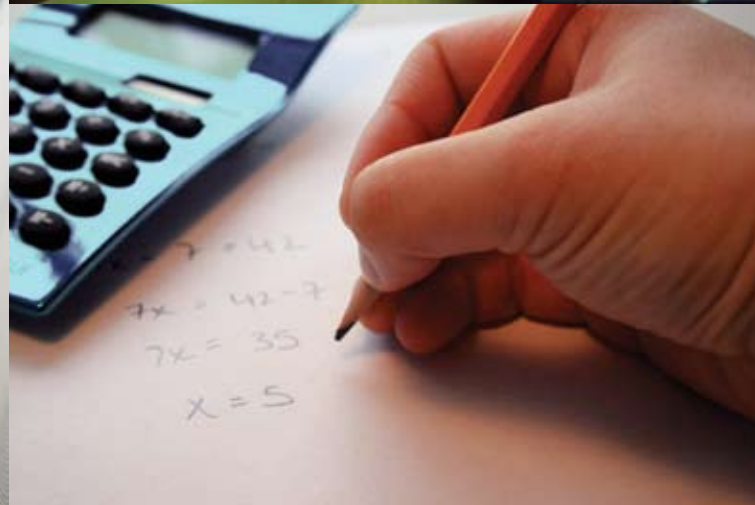


PCAP-13 2007

Report on Differences in
Reading Performance of 13-Year-Olds Based on
Language and Minority/Majority Status



cmeC

Council of
Ministers
of Education,
Canada

Conseil des
ministres
de l'Éducation
(Canada)

Pan-Canadian Assessment Program

PCAP-13 2007

Report on Differences in Reading Performance
of 13-Year-Olds Based on Language and
Minority/Majority Language Status



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of Education,
Canada

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de l'Éducation
(Canada)

The Council of Ministers of Education, Canada (CMEC) was formed in 1967 by the provincial and territorial ministers responsible for education to provide a forum in which they could discuss matters of mutual interest, undertake educational initiatives cooperatively, and represent the interests of the provinces and territories with national educational organizations, the federal government, foreign governments, and international organizations. CMEC is the national voice for education in Canada and, through CMEC, the provinces and territories work collectively on common objectives in a broad range of activities at the elementary, secondary, and postsecondary levels.

Through the CMEC Secretariat, the Council serves as the organization in which ministries and departments of education undertake cooperatively the activities, projects, and initiatives of particular interest to all jurisdictions¹. One of the activities on which they cooperate is the development and implementation of pan-Canadian testing based on contemporary research and best practices in the assessment of student achievement in core subjects.

Note of appreciation

The Council of Ministers of Education, Canada *would like to thank the students, teachers, and administrators whose participation in the Pan-Canadian Assessment Program ensured its success. The quality of your commitment has made this study possible. We are truly grateful for your contribution to a pan-Canadian understanding of educational policy and practices in reading, mathematics, and science among 13-year-olds.*

The Council of Ministers of Education, Canada *would also like to acknowledge the financial contribution from Canadian Heritage in the development and production of the PCAP-13 2007: Report on Differences in Reading Performance of 13-Year-Olds Based on Language and Minority/Majority Language Status.*

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ISBN 978-0-88987-189-2

Ce rapport est également disponible en français.



Printed on recycled paper.

¹ In this report, “ministry” includes “department” and “jurisdictions” includes participating “provinces” and “territories.”

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WHAT IS THE PAN-CANADIAN ASSESSMENT PROGRAM?

The Pan-Canadian Assessment Program (PCAP) is the most recent commitment by the Council of Ministers of Education, Canada (CMEC) to informing Canadians about how well their education systems are meeting the needs of students and society. The information gained from such a pan-Canadian assessment gives the ministers a basis for examining the curriculum and other aspects of their school systems.

School curriculum programs vary from jurisdiction to jurisdiction across the country, so comparing results from these varied programs is a complex task. However, young Canadians in the different jurisdictions learn many similar skills in reading, mathematics, and science, and PCAP has been designed to determine whether students across Canada reach similar levels of performance in these core disciplines at about the same age. Additionally, it complements the existing assessments administered by each jurisdiction and, thus, gives them access to comparative, Canada-wide data on the achievement levels attained by 13-year-olds across the country.

Goals

When the ministers of education began planning the development of PCAP in 2003, they set out the following goals for a conceptually new pan-Canadian instrument of assessment designed to

- inform educational policies as a means of improving approaches to learning
- focus on mathematics, reading, and science, with the possibility of including other domains as the need arises
- reduce the testing burden on schools through a more streamlined administrative process
- provide useful background information using complementary contextual questionnaires for students, teachers, and school administrators
- enable jurisdictions to use both national and international results to validate the results of their own assessment programs and to improve them

The development process

In August 2003, a PCAP working group of experienced and knowledgeable representatives from several jurisdictions and including an external authority on measurement theory, large-scale assessment, and educational policy began the development process. A concept paper was commissioned that would elaborate on issues of structure, development planning, operations, and reporting. Drawing on this concept paper, the working group defined PCAP as a testing program that would

- be administered at regular intervals
- be administered to students who are 13-year-olds at the start of the school year
- be based on the commonality of all current jurisdictional curricular outcomes across Canada

- assess reading, mathematics, and science
- provide a major assessment of one domain with a minor concentration on the two other domains
- focus on reading as the major domain in the first administration in 2007

For each subject area, a thorough review of curricula, current assessment practices, and research literature was then undertaken, and reports were written to indicate the common expectations among all jurisdictions.

The working groups for bilingual framework development, established for each of the three subject areas, were composed of representatives from several jurisdictions with knowledge and experience in curriculum and assessment for the particular subject. Each working group also had an external expert in the assessment of the particular subject to advise and assist with the development of a framework statement establishing the theory, design, and performance descriptors for each domain. The framework statements were reviewed and accepted by all participating jurisdictions as the basis for test item development.

Bilingual teams for developing the test items were then established; members of these teams were subject area educators selected from all jurisdictions, with a subject assessment expert to supervise. Each subject framework provided a blueprint, with its table of specifications describing the subdomains of each subject area, the types and lengths of texts and questions, the range of difficulty, and the distribution of questions assessing each specific curriculum expectation. Each jurisdiction was also encouraged to submit texts and test-ready materials that they felt were appropriate for the age group and that were not currently in use in their jurisdiction. The results in reading, for example, provided sufficient items for three complete forms for field testing, each 90 minutes in duration.

Texts and questions were developed in both official languages and cross-translated to be equivalent in meaning and difficulty. Jurisdictions reviewed and confirmed the validity of the French-English translations to ensure fair and equitable testing in both languages. All items were reviewed by outside validators and further revised by members of the item development team. These texts and items were then submitted to the framework development working group to be examined in light of the blueprint and to be structured into three comparable field-test forms. Each booklet contained both selected-response and constructed-response items with a range of difficulty accessible to the age group, based on scenarios meaningful to the age group and reflecting Canadian values, culture, and content.

Field testing involved the administration of these temporary forms to a representative sample of students from an appropriate range of jurisdictions in both languages. Approximately 2000 students in 100 schools across Canada were involved in the field testing. The tests were then scored by teams of educators from the jurisdictions in July 2006. Following analysis of the data from the field tests, each framework development working group reviewed all items and selected the texts and items considered best, from a content and statistical viewpoint, to form two booklets in reading and a booklet consisting of half mathematics and half science, each booklet totalling 90 minutes. The final test booklets were then reviewed and approved by all participating jurisdictions.

Design and development of contextual questionnaires

The accompanying questionnaires for students, teachers, and school administrators were designed to provide jurisdictions with contextual information that would contribute to the interpretation of performance results. Such information may also be examined and used by researchers, policy makers, and practitioners to help determine what factors influence learning outcomes.

A questionnaire development group composed of educators and research experts from selected jurisdictions developed a framework to ensure that the questions asked of students, teachers, and school principals were consistent with predetermined theoretical constructs or important research questions. The group reviewed models of questionnaire design found in the three large-scale assessment programs (the School Achievement Indicators Program [SAIP], the Trends in International Mathematics and Science Study [TIMSS], and the Programme for International Student Assessment [PISA]); worked to create a shorter, more streamlined model of the questionnaires; and attempted to maximize research value by shaping the questionnaires around selected research issues for the 2007 administration of the test.

Using initial drafts, a separate group (the chair of the questionnaire development working group and two reading experts) expanded the reading component of the questionnaire. This working group held briefing sessions with the chair of the reading working group and the CMEC coordinator, Education Data and Research, who suggested some areas of interest derived from the most recent round of consultations on the Pan-Canadian Education Research Agenda (PCERA). It was determined that the main research focus would be on teaching and learning reading strategies. Additional areas of interest included the methods and uses of assessment and the ways in which special-needs students are accommodated in schools and classrooms.

Features of the administration of PCAP Reading 2007

In the spring of 2007, the test was administered to a *random sample* of schools and students, representing the national cohort of 13-year-olds and of the jurisdictions. Booklets were randomly assigned to students.

Sampling

The *sampling process* refers to the way in which the schools and students were selected to write the assessment. It is necessary to select a large enough number of participants to allow for adequate representation of the population's performance (the word "population" refers to all eligible students within a jurisdiction and/or a linguistic group). This assessment adopted the following two-step stratified sampling process in the selection of participants:

- the *random selection of schools* from each jurisdiction, drawn from a complete list of publicly funded schools provided by the jurisdiction
- the *random selection of students*, drawn from a list of all eligible 13-year-olds within each school

In the case where numbers were smaller than the desired size, all schools and/or all students meeting the criteria within the jurisdiction were selected. This method ensured that we had an adequate number of participants to allow for reporting on their achievement as if all students within the jurisdiction had participated.

The sampling process resulted in approximately 30 000 13-year-old students writing the test. Approximately 20 000 wrote the reading segment, the primary domain, and about 10 000 wrote the mathematics and science segment, which represented the secondary domains. Approximately 15 000 wrote the reading segment in English and 5000 wrote in French. For mathematics and science, the numbers were 7500 in English and 2500 in French.

Reporting results by language

The results obtained from students educated in the French system of their respective jurisdictions are reported as French. The results obtained from students educated in the English system of their respective jurisdictions are reported as English. In most jurisdictions, the results achieved by French immersion students who wrote in French are calculated as part of the English results. However, in Manitoba, the results achieved by French immersion students are calculated as part of the French results. All French and English students were expected to write for 90 minutes, with breaks deemed appropriate by the assessment administrator. Then they completed the contextual questionnaire at the back of their test booklet.

Participation

Each school received the assessment handbook that outlined the purposes of the assessment, the organization and administration requirements, and suggestions to encourage as full participation as possible. These suggestions included a common administration script to ensure that all students encountered the testing process in a similar manner and provided guidelines for accommodating special-needs students. PCAP testing is intended to be as inclusive as possible in order to provide a complete picture of the range of performance for the age group. The students who were excused from participation were nevertheless recorded for statistical purposes; they included those with highly limited abilities in any one of the domains, those who would be adversely affected by the test, and those whose parents requested that their children be excused.

Participation rates

In large-scale assessments, participation rates are calculated in a variety of ways and are used to guide school administrators as they determine whether the number of students who completed the assessment falls within the norm established for all schools. In the case of PCAP, a formula for this purpose is provided to the test administrators, thereby ensuring that all schools use the same guidelines and that the set minimum of participating students is uniformly applied. Using this formula, the PCAP student participation rate was over 85%.

Schools were encouraged to prepare and motivate students for the test, aiming for as much positive participation and engagement in the process as possible by teachers, students, and parents. The materials provided included information pamphlets for

parents and students; the school handbook also included sample questions in reading that illustrated the types of demands and the descriptions of achievement levels for each question provided.

Schools were also asked to have the Teacher Questionnaire completed by all the language arts teachers of the participating students in the school and to have the School Questionnaire completed by the school principal. All three questionnaires (Student, Teacher, and School) were linked to student results, and unique identifiers were used to preserve confidentiality.

Scoring the student response booklets

The scoring was conducted concurrently in both languages in one location over a three-week period. After all student booklets had been submitted from the jurisdictions, the booklets were scrambled into bundles of 10 so that any single bundle contained booklets from several jurisdictions. The scoring administration team, the table leaders, and the scorers themselves came from several jurisdictions. The whole scoring process included

- **parallel training** of both table leaders and scorers in each subject area
- a bilingual committee with responsibility for reviewing all instruments and **selecting anchor papers** to ensure comparability at every level
- twice daily **rater-reliability checks**, in which all scorers marked the same student work in order to track the consistency of scoring on an immediate basis
- **double scoring**, in which 300 of each of the 3 booklets were returned to the scoring bundles to be re-scored, providing an overall inter-rater reliability score.

Structure of this report

This report supplements *PCAP-13 2007: Report on the Assessment of 13-Year-Olds in Reading, Mathematics, and Science* (CMEC 2008) which describes the performance of 13-year-old students on the Pan-Canadian Assessment Program developed and administered in 2007 by the Council of Ministers of Education, Canada. The assessment focused on reading as the major domain, with mathematics and science as the two minor domains. Another, complementary report (*PCAP-13 2007: Contextual Report*) analyzes the context variables from the Student, the Teacher, and the School/principal questionnaires administered as part of the assessment and seeks to identify those that are strongly linked to reading performance. This report is based on the same context variables, but it focuses on those that best explain the differences in performance between six language groups.

The assessment population was divided into six groups as follows: Majority English (students attending anglophone schools in all provinces and territories except Quebec); Quebec English (students attending anglophone schools in Quebec); Quebec or Majority French (students attending francophone schools in Quebec); and three groups of francophone students attending francophone schools in minority-language settings outside Quebec; that is, New Brunswick French, Ontario French, and Small French Minorities, encompassing francophone students from all other jurisdictions because the numbers of participants did not warrant freestanding groups.

This first chapter of the eight chapters in this report provides the broad context for the study, including the objectives, design, components, and implementation process of the 2007 CMEC assessment.

Chapter 2 describes the reading performance of all six language groups; then, provides comparisons with the average performance for all Canadian 13-year-old participants, as well as the relative performance between language groups.

Chapters 3, 4, 5, and 6 compare the six language groups based on the context variables derived from the responses on the questionnaires administered at the same time as the assessment. Chapter 3 deals with student- and school-level demographic variables (e.g., socioeconomic status, language spoken at home, public vs. private school, community size). Chapter 4 addresses variables related to attitude and motivation in connection with school, with learning, and with reading. Chapter 5 analyzes various student reading behaviours and strategies. Chapter 6 sets out a number of the variables related to teaching, particularly reading instruction in the participating schools. Each of these four chapters contains charts showing each group's score for each context variable measured, linking the variables with the students' reading performance.

Chapter 7 is crucial to understanding the links between the large number of context variables that were analyzed and the reading performance of the students in each of the six groups. Multivariate regression models are used to compare the links between the context variables for each individual language group. These models can analyze the effect of one variable (e.g., reading strategies) while taking into account the effect of all other context variables included. This report attempts to identify the variables that play a determining role in each group's reading performance. Some variables may have similar effects among all groups.

In Chapter 8, we offer a summary review of the key context variables that play a determining role in each group's reading performance, and we briefly discuss some of the educational and classroom consequences.

The inclusion of Section 23, “Minority Language Educational Rights,” in the *Canadian Charter of Rights and Freedoms* of the Constitution Act, 1982, gave new hope to the francophone minorities of Canada. It provided to parents the right to send their children to francophone schools under their own governance. Today, the Fédération nationale des conseils scolaires francophones (FNCSF) includes 31 school districts in the 9 provinces outside Quebec and the 3 territories. The same Section 23 also stabilized the rights of anglophone parents in Quebec to send their children to English-language elementary and secondary schools. Today, 9 school districts under the Quebec English School Boards Association serve the English-speaking population in several regions of Quebec. Moreover, all ministries and departments of education in Canada have, within their structure, an administrative unit in charge of educational services for official-language minorities.

In this report, we focus on the particular difficulties in French literacy that have been documented in several national and international studies (CMEC 2004, 2008; Corbeil 2006; Bussière et al. 2007; Wagner et al. 2002). On reading and writing assessments, students in French-language schools have tended to score below the Canadian mean, as have adult francophones on national literacy tests. A study sponsored by CMEC (Landry and Allard 2002) analyzed the results of the CMEC’s School Achievement Indicators Program (SAIP) assessments in reading, writing, mathematics, and science. The authors found that the more these academic activities involved language processing the greater were the discrepancies in performance between the students in the French-language communities outside Quebec and those in the other language groups (Majority English, Quebec French, and Quebec English). For instance, no differences were found between minority francophone students and the other language groups in mathematics and science in which language skills were minimally involved (numerical calculations and applied science problems), but differences were observed when problem solving in these subject matters involved reading skills. The differences were even greater in tests of reading comprehension, and were the largest in tests of writing abilities.

When interpreting the results of the present study of reading achievement, it is important to keep in mind that mean reading scores in French do not necessarily reflect the overall literacy skills of francophones who live in minority-language contexts. The vast majority of these students are bilingual, and studies have shown that, although schooled completely in French except for English language arts courses, these students’ scores in English reading tend to be higher than their scores for reading in French (Landry and Allard 1993, 2000; Landry, Allard, and Deveau 2007; in preparation). In the Pan-Canadian Assessment Program (PCAP), students were tested in the language of their school, except for immersion students in Manitoba who were tested in French. Ideally, francophones in minority-language contexts and students in French immersion would be tested in both official languages because their reality is one of biliteracy, and their full literacy potential is not adequately assessed by testing in a single language. For example, what is more important cognitively and socially for a person — to have high literacy skills and conceptual abilities in two languages or to have excellent abilities in a single language? Which individuals contribute the most to society’s human capital?

The issue is most pertinent for francophones living in a minority-language context because these students are often tested in the language for which their literacy level is lower.

As several studies have shown, in their activities outside school, many francophone students in minority-language contexts interact more frequently in English than in French. Even within school but outside the classroom, many francophone students speak with other students mostly in English, and their exposure to the wide range of media available to them is overwhelmingly in English. The contextual variables measured in the PCAP study provide limited information on the language contacts of the students outside their school. The only language question asked on the Student Questionnaire was about the language most often spoken in the home. This question is only partly indicative of the overall experiences of the students in a language context.

Language use in the home is correlated with language use in the community (Landry and Allard 1994a), but the language or languages spoken in the home are also strongly related to the linguistic parental structure. The anthropological terms “exogamous” and “endogamous” are used when exploring this fact of language acquisition or use. Exogamous couples (couples in which one partner is French-speaking or of French heritage and the other is English-speaking, whether of English heritage or another culture) tend to speak mainly English in the home, whereas endogamous couples (two francophone parents) tend to speak only French to their children (Marmen and Corbeil 2004). In 2001, 86 per cent of the children of francophone endogamous couples spoke French most often in the home, whereas only 15 per cent of the children of exogamous couples did so (Landry 2003).

When the francophone parent in exogamous couples speaks mainly French to their children (even though the other parent may speak another language) and these children attend a French school, their competency scores on French tests by grade 12 (Cégep 1 – QC) tend to be similar to those of children who have two francophone parents. Generally, the children who speak mostly English in the home, independent of the parental structure, tend to have lower scores on French tests (Landry and Allard 1997). However, some students may speak French at home but otherwise have little contact with French except for their school activities. In the present study, we are unable to control for use of French in such domains as the students’ social network, media use, entertainment, and reading activities.

Also not available for analysis is the location of the schools within the provinces. Opportunities to use French and English are strongly dependent on the vitality² of these languages in the municipalities where the students live (Landry and Allard 1994a). For example, within New Brunswick, students may live in municipalities where the percentage of francophones ranges from less than 5 per cent of the population to close to 100 per cent. In the other provinces, there is less variability in the proportion of francophones in municipalities; nonetheless, there are important differences in the vitality of the French communities. In the present study, francophone students from different regions within the same province are grouped together and, in some cases, francophone students from different provinces had to be pooled because of the small

² Vitality has been generally defined as the demographic, institutional, and status variables that allow a linguistic group to become or remain a distinct and active entity in inter-group contacts (Giles, Bourhis, and Taylor 1977).

sample sizes. The available data do not allow us to control for the variable vitality of French within groups in different municipalities.

Another factor that needs to be considered when interpreting the PCAP results is the percentage of eligible francophone students in the minority French communities (according to Section 23 of the Charter) who actually attend French schools. Rates of student participation vary greatly across provinces and are related to the vitality of the francophone communities. In 2006, only 49 per cent of the eligible students attended a French school (53% at the primary school level and 44% at the secondary school level) whereas 15 per cent attended a French immersion program and 35 per cent participated in the regular program in English schools (Corbeil, Grenier, and Lafrenière 2007). New Brunswick had by far the largest rate of participation (81% at the primary level and 78% at the secondary level). Ontario's rate of participation was close to the Canadian mean (55% primary and 45% secondary). Rates were below 50 per cent at the primary level and generally below 40 per cent at the secondary level for Prince Edward Island, Nova Scotia, and Manitoba. In the Western provinces, the rates were below 30 per cent at the primary level and below 20 per cent at the secondary level. In Newfoundland and Labrador, the rate of participation was 17 per cent at the primary level and below 10 per cent at the secondary level. In the three territories, the percentage of children attending the French school was relatively close to the Canadian mean at the primary level (46%) but very low at the secondary level (less than 15%).

Corbeil et al. (2007) did not analyze the rate of student participation in French schools by socioeconomic status. Three factors related to students' participation in French schools were the maternal ancestry and language of the parents, the amount of French schooling each parent had, and the principal language used at home — even by the francophone parents, that is, the language in which they were more at ease. Parents who had been schooled in French, couples who were both of francophone ancestry, and parents who were more at ease in French were more likely to send their children to French schools than either parents schooled mainly in English, or couples who had different ancestry and maternal language, or francophone parents who felt equally at ease in both languages, or those who were more at ease in English.

It is nonetheless possible, in communities with minimal French vitality, that the rate of participation in French schools is also related to the parents' socioeconomic status. When French schools are not readily available or when English schools are closer than French schools, it is the parents who are more concerned about French-language maintenance who might make more effort to have their children attend the French school. A study in New Brunswick (Landry and Allard 1994b) found that the parents' level of schooling was strongly related to whether they valued having their children schooled completely in French more than having them schooled half in French and half in English, or mainly in English. In a recent study (in preparation), Landry, Allard, and Deveau found that, for grade 11 (Secondary 5 in QC) students attending a French school, the parents with the highest level of schooling tended to be in the provinces that had both the lowest French vitality and the lowest rate of participation in French schools.

In the western provinces and in the territories, on average, 41.9 per cent of the mothers and 36.5 per cent of the fathers had a university degree compared to 25.4 per cent of the mothers and 20.5 per cent of the fathers in New Brunswick and 27.9 per cent for the mothers and 25.2 per cent for the fathers in Ontario. In the other three Atlantic

provinces (Nova Scotia, Prince Edward Island, and Newfoundland and Labrador), university degrees were held by 26.5 per cent of the mothers and 20.9 per cent of the fathers.

If few schooling opportunities exist in French and the French-speaking community has low vitality, both of which limit attendance at French schools, then the overall socioeconomic context has to be considered along with the socioeconomic characteristics of the parents. For instance, the Atlantic provinces including New Brunswick tend to have a lower socioeconomic level than other provinces. In regions like the western provinces, for example, where students attending French schools have little contact with French outside school (including language use at home), it is possible that the effect of this situation on mean reading scores could be compensated for by parents of a higher socioeconomic status, on average. This could be called the “self-selection effect” because French schooling in these regions might be more strongly related to voluntary parental choices.

In contrast, in regions such as northern New Brunswick, French schooling is externally regulated by the high concentration of francophones and the non-presence of English schools. In such regions, mean reading scores could be negatively influenced by the low socioeconomic status of the parents, but this effect could be compensated for, at least partly, by greater use of French at home and in the community. Hence, when comparing the mean reading scores of different groups of francophones living in minority situations, it is possible that mean scores are similar across groups but also that the factors influencing these results are not the same. Such possible differential factors are analyzed in chapter 7, where multivariate analysis tries to identify the principal factors that are related to achievement for the different language groups.

The PCAP-13 achievement results are presented in this chapter for seven language groups:

1. **Majority English**, which includes the students of the schools in the English-speaking jurisdictions (N = 14 250)
2. **Quebec French** (sometimes called Majority French), which consists of the students attending the French schools in Quebec (N = 1178)
3. **West French**, which groups all the students attending the French schools in Yukon, British Columbia, Alberta, Saskatchewan, and Manitoba³ (N = 543)
4. **Ontario French**, which groups all students in the French schools in different regions of Ontario (N = 1418)
5. **Quebec English** (sometimes called Minority English), which includes all the students attending the English schools in Quebec (N = 1019)
6. **New Brunswick French**, which groups all the students in the French schools of New Brunswick (N = 1467)
7. **East French**, which groups the francophone students from Nova Scotia, Prince Edward Island, and Newfoundland and Labrador (N = 218).

³ Although French immersion students in Manitoba wrote in French, only the results from students attending French schools are included with West French.

However, in subsequent chapters where reading results are broken down for subgroups of students, the minority-language francophone groups from the West French and the East French groups were pooled into a single group labelled Small French Minorities. This was done to minimize the size of the error related to small samples. However, the numbers get even smaller when we analyze the results from the Teacher and School questionnaires. The language groups for these questionnaires are reduced to four — Majority English, Majority French, Quebec English, and Small French Minorities, the latter combining the results from Ontario, New Brunswick, and the other provinces.

Results

Another way of looking at reading performance is to establish proficiency levels based on descriptions of what students can do at each level. For the reading test, three proficiency levels were defined, with level 2 being considered the acceptable level of performance. Performance levels were summarized as the percentage of students reaching each level. For details on the level definitions, please see the PCAP-13 2007 Report found at <http://www.cmec.ca/pcap/2007/pcap2007-report.en.pdf>

The reading results are presented in charts 2-1 and 2-2. Chart 2-1 presents the results of the seven language groups broken down by the three proficiency levels; Chart 2-2 shows the mean reading scores of these groups.

The most obvious result in Chart 2-1 is the relatively large percentage (37%) of Quebec French students who attain level 3 proficiency. In none of the other six groups does this percentage exceed 20 per cent. Three groups (Majority English, West French, and Ontario French) have between 17 per cent and 20 per cent of level 3 students, whereas three groups (Quebec English, New Brunswick French, and East French) have between 14 per cent and 15 per cent. New Brunswick French has the highest percentage of level 1 students (24%), and Majority French has the lowest (9%).

In Chart 2-2, the reading results are presented in standardized form, the Canadian mean being 500 and the standard deviation fixed at 100. Differences can therefore be interpreted in units of standard deviation. A difference of 50 points is equivalent to one-half of a standard deviation, and a difference of 33 points is equal to one-third of a standard deviation.

Results in Chart 2-2 show that the Quebec French group, with a mean score of 532, is approximately one-third of a standard deviation above the Canadian mean. As expected, the Majority English group has a mean score (493) that is close to the Canadian mean, this group having the largest number of students and the largest influence on the Canadian mean score. The Quebec English group has a mean score (479) that is approximately two-tenths of a standard deviation below the Canadian mean. Looking at the confidence intervals, it can be observed that this group's mean score is statistically different from the mean scores of the two majority groups, but not different statistically from those of three out of the four francophone groups in minority-language context. New Brunswick French students have the lowest mean score (458) and, although it is statistically different from the mean scores of the Quebec English and Ontario French students, it is not different from those of the East French and West French students.

