Comparisons of Teachers of Language Minority Fourth-graders in Norway and the United States: Results from PIRLS 2006

Laurence T. Ogle, larogle@gmail.com
Anne Charlotte Begnum, anne.c.begnum@uis.no
Ragnar Gees Solheim, ragnar.solheim@uis.no

National Center for Reading Education and Research
University of Stavanger
Stavanger, Norway

This paper was prepared for presentation at the Third IEA International Research Conference in cooperation with Science Education Center, National Taiwan Normal University, Chinese Taipei, September 16-20, 2008.

Abstract

In this paper, we examine the teachers of language minority students and attempt to understand their backgrounds, the types of students they teach, and their instructional techniques. We compare teachers of language minority students in Norway and the United States because of our interest in the different equity perspectives in the two countries. We identify language minority students as those fourth-graders who indicate that neither parent was born in the country in which the child was assessed. And we use the assessment and teacher background data from the Progress in International Reading Literacy Study (PIRLS) 2006 as our dataset. Selected results indicate that Language Minority Reporting (LMR) reading teachers and their non-LMR colleagues tend to have similar characteristics and practices within the countries (especially in Norway), but look very different when they are compared across countries. The findings also indicate that few fourth-grade teachers in either Norway or the United States have been trained in second-language learning. Additionally, we found few reliable teacher effects on student outcomes. We do suggest a tentative hypothesis on the benefits of instruction for language minority students in Norway and the United States. However, we point out that our conclusions are tentative because some of the PIRLS data on language minority students are weak, although steps are being taken to improve it, specifically in Norway.

Introduction

Language minority students are a growing and important segment of the populations of many developed countries (Organization for Economic Cooperation and Development [OECD], 2006). Frequently, these students come from homes that immerse them in languages, cultures and traditions that may not be typical of the majority of homes in their countries (Goldenberg, Rueda, and August, 2006a). While their varied backgrounds often enrich the schools and classrooms of language minority students, these students can also bring special needs with them. As a result, the integration of these students into their classrooms (and, indeed, into the larger society), has not always proceeded without difficulty (Goldenberg, Rueda, and August, 2006b; Kepel, G., 2004).

In this paper, we examine the teachers of these language minority students and attempt to discover how they are instructing them. We begin with an obvious point: teachers of all types of students, including language minority students, are important. Many studies in the United States, for example, have suggested that the quality of instruction in the classroom is the most crucial element in the schools' influence of educational achievement (U.S. Department of Education, 1999). Thus, understanding teachers, their backgrounds and their classroom practices should be a priority when examining student achievement. Because, in this paper, we were interested in studying specifically the teachers of language minority students, we will first compare them to teachers of students who do not teach any language minority students. In this way, we hope to determine if teaching language minority students might involve employing teachers with special skill sets, or grouping students differently, or emphasizing different reading strategies.

We then want to know if the teachers of language minority students are positively associated with students' average literacy outcomes. Specifically, we want to determine if the characteristics and practices of reading teachers of language minority fourth-graders are positively associated with average student outcomes from the Progress in International Reading Literacy Study (PIRLS) 2006. Since, on average, language minority students tend to score lower than their non-language minority counterparts (see e.g., Ogle, Miller, and Malley, 2006), we wanted to know if the reading teachers of these students modified this pattern.

Finally, we are interested in knowing if these characteristics and outcomes varied within and across countries that participated in PIRLS 2006. To this end we compare these patterns in Norway and the United States. Why select these two countries? Both Norway and the United States are developed, industrialized nations with sophisticated educational institutions, relatively high percentages of educated citizens, and growing language minority populations. But importantly, they differ widely on measures of equity. The Gini income coefficient[1], ranked Norway among the most income-egalitarian countries in the world (list of countries by income inequality, 2008), while expenditures seem to be unusually equitable across a number of measures (Statistics Norway, 2008)[2]. By contrast, the United States ranks much lower on the Gini index than Norway, has one of the largest income and wealth gaps in the world, while the

[1] The GINI coefficient is a measure of statistical spread which is often used as a measure of income or wealth inequality.

[2] A deviation from this rather upbeat assessment of equity in Norway was its recent ranking on UNICEF's "educational well-being" scale (2007). On this measure, Norway placed a middling tenth out of 21 countries, although still above the international average. However, most of the indices chosen by UNESCO for this category measure educational outcomes, or the relationship of education to employment. Income equality, education funding and other specific equity policies were not examined.

school finance system is also one of the most unequal[3] (Rotberg, 2008). In this paper, we want to know if different equity perspectives found in these two countries impacts the role of classroom teachers.

Methodology

Identifying language minority students and their teachers from PIRLS 2006
According to Goldberg, Rueda, and August (2006a), language minority students may be immigrants, or near descendents of immigrants (first to third generations in the host country), or native-born individuals whose natal language is not the language of the society. In other words, there may be different ways to define language minority students.

For this paper, we identify language minority students as those fourth-graders who indicated that neither parent was born in the country in which they were assessed. This categorization restricts our language minority student sample to only children born of two immigrant parents, and so we could call our sample "children of immigrants." But we feel justified using the "language minority" label for these students since it is quite likely that children of two immigrants sometimes or never speak the language of the test at home, an important consideration in identifying language minority children. Indeed, using this definition permits us to examine those students who not only are likely to bring a different language into the classroom, but might be experiencing different cultural norms and expectations, as well. Table 1 shows the percentages of language minority and non-language minority fourth-graders in Norway and the United States, applying the parent migration definition ("neither parent born in the country in which the child was assessed") to the PIRLS 2006 data.

Table 1. Percentage of language minority and non-language minority fourth-graders in Norway and United States: 2006

Country	Percentage	Standard Error	Percentage	Standard Error
Norway	5.7	0.55	94.3	0.55
United States	17.8	1.51	82.2	1.51

SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy (PIRLS), 2006.

In Table 1 we see that almost 6 percent of fourth-graders in Norway and approximately 18 percent of fourth-graders in the United States in 2006 were considered language minority students using our definition of neither parent being born in the country in which the assessment took place. These percentages of language minority students roughly approximate the most reasonable estimates of language minority students in these two countries (Egeland, 2005; Planty, et al., 2008; OECD, 2006). Non-language minority fourth-graders, on the other hand, are those forth-graders who did not indicate that either or both of their parents were born in another country. As a result, these two student groups are mutually exclusive.

The focus of this paper, however, is on the reading teachers of these students. From the PIRLS data, we created two groups of reading teachers linked to the student file: 1) teachers who reported teaching language minority students; and 2) teachers who reported teaching no language minority students, i.e., those teachers who taught only non-language minority students. We call

[3] This is not to argue that U.S. education policymakers are unconcerned about educational equity. Indeed, concerns about equity appear to be one of the driving forces behind the "No Child Left Behind" legislation. But here we are interested in comparing fiscal mechanisms that promote equity.

the first group of reading teachers L*anguage Minority Reporting* (**LMR**) *Reading Teachers,* and the second group *Non*-L*anguage Minority Reporting* (**Non-LMR)** *Reading Teachers.* This categorization of reading teachers, while mutually exclusive of teachers, is not mutually exclusive in terms of whom they teach. That is, non-LMR reading teachers teach only non-language minority students. But while LMR reading teachers must teach some language minority students, they may also teach language non-language minority students. What differentiates them is that the non-LMR reading teachers teach *no* language minority students, while the language minority teachers taught at least some. Using this scheme, we found that almost half (47 percent) of the reading teachers of fourth-grade classrooms in Norway taught no language minority students, while 53 percent were in classrooms where there were at least some language minority student. By contrast, in the United States, only 27 percent of the reading teachers of fourth-graders were in classrooms where there were no language minority students, while 74 percent were in classrooms where there were at least some language minority students. This difference could have important implications for our data analyses, and we will discuss them later in this paper.

