary home language with parents with a master's or doctor's degree; Model 4: Girls with Norwegian as their primary home language, with parents with a master's or doctor's degree and more than 100 books at home; Model 5: Girls with Norwegian as their primary home language with parents with a master's or doctor's degree and more than 100 books at home and who have access to a computer or tablet at home.

In the next step (Model 2), we included gender as a variable. Reflected in the regression coefficient, we see that gender has an impact on achievement (B = −20.67, p < 0.001). Gender accounts for a significant proportion of variance in reading (R² = 0.035 p < 0.001).

In the third step (model 3), we added the first of three indicators for home resources for learning to read: parents' educational level (three levels: completed primary school, completed upper secondary school and completed bachelor's degree). Reflected in the standardized coefficients, it is clear that parental educational level is significantly related to reading achievement. When the level of parental education increases, the level of points scored on reading achievement also increases. The unstandardized coefficient of the home-language-variable was altered from B = -19.41 in model 2 to B = -14.32 in model 3 after controlling for the highest educational level of the parents and gender. Parental education accounts for a significant proportion of variance in reading (R² = 0.100 p < 0.001 in model 3).

In the fourth step (Model 4), we added the second indicator of the home resources of learning to read: books at home. When controlling for books at home, parents' educational level and gender, the relationship between not having Norwegian as the primary home language and reading achievement is still negative and significant but

clearly altered (B = −14.32 in model 3 to B = −10.16, p = 0.20, R^2 = 0.119 p < 0.001 in model 4).

In the fifth and final step (Model 5), a child's accessibility to a computer or tablet at home, is introduced as the third indicator of home resources for learning to read. The regression coefficient of the variable sometimes or never speaking Norwegian at home, when controlling for computer or tablet at home, books at home, parents' educational level and gender was barely altered B = −10.16, p = 0.02 in model 4, B = −9.77, p = 0.023 in model 5).

Due to the change in the reference groups between the different models, the intercept altered from 558.99 (0-model) to 593.77 (model 5) when controlling for home language, gender and home resources for learning to read. The final model indicates that, overall, home resources is more strongly related to reading achievement than a student's home language. In total, the independent variables explained, lower than expected, only 12.2% of the variance in reading achievement (R^2 = 0.122, p<0.001).

Discussion and conclusion

The current study was conducted to extend existing research and provide a nuanced description of some of the complexities in the persistent achievement differences in reading literacy between LM learners and native Norwegian speakers in Norwegian ten-year-olds. We examined the relations between a student's home language, home resources for learning to read (indicators: parental educational level, number of books in the home and access to a computer or tablet) and reading achievement on student level. A related goal was to investigate changes in the relationship between frequency of Norwegian spoken at home and reading achievement when gender and home resources for learning were taken into account.

In the first regression model (step 1), the result indicates, without taking any other background variables into account, that students who do not have Norwegian as their primary home language are on average 21 score points behind students with Norwegian as their primary home language in reading achievement. In a Norwegian school context, this can be interpreted as these students being approximate half a school year behind their peers in formal reading skills (Gabrielsen & Lundetræ, 2017). However, home language only explains (surprisingly low in Model 1) 1% of the variance in reading achievement, meaning that a student's home language, as defined in this study, constitutes a very small part of what could explain achievement differences between LM learners and native-Norwegian speakers. In the fifth and final regression model (step 5), the 21 score points the non-native speaking students are behind the native speaking students, are reduced to approximately ten points. However, not surprisingly, we found a strong relationship between home resources for learning to read and reading achievement. Taking all indicators of home resources for learning to read, and gender into account, approximately 12% of the variance in reading achievement is explained.

We used the theory of discourses to approach our research question. Central to this theory is that a gap between a child's first discourse and second discourse may lead to literacy-related challenges (Gee, 2015, Chapter 9). Our findings support sociolinguistic views on second language acquisition suggesting that the challenges LM learners experience using the school language, are not merely influenced by the child's language background but also by the child's social background (Cummins, 1991; Gee, 2015, Chapter 9). This study shows that there are other important factors in addition to LM learners' second language status that may cause problems with school language. Our findings is in accordance with a significant number of recent studies that investigated the achievement gap between LM learners and native speaking students in school performance (e.g. see Bakken & Hyggen, 2018; Caro et.al, 2009; Kieffer, 2011). Hence, it can be discussed whether growing up in home environments offering less support for learning to read is a higher risk for an unsatisfactory reading development than growing up in home environments not speaking the language of instruction, in this case Norwegian. In addition, a supportive school-home collaboration could benefit from this acquired knowledge. Our findings allow schools and educators to better understand which factors can be important for students' reading achievements. This knowledge may lower the risk of overgeneralizing the effects of home language and – as a consequence – prejudices students for whom the described effects do not apply.

We acknowledge the diversity in Norwegian schools and the systematic differences in performance between LM learners and native-speaking students. We argue that the key to understanding the complexity of diversity is not only to use a student's second language background as a premise for difference in reading performance. It seems reasonable that family characteristics affect all students, and each initiative that is found to be effective to compensate for diversity in reading performance will be beneficial for students in general. We suggest that the polarized view grounded in constructed student groups may not be the best way to shed light on the disparities in school performance; what could be the consequences of applying undercomplex exploratory models. Further, it can be argued whether the findings in this article challenge the principle of a unitary school system in Norway, which has existed for more than 100 years, with its main goal of promoting equal opportunities for all.

Our results indicate that the challenges related to language use at school that are restricted to LM Learners' home language status, do not capture the complexity of why LM learners tend to have lower performance in reading achievement than native Norwegian speakers. The final model only explained 12% of the variance in reading achievement. This indicate that there is a need for exploring the relative contribution of other factors like school climate, teachers' support and parental support in addition to student's social background and home language on reading achievement.

The current study, is based on cross-sectional data, which do not allow for establishing causality. Longitudinal studies are needed to investigate how these learners grow in Norwegian reading over time. Another limitation is that unfortunately, the data do

not provide individual characteristics like for example individual linguistic skills or different language backgrounds. We do acknowledge that there is still much research to be done in this research area.

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Paper III

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Paper IV

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