CHART 2-1 Reading proficiency levels by language group

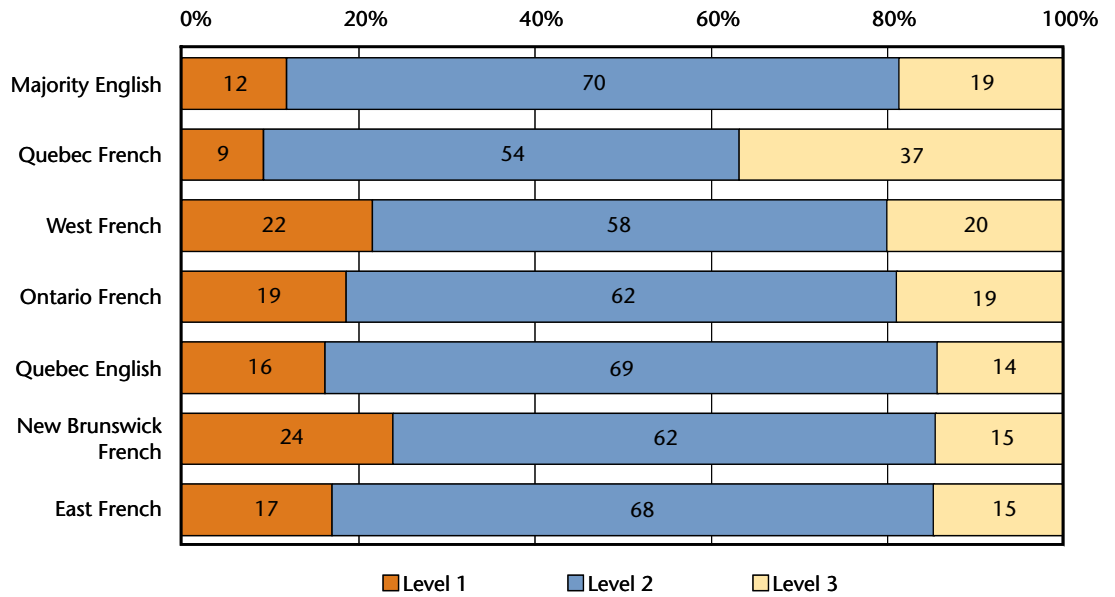
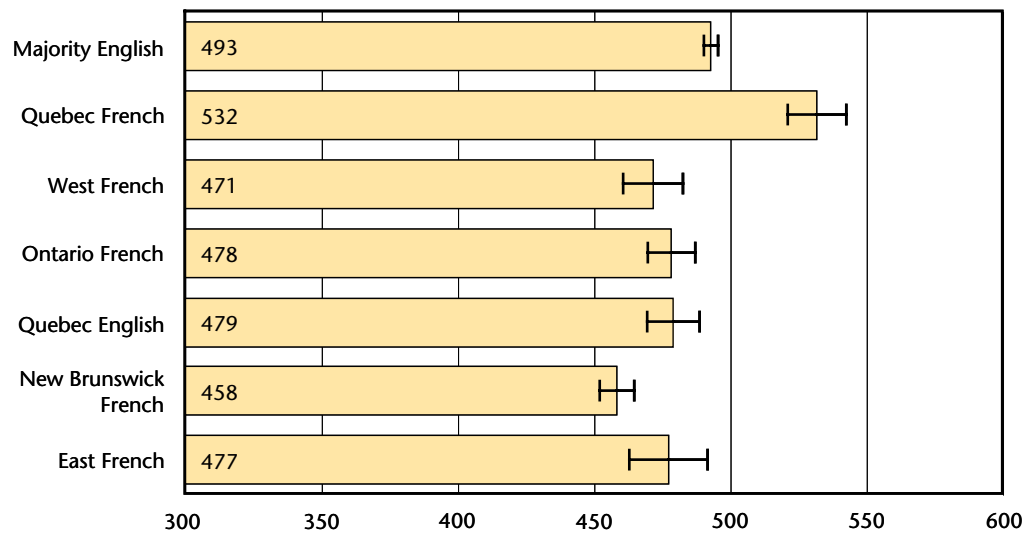


CHART 2-2 Mean reading scores by language group



In the chapters that follow, we analyze selective results from the contextual questionnaires. These results are presented in similar fashion to those presented in the *PCAP-13 2007: Contextual Report on Student Achievement in Reading* (CMEC 2009). However, we present only the contextual variables that are differentially distributed across language groups and that have at least a modest relationship to the reading results. We will show the bivariate effects⁴ on reading achievement of each of these contextual variables for each of the language groups. In chapter 7, multivariate⁵ regression models are used to analyze all the contextual variables together and identify, for each language group, the variables that are more strongly related to their reading achievement. We will discuss the educational implications in the last chapter of the report.

⁴ A bivariate effect can be defined as the relationship between a particular contextual variable and mean reading scores without controlling for other contextual variables.

⁵ A multivariate effect is the same relationship between a contextual variable and mean reading scores after controlling for its relationship to other variables.

This chapter presents demographic and socioeconomic characteristics of students, schools, and teachers. These individual and system characteristics can be seen as conditions that preceded teaching and learning, some of which (language spoken in the home, level of education of parents) are not under the control of the school system and others (school size, teacher specialization) that may be controlled to some extent by the school system but are limited by available resources. As already mentioned, only the variables that are differentially distributed across language groups and that are related to reading achievement are presented; for example, student gender has consistently been shown to be relevant — on average, girls have higher scores than boys. However, in the present study, the gender effect is similar for all language groups and is not likely to help us explain why certain language groups have higher scores than others. Some contextual variables had to be dropped because of insufficient numbers when they were broken down into the different response categories. For example, the proportion of students born outside Canada was modestly related to reading achievement scores for some groups, but the numbers were very small and the errors were therefore very large.

This chapter is divided into three sections — student characteristics, school characteristics, and teacher characteristics. In each section, contextual variables are broken down for each of the language groups, and these results are shown in a chart specific to this variable. A second chart shows the mean reading score of the language groups for each response category of the variable. Confidence intervals show which response category subgroups and which language groups are significantly different from each other. Differences in mean scores between response subcategories of a variable are indicative of the effect of a variable. For example, if “books in the home” is related to reading performance, response categories or intervals in the scale should be related to different mean scores in reading. As previously mentioned, because mean reading scores were standardized, the mean scores of the response category subgroups can be compared with the Canadian mean (500) and interpreted as units of standard deviation below or above this mean.

Student characteristics

Three variables were selected as relevant to the students’ reading achievement and as having possible differential effects for the different language groups — 1) language most often used at home, 2) books in the home, and 3) mother’s education. The first, the language variable, is indicative of a match or mismatch between the language used by the student in the home and the language of instruction in school. The other two are the socioeconomic variables that have been shown consistently to be related to educational achievement and that are not equally distributed among language groups.

Language most often used at home

The students were asked to identify the language they used most often at home. Results are broken down by language groups in Chart 3-1.

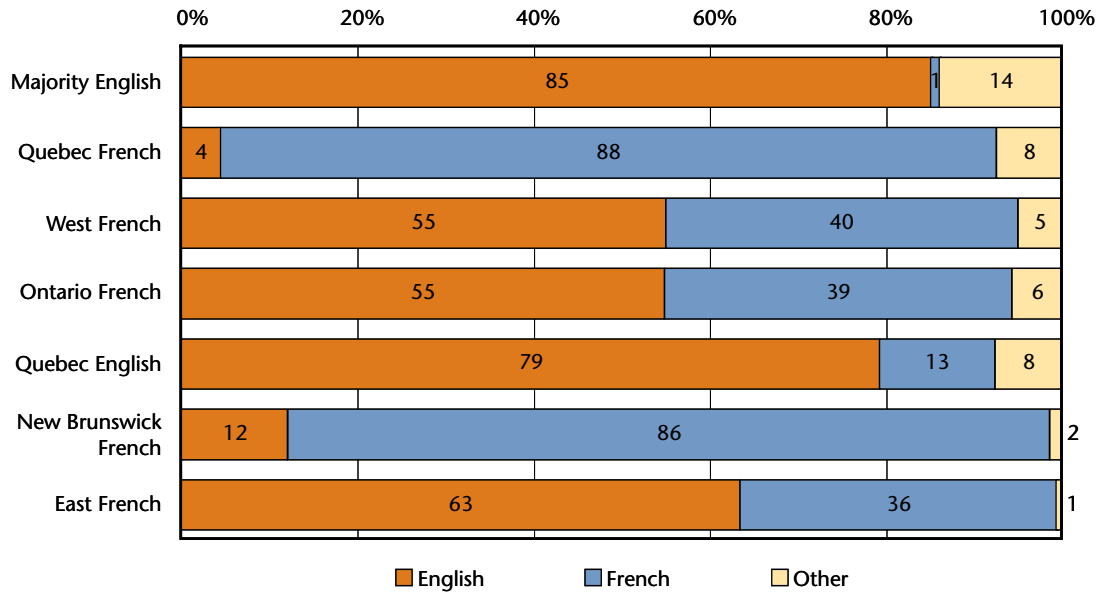
The vast majority of the students in the Majority English group speak English most often in the home (85%). French is spoken at home by only 1 per cent of the student population. Reflecting Canada's increasing diversity, a significant proportion of students (14%) most often speak languages other than the two official languages in their home.

A similar situation is observed in the Quebec French group, where the vast majority of the students (88%) speak French, the majority language of the province, at home. The remaining 12 per cent of students most often speak either English (4%) or another language (8%) at home.

In the Quebec English group, a strong majority (79%) of the students most often speak English, the language of the school, at home. Some students (13%) who attend English schools speak French most often at home; they may attend English schools if one of their parents is an anglophone right-holder under Section 23 of the Charter, but they may choose to speak French at home because it is the language of the province of Quebec. The same holds for parents whose first language is neither French nor English and who became right-holders by intermarriage or because their children had prior schooling in English in other jurisdictions in Canada. Altogether, some 8 per cent of the students in the Quebec English group most often speak a language other than English or French in their home.

Except for New Brunswick students, the home language situation of students in the French-speaking minority communities is quite different from that of students in either the English-speaking majority jurisdictions or the majority French jurisdiction of Quebec. Their lower use of French at home is indicative of the low vitality of the French language in these jurisdictions and the increasing rate of marriage outside the French culture. As already mentioned, exogamy is strongly related to the use of English in the home. More than half of the students in the West French, East French, and Ontario French groups do not speak most often at home the language of instruction in the schools they attend. Forty per cent or less of the students speak French most often in the home. Among the French-language minority groups, New Brunswick is unique, being the only French jurisdiction outside Quebec where a strong majority of the students (86%) speak the language of the school most often at home. The jurisdictions with minority French-speaking communities tend to have low percentages (ranging from 1% to 6%) of students speaking languages other than French or English at home, the percentages being higher in Ontario and in the West French than in the East French.

CHART 3-1 Language spoken at home by language group



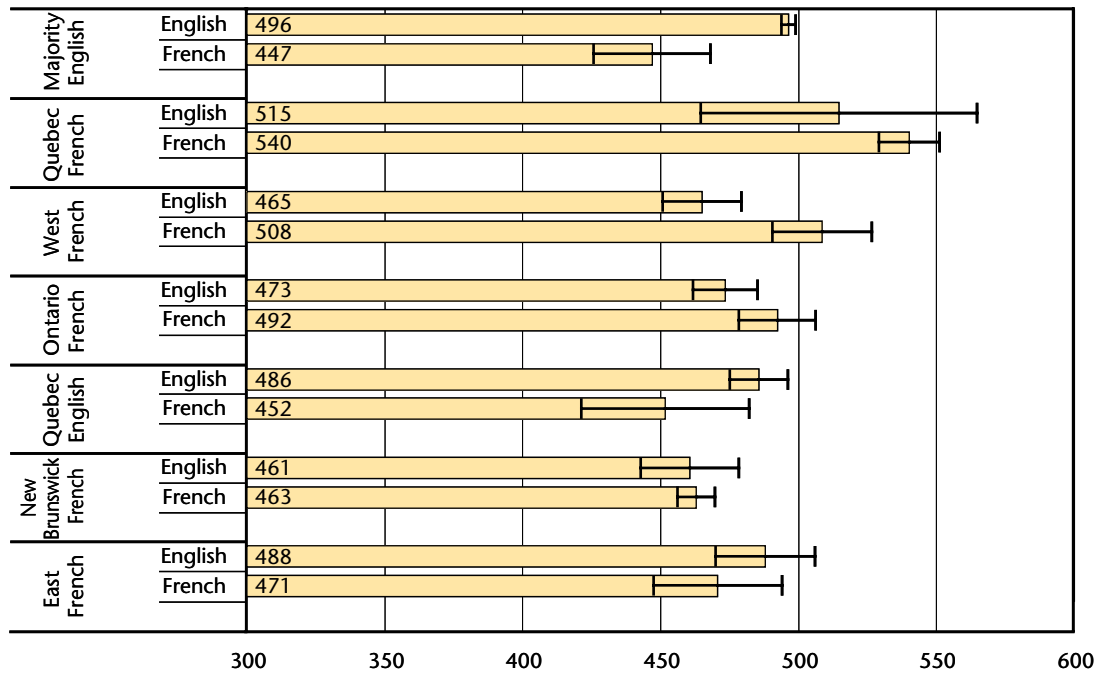
The relationship between language in the home and reading achievement is presented in Chart 3-2. For all language groups, the tendency is for student subgroups who speak the language of instruction in the school most often at home to have higher mean scores, except for East French. For most groups, however, the differences are not statistically significant.

When making comparisons between groups (such as the difference in mean reading scores), the difference is said to be **statistically significant** if the observed difference is greater than the sum of the two confidence intervals. For graphical presentations, a difference can be considered statistically significant if the error bars for the groups being compared do not overlap.

The difference between students who speak French and those who speak English at home are only statistically significant for the Majority English and the West French groups. In the Quebec English and the Quebec French groups, results are not statistically significant despite relatively large differences between home language groups as shown in Chart 3-1. The large errors in these two groups may be due to the small number of students in these language groups, but score variability may also be related to strong regional differences between the students living in Montreal and those in other regions of Quebec. For example, students who speak French at home and who attend an English school in Montreal may be expected to have stronger skills in English than the students attending English schools outside Montreal. Similarly, a Quebec student who speaks English at home and who attends a French school may be expected to use French more often outside Montreal than in Montreal.

Among the French-speaking minority groups outside Quebec, the use of French in the home may be expected to interact with socioeconomic status. For example, the francophone students in Ontario, in New Brunswick, and in the East French group who most often speak French at home can be expected to live in regions with greater concentrations of the francophone population. In many of these francophone regions, which are often rural communities, the socioeconomic status tends to be lower than in urban areas where the density of the francophone population is less strong. Only the multivariate analyses reported in chapter 7 can identify the relative effects of these two variables.

CHART 3-2 Mean reading scores by language spoken in the home and by language group

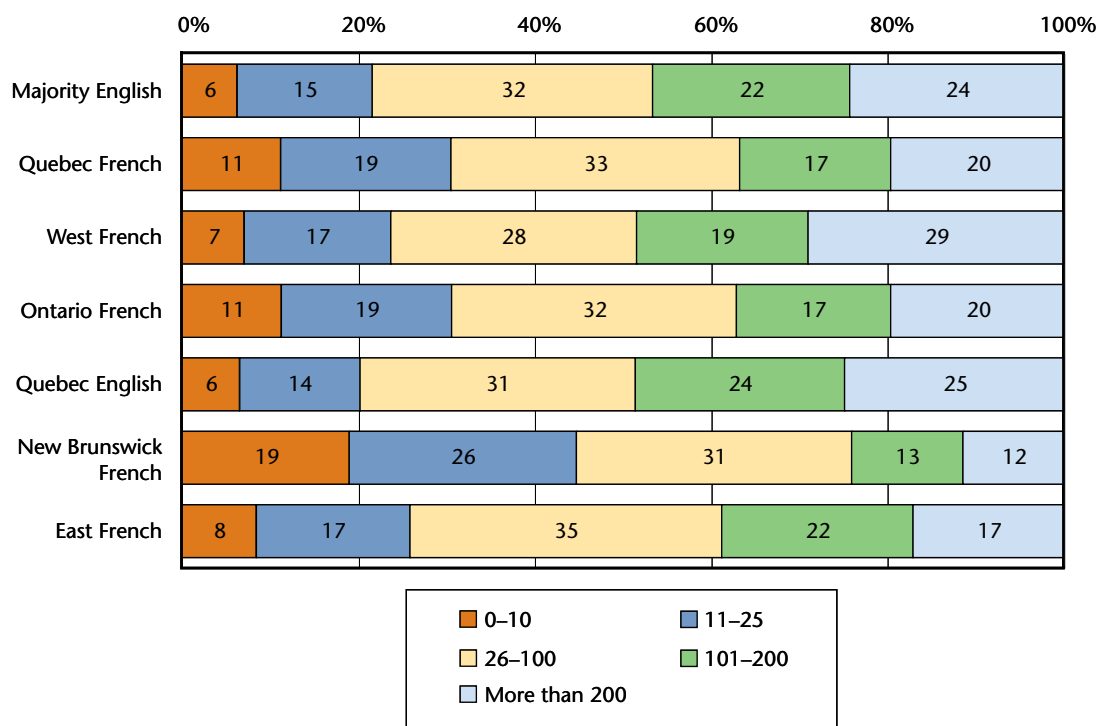


Student socioeconomic status

The two indicators of student socioeconomic status — number of books in the home and the mother’s education — were included in the questionnaire. Charts 3-3 and 3-4 present these results by language groups, and charts 3-5 and 3-6 present their relationship to reading achievement.

As shown in Chart 3-3, three language groups (Majority English, West French, and Quebec English) tend to have the highest proportion of students reporting 100 or more books in the home. The West French group has the highest percentage (29%), reporting 200 or more books. New Brunswick French reports the lowest percentage (12%), having 200 or more books. The two largest French-language groups (Quebec and Ontario) have almost identical profiles, with 20 per cent reporting 200 or more books in the home. The East French group has a profile similar to those of Quebec and Ontario.

CHART 3-3 Books in the home by language group



Mother's education is presented by language group in Chart 3-4. As for the other socioeconomic indicator, West French has the strongest profile, with 44 per cent of the students reporting that their mother has one or more university degrees. New Brunswick French has the lowest profile, with 27 per cent of the students reporting that their mother has one or more university degrees; 15 per cent responded that their mother had not completed high school. More than 60 per cent of the mothers in six groups — Ontario French (69%), West French (68%), Quebec English (65%), East French (63%), Majority English (62%), and Quebec French (61%) — have either a college diploma, a university degree, or some postsecondary education. In the New Brunswick French group, this figure is 50 per cent.

CHART 3-4 Mother's education by language group

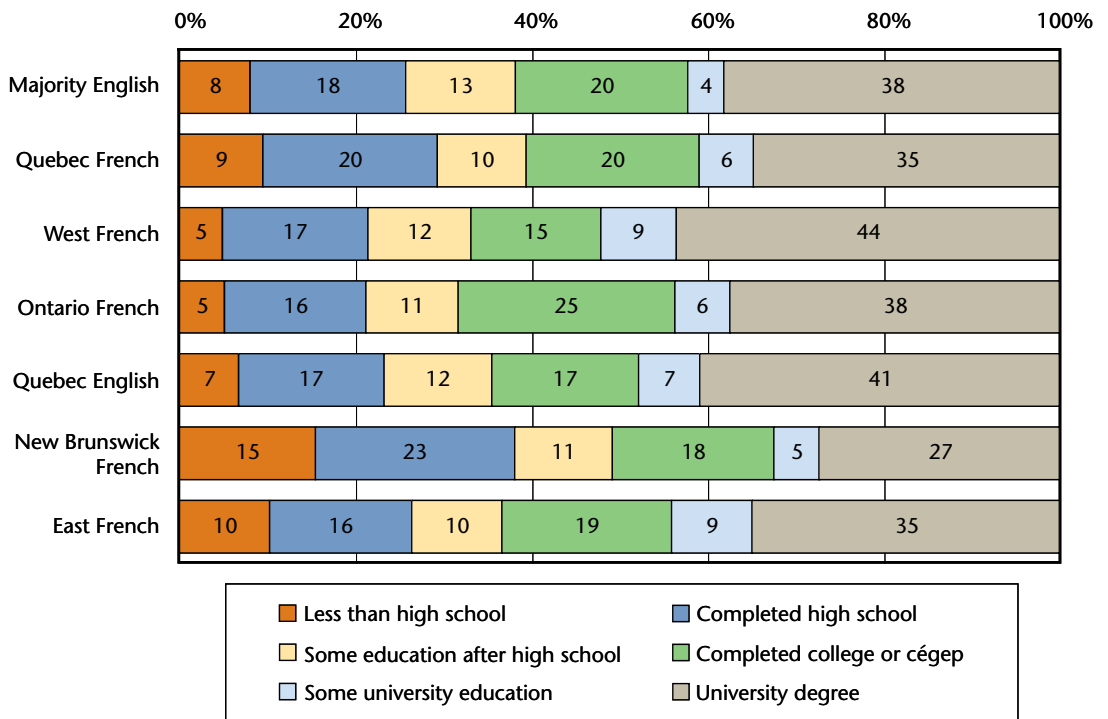


Chart 3-5 shows that the number of books in the home is strongly related to mean scores in reading for all language groups. Although not all subgroups are statistically different from each other, a clear and positive linear trend can be observed. The smallest difference between the subgroup for 0 to 10 books and the subgroup for more than 200 books is in the Quebec English group, and this difference is a 0.9 standard deviation⁶. The Quebec French, the New Brunswick French, and the Small French Minorities groups show the largest differences at 1.17, 1.16, and 1.12 standard deviation, respectively. For the Majority English and the Ontario French groups, differences of 0.94 and 0.99 standard deviation are observed. Therefore, differences are quite large for all language groups. It is interesting to note that for subgroups of students who have 200 or more books at home, except for the Quebec French group, which has a score well above the mean (588), differences between language groups are not statistically significant.

⁶ The reader is reminded that the reading score is on a scale where the mean is 500 and the standard deviation is 100. A difference of 90 points is equal to 0.9 standard deviation.

CHART 3-5 Mean reading scores by books in home and language group

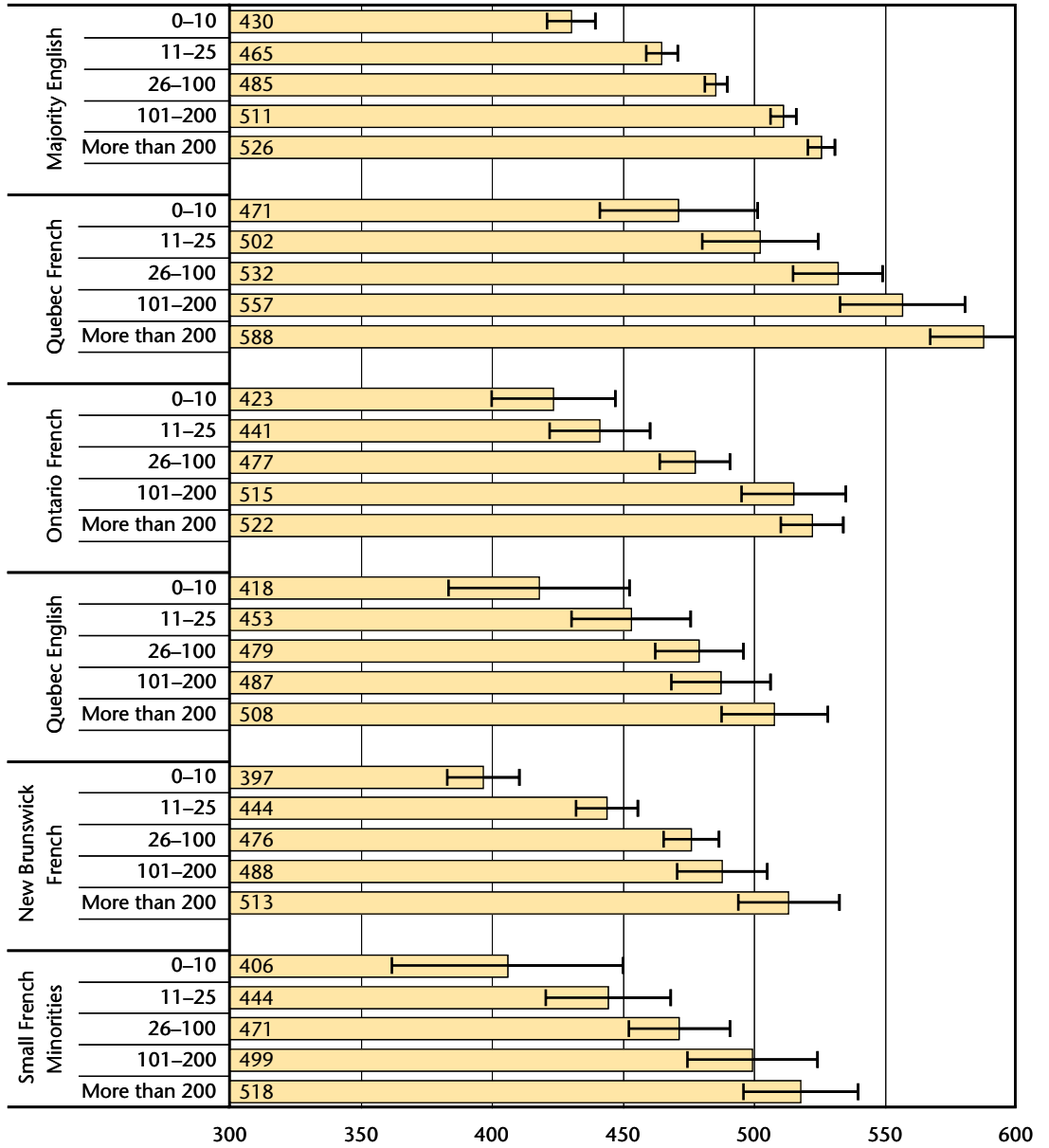
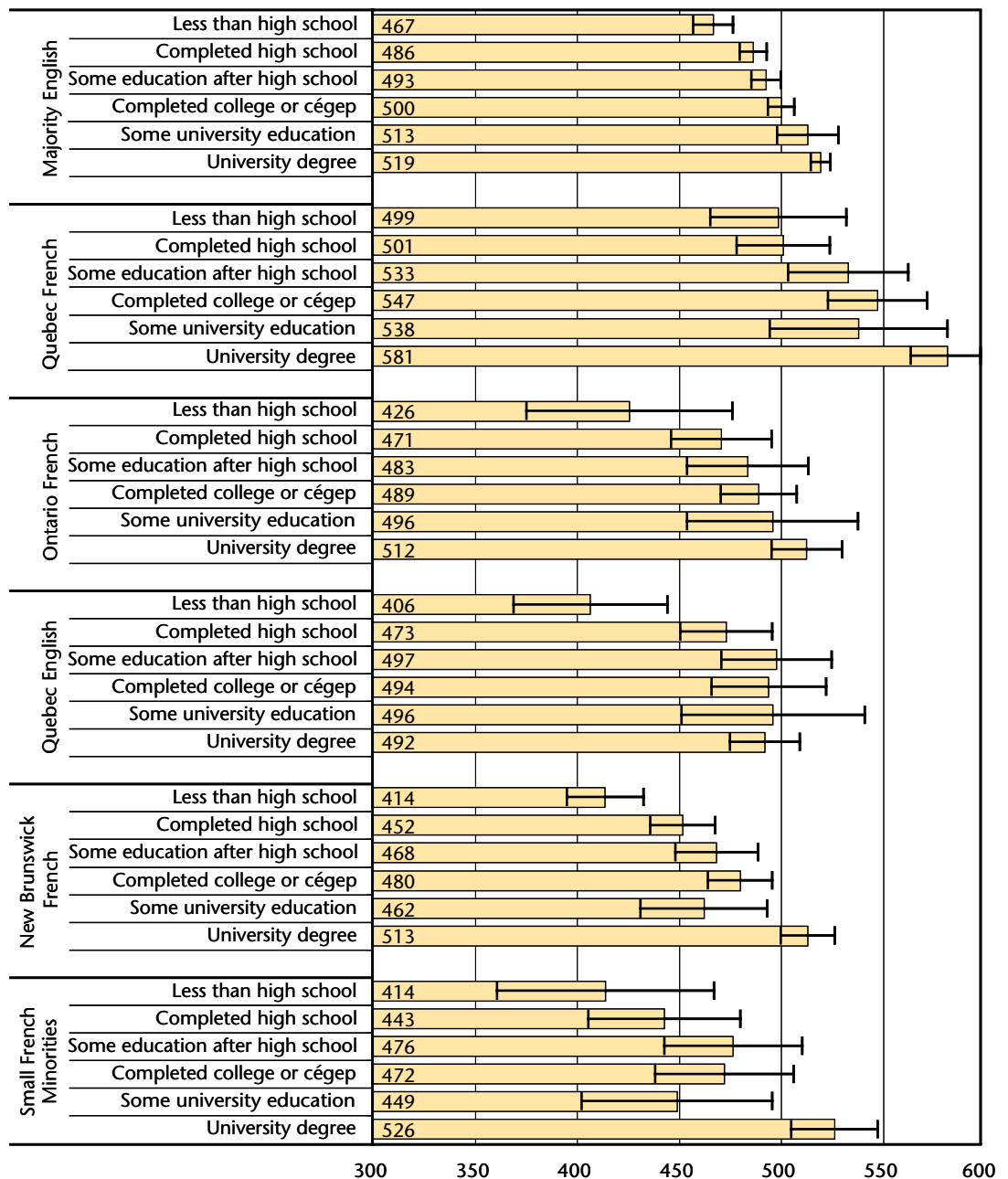


Chart 3-6 shows the relationship between the students' mother's education and mean reading scores. As regards to books in the home, the effect is linear, although not all subgroups differ from each other. Deviations from linearity are nonetheless frequent, i.e., the increase in mean reading scores with increase in mother's education is not consistent in some groups. The largest differences, as expected, are between the subgroups in which the students' mother's education is less than high school and those in which the students' mother completed one or more university degrees. Differences, however, range from 0.52 standard deviation for the Majority English group to 1.12 standard deviation for the Small French Minorities group. The second lowest difference between the low and high response categories is 0.82 for the Quebec French group; the second strongest difference is 0.99 standard deviation for the New Brunswick French group. For the other two groups the difference is 0.86 standard deviation for each. There is, therefore, a tendency toward a greater effect of a mother's education among the minority language groups.