We should note that we had originally planned to introduce data from language minority students into this report, as well. But instead, as we analyzed the teacher files, it became clear to us that we needed to focus additional space on uncertainties we had about our teacher data. We do plan to examine students in detail in future reports, as we note in the last section of this paper.

Data Source: PIRLS 2006

The data used in this paper come from the PIRLS 2006 assessment and reading teacher background questionnaire. Forty countries, including Norway and the United States participated in PIRLS 2006, most drawing nationally representative samples from students in the fourth year of formal education[4] (Mullis, Martin, Kennedy, and Foy, 2007). Fourth-grade was the selected population because it represents a key transitional point in children's development as readers. In most countries, children at the end of fourth grade are generally completing formal reading instruction (Mullis and Martin, 2007).

In the reading assessment, reading purposes and comprehension processes were assessed based on 10 passages: 5 for the literary purpose and 5 for the informational purpose (Mullis and Martin, 2007). Altogether, the assessment consisted of 126 items. Each student completed two passages, which were accompanied by approximately 12 questions (test items), with about half in the multiple-choice format and half in the constructed-response format, i.e., requiring students to write their own answers.

In addition to the reading literacy assessment, several questionnaires were also administered as part of the PIRLS 2006 data collection. As noted, in this study, we use items from the PIRLS teacher background questionnaire. Teachers were asked to complete a survey regarding their training and professional development, instructional reading practices, and assessment methods.

The teachers who responded to this questionnaire were not chosen randomly to be nationally representative of reading teachers of fourth-graders in either Norway or the United States. Instead, they were selected because they were the reading teachers of the fourth-graders who participated in PIRLS 2006 and could provide information about their reading instruction. Consequently, we cannot make any statement about these teachers being representative of their

[4] Norway nearly satisfied PIRLS guidelines for sample participation rates after replacement schools were added. The United States did satisfy PIRLS guidelines for sample participation rates after replacement schools were included. However, their national defined population (i.e., essentially the sampling frame) covered less than 95 percent of the national desired population (i.e., the actual target population).

counterparts nationwide. Rather, the "unit of analysis" is the fourth-graders. So throughout this paper we will say, for example, "reading teachers of Norwegian language minority fourth-graders report that fourth-graders in their classes…", or "According to the reports of reading teachers of language minority fourth-graders in the United States…", where our emphasis will center on the characteristics of the teachers *of these fourth-graders*. Appendix A provides a listing of the teacher background items used in this report.

Readers wanting to know more about PIRLS should turn to the *PIRLS 2006 Technical Report* (Martin, Mullis, and Kennedy, 2007), the *PIRLS 2006 Assessment Framework and Specifications* (Mullis, Kennedy, Martin, and Sainsbury, 2006), the *PIRLS 2006 International Report* (Mullis, Martin, Kennedy, and Foy, 2007), or visit the PIRLS website: http://timss.bc.edu/pirls2006/index.html where these and other documents can be examined and downloaded.

Findings and Discussion

Teacher-Level Frequency Distributions

We first examine teacher differences within and across Norway and the United States. To highlight these two types of differences, the same data are presented in two separate tables, although the ordering of the data in each table is different. In Table 2 we examine the differences between LMR and non-LMR reading teachers within both countries (with-in country differences), but in Table 3 we focus on the differences between LMR teachers in Norway and the United States countries (between country differences). The data come from PIRLS 2006, and in both tables we examine reading teachers backgrounds; the characteristics of students in their classrooms; and activities and strategies they use to teach reading comprehension to their students.

In both tables we also highlighted statistically significant comparisons by greying the significant cell. For each comparison highlighted, we have employed independent t tests, and comparisons have been tested for statistical significance at the .05 level. These data were analyzed with the IDB Analyzer software developed by the International Association for the Evaluation of Educational Achievement (IEA). The IDB Analyzer was designed, in part, to deal with the complex sampling procedures used in international surveys like PIRLS (IEA, 2008).

Table 2. Percentage of Norwegian and U.S. reading teachers of language minority and non-language minority fourth-graders, by selected educational characteristics and reading activities, within country comparisons: 2006

	Norway Teachers				United States Teachers			
	Language Minority		Non-Language Minority		Language Minority		Non-Language Minority	
TEACHER CHARACTERISTICS	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.
Teacher Background								
To what degree did you study second language learning?								
Not at all	63.6	4.5	72.2	3.8	31.0	4.6	55.5	4.2
Overview or introduction to topic	23.7	5.0	14.7	2.4	42.5	4.2	36.4	3.9
It was an area of emphasis	12.8	4.2	13.1	3.0	26.5	4.8	8.0	2.1
Index of teacher career satisfaction								
Low	0.5	0.5	0.5	0.5	2.0	1.0	3.4	1.3
Medium	11.1	4.1	15.2	2.7	29.7	4.9	23.1	3.7
High	88.4	4.1	84.3	2.6	68.3	4.8	73.5	3.4
Characteristics of Students in Class								
Describe the reading level of fourth-grade students in this class								
Most are below average	39.3	6.1	28.2	3.5	15.0	3.2	17.6	2.8
The reading levels vary greatly	5.8	1.9	1.8	1.2	36.8	5.6	15.7	2.2
Most are average	48.2	5.9	55.8	4.1	41.3	4.8	56.8	3.2
Most are above average	6.7	2.2	14.2	2.9	6.9	2.4	9.9	2.2
The percentage of students who experience difficulty understanding spoken English/Norwegian?								
More than 5	5.5	1.9	3.4	1.2	8.1	2.9	1.4	0.5
3 to 5	11.4	3.7	6.0	1.9	14.8	4.2	5.5	1.4
1 or 2	25.6	5.0	26.0	3.7	28.7	4.6	20.4	3.1
Zero	57.4	6.2	64.6	3.9	48.5	6.1	72.8	3.6
Percentage of students who need remedial instruction in reading								
More than 5	18.0	4.4	14.2	3.0	49.2	4.1	40.6	3.9
3 to 5	52.9	5.6	42.6	3.7	32.6	4.2	39.3	4.5
1 or 2	22.1	3.6	28.8	4.0	14.6	3.7	13.7	2.8
Zero	7.0	2.6	14.4	3.0	3.6	1.9	6.4	1.8
Activities to Develop Reading Comprehension Skills or Strategies								
Identify main ideas								
Never or almost never	7.4	3.6	6.3	1.8	0.1	0.1	0.2	0.2
Once or twice a month	24.3	5.3	29.2	4.4	0.2	0.2	2.3	1.1
Once or twice a week	51.3	5.2	51.6	4.3	39.4	4.5	35.6	3.1
Everyday or almost everyday	17.1	4.1	12.9	3.4	60.3	4.5	61.9	3.5
Explain or support their understanding								
Never or almost never	9.0	3.0	11.0	2.9	0.7	0.6	1.1	0.9
Once or twice a month	26.4	6.6	25.0	4.4	1.2	0.8	1.8	0.9
Once or twice a week	56.6	6.5	53.5	4.9	31.9	5.1	37.3	3.8
Everyday or almost everyday	8.0	2.6	10.5	3.1	66.3	5.2	59.8	3.6
Compare reading with experiences								
Never or almost never	19.7	5.1	17.8	3.1				
Once or twice a month	43.5	4.7	47.1	4.4	10.6	3.5	10.2	2.4
Once or twice a week	33.4	5.2	32.3	4.0	34.7	4.7	42.6	4.4
Everyday or almost everyday	3.5	0.8	2.8	1.1	54.8	5.2	47.2	4.2
Compare reading with other readings								
Never or almost never	26.9	5.8	31.9	3.7	1.4	0.9	2.0	1.3
Once or twice a month	53.2	6.1	51.8	3.7	16.7	4.0	17.7	3.5
Once or twice a week	19.6	4.6	15.5	3.2	47.0	5.2	48.0	4.2
Everyday or almost everyday	0.2	0.0	0.8	0.6	35.0	5.9	32.3	3.6
Make predictions								
Never or almost never	22.2	5.0	19.5	3.8				
Once or twice a month	60.8	6.7	52.2	4.3	1.7	0.8	4.6	1.6
Once or twice a week	16.7	4.3	27.0	4.3	29.6	4.8	32.2	4.6
Everyday or almost everyday	0.2	0.0	1.3	0.9	68.8	4.8	63.3	4.6
Make generalizations/draw inferences								
Never or almost never	12.7	3.2	20.5	3.8				
Once or twice a month	57.7	5.9	51.1	4.0	7.1	2.3	7.0	1.7
Once or twice a week	29.6	6.0	26.7	4.4	40.1	4.8	43.8	4.5
Everyday or almost everyday			1.8	1.2	52.7	4.8	49.2	4.4
Describe style and structure of text								
Never or almost never	45.4	7.0	45.8	4.3	5.3	2.2	4.8	1.7
Once or twice a month	41.7	5.7	43.5	4.2	18.2	4.4	25.2	3.4
Once or twice a week	12.9	3.9	10.4	2.4	56.9	5.1	50.2	4.8
Everyday or almost everyday	0.0	0.0	0.3	0.0	19.6	3.7	19.8	3.2