CHART 3-6 Mean reading scores by mother's education and by language group



School characteristics

Two questions in the School Questionnaire were analyzed for this report — school governance and community size. Results are presented for only four language groups because the number of schools was very low for some groups. All French minority groups are pooled together.

School governance

As shown in Chart 3-7, the percentage of private schools in the minority francophone population is very low. In the Majority English group, 6 per cent of the schools are private, but the percentage varies from a low of 0 per cent in New Brunswick and Nova Scotia to a high of 23 per cent in British Columbia. Quebec is the province where the highest percentage of private schools participated in the study, 33 per cent in the French schools and 30 per cent in the English schools. These percentages are much higher than the average percentage of private schools in the Quebec school system which, in 2006–07, was 11.4 per cent or 325 out of the 2845 public and private elementary and secondary schools (CMEC 2008).

CHART 3-7 School governance by majority/minority language

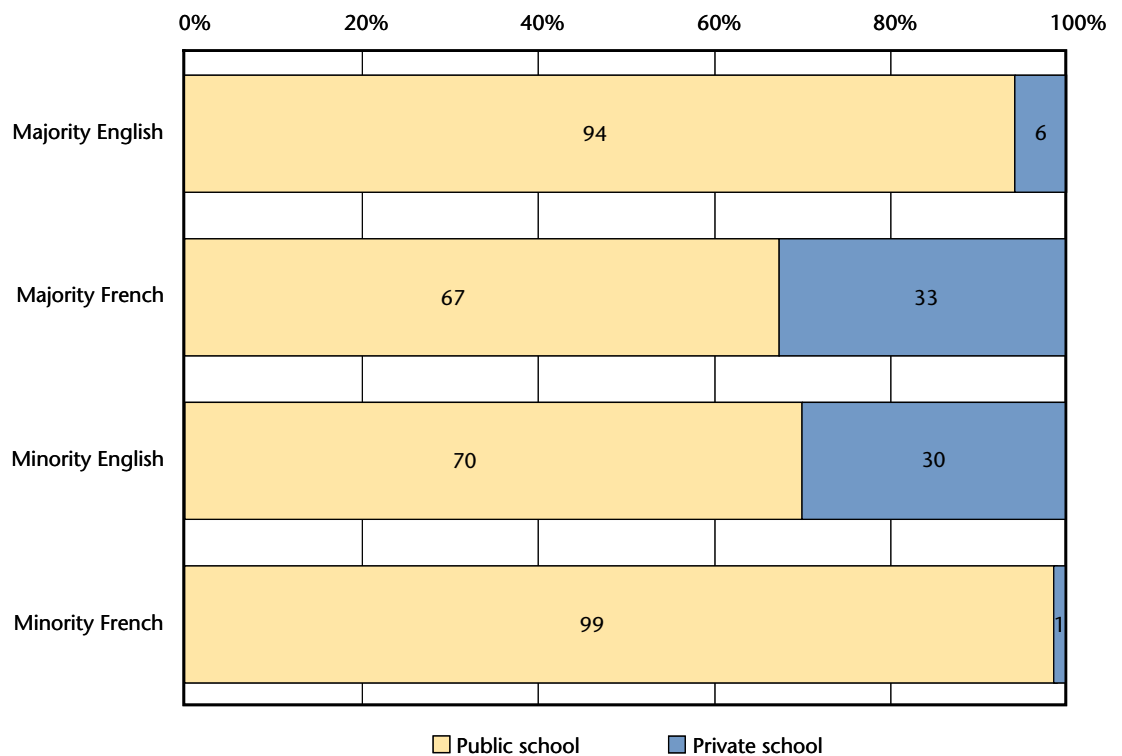
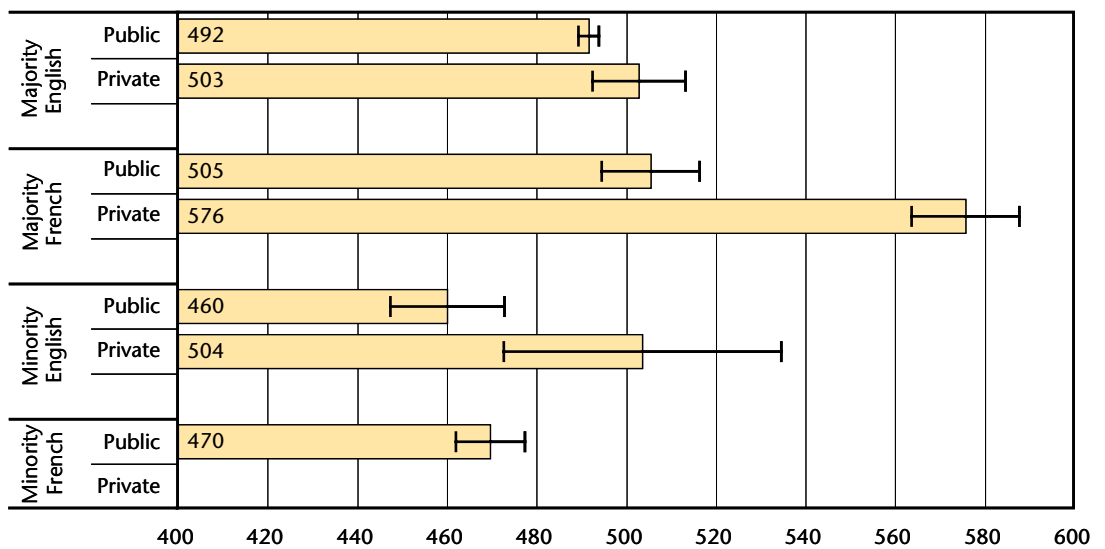


Chart 3-8 shows the relationship between school governance and mean reading scores for the two majority language groups and the Minority English group. The number of private schools in the minority-language French communities was too low to be included in the analysis. Results show that the private/public differences range from low (0.11 standard deviation for the Majority English group) to high (0.44 standard deviation for the Minority English group) to very high (0.71 standard deviation for the Majority French group). All differences are statistically significant. Although the Majority French group, on average, scores approximately one-third standard deviation above the Canadian mean (mean score of 532), it can be observed that students in the French public schools of Quebec have a mean score (505) very close to the Canadian mean. It is therefore suggested that, in their reading achievement in French, the minority francophone groups be compared with the public school group rather than with the global Quebec mean.

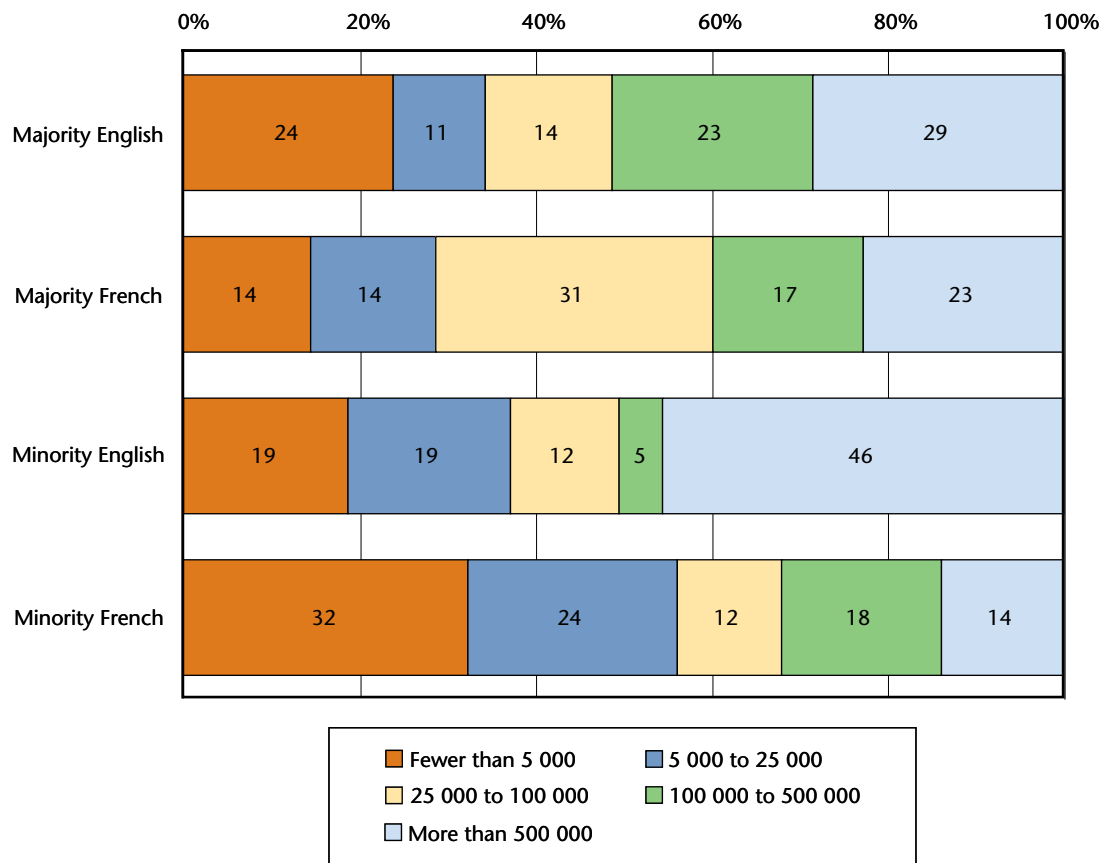
CHART 3-8 School mean reading scores by school governance and language group



Community size

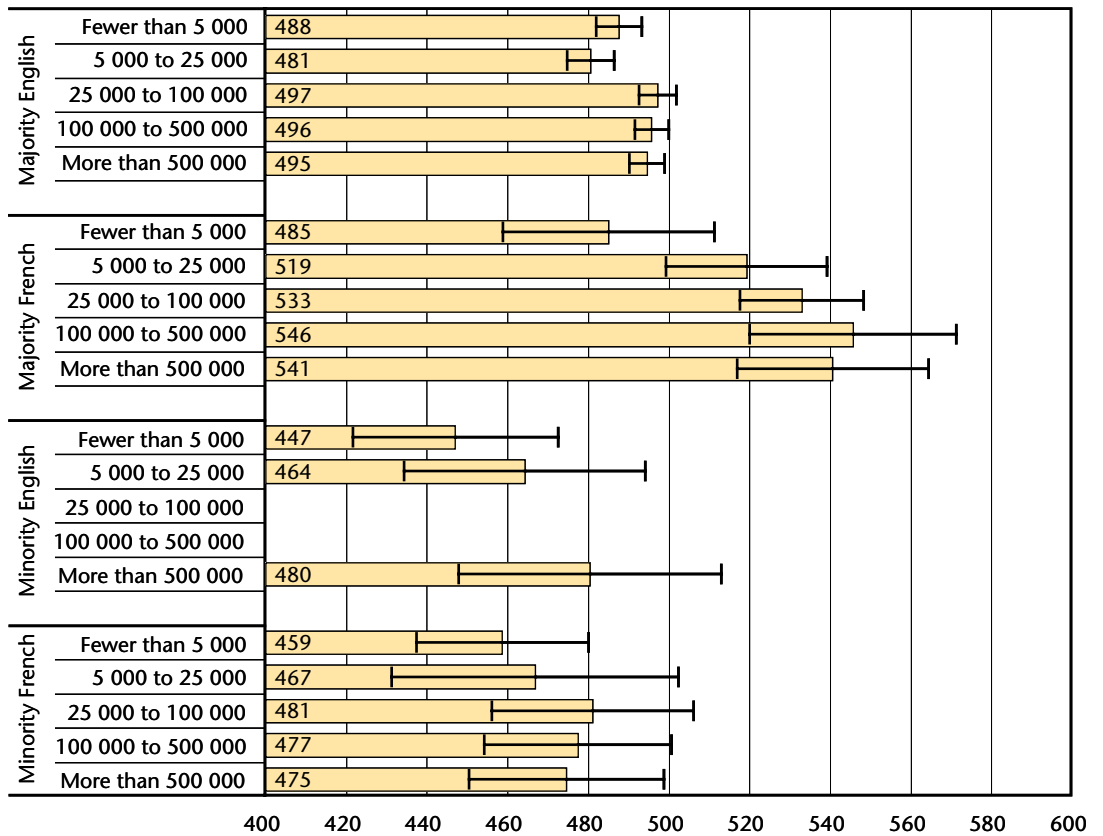
Respondents on the School Questionnaire were asked to estimate the size of the community in which their school was situated. Chart 3-9 shows the community size estimates for language and majority/minority status. The Minority English group has the highest percentage of schools in large cities (more than 500 000), reflecting the large concentration of anglophones in the Montreal area. The Minority French group has the highest percentage of schools (32%) situated in communities with less than 5000 inhabitants. The Majority French group has the highest percentage (31%) of schools in mid-size communities (25 000 to 100 000).

CHART 3-9 Percentage of schools by community size by majority/minority language group



The school mean reading scores, broken down by language groups and community size, are presented in Chart 3-10. Differences tend to be small and non-significant. There is little to no difference between different language groups and the size of their communities. However, in the Majority French group, the difference between the schools in small communities (fewer than 5000) and those in larger communities (more than 25 000) is substantial and statistically significant. For this group, a clear rural-urban difference can be observed.

CHART 3-10 School mean reading scores by community size and language group

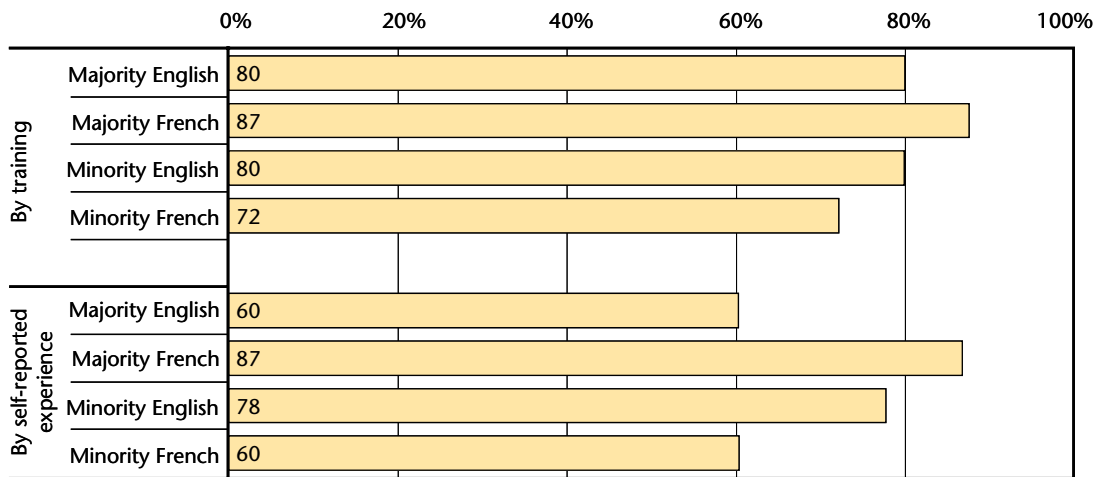


Teacher characteristics

Only one teacher characteristic is presented in this report — language arts specialization. Other teacher characteristics such as gender, years of experience, university degrees, and days of professional development were not found to have differential effects on reading achievement. Two questions in the Teacher Questionnaire dealt with language arts specialization. They reported whether they were trained as a language arts specialist and also whether they considered themselves language arts specialists by experience. Results are shown in Chart 3-11.

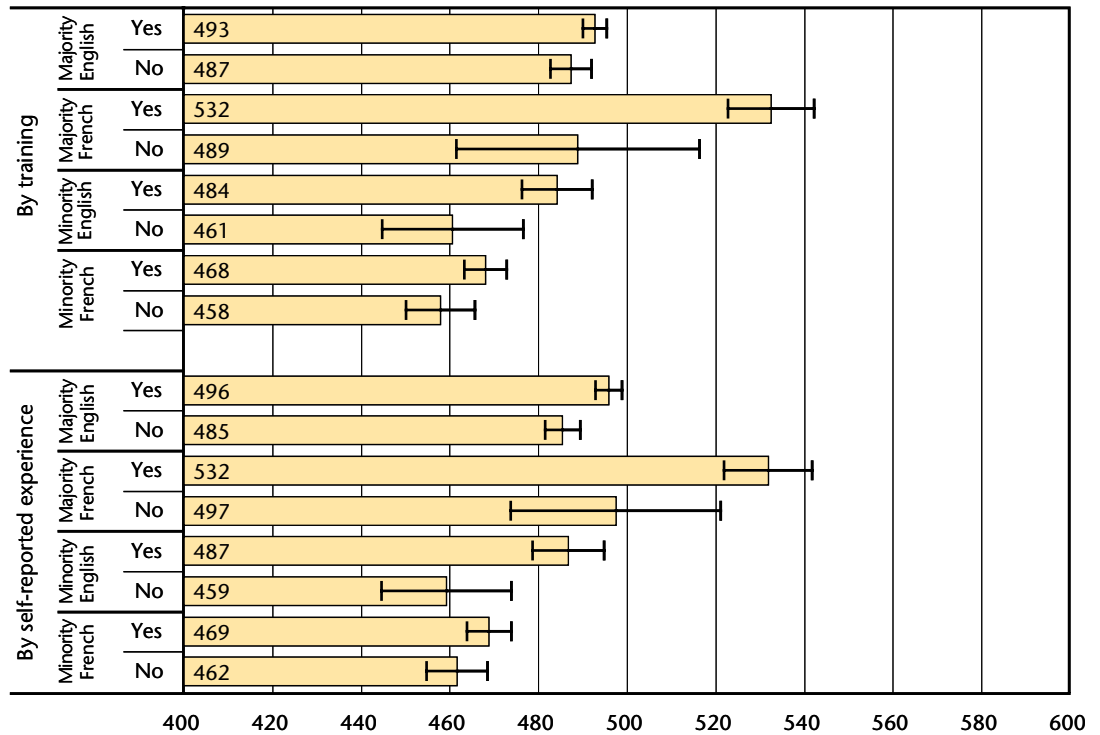
For both training and experience, the Majority French group has the highest percentage of teachers (87%) who consider themselves to be language arts specialists. This contrast with the Minority French groups where the smallest proportion of teachers consider themselves specialists of language arts (72% by training, 60% by self-reported experience). Except for the Majority French group where estimates are the same, there is a tendency for teachers to consider themselves language arts specialists more by training than by experience.

CHART 3-11 Percentage of teachers specializing in language arts by language group



As shown in Chart 3-12, the reading scores of students whose teachers consider themselves language arts specialists tend to be higher than those of students of non-specialists. Differences by specialization are the strongest for the Majority French group. For the Minority French group, differences are not statistically significant, both for training and by self-reported experience. For the Minority English group, differences are statistically significant for both training and self-report. Finally, for the Majority English group, difference by training is not statistically significant whereas the 11 points of difference by self-reported experience is statistically significant.

CHART 3-12 Mean reading scores by language arts specialization by language group



4 ATTITUDES AND MOTIVATION

Statistical Note on Factor Analysis

In order to reduce the complexity of the analysis and to obtain more stable measures of attitude, groups of questions were subjected to factor analysis, a technique designed to determine whether item responses cluster together in some psychologically meaningful way. If meaningful groupings can be found, factor analysis permits the construction of a smaller number of “derived variables” or “factors.” For example, a set of 18 questions on student attitudes toward school was reduced to two broader constructs, which we have called “enjoyment of school” and “sense of belonging to school.”

Assuming that the factor analysis produces meaningful clusters, this approach facilitates later analysis because fewer variables need to be examined and because the measurement properties of the “factor scores” that can be assigned to individuals lend themselves better to their inclusion in models of achievement.

Applying factor analysis to the student attitude questions yielded a set of 7 attitude factors, reduced from 30 individual questionnaire items. This illustrates the efficiency of this technique.

A “score” for each student on each factor was derived from the factor analysis, in much the same way as a scaled reading score was derived from analysis of the reading test items. Factor scores are typically computed in standard score form, with a mean of zero and a standard deviation of one. For convenience in presentation, and to avoid negative values on charts, the scores were transformed to a mean of 50 and a standard deviation of 10 for Canada as a whole. This is analogous to the transformation of reading scores to a mean of 500 and a standard deviation of 100. Mean factor scores for groups such as jurisdictions should be examined in relation to the Canada mean of 50 and standard deviation of 10. For example, a mean factor score of 52 for a group implies that the group is 0.20 standard deviation units above the mean for that factor. **It is particularly important to stress that factor scores should not be interpreted as percentages.**

One important aspect of the reading process is the degree to which students develop positive attitudes toward reading, that is, whether they enjoy reading and feel confident as a reader. Several aspects of the motivational dispositions of the students were measured in the Student Questionnaire and are presented in this chapter. The results on attitude and motivation are presented in such a way as to identify the relationship to the students’ mean reading scores, but the causal nature of this relationship cannot be determined. Reading achievement may lead to enjoyment and confidence, but these emotions may also contribute to reading behaviours that foster reading performance. Presumably, the relationship between reading achievement and motivation goes both ways, a relationship that cannot be assessed using only correlation techniques. Nonetheless, attitude and motivation are important results in and of themselves, and their relationship to reading performance is both educationally relevant and useful.

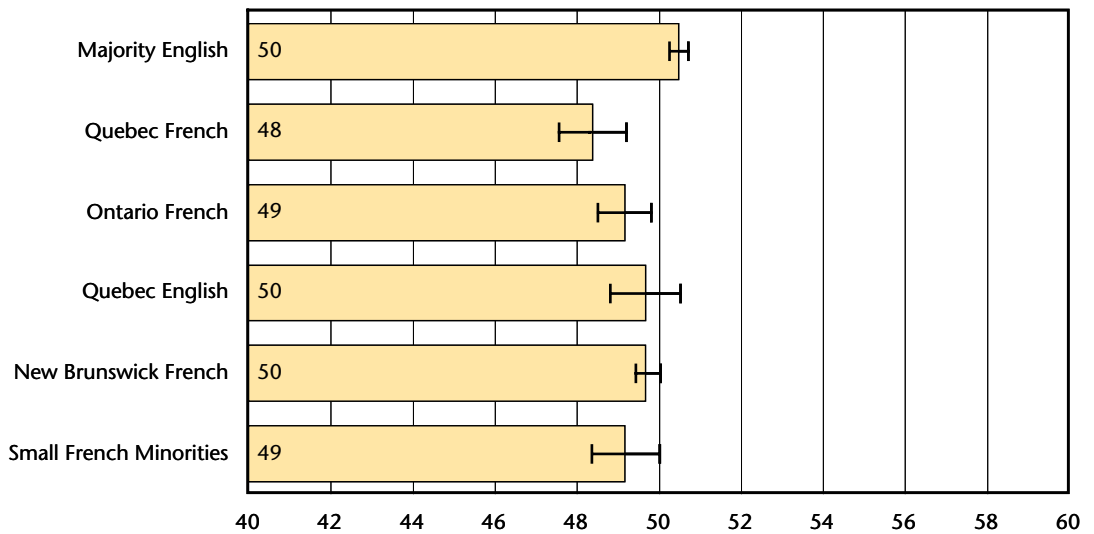
In this chapter, we analyze three categories of attitude and motivation variables — (1) attitudes toward school, (2) attitudes toward reading, and (3) attribution of success and failure. For some charts, factor analysis was used to reduce the number of variables and to group them into meaningful units. For other charts, students were grouped into quintiles on the factor scores, starting with Chart 4-3 (five groups — the first encompassing the bottom 20%, the fifth encompassing the top 20%). The quintiles for the language groups were then compared on the basis of their reading achievement.

Attitudes toward school

Five questions measured the degree to which students like school. Each was answered on a four-point scale from “strongly disagree” to “strongly agree.” A factor analysis yielded two factors; the first grouped questions related to “enjoyment of school” (e.g., I like school) and the other is indicative of a “sense of belonging to school” (e.g., I make friends easily). Charts 4-1 and 4-2 show the results for the six language groups.

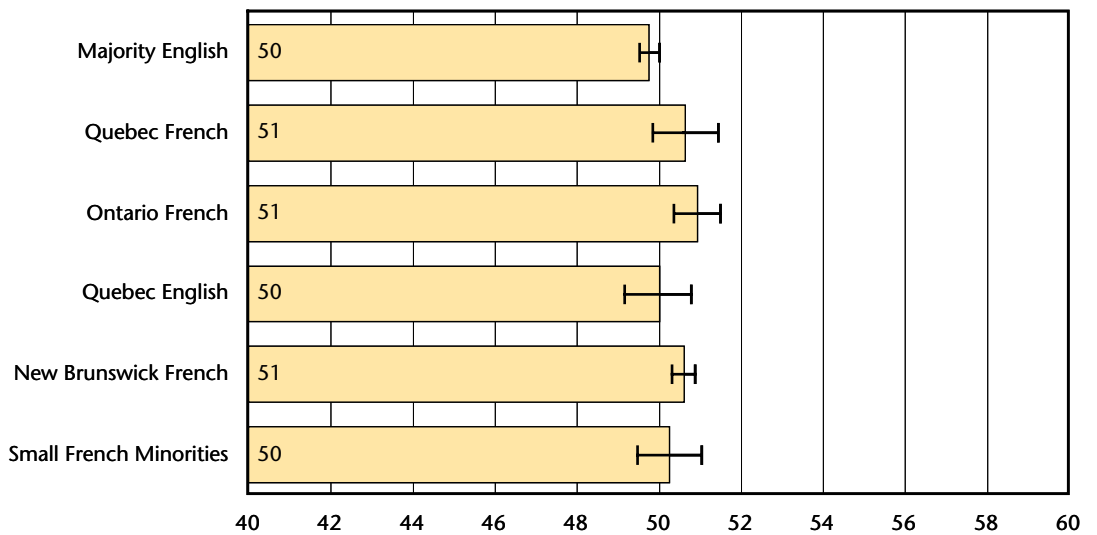
Chart 4-1 presents the mean factor scores for enjoyment of school. Factor scores were standardized so that the mean is 50 with a standard deviation of 10. As can be observed, differences between language groups are small. The only statistically significant difference is between the two majority language groups, enjoyment of school being higher in the Majority English group than in the Quebec French group. A difference of two-tenths of a standard deviation is observed between the two groups.

CHART 4-1 Mean factor scores for enjoyment of school by language group



The “sense of belonging to school” results are shown in Chart 4-2. Again, the differences between language groups tend to be small and not statistically significant.

CHART 4-2 Mean factor scores for sense of belonging to school by language groups



The relationship between these two factors and mean reading scores is shown in charts 4-3 and 4-4. As shown in Chart 4-3, enjoyment of school in all language groups is strongly related to reading achievement. Not all quintiles are statistically different from each other, but a general linear trend can be observed (i.e., the increase in scores is generally in the expected direction), except for the Quebec English group. Differences tend to be the strongest between the first three quintiles, perhaps indicating that a minimal level of enjoyment of school is necessary before achievement in reading improves and that after this minimal threshold is reached other factors come into play. As previously mentioned, these results may mean simply that students who enjoy school do better in reading than students who do not like school; they may also mean, however, that the students who succeed tend to enjoy school more than students who do not succeed. Most likely, these two processes interact and reinforce each other, calling upon teachers to employ strategies that have positive effects on both.

CHART 4-3 Mean reading scores for enjoyment of school quintiles by language group

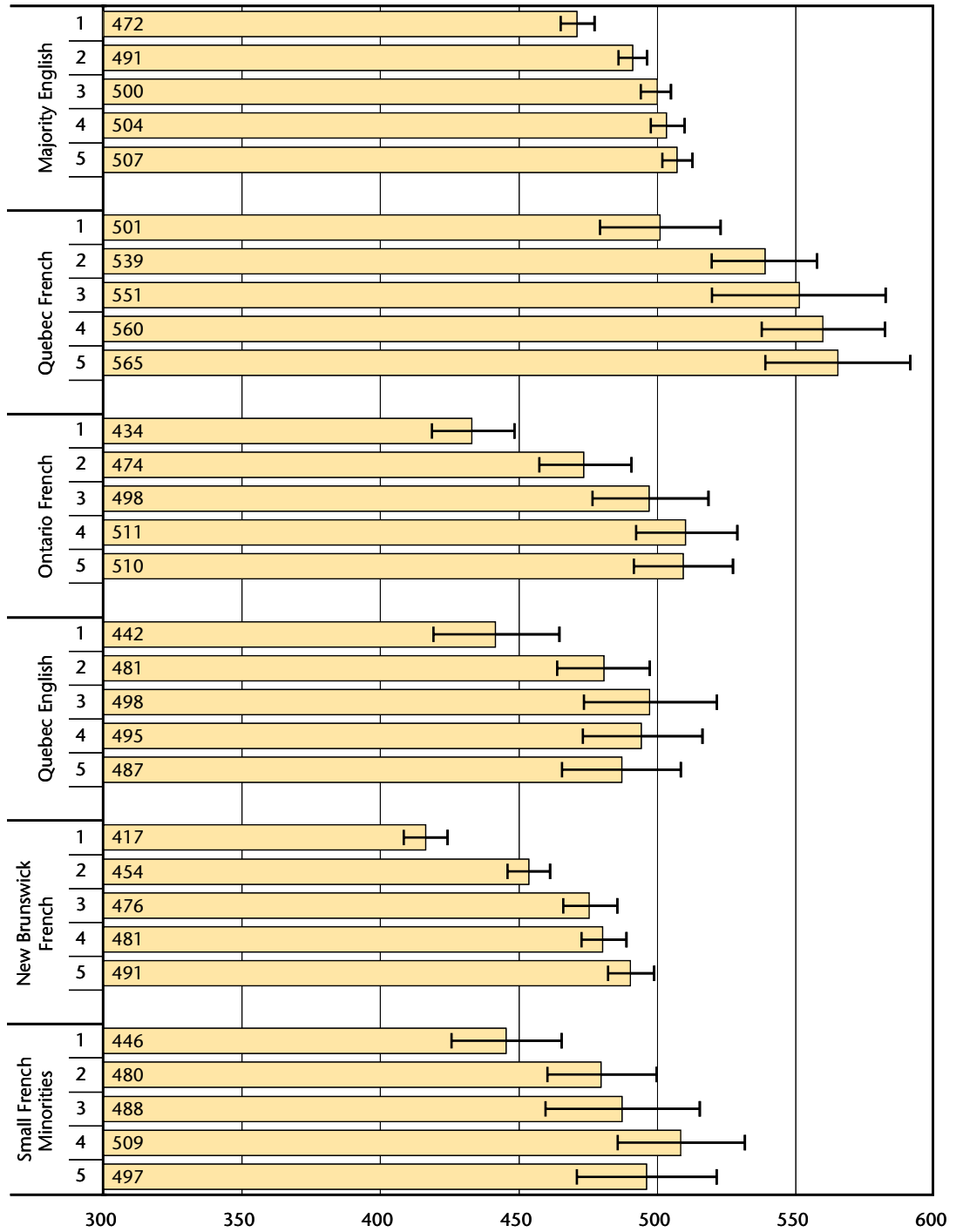
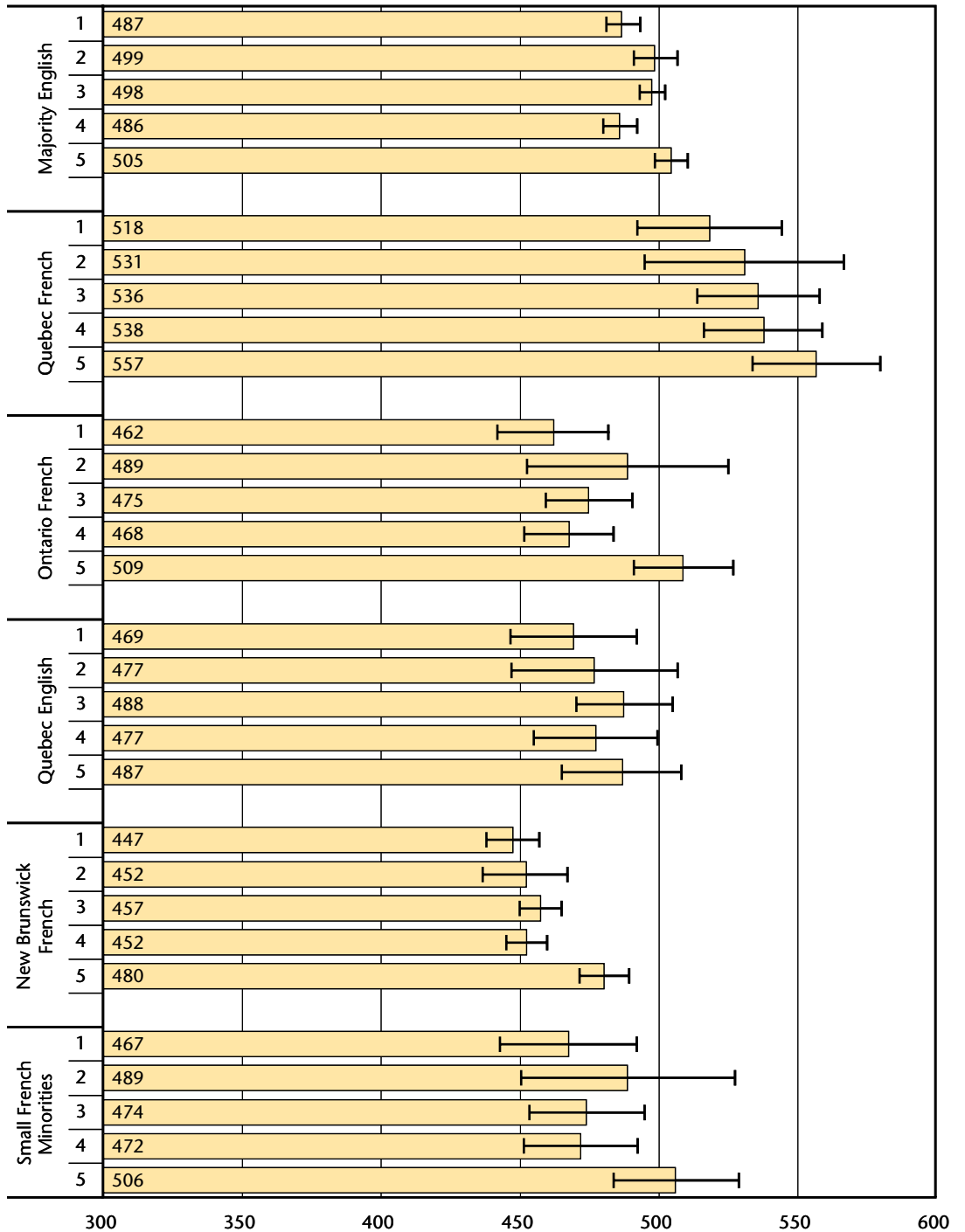


Chart 4-4 shows the relationship between the students' sense of belonging in the school and mean reading scores. Although the relationship is positive, most differences between quintiles are not statistically significant. Differences between the top (5th) and bottom (1st) quintiles are statistically significant, except for the Quebec French and Quebec English groups, and the Small French Minorities.

CHART 4-4 Mean reading scores for sense of belonging to school quintiles by language group

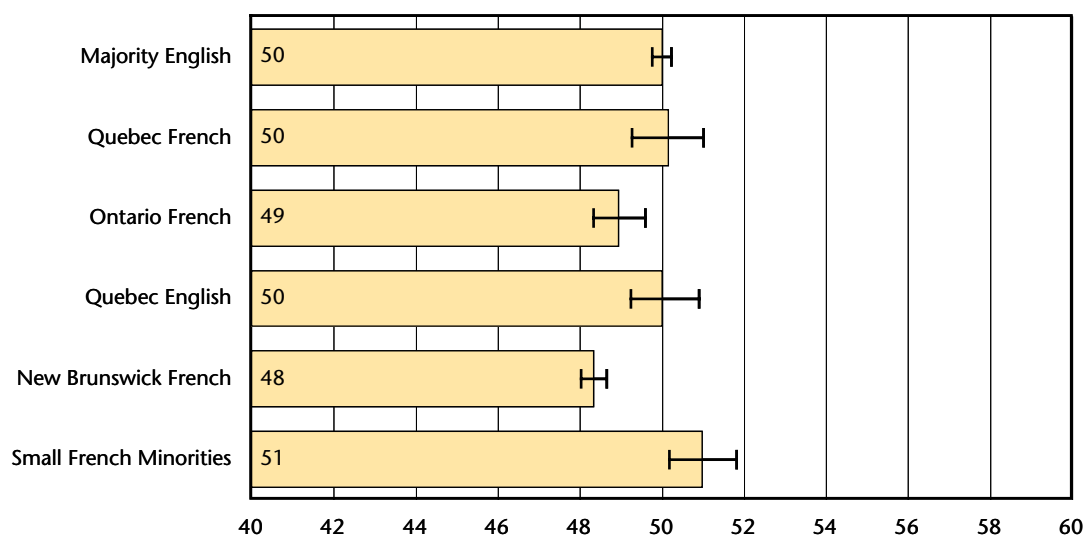


Attitudes toward reading

Students responded to thirteen questions pertaining to their attitudes toward reading. A factor analysis identified three factors, one measuring reading enjoyment, one grouping items related to self-confidence in reading, and the last, a residual factor not readily identifiable but related to “reading for information.” Factors were labelled “enjoyment of reading,” “good reader,” and “reading for information.”

Charts 4-5, 4-6, and 4-7 present the mean factor scores for each language group. The differences in enjoyment of reading between groups (Chart 4-5) tend to be small (no group is more than two-tenths of a standard deviation from the mean). The New Brunswick French group has the lowest mean factor score (48) which is statistically lower than the mean factor score of all language groups except the Ontario French group.

CHART 4-5 Mean factor scores for enjoyment of reading by language group



Mean factor scores for the “good reader” factor are presented in Chart 4-6. The New Brunswick French group again has the lowest mean factor score (48) which is statistically lower than the mean factor score of all language groups except the Quebec French group. The latter has a mean factor score that is statistically different from the Majority English group, but differences with the other language groups are not statistically significant.

CHART 4-6 Mean factor scores for good reader by language group

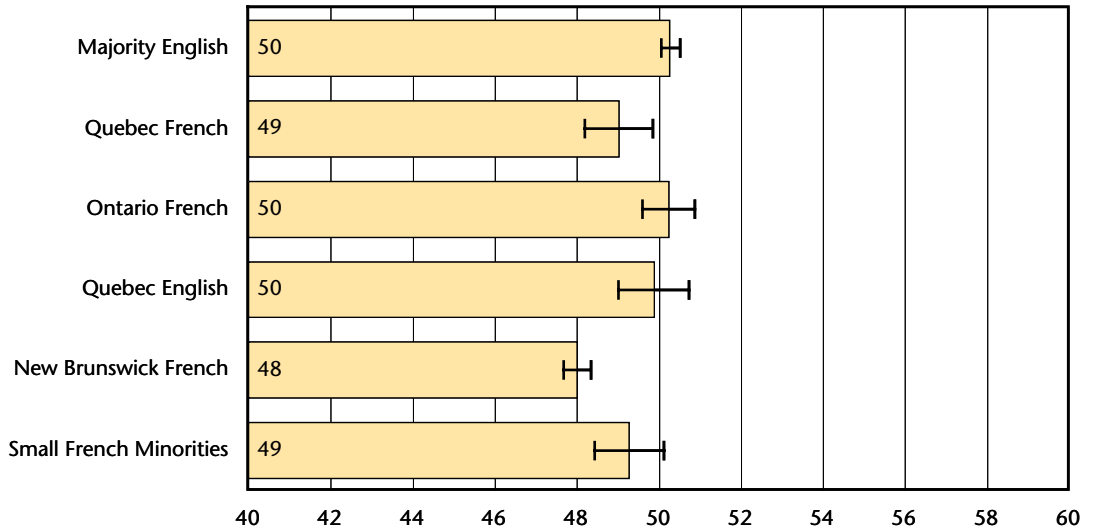
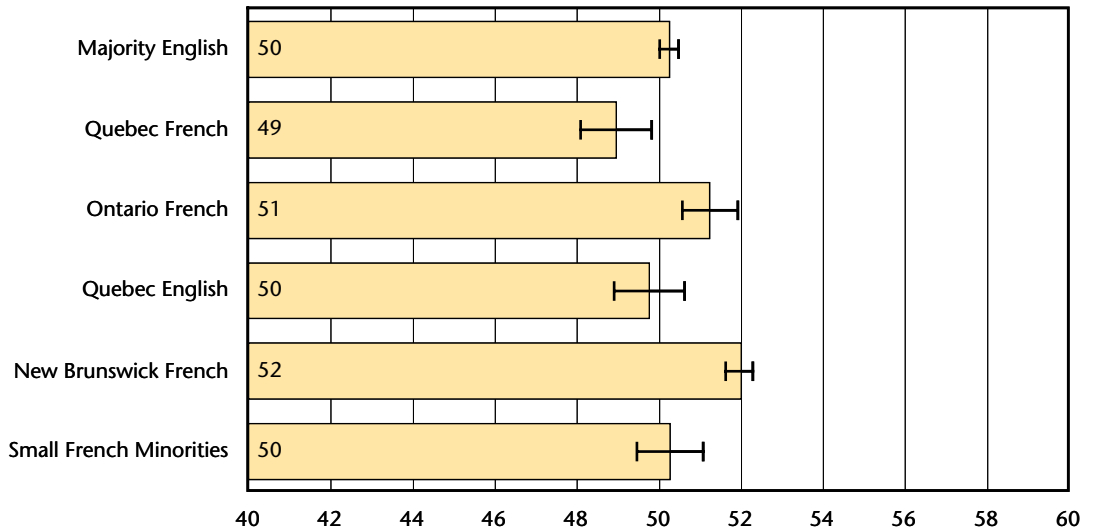


Chart 4-7 shows mean factor scores for the “reading for information” variable. New Brunswick French has the highest score (52), differences with the other groups being statistically significant except with the Ontario French group. Quebec French has the lowest mean factor score (49), the latter being statistically different from the mean factor scores of the Majority English, Ontario French, and New Brunswick French groups.

CHART 4-7 Mean factor scores for reading for information by language group



Charts 4-8 to 4-10 show the relationship between the three attitudes toward reading factors and mean reading scores. Very strong linear relationships are observed for “enjoyment of reading” and the “good reader” factors for all language groups. The “reading for information” factor, however, is not strongly nor consistently related to mean reading scores. Quintiles tend not to differ from each other. The top (5th) quintile differs from the other quintiles in the Majority English group.

CHART 4-8 Mean reading scores for enjoyment of reading quintiles by language group

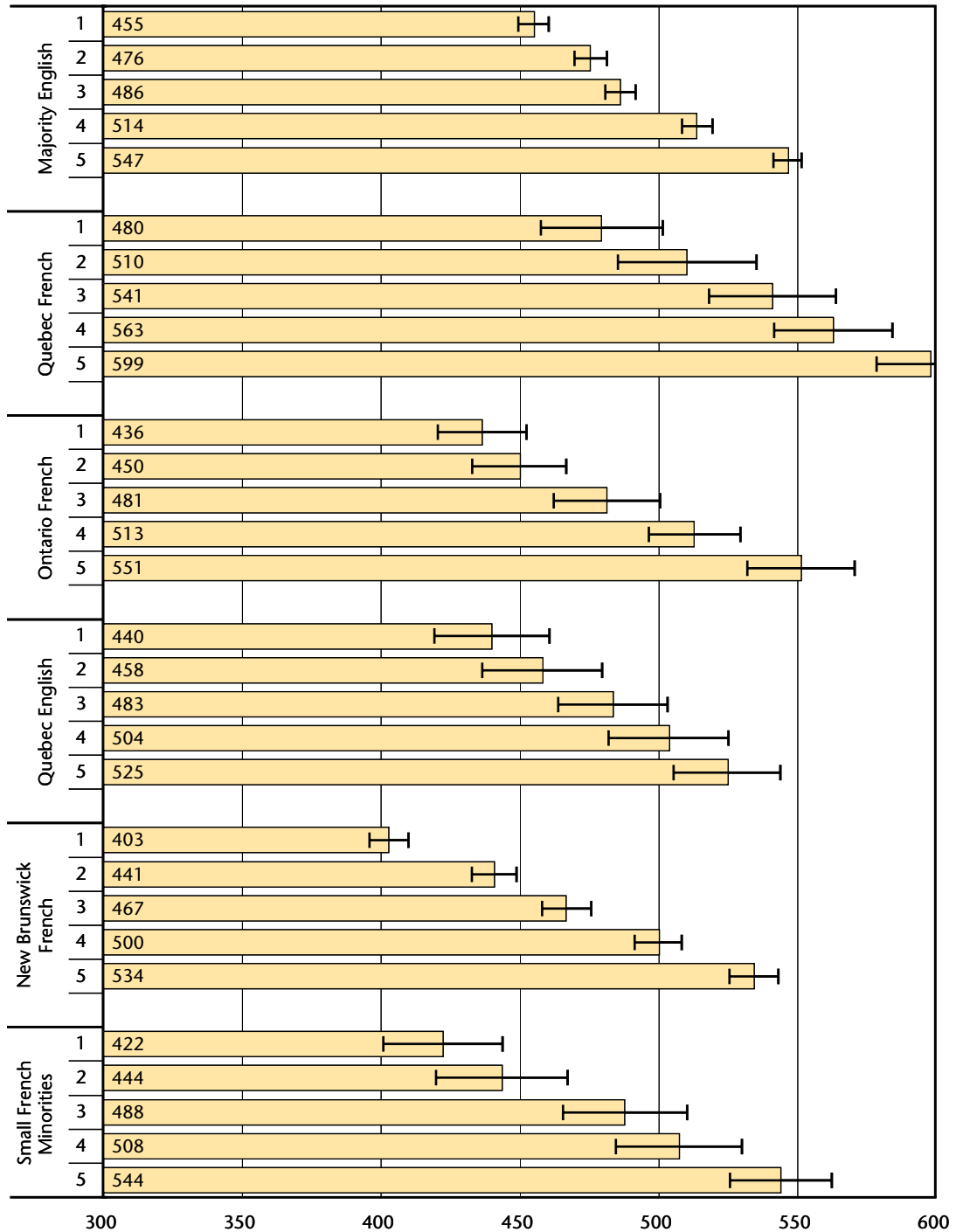


CHART 4-9 Mean reading scores for good reader quintiles by language group

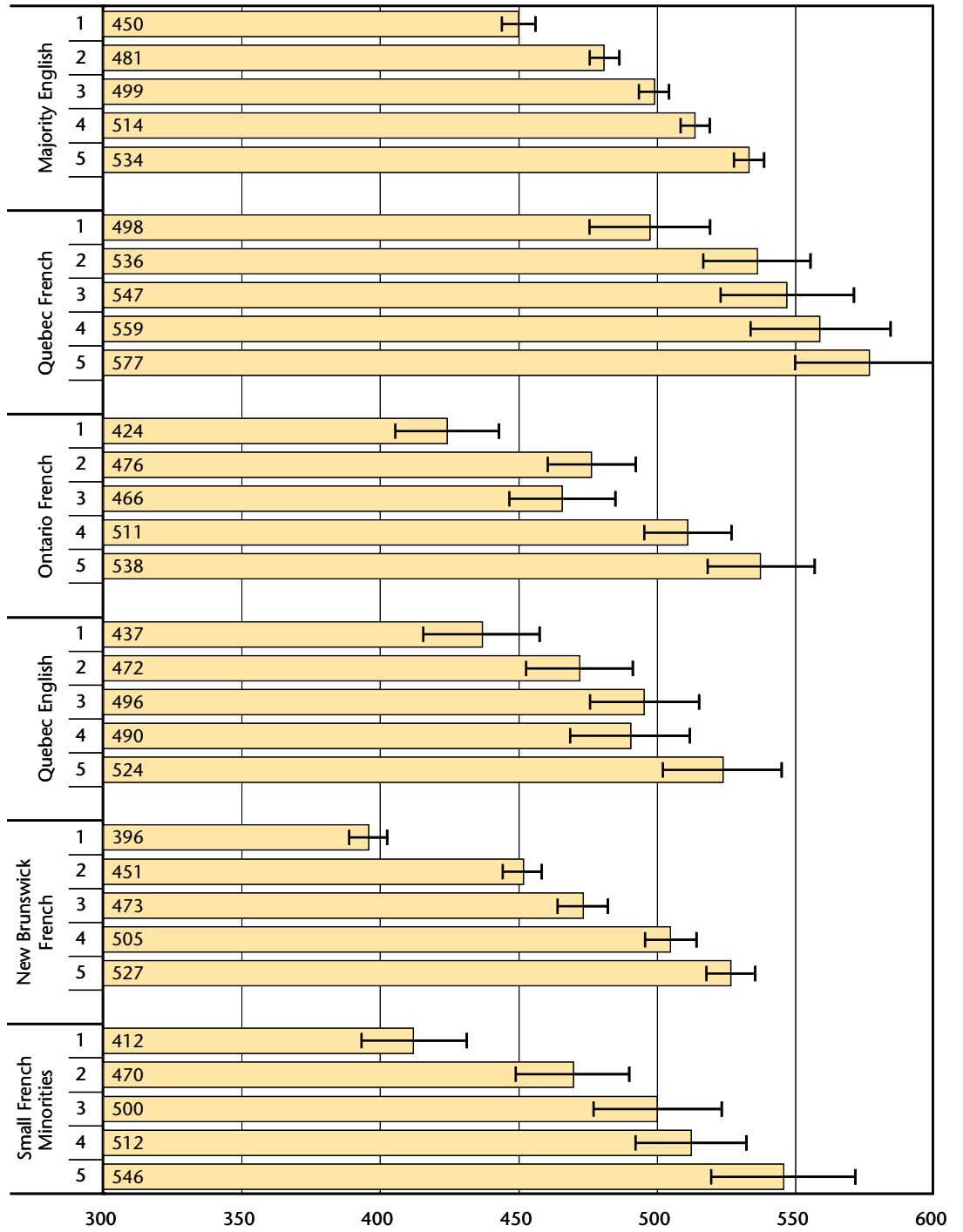
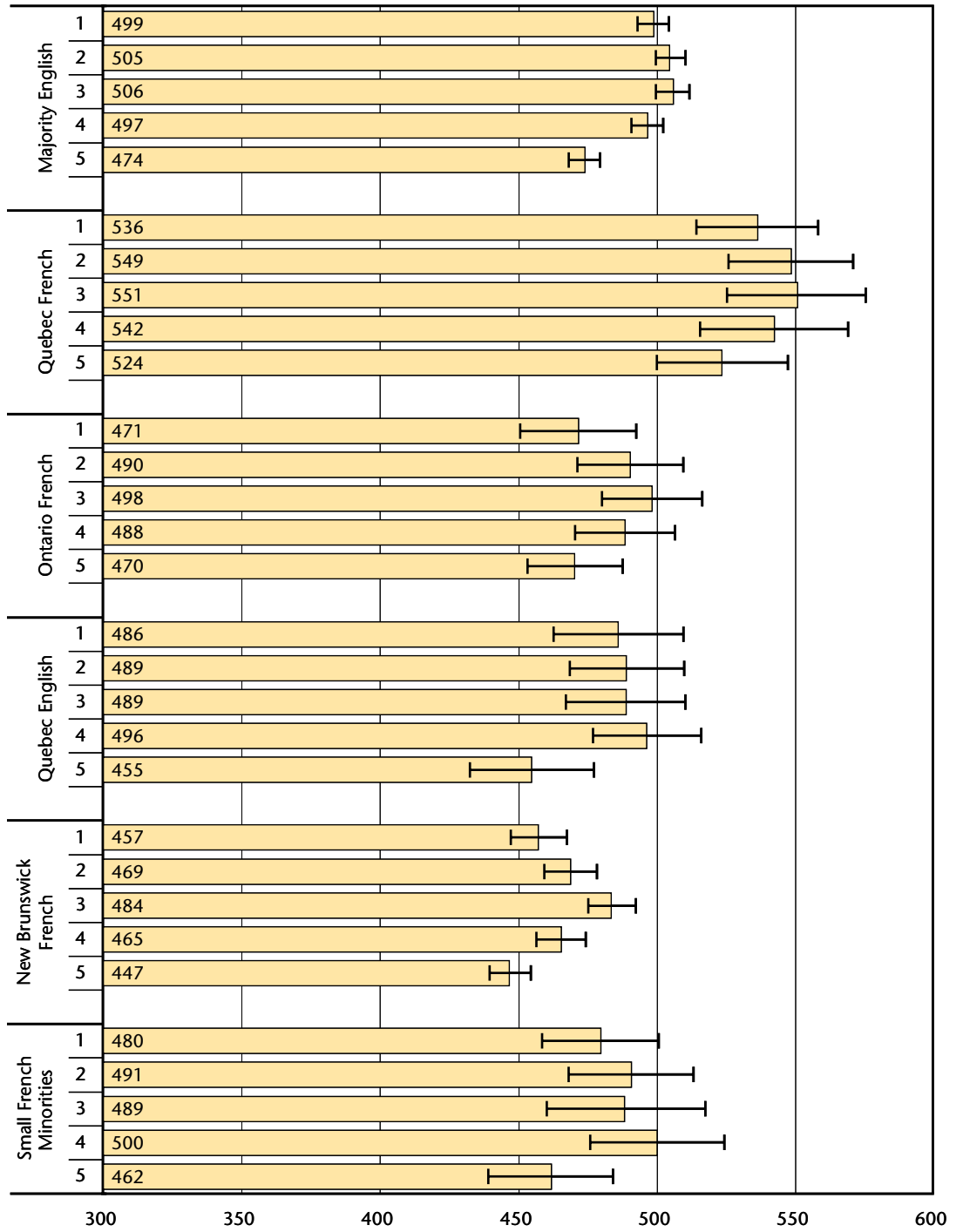