NOTE: S.E. represents Standard Error. Shaded cells indicated statistically significant difference between the reading teachers of language minority and non-language minority fourth-graders within Norway or the United States.

SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Table 3. Percentage of Norwegian and U.S. reading teachers of language minority and non-language minority fourth-graders, by selected background characteristics, cross-country comparisons: 2006

	Language Minority Teachers				Non-Language Minority			
	Norway		United States		Norway		United States	
TEACHER CHARACTERISTICS	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.
Teacher Background								
To what degree did you study second language learning?								
Not at all	63.6	4.5	31.0	4.6	72.2	3.8	55.5	4.2
Overview or intro to topic	23.7	5.0	42.5	4.2	14.7	2.4	36.4	3.9
An area of emphasis	12.8	4.2	26.5	4.8	13.1	3.0	8.0	2.1
Index of teacher career satisfaction								
Low	0.5	0.5	2.0	1.0	0.5	0.5	3.4	1.3
Medium	11.1	4.1	29.7	4.9	15.2	2.7	23.1	3.7
High	88.4	4.1	68.3	4.8	84.3	2.6	73.5	3.4
Characteristics of Students in Class								
Describe the reading level of fourth-grade students in this class								
Most are below average	39.3	6.1	15.0	3.2	28.2	3.5	17.6	2.8
Reading level varies greatly	5.8	1.9	36.8	5.6	1.8	1.2	15.7	2.2
Most are average	48.2	5.9	41.3	4.8	55.8	4.1	56.8	3.2
Most are above average	6.7	2.2	6.9	2.4	14.2	2.9	9.9	2.2
Percentage of students who experience difficulty understanding spoken English/Norwegian?								
More than 5	5.5	1.9	8.1	2.9	3.4	1.2	1.4	0.5
3 to 5	11.4	3.7	14.8	4.2	6.0	1.9	5.5	1.4
1 or 2	25.6	5.0	28.7	4.6	26.0	3.7	20.4	3.1
zero	57.4	6.2	48.5	6.1	64.6	3.9	72.8	3.6
Percentage of students who need remedial instruction in reading								
More than 5	18.0	4.4	49.2	4.1	14.2	3.0	40.6	3.9
3 to 5	52.9	5.6	32.6	4.2	42.6	3.7	39.3	4.5
1 or 2	22.1	3.6	14.6	3.7	28.8	4.0	13.7	2.8
zero	7.0	2.6	3.6	1.9	14.4	3.0	6.4	1.8
Activities to Develop Reading Comprehension Skills or Strategies								
Identify main ideas								
Never or almost never	7.4	3.6	0.1	0.1	6.3	1.8	0.2	0.2
Once or twice a month	24.3	5.3	0.2	0.2	29.2	4.4	2.3	1.1
Once or twice a week	51.3	5.2	39.4	4.5	51.6	4.3	35.6	3.1
Everyday or almost everyday	17.1	4.1	60.3	4.5	12.9	3.4	61.9	3.5
Explain or support their understanding								
Never or almost never	9.0	3.0	0.7	0.6	11.0	2.9	1.1	0.9
Once or twice a month	26.4	6.6	1.2	0.8	25.0	4.4	1.8	0.9
Once or twice a week	56.6	6.5	31.9	5.1	53.5	4.9	37.3	3.8
Everyday or almost everyday	8.0	2.6	66.3	5.2	10.5	3.1	59.8	3.6
Compare reading with experiences								
Never or almost never	19.7	5.1	0.0	0.0	17.8	3.1	0.0	0.0
Once or twice a month	43.5	4.7	10.6	3.5	47.1	4.4	10.2	2.4
Once or twice a week	33.4	5.2	34.7	4.7	32.3	4.0	42.6	4.4
Everyday or almost everyday	3.5	0.8	54.8	5.2	2.8	1.1	47.2	4.2
Compare reading with other readings								
Never or almost never	26.9	5.8	1.4	0.9	31.9	3.7	2.0	1.3
Once or twice a month	53.2	6.1	16.7	4.0	51.8	3.7	17.7	3.5
Once or twice a week	19.6	4.6	47.0	5.2	15.5	3.2	48.0	4.2
Everyday or almost everyday	0.2	0.0	35.0	5.9	0.8	0.6	32.3	3.6
Make predictions								
Never or almost never	22.2	5.0	0.0	0.0	19.5	3.8	0.0	0.0
Once or twice a month	60.8	6.7	1.7	0.8	52.2	4.3	4.6	1.6
Once or twice a week	16.7	4.3	29.6	4.8	27.0	4.3	32.2	4.6
Everyday or almost everyday	0.2	0.0	68.8	4.8	1.3	0.9	63.3	4.6
Make generalizations/draw inferences								
Never or almost never	12.7	3.2			20.5	3.8	0.0	0.0
Once or twice a month	57.7	5.9	7.1	2.3	51.1	4.0	7.0	1.7
Once or twice a week	29.6	6.0	40.1	4.8	26.7	4.4	43.8	4.5
Everyday or almost everyday			52.7	4.8	1.8	1.2	49.2	4.4
Describe style and structure of text								
Never or almost never	45.4	7.0	5.3	2.2	45.8	4.3	4.8	1.7
Once or twice a month	41.7	5.7	18.2	4.4	43.5	4.2	25.2	3.4
Once or twice a week	12.9	3.9	56.9	5.1	10.4	2.4	50.2	4.8
Everyday or almost everyday	0.0	0.0	19.6	3.7	0.3	0.0	19.8	3.2

NOTE: S.E. represents Standard Error. Shaded cells indicated statistically significant difference between the LMR reading teachers in Norway and the United States and between non-LMR reading teachers in Norway and the United States.

SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Teacher Characteristics

The first question we examine specifically asked the degree to which LMR and non-LMR reading teachers in Norway and the United States studied or were trained in issues related to second-language learning. This question is important for our study because it hints at a teacher's readiness to teach language minority students. Well over half of both LMR and non-LMR reading teachers in Norway indicated that they had not studied second-language learning at all. In the United States, significantly higher percentages of LMR reading teachers than non-LMR reading teachers indicated that second language learning was an area of emphasis for them ($t = 3.51$). Further, less than a third of the U.S. LMR reading teachers reported that they had not studied second language learning at all. Between country comparisons in Table 3 indicate that greater percentages of LMR U.S. reading teachers than LMR Norwegian reading teachers studied second-language learning as an area of emphasis ($t = 2.14$). Still, only slightly more than a quarter of the reading teachers of language minority students in the United States, and only about 13 percent of the Norwegian reading teachers of language minority students indicated that the study of second language learning had been an area of emphasis for them.