CHART 4-10 Mean reading scores for reading for information quintiles by language group



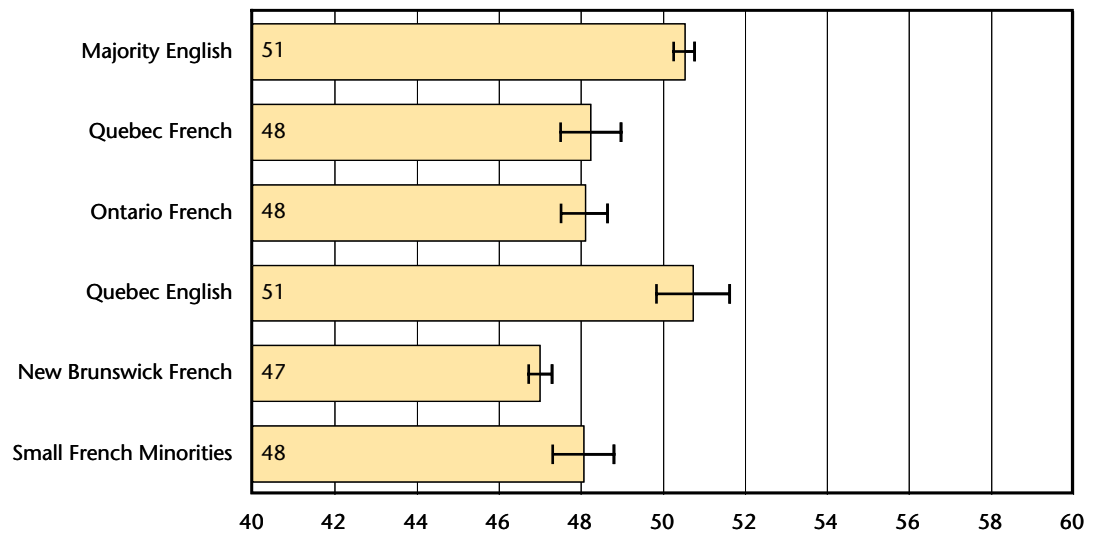
Attributions of success and failure

Twelve questions asked students to assess their agreement or disagreement with statements pertaining to their attributions of success and failure in reading. A factor analysis yielded four factors. These were labelled “external attributions of failure” (e.g., because of poor teaching), “external attributions of success” (e.g., because of good teaching, encouragement from parents/guardians), “fatalism” (e.g., do poorly because of bad luck or because they do not have enough natural ability, or they do well because of good luck), and “internal attributions of success and failure to ability and work” (e.g., do well because they work especially hard or because of natural ability).

Mean factor scores are presented in Charts 4-11 to 4-14. The relationship of these factors to reading achievement is shown in the next group of charts (4-15 to 4-18).

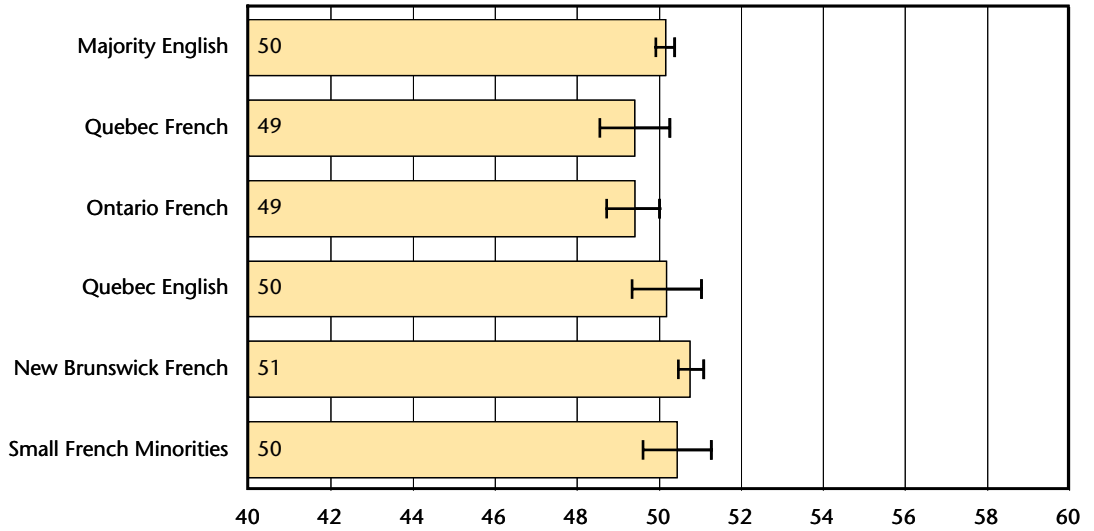
Factor scores for “external attribution of failure” range from 47 to 51 (Chart 4-11). The New Brunswick French students have the lowest mean factor score, and the differences with all the other language groups are statistically significant. The Majority English and the Quebec English groups have the highest mean factor scores. In general, the students in the French groups tend to attribute their failure in reading less to external factors than do the students in the two English groups.

CHART 4-11 Mean factor scores for external attributions of failure by language group



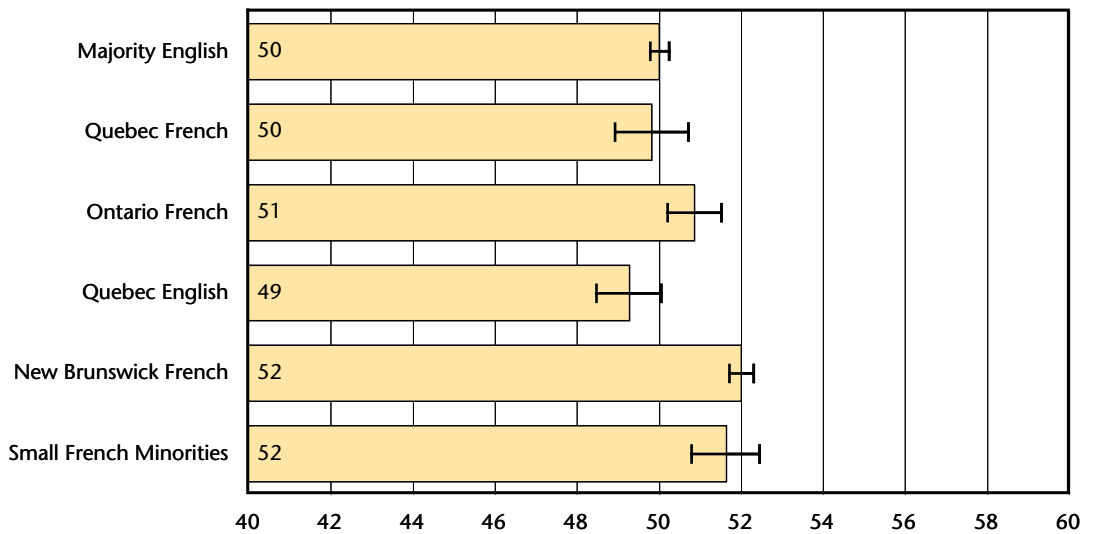
Mean factor scores for “external attributions of success” vary little across language groups, ranging from 49 to 51 (Chart 4-12). The only statistical significance is between New Brunswick French group whose score is higher than that of the Majority English group, the Quebec French group, and the Ontario French group.

CHART 4-12 Mean factor scores for external attributions of success by language group



Scores on the “fatalism” factor range from a low of 49 for the Quebec English group to a high of 52 for the New Brunswick French and the Small French Minorities groups (Chart 4-13). These differences are statistically significant. Since the second highest score (51) is that of the Ontario French group, there is a tendency for the minority-language francophone groups to have higher scores on this factor.

CHART 4-13 Mean factor scores for fatalism by language group



Finally, the mean factor scores for “internal attributions of success and failure to ability and work” (Chart 4-14) are those that vary the most across groups, ranging from 46 to 53, a difference of 0.7 standard deviation. All French groups have lower mean factor scores than the two English groups. The Quebec French group is the one that associates less failure and success to internal attributes, such as ability and hard work, and the Quebec English group is the one that does so the most. It is not known if these language differences are related to cultural factors or to different pedagogical approaches.

CHART 4-14 Mean factor scores for internal attributions of success and failure to ability and work by language group

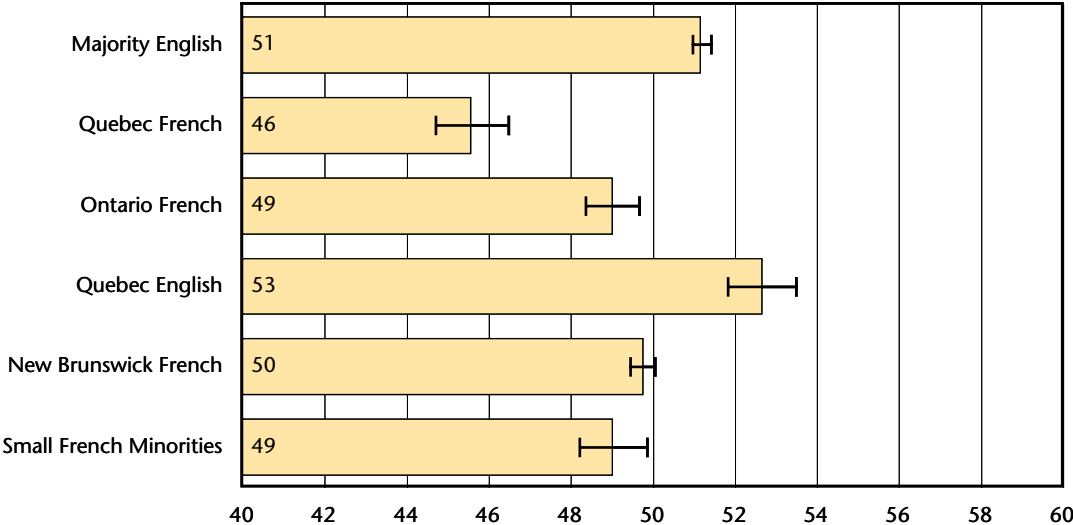


Chart 4-15 shows the relationship between “external attributions of failure” and mean reading scores. Differences between quintiles do not show a clear pattern across language groups and tend not to be statistically significant. Similar observations can be made for the relationship between mean reading scores and “external attributions of success” (Chart 4-16).

CHART 4-15 Mean reading scores for external attributions of failure quintiles by language group

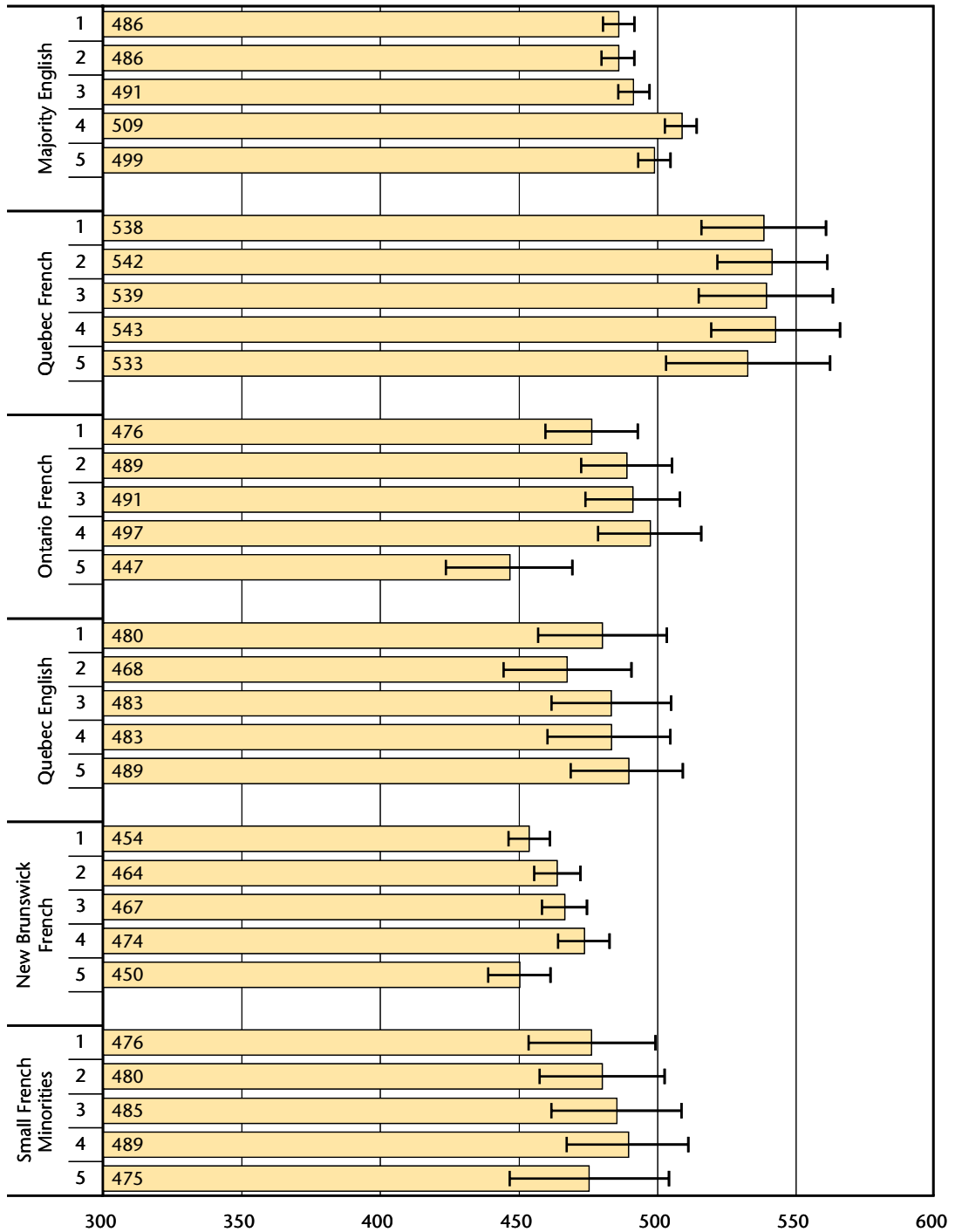
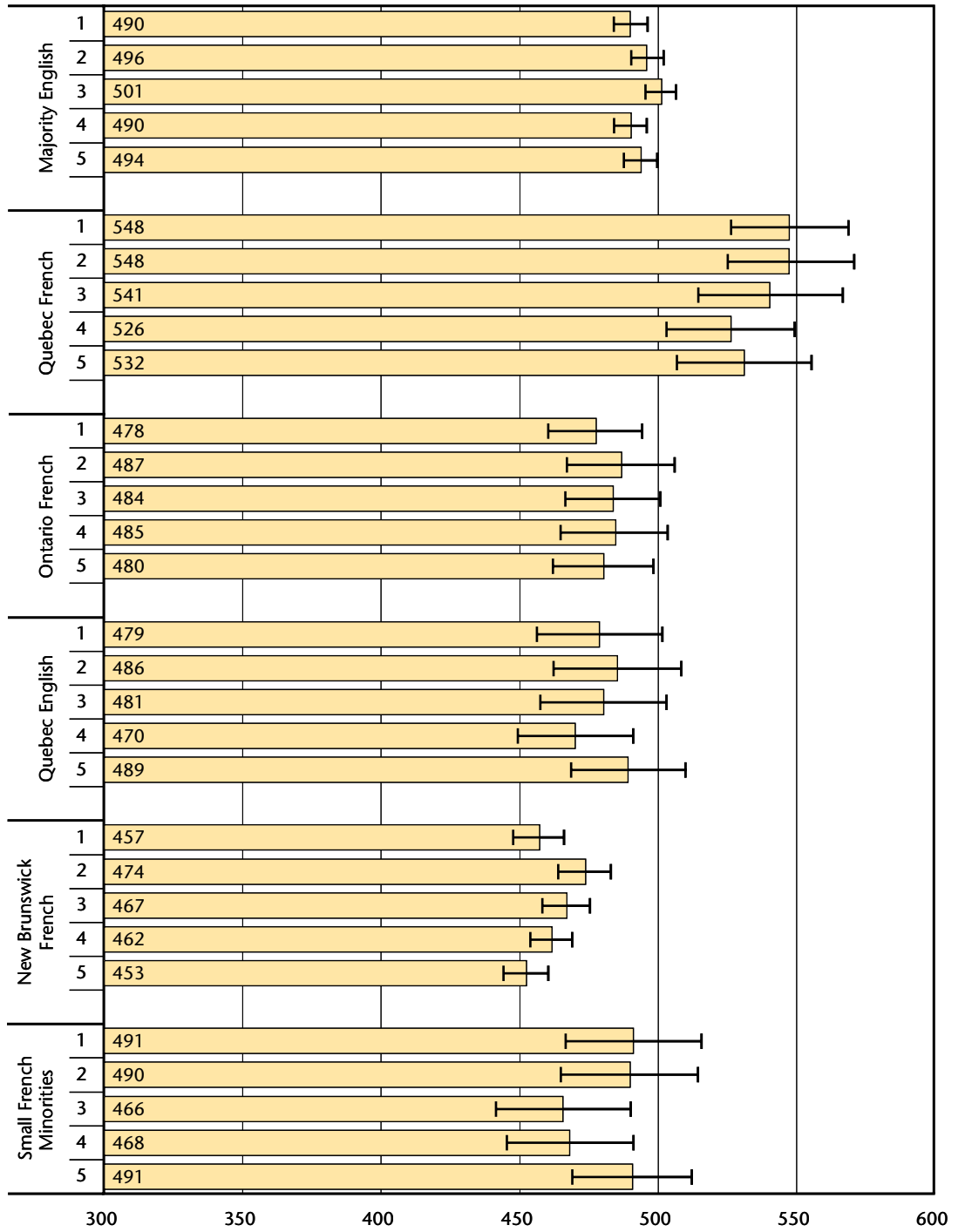
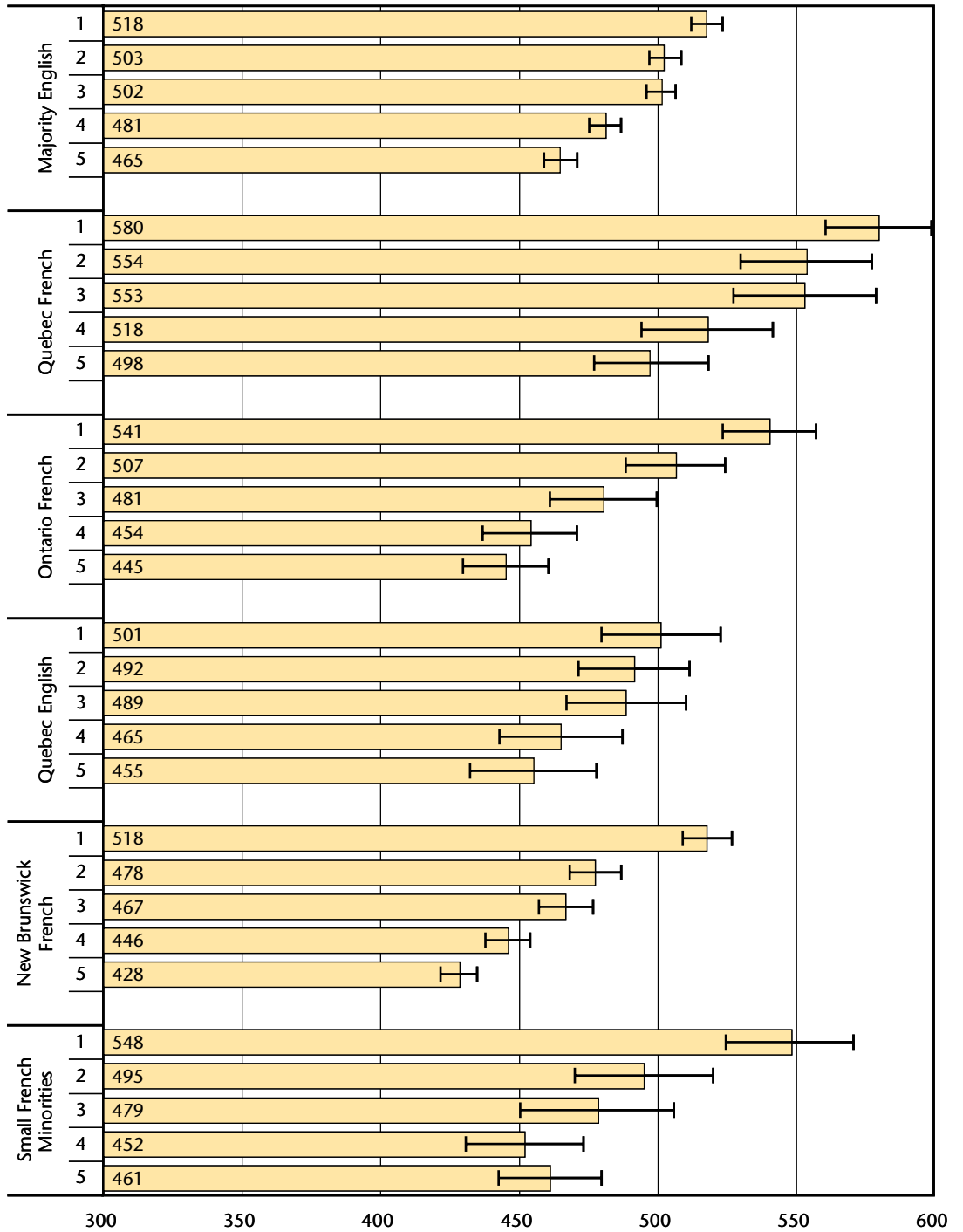


CHART 4-16 Mean reading scores for external attributions of success quintiles by language group



“Fatalism” shows a strong linear and negative relationship to mean reading scores (Chart 4-17). The more the students attribute their success to good luck and their failure to bad luck and lack of natural ability, the lower their mean reading scores. Differences between top (5th) and bottom (1st) quintiles are strong, ranging from 0.46 to 0.96 standard deviation. For the Small French Minorities group, the lowest score is associated with the 4th quintile, but it is not statistically different from the top (5th) quintile. Top (5th) to bottom (1st) quintile differences are much lower for the Majority English and the Quebec English groups (0.53 and 0.46 standard deviation, respectively) than for the other groups. The difference is 0.82 standard deviation of the Quebec French group and varies from 0.87 to 0.96 for the minority French groups. As mentioned above, scores on the “fatalism” factor tended to be the highest among the minority francophone groups, but it is also for these groups that the factor is the most strongly related to reading achievement. It is interesting to note that the less “fatalistic” students among these groups all have mean reading scores that are considerably above the Canadian mean (ranging from 518 to 548), mean reading scores that are equal or higher to that of the same quintile in the Majority English group (518) and higher than the same quintile of the Quebec English group (501). Only the Quebec French group has a higher score (580) in the bottom (1st) quintile of the “fatalism” factor.

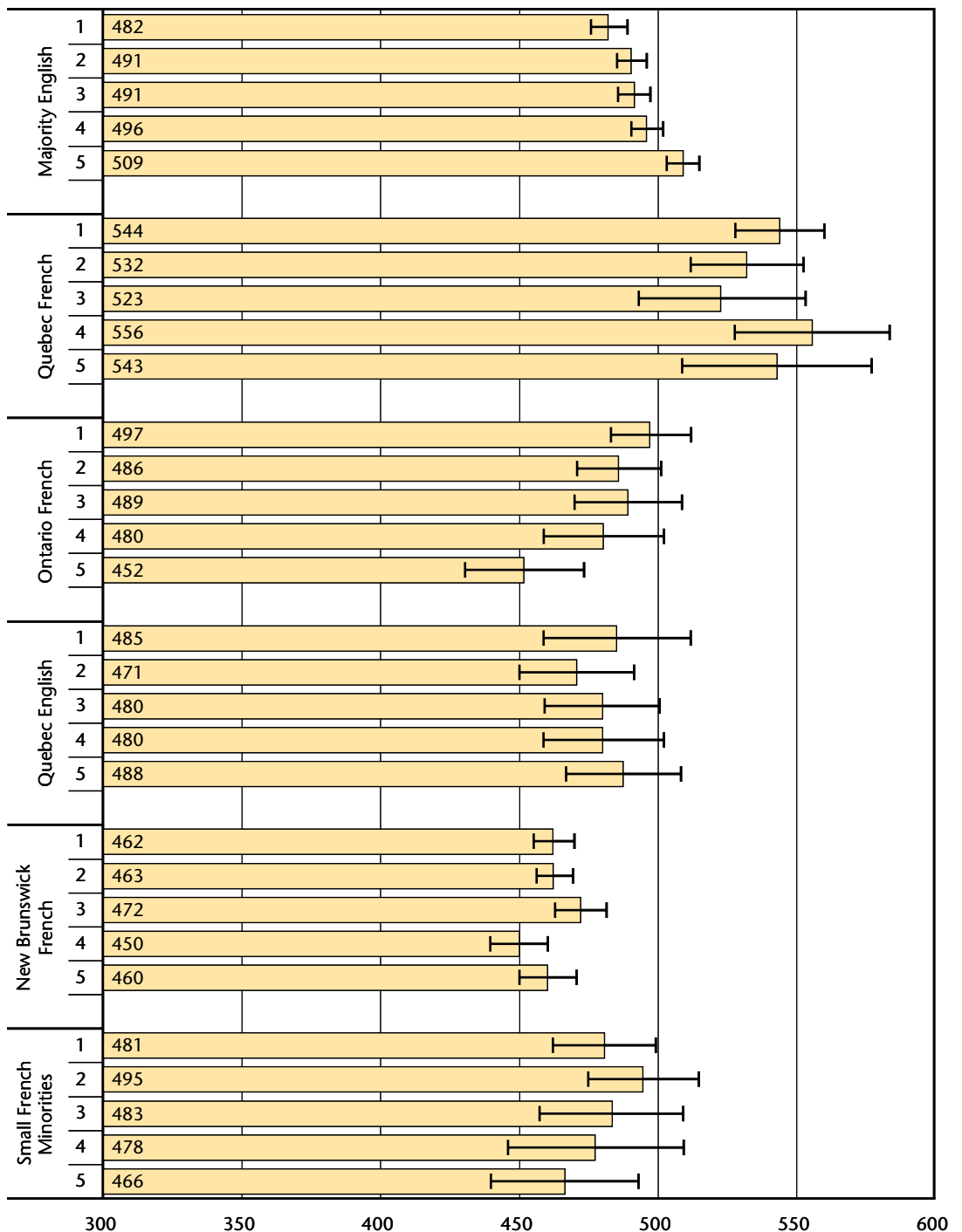
CHART 4-17 Mean reading scores for fatalism quintiles by language group



The relationship of “internal attributions of success and failure” to mean reading scores is shown in Chart 4-18. Patterns are not consistent across groups. For the Majority English group, the relationship is positive and linear but modest, a difference between the bottom (1st) and the top (5th) quintiles of 0.27 standard deviation. For the Quebec French group, there is a tendency for both high and low scores on this factor to be associated with higher mean reading scores, but differences between quintiles are not

statistically significant. For the Ontario French group, the relationship is opposite that for the Majority English group (being linear, negative, and relatively strong). The difference between the bottom (1st) quintile (mean reading score of 497) and the top (5th) quintile (mean reading score of 452) is 0.55 standard deviation and statistically significant. For the other three groups, differences between quintiles are not statistically significant and no consistent patterns emerge.

CHART 4-18 Mean reading scores for internal attributions of success and failure quintiles by language group



Aside from their socioeconomic characteristics and their attitudes and motivations, students also bring learned strategies and behaviours to the reading task. These may also impact their reading performance. Students were asked specific questions pertaining to their reading behaviours and strategies and the out-of-school activities that might compete with time spent on reading. Students were also asked to recall when and how they first learned to read and how much others helped them learn to read.

Reading strategies

Fifteen questions were developed to capture the frequency of use of reading strategies. They were answered on a three-point scale (rarely or never, sometimes, often). A factor analysis yielded four factors.

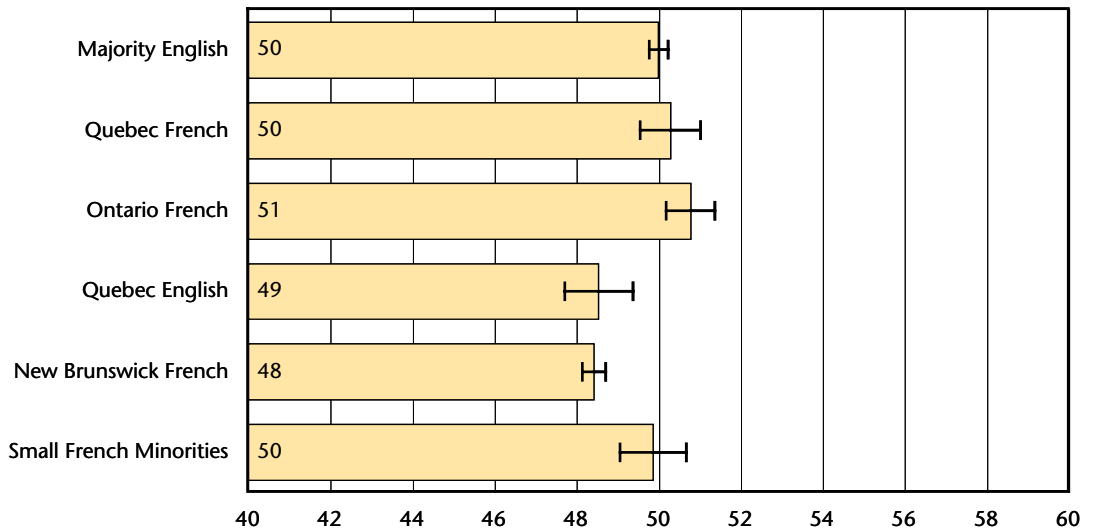
- The first factor grouped together the strategies that help students find meaning in the text read (e.g., “trying to make connections to what I already know,” “thinking about the author’s message”). The factor was labelled “reading for meaning.”
- The second factor, labelled “decoding,” relates to the following strategies: “reading out loud to myself,” “sounding out as many words as I can,” and “asking someone to help me.” The decoding factor, therefore, seems to focus on strategies used to decode difficult words or sentences. These may be used more frequently by readers who are in difficulty.
- The third factor puts together items that identify a variety of “reading routines” such as “thinking about the other words in a sentence to figure out the meaning,” “finding a quiet place to read,” and “re-reading the more difficult parts.”
- The fourth factor was labelled “external sources.” Items that load on this factor all relate to the use of external supports such as “looking at charts and pictures” and “using an outside source like a dictionary.”

The strategy “asking someone to help me” correlated negatively with this factor, suggesting that the use of “external sources” such as dictionaries is a strategy mostly used by students who feel autonomous or who do not want to “ask someone to help me.” On the other hand, this same strategy was correlated positively with the factor “reading routines.” This could suggest that the reading routines grouped under that factor might be indicative of strategies used by students who may need help but who persist in trying to find meaning in what they read by “thinking about the other words in a sentence” or “re-reading the more difficult parts.” Another label for “reading routines” could be “active processing to find meaning.”

Charts 5-1 to 5-4 show the mean factor scores for these four categories of reading behaviours. As already mentioned, these scores have a mean of 50 and a standard deviation of 10.

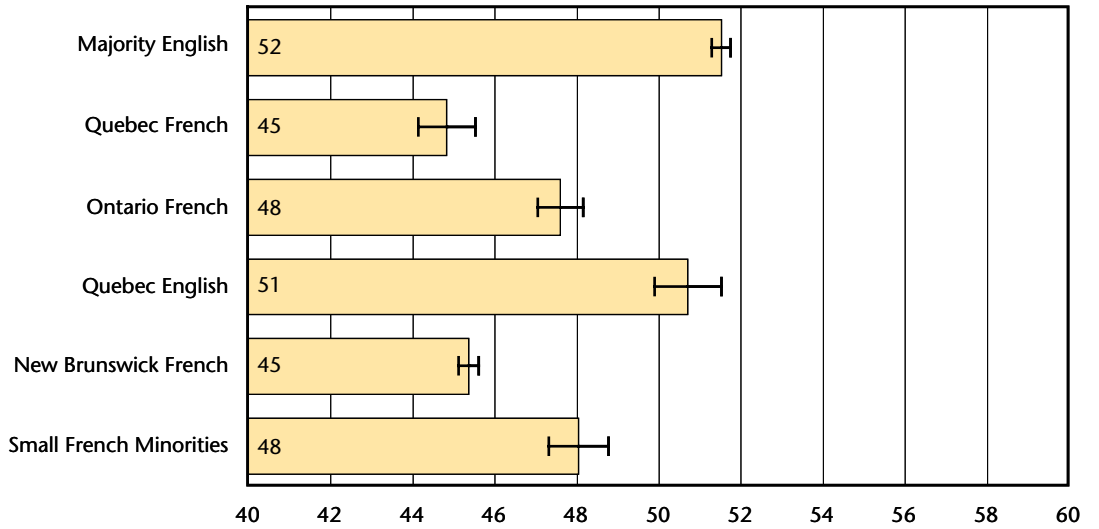
Chart 5-1 shows that mean scores of the six language groups vary from 48 to 51 for the factor “reading for meaning.” The New Brunswick French and the Quebec English groups have the lowest scores.

CHART 5-1 Mean factor scores for reading for meaning by language group



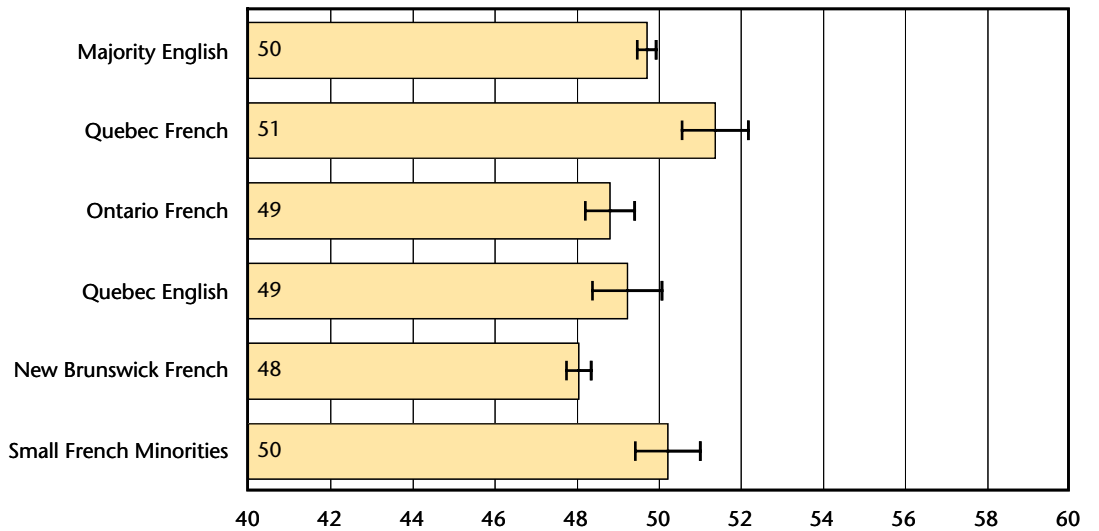
Groups vary much more on the mean factor scores for reading by decoding. Mean scores vary from 45 to 52, a 0.7 standard deviation difference (Chart 5-2). Quebec French and New Brunswick French students have the lowest scores (45). The Majority English and the Quebec English students have the highest mean scores (52 and 51, respectively). The other minority francophone groups, Ontario French and Small French Minorities, each have an intermediate score of 48. Differences between these three groupings (high, intermediate, low) are all statistically significant. It is interesting to note that the two groups that have the least contact with English — francophones in Quebec and New Brunswick — have the lowest scores on reading by decoding, followed by francophones who live in predominantly English-speaking provinces, then by anglophones who have the highest mean score on this factor.

CHART 5-2 Mean factor scores for reading by decoding by language group



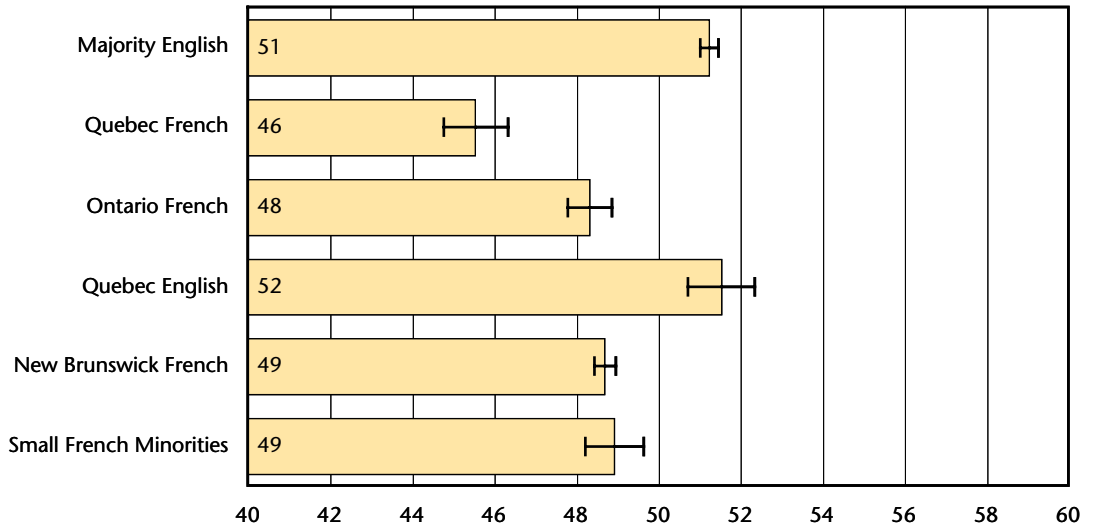
Mean factor scores for “reading routines” are shown in Chart 5-3. These vary among language groups only modestly, from a low of 48 to a high of 51. Quebec French has the highest mean score, and three minority language groups have the lowest scores — New Brunswick French, Ontario French, and Quebec English.

CHART 5-3 Mean factor scores for reading routines by language group



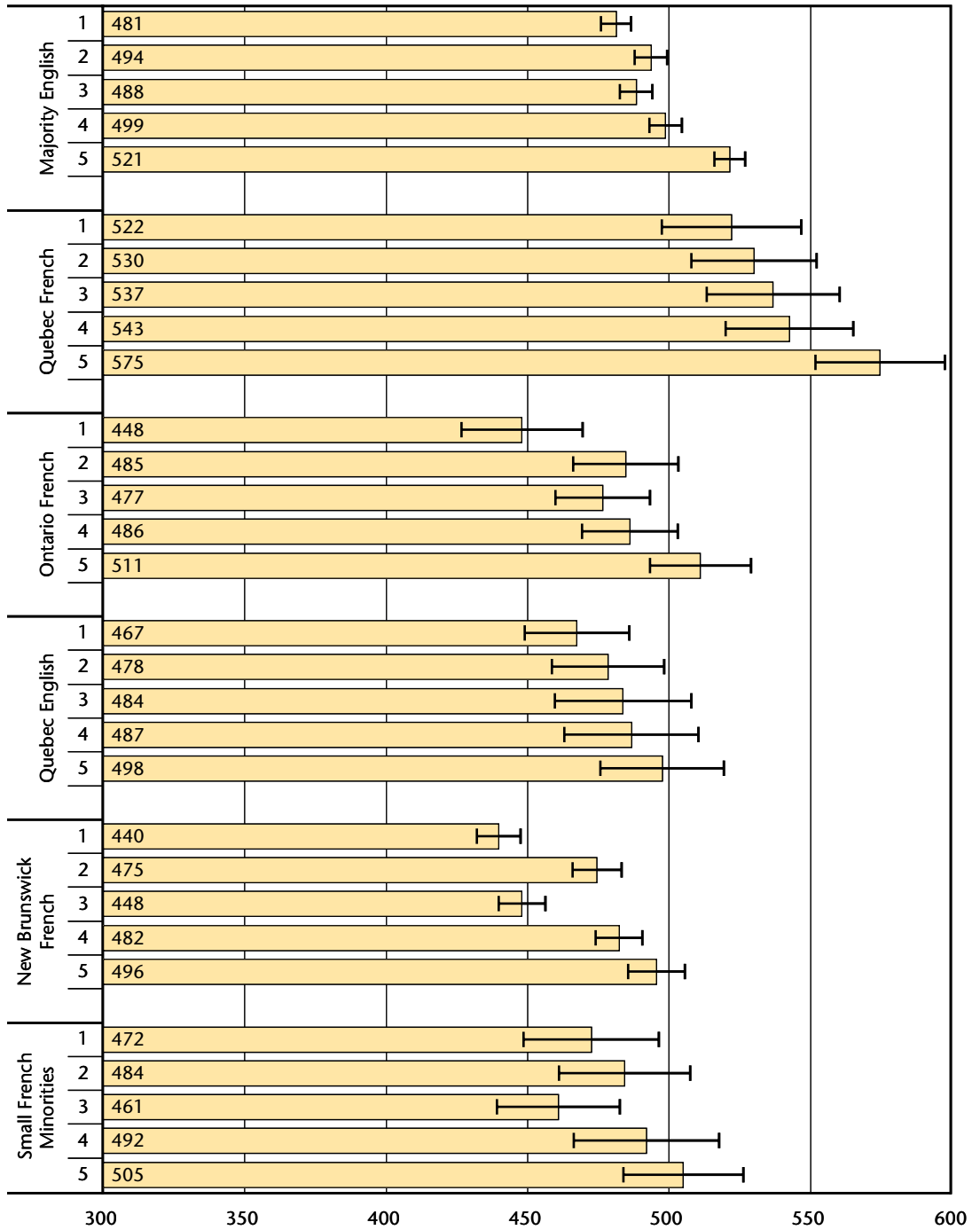
Mean factor scores for “use of external reading sources” are shown in Chart 5-4. These vary from a low of 46 for the Quebec French group to a high of 52 for the Quebec English group. The anglophone students — Quebec English and Majority English — have the highest scores. These scores seem to be related to language, as was the case for decoding. The lowest mean score is found in the Quebec French group.

CHART 5-4 Mean factor scores for use of external reading sources by language group



The relationship between the four reading strategies factors and reading achievement is shown in charts 5-5 to 5-8. The first factor, reading for meaning, is positively related to mean reading scores for all language groups (Chart 5-5). Although quintiles are not all statistically different from each other, there is a general linear and positive trend, that is, scores tend to increase in the same direction (linearly) and the relation is positive (an increase in the mean factor score is related to an increase in the mean reading score). Differences between bottom and top quintiles vary from 0.31 to 0.63 standard deviation.

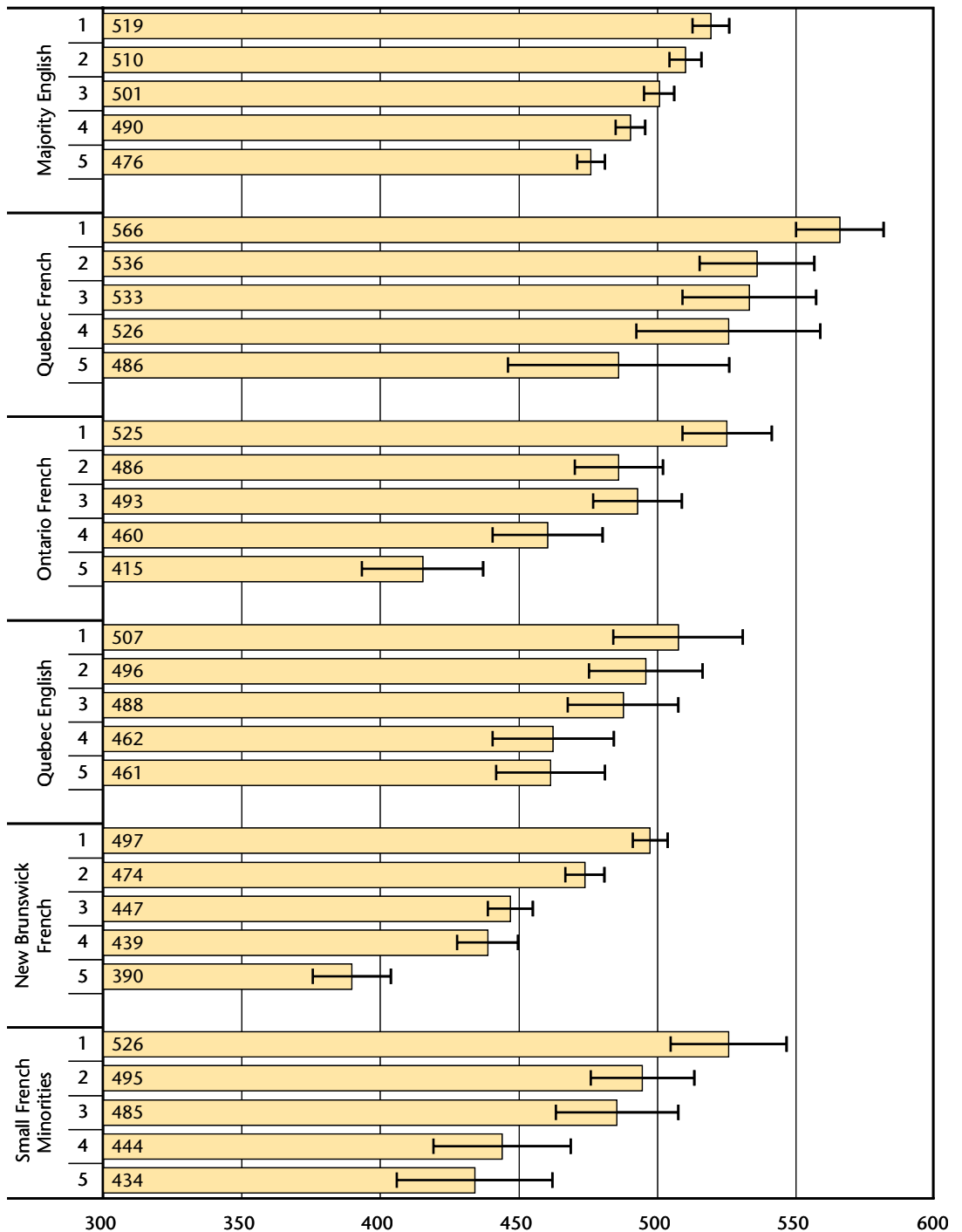
CHART 5-5 Mean reading scores for reading for meaning quintiles by language group



Reading by decoding, on the other hand, is negatively related to mean reading scores in all language groups, that is, an increase in the mean factor score is related to a decrease in mean reading score (Chart 5-6). The relationship is linear and negative even though not all quintiles differ from each other. Differences between bottom and top quintile groups are considerably less for the anglophone groups (0.43 and 0.46 standard deviation for Majority English and Quebec English, respectively) than for the francophone groups (0.80, 1.10, 1.07, and 0.92 standard deviation for Quebec French, Ontario French,

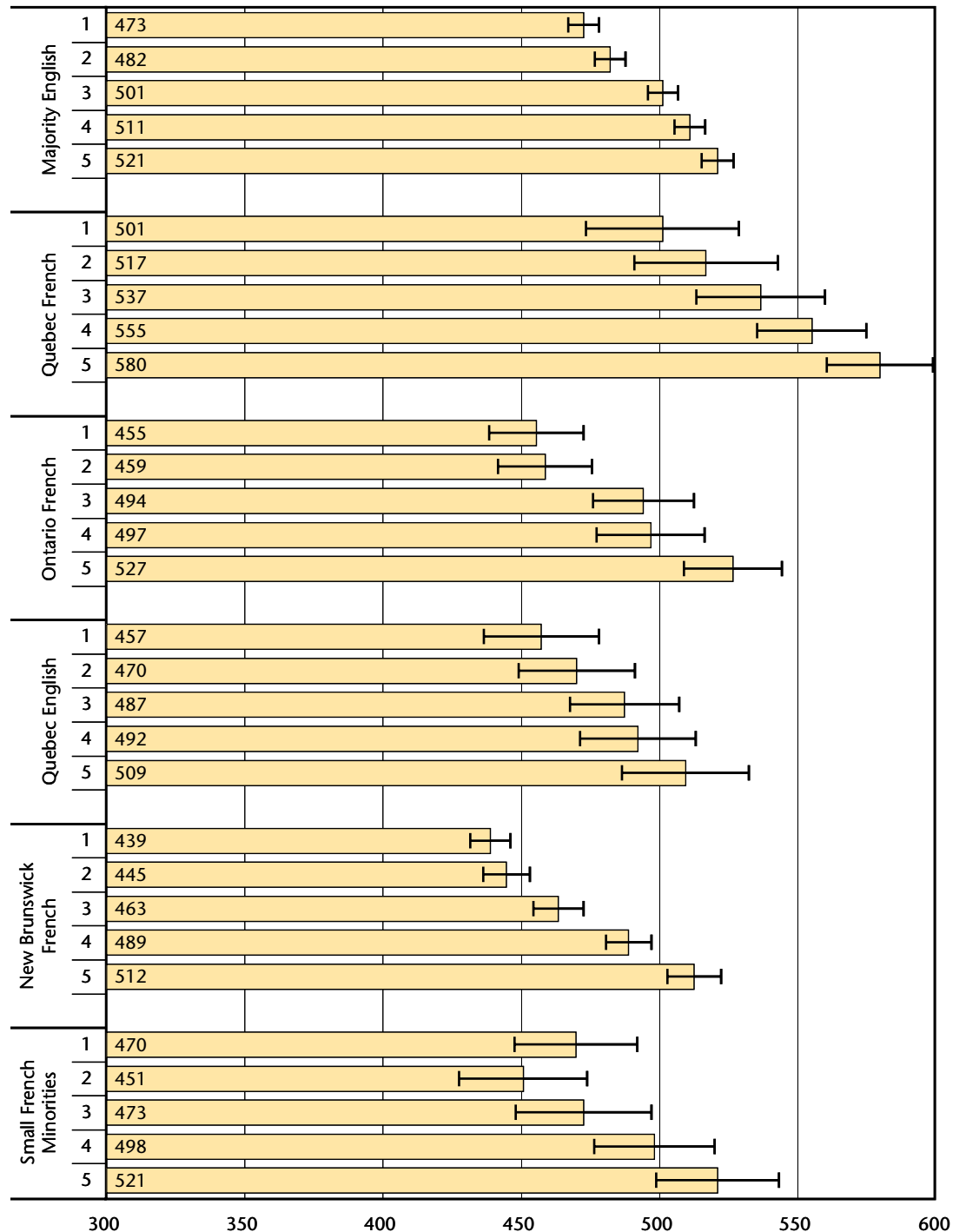
New Brunswick French, and Small French Minorities, respectively). Therefore, even though decoding is a behaviour more often present in the English jurisdictions (see Chart 5-2), it is not as much negatively related to mean reading scores in these groups as it is in the four French jurisdictions. This may indicate that reading strategies such as “reading out loud” or “sounding out words” may be a more “natural” approach to reading in English than in French or that different pedagogical approaches are used in teaching French and English.