Next, we were interested in determining the level of teachers' career satisfaction between the two groups of teachers. Did teachers of language minority students face special obstacles as teachers, thus limiting their satisfaction in their careers, or were they as satisfied as their counterparts? Results from Table 2 indicate there were no detectable differences between the LMR and non-LMR reading teachers in either country. Cross-country comparisons from Table 3 indicate that a greater percentage of Norwegian fourth-grade reading teachers had a high level of teacher career satisfaction than was the case in the United States ($t = 3.20$). Regardless, a majority of both types of teachers in both countries enjoyed a high level of career satisfaction, while very few teachers indicated a low level of teacher satisfaction.

Characteristics of Students in their Classes

After this brief description of teacher background characteristics we proceeded to examine the characteristics of the students in reading teachers' classrooms. Our first question in this section asked reading teachers about the levels of reading ability of students in their classes. For both LMR and non-LMR reading teachers in both countries, the modal response was that students in their classes were average. However, significant differences did exist in both countries. A greater percentage of LMR reading teachers in the United States indicated that the reading ability varied in their classes ($t = 3.49$), while a smaller percentage of LMR reading teachers indicated that most of the students in their class were average, than did their non-LMR counterparts ($t = -2.69$). In Norway, a smaller percentage of LMR reading teachers said that the students in their classes were above average than did their non-LMR peers ($t = -2.07$).

We next analyzed the percentage LMR and non-LMR reading teachers who indicated that their fourth-graders were having difficulty understanding the spoken language of the class. A majority of both types of reading teachers in Norway indicated that no student in their class was having this difficulty. In the United States, the situation was similar except that *almost* half of the teachers of language minority students indicated that no students in their class were having this problem. (This reminds us that many of our designated "language minority reporting teachers" taught classes with a considerable number of non-language minority students. We will discuss this in more detail below.) Nevertheless, in the United States a higher percentage of LMR reading teachers than their non-LMR counterparts indicated that more than 5 students in their classes were having difficulty with the spoken language ($t = 2.30$). This was not the case in Norway where there were no detectable differences between the two groups of teachers.

Aside from the problem of understanding the spoken language, did fourth-graders, according to their teachers, need remedial instruction in reading? Perhaps surprisingly, there were no detectable differences between the reports of two groups of teachers within either country. However, larger percentages of LMR reading teachers in the United States indicated that more than 5 students in their classes needed reading remediation than did their counterparts in Norway ($t = 5.19$).

Activities to Develop Reading Comprehension Skills or Strategies

In the PIRLS background questionnaire, teachers were asked about the type and frequency of activities used to develop reading comprehension skills in their students. Specifically, teachers were asked how often they asked their fourth-graders to do the following in their class: 1) identify the main idea; 2) explain or support their understanding of what they have read; 3) compare what they have read with experiences they have had; 4) compare what they have read with other things they have read; 5) make predictions about what will happen next in the text they are reading; 6) make generalizations and draw inferences based on what they have read; and 7) describe the style or structure of the text they have read. There were almost no detectable differences between the teachers of language minority students and their counterparts in almost any frequency category for all seven categories of instruction – within either country. However, there were large differences here, but they were cross- rather than within country. Both LMR and non-LMR reading teachers in the United States were more likely than their Norwegian counterparts to indicate that they used these techniques everyday or almost everyday (see appendix B for t test results). Additionally, the Norwegian teachers of language minority fourth-graders, in every category, were more likely to indicate that they never or almost never used a reading comprehension technique than were their U.S. counterparts. So in this category, the results are a bit more complex. When we compared reading comprehension techniques used by the two teacher-types within each country, we found almost no significant differences. However, when we compared LMR reading teachers across the two countries, we found large and consistent differences favoring (in terms of relative frequency) the U.S. teachers.

Summary

In this section, we compared within and cross-country responses on teacher characteristics from the LMR and non-LMR fourth-grade reading teachers in Norway and the United States. In Norway, the most obvious outcome was the lack of differences found between the LMR and non-LMR reading teachers. In the United States, a few more differences were found and most of these centered on the characteristics of students in their classes. Cross-country comparisons focused on differences between LMR reading teachers in Norway and the United States, and in these comparisons we found many more differences. Fewer LMR teachers in Norway than the United States studied second language learning as an area of emphasis. A greater percentage of Norwegian LMR reading teachers indicated that most of the students in their classes were below average than was indicated for the U.S. LMR teachers, but a greater percentage of LMR reading teachers in the United States indicated that more students in their classes needed remedial instruction. The biggest cross-country differences, however, centered on teacher activities to develop reading comprehension skills or strategies. There were many significant differences between the Norwegian and U.S. LMR reading teachers (and their non-LMR colleagues, as well) in every comprehension skill category. In almost every case the U.S. reading teachers appeared to be spending more time than their Norwegian counterparts teaching these skills.

Exploring the Results: Taking a Closer Look at the Data

Before going on to the next part of our paper, we decided to briefly explore the validity of the results from Tables 2 and 3. The major findings from the those tables indicate that: 1) there were

very few differences between LMR reading teachers and non-LMR reading teachers in Norway, but 2) that there were some differences between groups in the United States. When we compared cross-country, we found 3) considerable differences between LMR reading teachers in Norway and the United States. How valid are these findings? We examined two areas that might cast light on our question: 1) our definition of language minority students, and 2) clustering.

Question 1: Did We Correctly Identify Language Minority Fourth-Graders?
In our Introduction, we pointed out that there are different ways to define language minority students. In this paper we are identifying them through their parents' migration status (i.e. if both parents were born outside the country in which the child was assessed). In this section, only, we examine two alternative definitions.

First, using the PIRLS 2001 data, Ogle, Miller, and Malley (2006) defined language minority students as those fourth-graders who sometimes or never spoke the language of the test at home, which seemed like a logical choice for this paper. However, for the 2006 PIRLS, the item on which that information was based was changed and produced possible overestimates of the language minority populations in both Norway and the United States (International Association for the Evaluation of Educational Achievement [IEA], PIRLS 2006 Student Questionnaire, 2007). That is, the response category "sometimes speak language of test" in 2001 was changed to "sometimes speak language of the test, and sometimes speak another language" in 2006. In 2001, 7 and 14 percent of 4th-graders in Norway and the United States, respectively said they sometimes spoke the language of the test at home. After the question was modified in 2006, the percentages for that revised category increased to 20 and 27 percent for Norwegian and U.S. 4th-graders respectively; an increase of approximately 13 percentage points for both countries. We did not believe that these new percentages accurately represented language minority students in either country.

We next analyzed fourth-grader responses to the PIRLS student background question asking students what language they spoke before entering school in both countries[5]. The results are presented in Table 4.

Table 4. Percentage of fourth-graders classified as language minority and non-language minority in Norway and the United States: 2006

	Norway			United States	
Non-Language Minority	Percentage	Standard Error	**Non-Language Minority**	Percentage	Standard Error
Norwegian	95.2	1.08	English	93.6	0.51
Sami	0.9	0.24	**Language Minority**		
Swedish or Danish	5.8	0.47	Spanish	25.4	1.26
Language Minority			Vietnamese	1.9	0.25
Urdu	0.4	0.10	Chinese	3.6	0.36
Vietnamese	0.7	0.15	A Filipino Language	2.5	0.35
Other Language	15.8	0.82	Other Language	17.0	0.97

NOTE: Percentages add to more than 100 since respondents could choose more than one category.
SOURCE: International Association for the Evaluation of Education Achievement, Progress in International Reading Literacy Study (PIRLS) 2006.

From Table 4 the delineation of language usage for U.S. fourth-graders is fairly straightforward. English is the language of the test, and almost all children indicated speaking that language prior

[5] For this analysis we used the PIRLS 2006 variable ASBGLNG1: "Before you started school, did you speak <language of the test>?" For the data used in Table 4 we used PIRLS 2006 variables ASBGLNG2 through ASBGLNG6.

to enrolling in school. One-quarter of the U.S. fourth-graders indicated speaking Spanish before they enrolled in school. Although probably high, this large percentage mirrors that fact that Hispanics in the United States are now the largest ethnic group in that country. The other named languages cited in Table 5 are spoken in the United States, but by far fewer children than those who speak Spanish. Finally, 17 percent of the U.S. fourth-graders indicated that they spoke a language other than the ones listed. This seems quite high, well beyond most reliable estimates (U.S. Census Bureau, American Community Survey, 2005).

In Norway, this delineation is somewhat more complicated. Norwegian was the language of the test, and like the situation in the United States, almost all children indicated speaking that language prior to their enrolment in school. However, unlike the situation in the United States, speaking another language did not automatically qualify a fourth-grader as a language minority student. Speaking Sami, for example, an indigenous Norwegian language, would not typically classify a student as a "language minority" student. In addition, almost 6 percent of the fourth-graders indicated that they were Swedish- or Danish-speaking, the largest named language category for Norwegian students outside of Norwegian. However, these two languages are of Nordic origin and are closely related to Norwegian. Importantly, students with these language backgrounds are not treated as language minority students in Norwegian schools. This leaves Urdu, Vietnamese, and "Other Language" as the "real" language minority categories in Norway, although it is not clear what languages the "other language" category represents.

Would it be preferable to use these language categories instead of parent migration as a way of identifying language minority students? It's not clear, but we think there could be problems. First, this language categorization scheme identifies language minority students *prior to their enrolment in the first grade*, not in the fourth grade. Thus, while they might have been a language minority student prior to first grade, they might not have been categorized that way by the time they entered the fourth grade. Second, for the Norwegian and U.S. data to be comparable, the "other language" category would need to be incorporated for both countries. While this is acceptable for Norway, it is unacceptable for the United States. Although students can indicate that they can respond positively to more than one language, the sum of these "language minority" categories would be near 50 percent for the United States, much higher than most reasonable estimates (U.S. Census Bureau, American Community Survey, 2005). Thus, problems exist with identifying language minority children in PIRLS regardless of what type of classification scheme is used. However, given that our definition, based on parent migration status, produces numbers similar to other official counts, we think staying with that definition is the best course of action. Therefore in the remaining sections of this paper, we return to identifying language minority fourth-graders as those who indicated that neither parent was born in the country in which the child was assessed.

Question 2: Did Clustering Play a Role?

We have already noted that almost half of the Norwegian reading teachers in the PIRLS sample taught no language minority students, but only 27 percent of reading teachers in the United States taught classes where there were no language minority students. Going beyond these data, we next wanted to know if reading teachers in Norway were teaching classes whose student characteristics were fundamentally different than those in the United States. To answer this question we performed a distributional analysis of language minority students in the classrooms of both countries. The results are presented in Table 5.

Table 5. Distributions of language minority fourth-graders in Norwegian and U.S. classrooms: 2006

Percentage of language minority fourth-graders in classrooms	Norwegian percentage language minority	U.S. percentage Language Minority
25 percent or fewer	90.4	71.5
Between 26 and 50 percent	6.1	16.2
Between 51 and 75 percent	2.2	8.3
More than 75 percent	1.3	4.0

SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Table 5 indicates that in both Norway and the United States large majorities of fourth-graders attend classes where 25 percent or fewer students in their classes are language minority students. In Norway, however, almost all fourth-graders (9 out of 10) are in these types of classes, while in the United States, less than three-quarters of all fourth-graders attend classes where language minority students make up 25 percent or fewer of the students in the class.

Based on the information in Table 5, we then reanalyzed the data to examine whether the differences between LMR teachers in Norway and the United States are due to sample characteristics (e.g. clustering). We did this by attempting to "match" the Norwegian and U.S. samples. Since table 5 shows that over 90% of Norwegian fourth-graders and 72 percent of U.S. fourth-graders attend classes with less than 25% minority students, we compared just those fourth-grade reading teachers who had 25% or fewer students in their classes in both countries. If the significant differences between fourth-grade LMR reading teachers in Norway and the United States shown in table 3, are due to differences in sampling, one might expect, that the differences would be diminished.

Table 6. Fourth-grade Norwegian and U.S. reading teachers of classes in which the percentages of language minority students in classrooms ranges from 0 through 25 percent, by selected background, instructional and classroom characteristics: 2006

	Language Minority Teachers				Non-Language Minority			
	Norway		United States		Norway		United States	
TEACHER CHARACTERISTICS	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.	Percentage	S.E.
Teacher Background								
To what degree did you study second language learning?								
Not at all	68.3	5.2	52.8	5.1	72.5	3.8	60.2	4.9
Overview or intro to topic	21.3	4.9	42.7	5.3	14.5	2.4	35.5	4.7
An area of emphasis	10.4	3.4	4.5	2.3	12.9	3.0	4.3	1.8
Index of teacher career satisfaction								
Low	0.6	0.6	4.4	2.2	0.5	0.5	3.7	1.5
Medium	6.7	2.6	25.6	5.4	15.1	2.7	23.3	4.0
High	92.7	2.5	70.0	5.4	84.5	2.7	73.1	3.7
Characteristics of Students in Class								
Describe the reading level of fourth-grade students in this class								
Most are below average	37.9	7.0	19.2	4.5	28.1	3.6	17.7	3.4
Reading level varies greatly	3.9	2.2	15.8	4.1	1.7	1.2	11.8	2.4
Most are average	49.9	7.1	56.9	6.3	55.8	4.1	60.4	3.9
Most are above average	8.3	2.7	8.2	3.1	14.3	2.9	10.0	2.5
Percentage of students who experience difficulty understanding spoken English/Norwegian?								
More than 5	4.3	1.5	0.0	0.0	3.3	1.2	0.4	0.4
3 to 5	11.3	4.1	5.1	2.9	5.9	1.9	2.9	1.3
1 or 2	27.2	4.8	30.4	5.3	26.0	3.8	18.3	3.4
zero	57.2	5.7	64.5	5.6	64.7	3.9	78.4	3.8
Percentage of students who need remedial instruction in reading								
More than 5	15.8	4.0	35.2	5.7	14.1	3.0	38.6	4.4
3 to 5	54.9	4.5	42.5	6.0	42.6	3.8	41.7	5.0
1 or 2	20.7	3.8	16.9	4.5	28.7	4.1	13.0	3.0
zero	8.6	3.1	5.3	3.1	14.6	3.0	6.7	1.9
Activities to Develop Reading Comprehension Skills or Strategies								
Identify main ideas								
Never or almost never	7.7	4.3	0.3	0.3	6.3	1.8	0.2	0.2
Once or twice a month	28.9	5.9	0.7	0.5	29.4	4.5	2.7	1.3
Once or twice a week	54.9	6.4	36.4	5.2	51.8	4.3	34.9	4.2
Everyday or almost everyday	8.6	3.6	62.6	5.1	12.5	3.4	62.1	4.2
Explain or support their understanding								
Never or almost never	10.8	3.6	0.3	0.3	11.1	3.0	1.2	1.0
Once or twice a month	25.8	7.6	1.4	0.8	25.0	4.4	1.7	0.9
Once or twice a week	56.7	8.0	44.8	5.2	53.3	4.9	38.6	4.2
Everyday or almost everyday	6.7	3.1	53.6	5.1	10.5	3.2	58.4	4.0
Compare reading with experiences								
Never or almost never	20.3	6.0	0.0	0.0	17.9	3.2	0.0	0.0
Once or twice a month	43.4	5.8	7.7	2.6	47.1	4.4	9.8	3.0
Once or twice a week	35.3	6.2	43.9	5.7	32.3	4.1	42.6	5.0
Everyday or almost everyday	1.0	0.8	48.4	5.2	2.7	1.1	47.5	4.9
Compare reading with other readings								
Never or almost never	32.9	6.7	2.6	2.3	32.2	3.7	2.1	1.5
Once or twice a month	47.4	5.8	21.2	6.0	51.5	3.8	18.2	3.9
Once or twice a week	19.4	5.3	46.1	6.6	15.4	3.2	47.4	4.9
Everyday or almost everyday	0.3	0.3	30.1	5.1	0.8	0.6	32.2	4.1
Make predictions								
Never or almost never	23.2	5.5	0.0	0.0	19.5	3.8	0.0	0.0
Once or twice a month	56.5	6.4	5.4	2.6	51.9	4.3	5.3	1.8
Once or twice a week	20.0	4.7	29.0	6.0	27.2	4.3	32.0	5.3
Everyday or almost everyday	0.3	0.3	65.6	6.6	1.3	1.0	62.6	5.4
Make generalizations/draw inferences								
Never or almost never	14.9	3.7	0.0	0.0	20.7	3.9	0.0	0.0
Once or twice a month	53.5	7.3	9.8	3.1	50.9	4.0	6.7	1.9
Once or twice a week	31.6	7.3	42.1	5.2	26.6	4.4	44.4	5.5
Everyday or almost everyday	0.0	0.0	48.1	5.5	1.8	1.2	48.9	5.3
Describe style and structure of text								
Never or almost never	52.7	*6.8*	5.6	3.1	46.1	4.3	5.0	2.1
Once or twice a month	37.8	6.3	28.1	5.8	43.5	4.2	26.7	3.8
Once or twice a week	9.5	3.5	50.7	6.8	10.2	2.5	48.8	5.5
Everyday or almost everyday	0.0	0.0	15.7	3.7	0.3	0.3	19.5	3.7