CHART 5-6 Mean reading scores for reading by decoding quintiles by language group



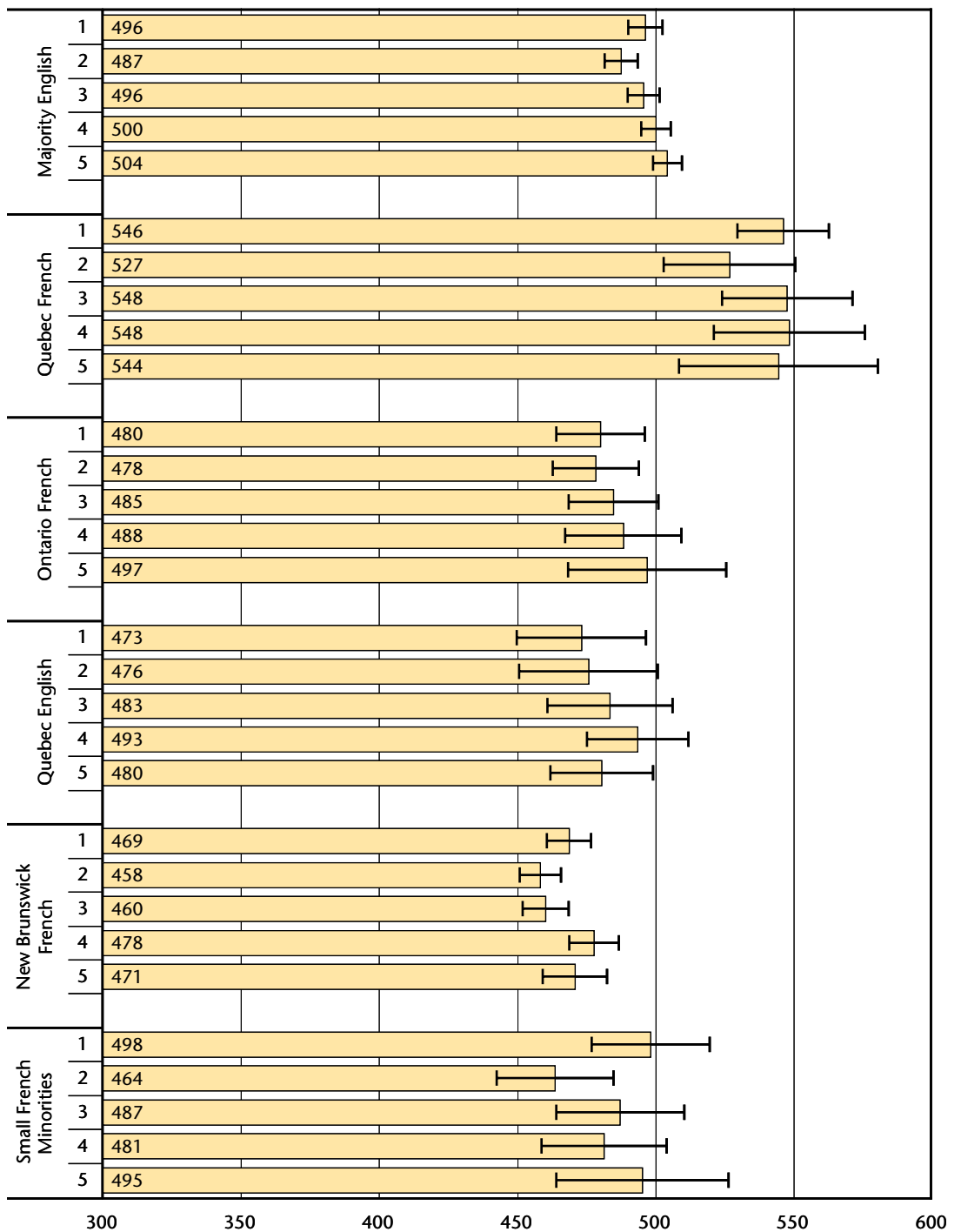
Reading routines, as shown in Chart 5-7, are positively related to mean reading scores. The relationship tends to be linear and positive. Again, there is a tendency for the differences between the bottom and top quintiles to be smaller in the English-speaking jurisdictions (0.48 and 0.52 standard deviation for the Majority English and Quebec English groups, respectively) than in the French jurisdictions with the exception of the Small French Minorities group, where the difference is 0.51 standard deviation between the bottom and top quintiles (however, this difference is 0.7 if the second quintile is used, the relationship not being completely linear for this group). For the other French groups, differences are 0.79, 0.72 and 0.73 for Quebec, Ontario, and New Brunswick, respectively.

CHART 5-7 Mean reading scores for reading routines quintiles by language group



Finally, as shown in Chart 5-8, in all language groups, the use of external reading sources is not related to mean reading scores.

CHART 5-8 Mean reading scores for use of external reading sources quintiles by language group



Out-of-school reading activities

A set of nine items measured time spent on a variety of out-of-school activities. Answers were given on a 6-point scale ranging from no time spent to more than 6 hours per week. A factor analysis on these 9 items yielded a 3-factor solution. The first factor, labelled “out-of-class reading,” grouped three items: out-of-class reading for courses, reading for enjoyment, and using a computer for school purposes, an activity that certainly involves reading. The second factor, labelled “entertainment,” also grouped three questions: watching television or movies, playing computer/video games, and using a computer for personal reasons. The last factor was labelled “academic and cultural activities” and it groups three questions: sports or other school/community activities, extra schooling lessons or going to tutors, and taking other lessons (e.g. music, swimming). Mean factor scores for the six language groups are presented in Charts 5-9 to 5-11.

The New Brunswick French group is different from all other groups on the out-of-school reading activities factor (Chart 5-9). Its mean (47) is 0.30 standard deviation below the Canadian mean. All other groups have mean scores that are equal to this mean or slightly above. It is not known, however, in what proportion these reading activities were done in French or in English, especially for the minority francophone groups.

CHART 5-9 Mean factor scores for out-of-school reading activities by language group

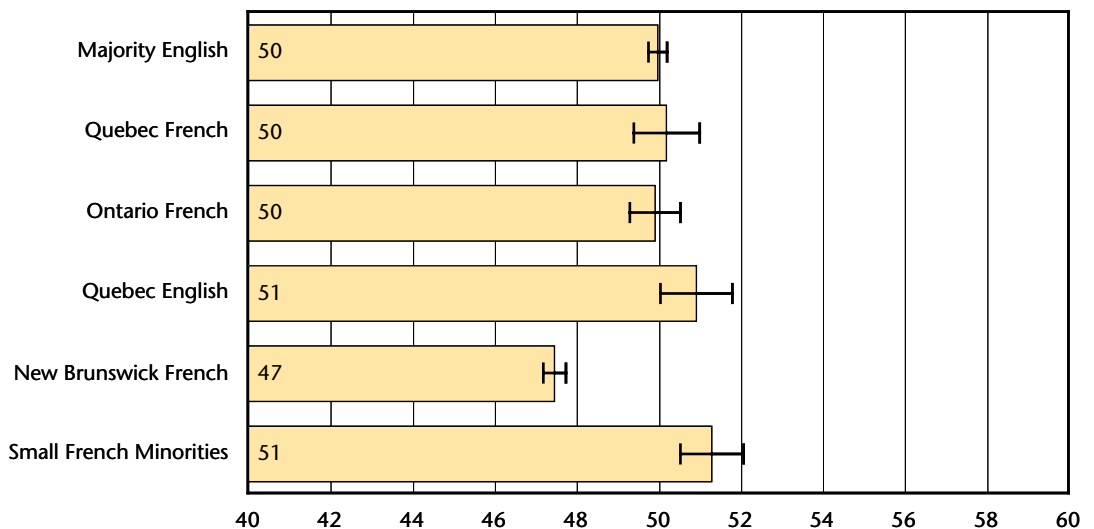
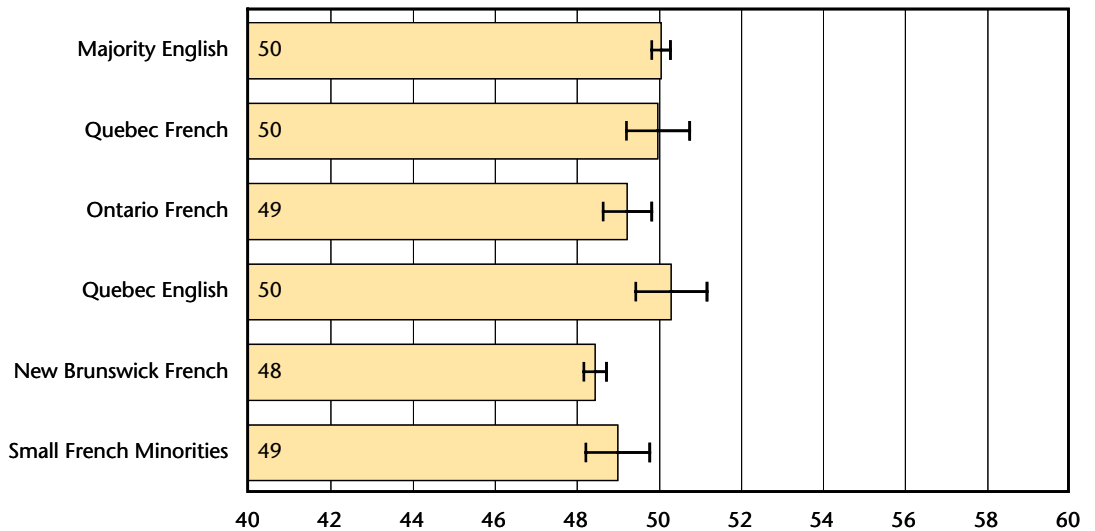


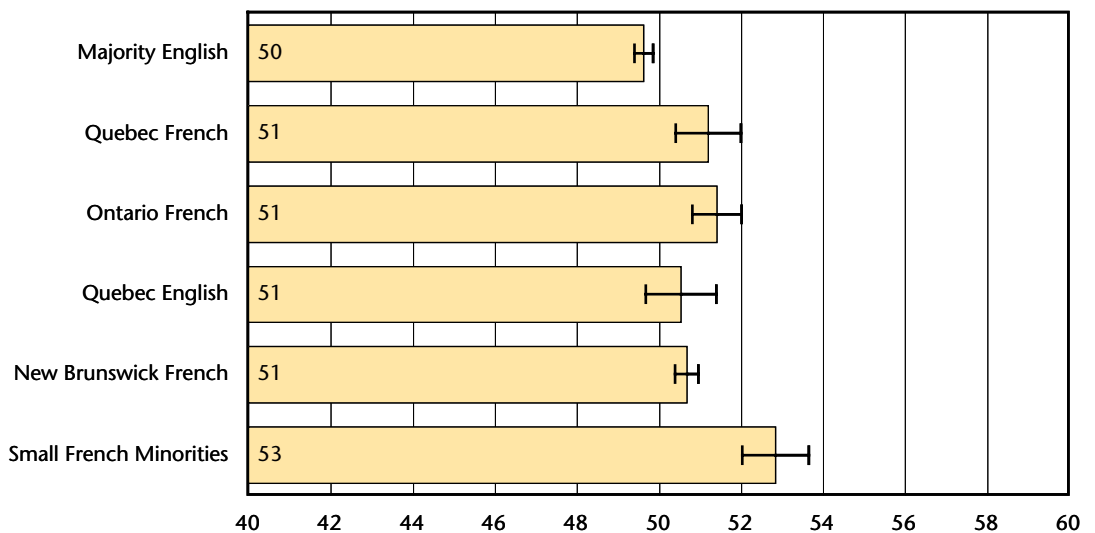
Chart 5-10 shows the mean factor scores for entertainment activities. New Brunswick French has the lowest mean score (48), but the latter is statistically different only from the two anglophone groups.

CHART 5-10 Mean factor scores for entertainment activities by language group



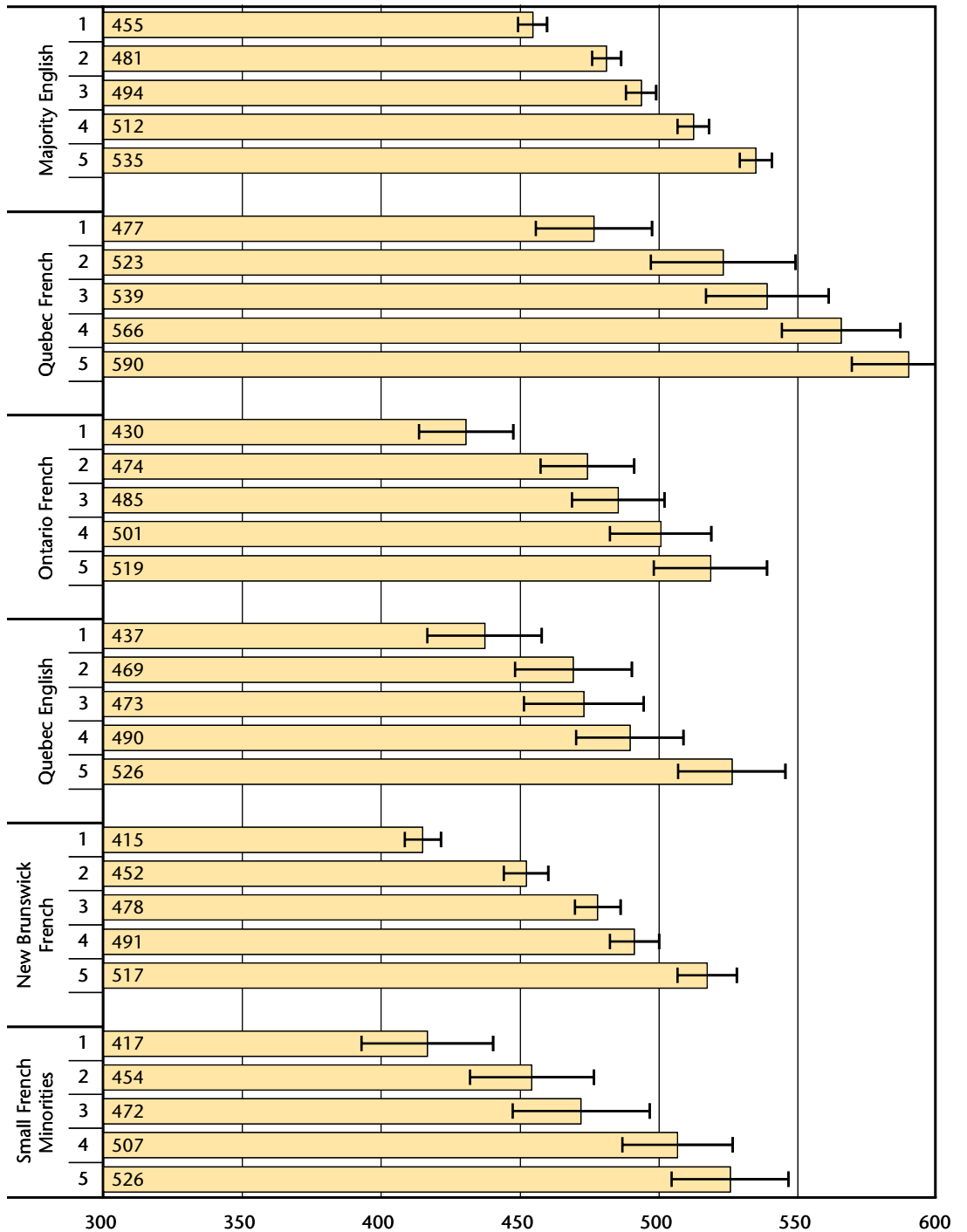
Mean scores for out-of-school academic/cultural activities are shown in Chart 5-11. All four French jurisdiction groups have a mean score that is higher than that of the Majority English group, the Small French Minorities group having the highest. The mean score of the Quebec English group on this factor is not statistically different from that of the Majority English group, nor is it different from the francophone groups, except the Small French Minorities group.

CHART 5-11 Mean factor scores for out-of-school academic/cultural activities by language group



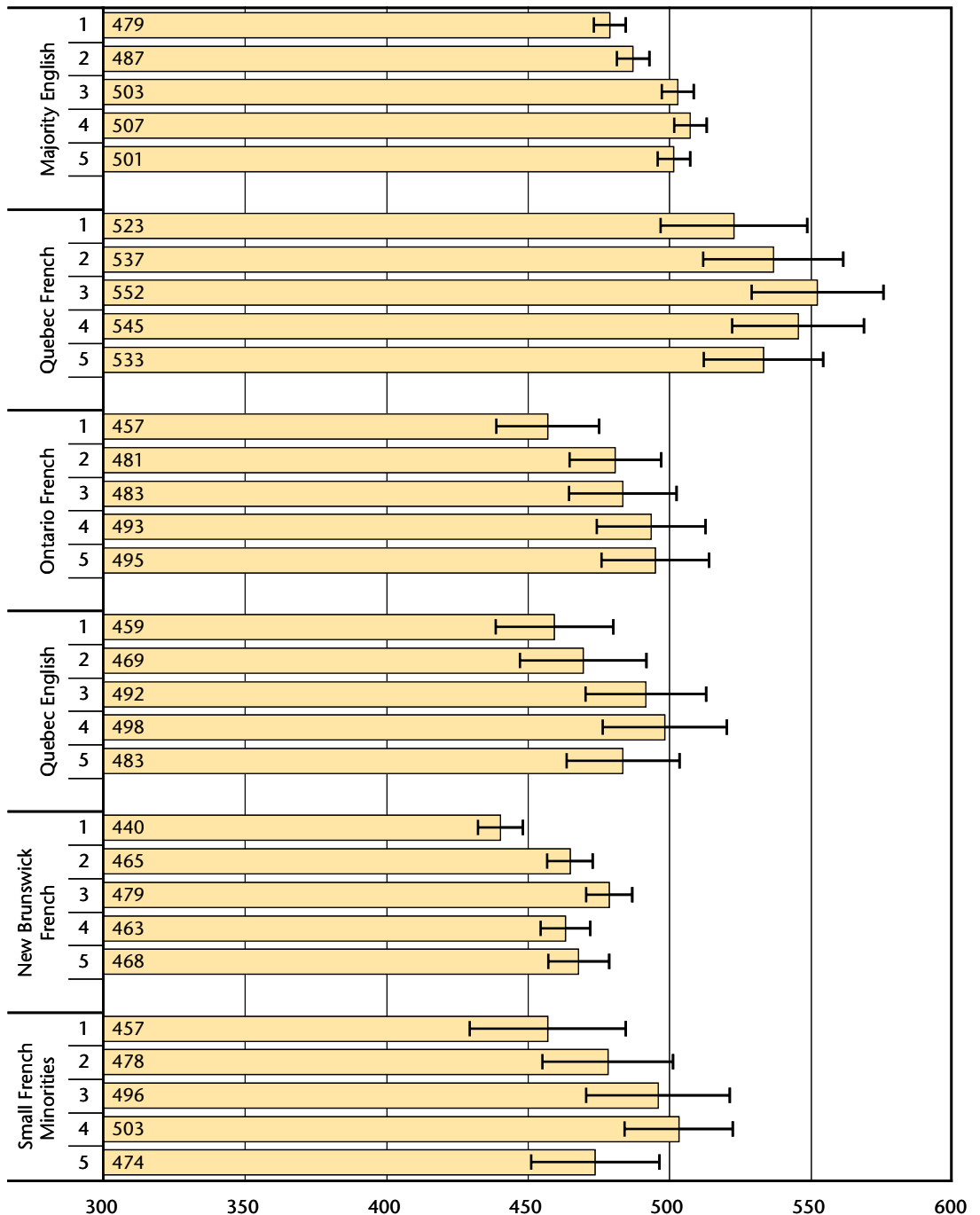
Charts 5-12 to 5-14 show the relationship between the three out-of-school activities factors and reading achievement. As shown in Chart 5-12, the effect of out-of-school reading is strong, linear, and positive for all language groups. Differences between the bottom and top quintiles range from 0.80 standard deviation for the Majority English group to 1.09 standard deviation for the Small French Minorities group.

CHART 5-12 Mean reading scores for out-of-school reading activities quintiles by language group



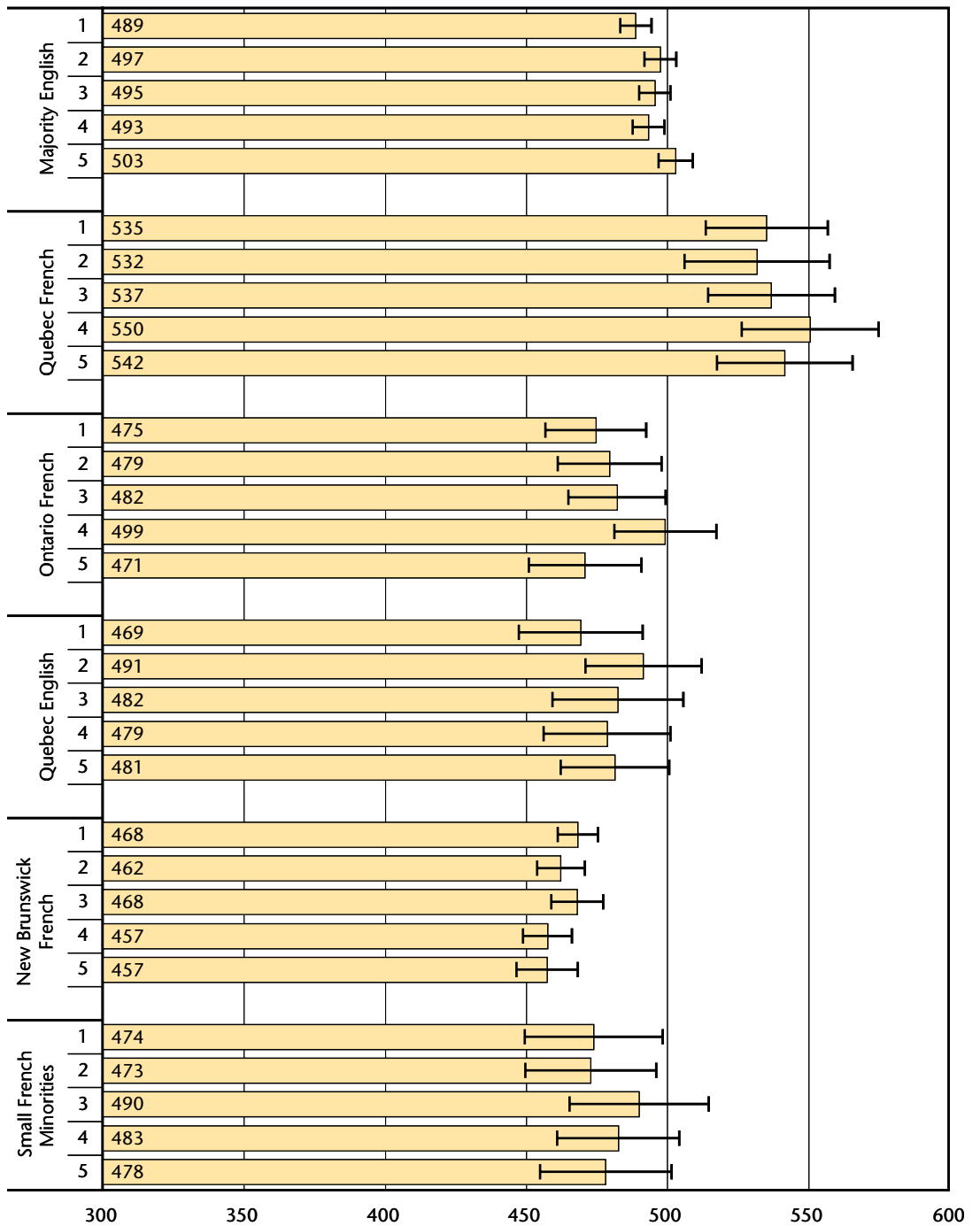
The effects of out-of-school entertainment activities on reading tend to be weak and not consistent across groups (Chart 5-13). For the Majority English group, the effect is positive and linear for the first four quintiles. For the Quebec French students, higher mean reading scores are associated with a moderate frequency of these activities, but differences between quintiles are not statistically significant. A similar trend is observed in the New Brunswick French group. The profiles of the Small French Minorities and the Quebec English students are similar to that of the Majority English group, where a linear increase is observed for the first four quintiles. Finally, for the Ontario French group, the first quintile tends to have lower mean reading scores than the other four, but none of the differences are statistically significant. Globally, if there is an emerging pattern, it is that out-of-school entertainment activities tend to be related to higher scores when the frequency of these activities is moderate.

CHART 5-13 Mean reading scores for out-of-school entertainment activities quintiles by language group



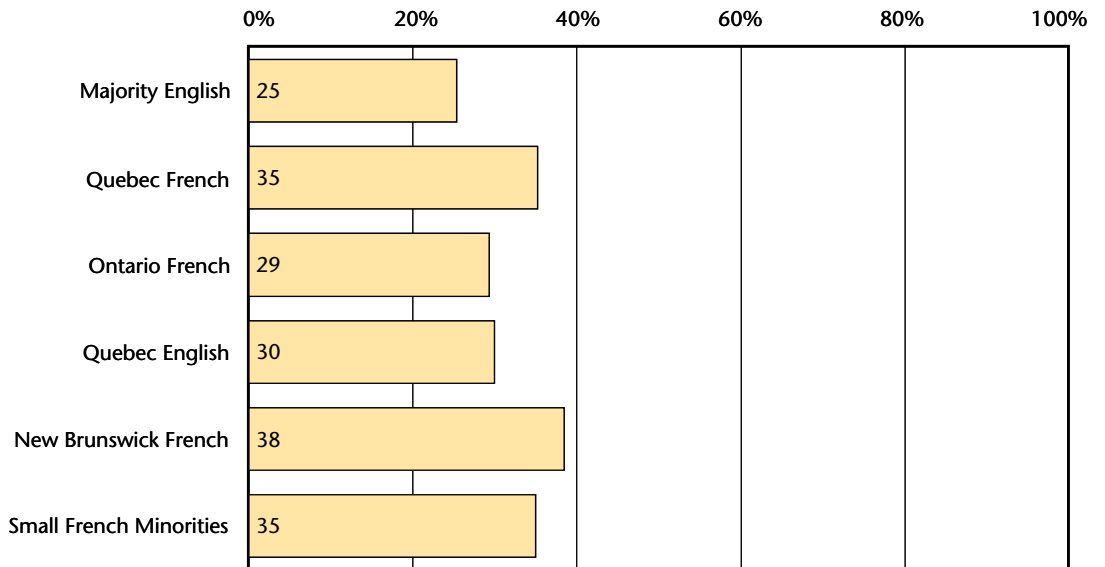
Finally, for none of the language groups is the frequency of out-of-school academic/cultural activities related significantly to reading achievement (Chart 5-14).

CHART 5-14 Mean reading scores for academic/cultural activities quintiles by language group



Because “being tutored” was one of the items that constituted the academic/cultural activities factor, and because this variable is generally related negatively to mean reading scores (students being tutored tending to have reading difficulties), separate analyses were done for tutoring and the other cultural/academic activities. Chart 5-15 shows the percentage of students who reported being tutored, and Chart 5-16 presents the relationship between being tutored and mean reading scores. Except for Ontario French students, francophone students tend to be tutored more often than those in other jurisdictions. The Majority English group has the lowest percentage of students who report being tutored.

CHART 5-15 Percentage of students being tutored by language group



As can be observed in Chart 5-16, students who report being tutored as an out-of-school activity have lower mean reading scores than the students not tutored. Differences are statistically significant for all language groups. Differences between tutored and non-tutored students tend to be greater in the French than in the English jurisdictions.