NOTE: S.E. represents Standard Error. Shaded cells indicated statistically significant difference between the LMR reading teachers in Norway and the United States and between non-LMR reading teachers in Norway and the United States.
SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Table 6 indicates that a few differences did diminish when we compared similar samples from Norway and the United States. Perhaps most interesting was that the significant difference between Norwegian and U.S. teachers indicating that second-language learning was an area of

emphasis is now eliminated. This would seem to make sense: as teachers have fewer language minority students in their classes they are probably less likely to seek out (or be urged to seek out) training in this area. Nevertheless, the compelling finding from a comparison of Tables 3 and 6 is that, overall, significant differences are roughly the same in both tables. This suggests that, in general, the differences we found in Table 3 appear to hold, regardless of the percentages of language minority students in those classes.

Teacher Characteristics and Student Outcomes

Overview

In this section, our main goal is to determine if the characteristics and practices of LMR reading teachers identified in Tables 2 and 3 are associated with different average PIRLS overall scores than the non-LMR reading teachers. But first we examine the average overall scores and related statistics for the two groups of students. Studies (see e.g., Ogle, et al., 2006) have shown that non-language minority students tend, on average, to score higher than their language minority counterparts on student outcomes. From Table 7 we see the same result with our data.

Table 7. PIRLS overall average literacy score for language minority and non-language minority fourth-graders in Norway and the United States

	Norway		United States	
	Overall Average Score	Standard Error	Overall Average Score	Standard Error
Language Minority	446	6.1	522	4.7
Non-Language Minority	504	2.3	549	3.9

SOURCE: International Assessment for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Table 7 indicates that, on average, language minority fourth-graders in Norway scored 58 points lower than their non-language minority fourth-grade counterparts (t = 5.83). In the United States, while the pattern was similar, the gap was less than half of that in Norway: 27 points (t = 4.42). In short, large and significant gaps were found for both countries, with the larger gap in Norway. Its is also clear from Table 7 that both language minority (t=6.22) and non-language minority (t=10.70) fourth-graders in the United States, on average, scored significantly higher than their Norwegian counterparts.

Why these relatively low scores for Norway? Given the many positive indicators associated with the Norwegian school system, it has come as a surprise to some that the Norwegian results in PIRLS 2006, overall, fall near the international mean. A possible explanation might be that Norway introduced a new curriculum in 1997. Norwegian students now start in school at the age of six, but the first year in school is a preparatory year. Formal education in reading starts in second grade. Therefore Norwegian fourth-graders have only had three years of reading instruction, while fourth-graders in other countries will have had four years of reading instruction.

The Relationship of Teacher Variables to Student Outcomes

Next we examined if the teacher variables presented in Tables 2 and 3 were related to student outcomes in Norway and the United States. Because PIRLS data are nested (i.e., data are on different levels), we employed the Hierarchical Linear Modeling (HLM) software (Raudenbush, Bryk, and Congdon, 2008) which takes into account the multilevel structure of the data (Bickel, 2007; Snijders and Bosker, 1999).

Table 8. Hierarchical Linear Models (HLM) coefficients for LMR fourth-grade reading teachers in Norway and the United States: 2006

	Norway		United States	
Teacher background characteristic	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	450	8.5	521	4.0
Teacher background				
To what degree did you study second-language learning	17.0	7.7	-2.9	5.8
Index of teacher career satisfaction	-44.4	20.9	4.6	7.9
Characteristics of students in class				
Describe the reading level of students in this class	20.5	8.7	3.5	5.2
Percentage experiencing difficulty with spoken language	-10.7	8.2	5.5	4.8
Percentage who need remedial instruction in reading	6.4	7.3	11.5	4.8
Activities to develop comprehension skills/strategies				
Identify main ideas	15.8	9.9	-6.5	10.2
Explain or support their understanding	-21.9	11.3	-9.6	11.5
Compare reading with experiences	-12.9	10.5	12.7	10.3
Compare reading with other readings	-15.0	11.7	-8.6	8.7
Make predictions	-11.1	12.1	14.8	8.5
Make generalizations/draw inferences	-12.0	11.1	-0.3	7.7
Describe style and structure of text	24.8	12.4	-2.3	6.4

NOTE: Statistically significant coefficients are shaded grey. Variables entered into the HLM model were grand-mean centered.
SOURCE: International Association for the evaluation of educational achievement. Progress in International Reading Literacy Study (PIRLS), 2006.

From the HLM data in Table 8, we see that there were 5 significant predictors for Norway and only one for the United States. These results, however, may be misleading. Prior to generating the statistics in Table 8, we created interclass correlation coefficients (ICC) for LMR reading teachers, incorporating null models of both countries' data[6]. ICCs generally indicate if data structures are multilevel, and identify the levels of variance at both level 1 (in this case, student-level) and level 2 (here, teacher-level). For Norway, the ICC was 0.47. This is quite high (Bickel, 2007) and indicates that there was almost equal variation at both the student and teacher level in Norway. By contrast, the ICC for the United States was a more modest 0.24, indicating that for the U.S. fourth-graders, 24 percent of the variance in the fourth-graders overall PIRLS scores was between teachers, while 76 percent was at the student level. In other words, there was almost double the variation at the teacher level in Norway than in the United States[7]. Since LMR reading teachers in Norway are likely to exhibit such great variation, the findings for Norway, above, are not easily interpreted and should be treated with a significant degree of caution.

For the U.S. LMR reading teachers, the findings in Table 8 were easier to interpret. There we find only one significant predictor: the percentage of students in the class who need remedial instruction in reading. This variable was reverse coded (see Appendix A) meaning that for every unit decrease in students needing remedial instruction, scores increase, on average, 11.5 points. This finding makes sense, but there is little that LMR reading teachers can do to limit the number of students needing remediation in their classrooms. Otherwise, given the variables that we analyzed, the table suggest that U.S. LMR fourth-grade reading teacher's characteristics and practices are not associated with changes in scores of language minority students.

[6] It is referred to as the "null model" because it incorporates no predictors at either the student (level 1) or teacher (level 2) level.

[7] Given our earlier discussion about clustering in Norway, this is not surprising. That is, the vast majority of LMR reading teachers in Norway appear to have only a few language minority students in their classes. It is likely, therefore, that these identified "teachers of language minority students" are not really focusing their instruction on these isolated individuals. Rather, their attention, understandably, is probably on the majority of students in the classes. As a result the teaching practices in the classes of language minority student in Norway probably exhibit a great deal of variation in terms of instruction – reflecting the wide needs of the majority of students in the classes.

Summary, Conclusions, and Implications

First, findings from our paper suggest that reading teachers of fourth-graders *within* both Norway and the United States appear, on average, to teach comprehension skills with the same level of frequency to both language minority and non-language minority fourth-graders. At the same time, we have found that language minority students in Norway and the United States, on average, score lower than their language majority peers. Although this relationship does not indicate causality, allotting more time to language minority students for reading comprehension might be a one place to start improving their instruction.

Second, it was troubling to find that Norwegian reading teachers of language minority fourth-graders did not evidence a greater degree of education or training in second-language learning. However, additional analyses indicated that when the Norwegian sample was compared to similarly clustered U.S. sample, this difference vanished. Nevertheless, the number of language minority students in both Norway and the United States is increasing. Our results indicate that few fourth-grade teachers have been trained in second-language learning in either country.

Third, for teachers of language minority students we found few reliable teacher effects on achievement. This might not be surprising given the small sample sizes for language minority students. However, at least one study of teachers in Norway (van Daal, Begnum, Solheim, and Adèr, 2006) indicates that only a few teacher variables, overall, in PIRLS 2001 were positively associated with student outcomes.

Fourth, we were surprised by the large and consistent differences between the frequency of use of reading comprehension techniques between the reading teachers in Norway and the United States, across both teacher-types. But after examining the international PIRLS results (see Mullis, Martin, Kennedy, Foy, 2007, table 6.11, p. 217; Baer, J., Baldi, S., Ayotte, K., and Green, P., 2006), it is clear that the U.S. teachers, overall, produced average percentages higher than reading teachers in many other countries that participated in PIRLS. Why this is so is unclear. In any event, we hypothesis that similar results would have been found if most countries that participated in PIRLS 2006 had been compared to the United States.

Fifth, in Table 2, there were almost no differences between the two teacher types for Norwegian reading teachers, but there were a few differences between the U.S. reading teachers. One might expect to attribute this to different equity perspective in the two countries. One might further expect that these differences would be reflected in performance. Data from this paper, however, indicate the opposite. In fact, the Norwegian score gap between the two language groups was more than twice that for the United States. As mentioned earlier, reading comprehension techniques are taught more frequently in the United States than in Norway and this variability might explain why both groups of students in the United States profit more from the instruction. Of course, much additional research would be required before we would be able to confirm that hypothesis.

Sixth, in choosing to compare teachers in Norway and the United States, we had planned to discuss the relationship between teachers, equity perspectives and student outcomes. But as we have seen, the more equitable country (i.e., Norway, as defined in this paper) produced the larger score gap. We were not sure what to make of this, and so we do not comment on it further. We could, of course, have changed our definition, but believed the first step would be to get better data on language minority students, especially from Norway. It should be pointed out that Norway was in a difficult situation with its language minority students. As we have defined them in this paper, Norwegian language minority students make up less than 6 percent of the total

fourth-grade population in Norway, about a third of the percentage in the United States. Aware of that, Norwegian officials attempted to oversample these students for PIRLS 2006. Unfortunately, they were unsuccessful. Undaunted, Norway is planning to get better data, as they will be oversampling language minority students in the largest cities in the country in the coming months.

Norway's experience should serve as an object lesson for other countries, including the United States. Norway realized that their language minority student population was rising and tried to capture that in their sampling. While they were unsuccessful, they have not given up. As language minority populations continue to increase in most developed countries, the necessity of gathering accurate information on these individuals will also increase. It is incumbent upon education officials in those countries experiencing an influx of language minority individuals to consider ways to increase language minority student representation in large-scale surveys, including the use of oversampling techniques. Only in this way can we have increased confidence in our results.

Future Research Direction

As we indicated above, we had planned to examine the characteristics of language minority students together with their teachers in this paper. Unfortunately, that was not possible. But we do plan to continue that line of research. To begin, we plan to integrate student background variables into our current work. Preliminary runs of the data suggest that although U.S. language minority students have fewer books, lower self-esteem, spend more time with computer games and watching TV, they produce better average outcome scores than language minority fourth-graders in Norway. Or putting this the other way around: although the differences between language minority and non-language minority students in Norway background variables appear to be small (see Ogle, Begnum, and Scott, 2008), there is a larger gap in performance between those Norwegian groups and their U.S. counterparts. We plan to explore those differences in our future work.

References

Baer, J. Baldi, S., Ayotte, K., & Green, P. (2007). *The reading literacy of U.S. fourth-graders in an international context: Results from the 2001 and 2006 Progress in International Reading Literacy Study (PIRLS)* (NCES 2008-017). Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Bickel, R. (2007). *Multilevel analysis for applied research: It's just regression!*. New York: The Guilford Press.

Egeland, L. (2005, July 7). *Country report on multilingual issues: Norway*. Retrieved May 20, 2008. http://mek.oszk.hu/minerva/html/dok/norway.pdf.

Fitzgerald, J. (1995). English-as-a-second-language learners' cognitive reading processes: A review of research in the United States. *Review of Educational Research*, Vol. 6 (2), 145-190.

Foy, P., Galia, J., & Li, I. (2007). Scaling the PIRLS 2006 reading assessment data. In Martin, M. O., Mullis, I. V. S., & Kennedy, A. M. (Eds.) *PIRLS 2006 technical report* (pp. 23-34). Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College.

Goldberg, C., Rueda, R. S., & August, D. (2006a). Sociocultural influences on the literacy attainment of language-minority children and youth. In August, D. & Shanahan, T. (Eds.) *Developing Literacy in Second-Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth* (pp. 269-318). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Goldberg, C., Rueda, R. S., & August, D. (2006b). Synthesis: Sociocultural Contexts and Literacy Development. In August, D. & Shanahan, T. (Eds.) *Developing Literacy in Second-Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth* (pp. 249-267). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

International Association for the Evaluation of Educational Achievement, TIMSS & PIRLS International Study Center, Boston College. (2007). *PIRLS 2006 Student Questionnaire* (online). Retrieved June 6, 2008, http://timss.bc.edu/PDF/P06_StudentQuestionnaire.pdf.

International Association for the Evaluation of Educational Achievement [IEA], IEA Data Processing and Research Center. (2008). *IDB Analyzer, version 1.4.0.6.* (Software). Hamburg, Germany: IEA.

Kepel, G. (2004). *The war for Muslim minds: Islam and the west* (P. Ghazaleh, Trans.). Cambridge, Massachusetts: The Belknap Press of Harvard University Press.

List of countries by income inequality (2008, February 19). In *Wikipedia, the free encyclopaedia*. Retrieved March 1, 2008, http://en.wikipedia.org/wiki/List_of_countries_by_income_equality.

Martin, M.O., Mullis, I.V.S., & Kennedy, A.M. *PIRLS 2006 technical report*. Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College.

Mullis, I. V. S., Kennedy, A. M., Martin, M.O. & M., Sainsbury, M. (2006). *PIRLS 2006 assessment framework and specifications* (2nd ed.). Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College.

Mullis, I.V. S., & Martin, M. O. (2007). Overview of PIRLS 2006. In Martin, M. O., Mullis, I. V. S., & Kennedy, A. M. (Eds.) *PIRLS 2006 technical report* (pp. 1-8). Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Lynch School of Education, Boston College.

Mullis, I.V.S., Martin, M.O., Kennedy, A.M., & Foy, P. (2007). *PIRLS 2006 International Report: IEA's Progress in Internatonal Reading Literacy Study in Primary Schools in 40 countries.* Chestnut Hill, MA: International Study Center, Lynch School of Education, Boston College.

Ogle, L. T., Miller, D. C., & Malley, L. B. (2006). *Characteristics of U.S. fourth-grade language minority students in an international context: Findings from PIRLS 2001*. Paper presented at the second IEA International Research Conference in association with the Brookings Institution, Wahington, DC.

Ogle, L.T., Begnum, A.C., & Scott, E. (2008). Comparisons of home and school characteristics of language minority and language majority fourth-graders: PIRLS results from three Nordic countries. Paper presented at annual meeting of the Comparative and International Education Society, New York.

Organisation for Economic Cooperation and Development [OECD]. (2006). *Where immigrants students succeed: A comparative review of performance and engagement in PISA 2003.* Paris: Author.

Planty, M., Hussar, W., Snyder, T., Provasnik, S., Kena, G., Dinkes, R., Kewal-Ramani, A., & Kemp, J. (2008). *The Condition of Education 200*8 (NCES 2008-031). Washington, DC.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Raudenbush, S., Bryk, A., & Congdon, R. (2004). *HLM 6: Hierarchical Linear & Nonlinear Modeling* (software). Lincolnwood, Il. Scientific Software International.

Rotberg, I.C., (2008, June 9) Quick fixes, test scores, and the global economy. *Education Week* (online). Retrieved June 12, 2008. http://www.edweek.org/ew/articles/2008/06/11/41rotberg_ep.h27.html?print=1.

Snijders, T., & Bosker, R. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, Ca.: Sage Publications.

United Nations Children's Fund [UNICEF]. (2007). An overview of child well-being in rich countries: A comprehensive assessment of the lives and well-being of children and adolescents in the economically advanced nations. *Child poverty in perspective: Report Card 7*. Florence, Italy: UNICEF Innocenti Research Centre.

U.S. Department of Education, National Center for Education Statistics. (1999). *Measuring classroom instructional processes: Using survey and case study field-test results to improve item construction*. Washington, D.C.: U.S. Government Printing Office.

U.S. Census Bureau, *American Community Survey*, (2005). Retrieved July 7, 2008, http://www.census.gov/compendia/statab/tables/08s0052.pdf.

Van Daal, V.H.P., Begnum, A.C., Solheim, R.G., & Adèr, H.J. (2006). *PIRLS 2001: Secondary analysis of Norwegian data*. Paper presented at the second IEA International Research Conference in association with the Brookings Institution, Wahington, DC.

Appendix A

TEACHER VARIABLES TO BE USED IN THIS REPORT

Old/New Variable Name	Location in File	Variable Description	Response Options	Final Recode
ATBGEAR9 LANGLEARN		As part of your formal education and/or training, to what extent did you study the following areas?: Second language learning	1: Not at all; 2: Overview or introduction to the topic; 3: It was an area of emphasis	0= Not at all; 1= Overview or introduction to the topic; 2= It was an area of emphasis
ATDGTCS ATDGTCS1	Indexed	Index of Teacher career satisfication (use all #41 variables)	1: High; 2: Medium; 3: Low	0= Low; 1=Medium; 2= High
ATBGRLEV ATBGRLV1	TG1-03	According to your experience, how would describe the reading level of the fourth-grade students in this class? US	1: Most are above average; 2: Most are average; 3: Most are below average; 4: reading level varies greatly	0= reading level varies greatly; 1= most are below average; 2= most are average; 3= Most are above average
ATBGDIFU STUDDIFU	TG1-4	How many students experience difficulties understanding spoken English?	_____ fourth-grade students in this class (write in a number)	**0**= 6 or more; **1**= 3-5; **2**= 1 or 2; **3** = Zero
ATBGNDIN NEEDREMD	TG1-05A	How many students need remedial instruction in reading?	_____ fourth-grade students in this class (write in a number)	**0**= 6 or more; **1**= 3-5; **2**= 1 or 2; **3** = Zero
		How often do you ask the students to do the following things to help develop reading comprehension skills or strategies?	**For all responses in section**	**For all responses in section**
ATBGDEV1 COMPDEV1	TG1-17A	Identify the main ideas of what they have read	1: Every day or almost every day; 2: Once or twice a week; 3: Once or twice a month; 4: Never or almost never	0= Never or almost never 1= Once or twice a month 2= Once or twice a week 3= Everyday or almost everyday
ATBGDEV2 COMPDEV2	TG1-17B	Explain or support their understanding of what they have read		
ATBGDEV3 COMPDEV3	TG1-17C	Compare what they have read with experiences they have had		
ATBGDEV4 COMPDEV4	TG1-17D	Compare what they have read with other things they have read		
ATBGDEV5 COMPDEV5	TG1-17E	Make predictions about what will happen next in the text they are reading		
ATBGDEV6 COMPDEV6	TG1-17F	Make generalizations and draw inferences based on what they have read		
ATBGDEV7 COMPDEV7	TG1-17G	Describe the style or structure of the text they have read		

Appendix B
Selected t tests for Comparisons on page 11

T TESTS BETWEEN NORWEGIAN and US TEACHERS OF LANGUAGE MINORITY 4TH GRADERS

t tests for percentage who identify main idea

Description of Tested Estimates	*Mean 1*	*SE1*	*Mean 2*	*SE2*	Dep? 1=yes 0=no	t	k	*CritT*	*Sig/No Sig*
	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	7.4	3.6	0.1	0.1	0	2.07	1	1.96	yes
Once or twice a month	24.3	5.3	0.2	0.2	0	4.56	1	1.96	yes
Once or twice a week	51.3	5.2	39.4	4.5	0	1.73	1	1.96	no
Everyday or almost everyday	17.1	4.1	60.3	4.5	0	-7.13	1	1.96	yes

t tests for percentage of students who explain or support their understanding

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	9	3	0.7	0.6	0	2.77	1	1.96	yes
Once or twice a month	26.4	6.6	1.2	0.8	0	3.78	1	1.96	yes
Once or twice a week	56.6	6.5	31.9	5.1	0	2.99	1	1.96	yes
Everyday or almost everyday	8	2.6	66.3	5.2	0	-10.14	1	1.96	yes

t tests for percentage of students who compare their reading with their experiences

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	19.7	5.1	0	0	0	3.85	1	1.96	yes
Once or twice a month	43.5	4.7	10.6	3.5	0	5.59	1	1.96	yes
Once or twice a week	33.4	5.2	34.7	4.7	0	-0.19	1	1.96	no
Everyday or almost everyday	3.5	0.8	54.8	5.2	0	-9.84	1	1.96	yes

t tests for percentage of students who compare their readings with other readings they have done

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	26.9	5.8	1.4	0.9	0	4.33	1	1.96	yes
Once or twice a month	53.2	6.1	16.7	4	0	5	1	1.96	yes
Once or twice a week	19.6	4.6	47	5.2	0	-3.93	1	1.96	yes
Everyday or almost everyday	0.2	0	35	5.9	0	-5.94	1	1.96	yes

t tests for percentage of students who make predictions about what is going to happen

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	22.2	5	0	0	0	4.41	1	1.96	yes
Once or twice a month	60.8	6.7	1.7	0.8	0	8.77	1	1.96	yes
Once or twice a week	16.7	4.3	29.6	4.8	0	-1.99	1	1.96	yes
Everyday or almost everyday	0.2	0	68.8	4.8	0	-14.29	1	1.96	yes

t tests for percentage of students who make generalizations or draw inferences about what they have read

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	12.7	3.2	0	0	0	4	1	1.96	yes
Once or twice a month	57.7	5.9	7.1	2.3	0	7.94	1	1.96	yes
Once or twice a week	29.6	6	40.1	4.8	0	-1.37	1	1.96	no
Everyday or almost everyday		0.0	52.7	4.8	0	-10.99	1	1.96	yes

t tests for percentage of students who describe the style and structure of the text

	Norway Lang. Min.	S.E.	U.S. Lang. Min.	S.E.					
Never or almost never	45.4	7	5.3	2.2	0	5.46	1	1.96	yes
Once or twice a month	41.7	5.7	18.2	4.4	0	3.27	1	1.96	yes
Once or twice a week	12.9	3.9	56.9	5.1	0	-6.85	1	1.96	yes
Everyday or almost everyday		0.0	19.6	3.7	0	-5.33	1	1.96	yes