CHART 5-16 Mean reading scores for being tutored by language group

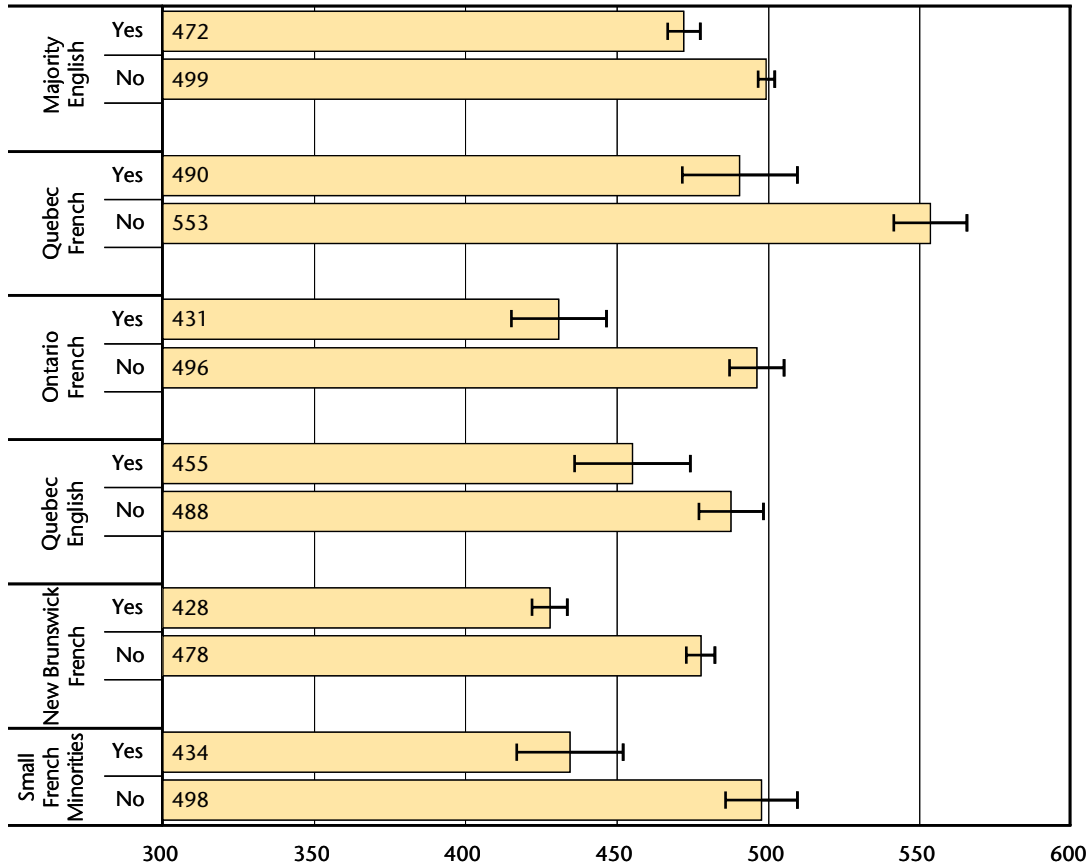
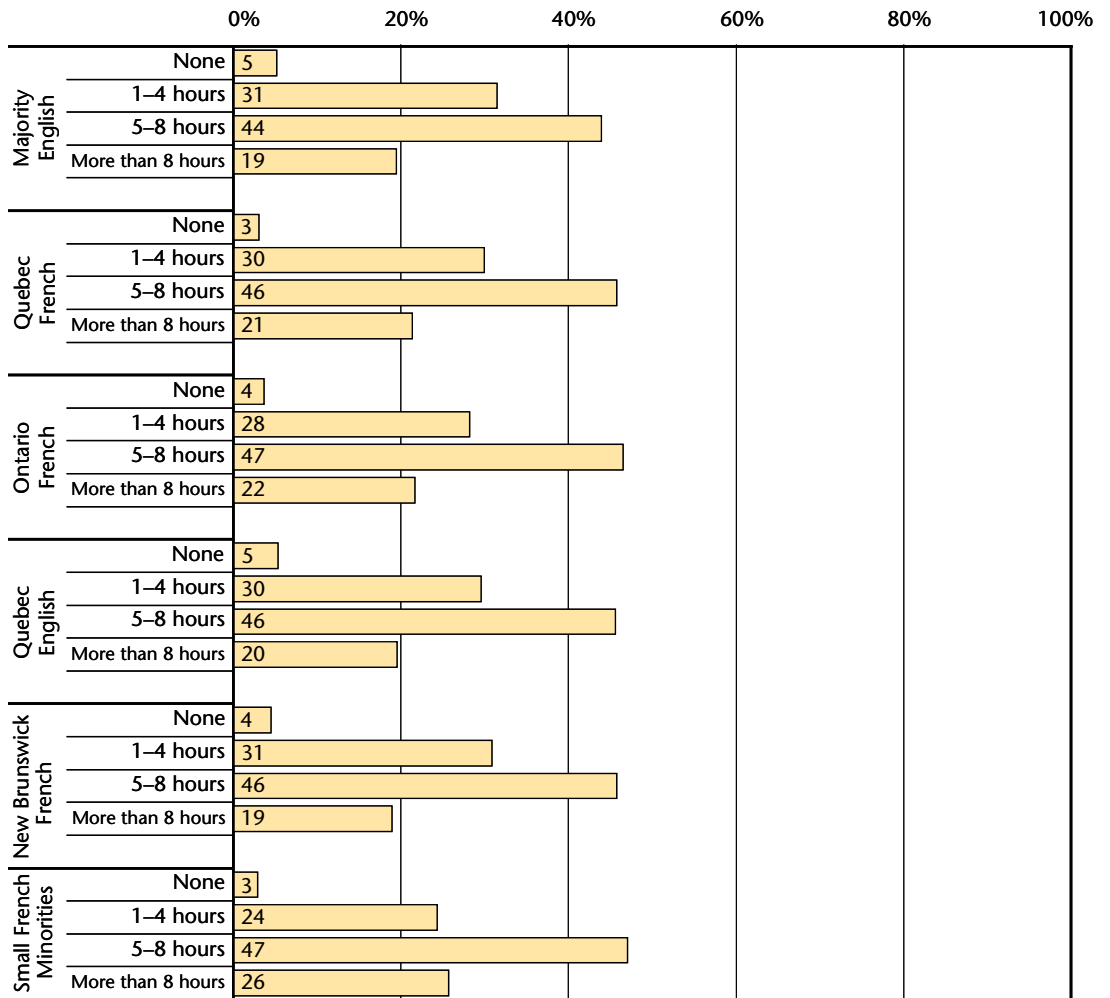


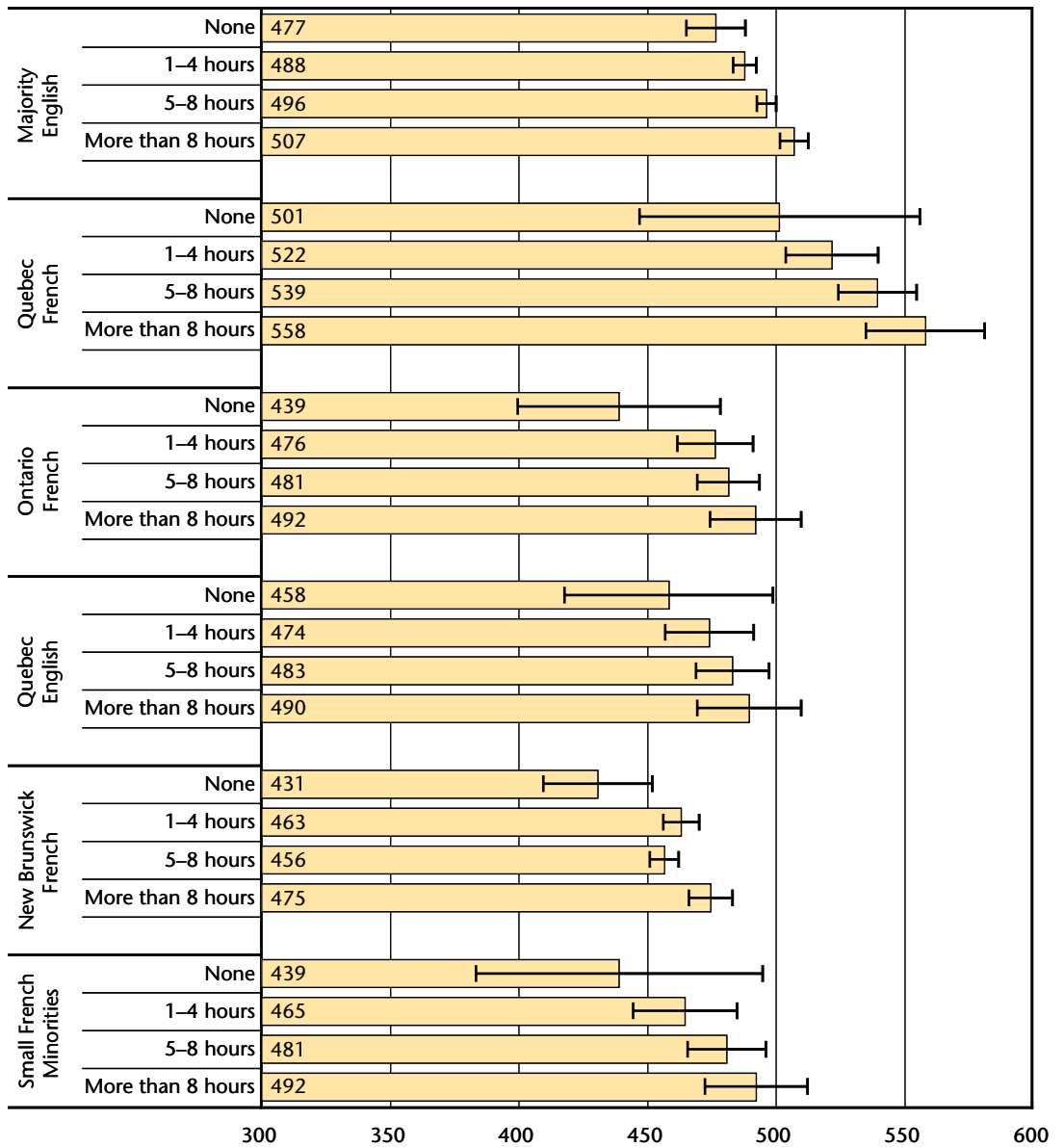
Chart 5-17 shows hours per week devoted to cultural/academic activities — after removing the tutorial or extra lessons item. All language groups have very similar profiles. Close to one-half of the students spend 5 to 8 hours on these activities. A second group consisting of close to one third of the students spends 1 to 4 hours on similar activities. Approximately one out of five students devotes more than 8 hours to out-of-school cultural/academic activities.

CHART 5-17 Hours per week in out-of-school cultural/academic activities by language group



The relationship between hours of cultural/academic activities and mean reading scores, when not including the tutorial activities, is shown in Chart 5-18. Whereas the relationship was neutral when tutorial activities were included, the relationship is now linear and positive. Students who are the most active in these activities tend to have the highest mean reading scores although the difference is not always significant. The errors for the groups that report doing none of these activities tend to be large because of the small number of students in this category. It is not known, however, if this moderate to strong effect would be sustained if other variables such as socioeconomic status were controlled. The effects of variables while controlling for other contextual variables are presented in chapter 7.

CHART 5-18 Mean reading scores for hours per week in cultural/academic activities by language group

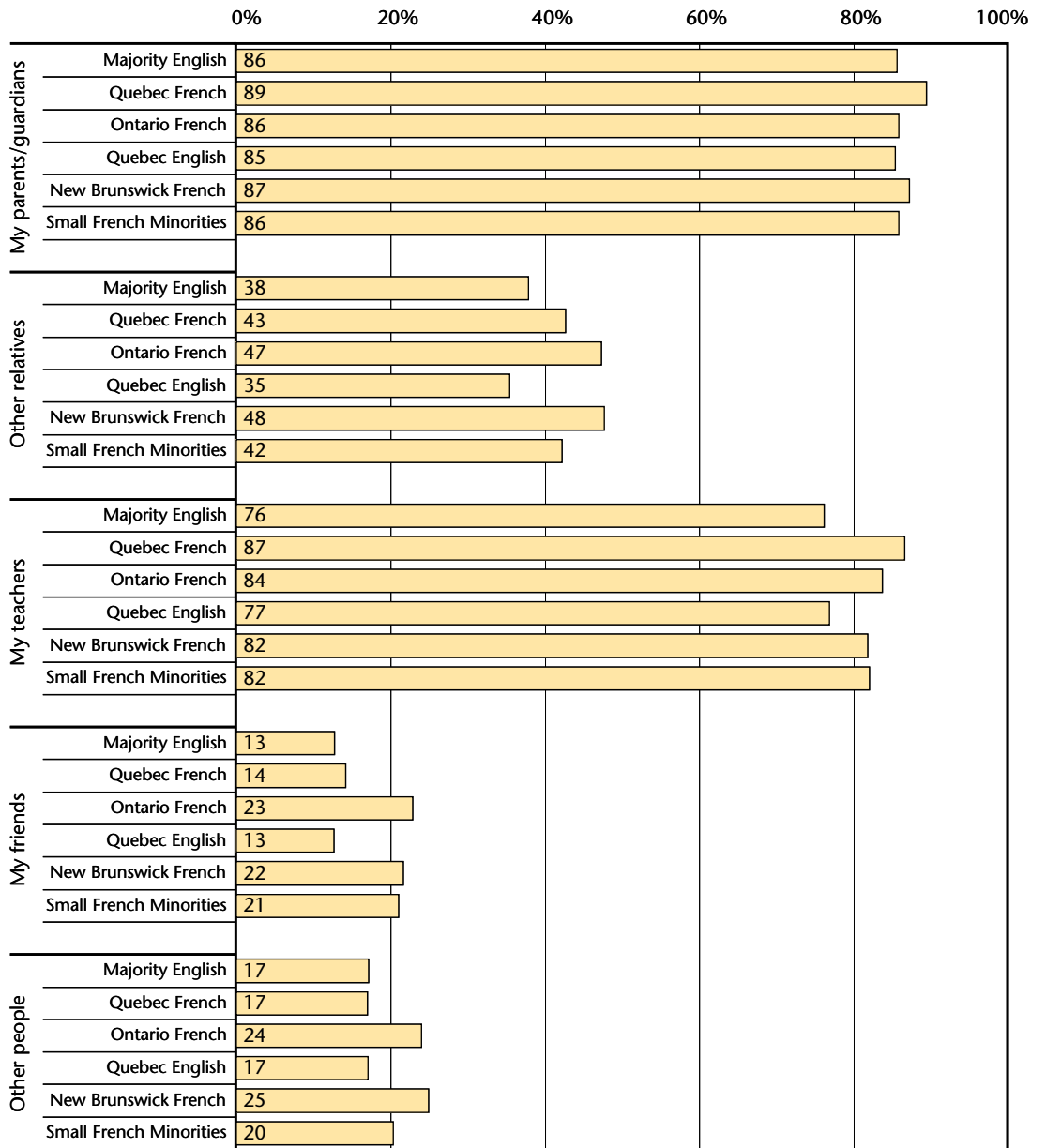


Early reading activities

The results in this section may not be reliable and should be interpreted with care. Most students were in grade 8 (Secondary 2 in QC) at the time of the assessment and may not remember much about how they first learned to read, and are even less likely to remember the specific strategies that they used during the learning process. On each question about past learning strategies, from 20 per cent to 30 per cent of the students answered that they did not remember them. The first set of questions asked the students whether they recalled certain strategies in early reading, to be answered yes or no. A second set of questions asked the students to identify the extent to which parents/guardians, teachers, and other persons helped them learn to read (a 4-point scale ranging from “not at all” to “a lot”). A third set of questions focused on parental encouragement to read when the student was younger. Then the students were asked at what age they had initially learned to read, and how frequently their mothers and fathers read. Because prior analyses (CMEC 2009) have not shown consistent relationships between the first set of questions and reading achievement, only the last three sets of questions are analyzed here.

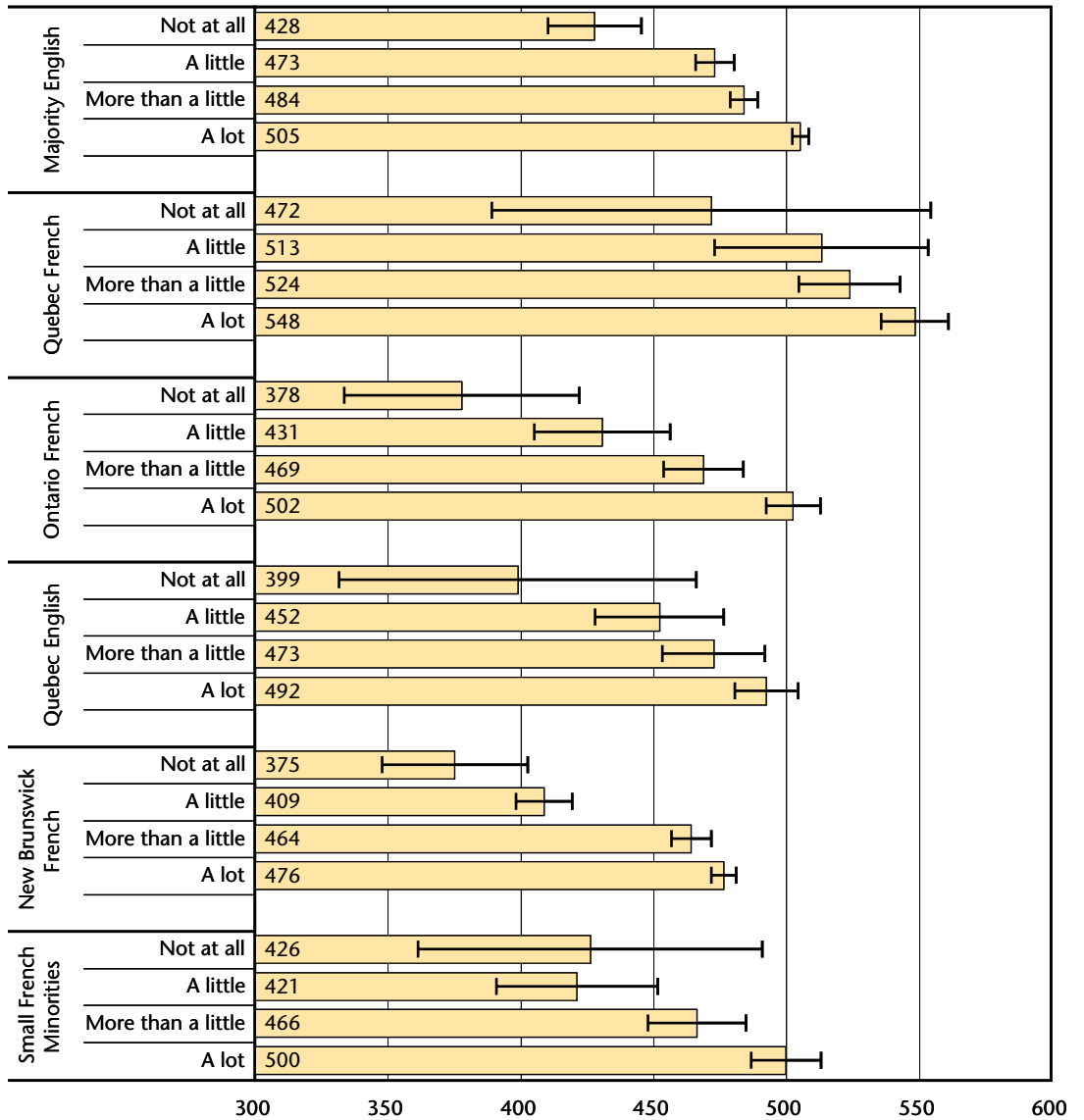
Chart 5-19 shows the percentage of students by language groups who consider that certain categories of persons helped them “more than a little” or “a lot” when they were learning to read. As shown for all groups, it is parents/guardians and teachers who are considered by the students to be the persons who helped them the most as they were learning to read. A significant proportion of the students, however, indicate that they had help from other relatives. A minority of students indicated that they had help from friends and other people.

CHART 5-19 Student recollections of how much others have helped them learn to read



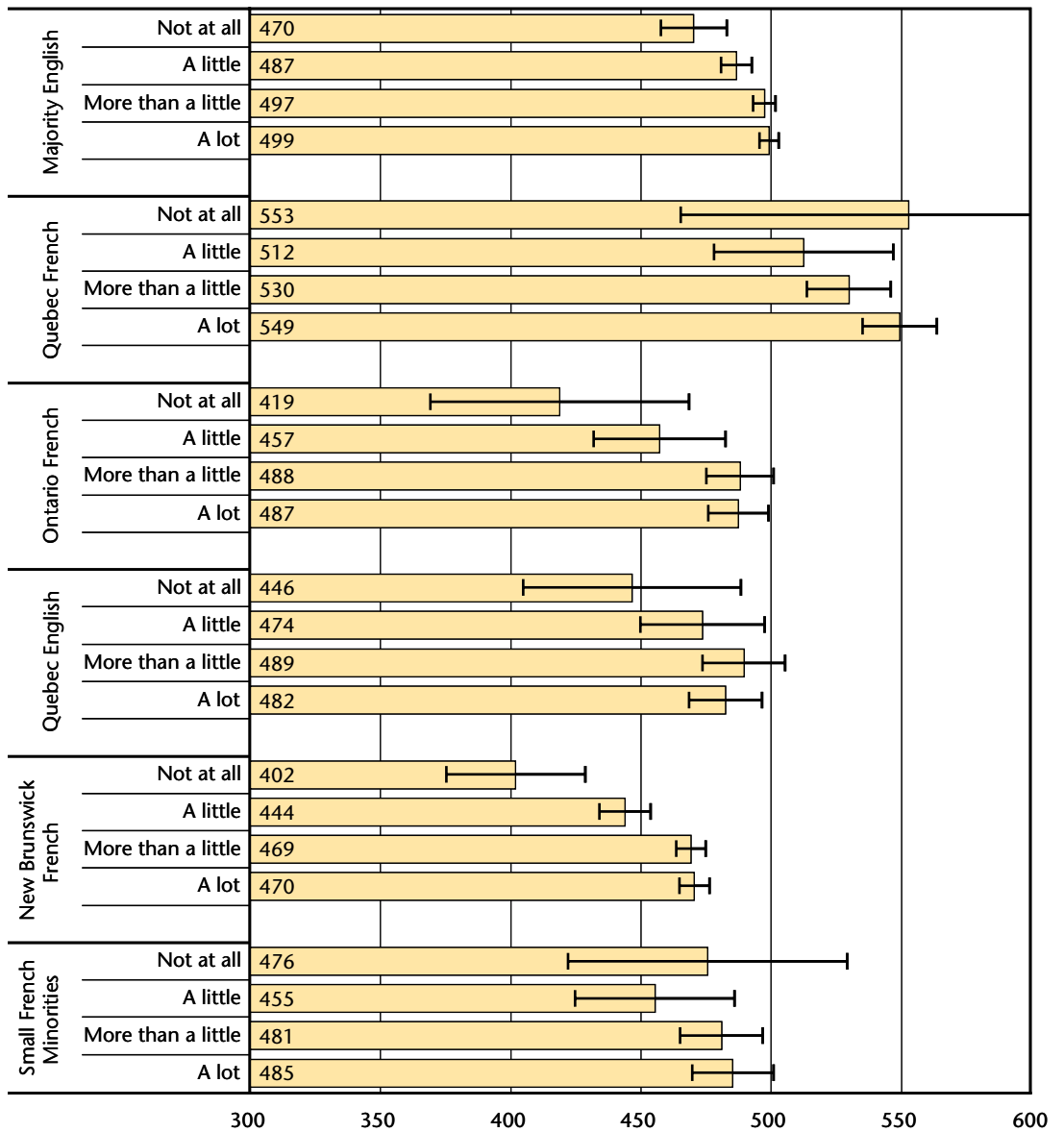
Two charts (5-20 and 5-21) show, respectively, the relationship of the amount of help obtained from parents/guardians and teachers to the student's reading achievement for each of the six language groups. As shown in Chart 5-20, parental help tends to be positively and linearly related to reading achievement. However, because the number of students in some response categories is small, the confidence intervals can be quite large and there is therefore overlap between the confidence intervals of different response category groups, resulting in statistically non-significant results.

CHART 5-20 Mean reading scores for parent/guardian help in learning to read



The trend for teacher help shown in Chart 5-21 is not as consistent as that for parental help. The effects are smaller and not always linear. In all language groups, the last two response categories (“more than a little” and “a lot”) have very similar scores. When there is a linear increase in scores, it is between the first three response categories. Globally, differences are between the students who received some help and those who received little help or none. We should remember, however, that these are retrospective and very subjective responses. We cannot, for example, distinguish between students who received help that was really instrumental in their learning to read and the students for whom help was not instrumental in learning to read but who, nonetheless, attribute their reading performance to parental or teacher help.

CHART 5-21 Mean reading scores for teacher help in learning to read



The third set of questions on early reading activities had to do with how parents/guardians encouraged reading. All six questions pertained to parental interest, encouragement, and support. Items were highly correlated, and a factor analysis yielded a single large factor that was labelled “parent/guardian encouragement.” The mean factor scores are presented in Chart 5-22. Differences between language groups in parental encouragement during the early years are small. The minority language groups have mean scores that are slightly lower than those of the two majority groups.

CHART 5-22 Mean factor scores for parent/guardian encouragement of reading by language group

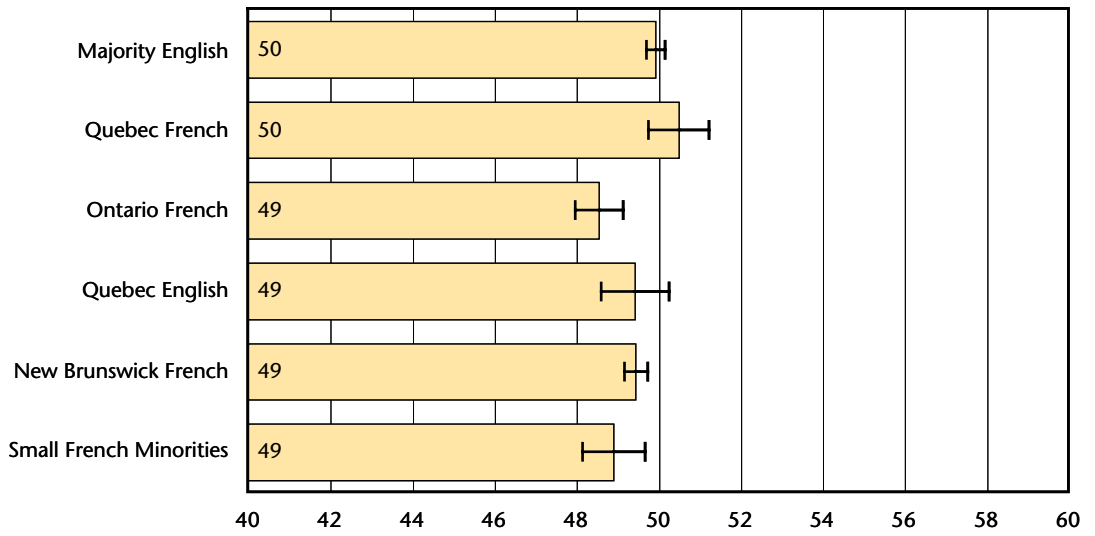
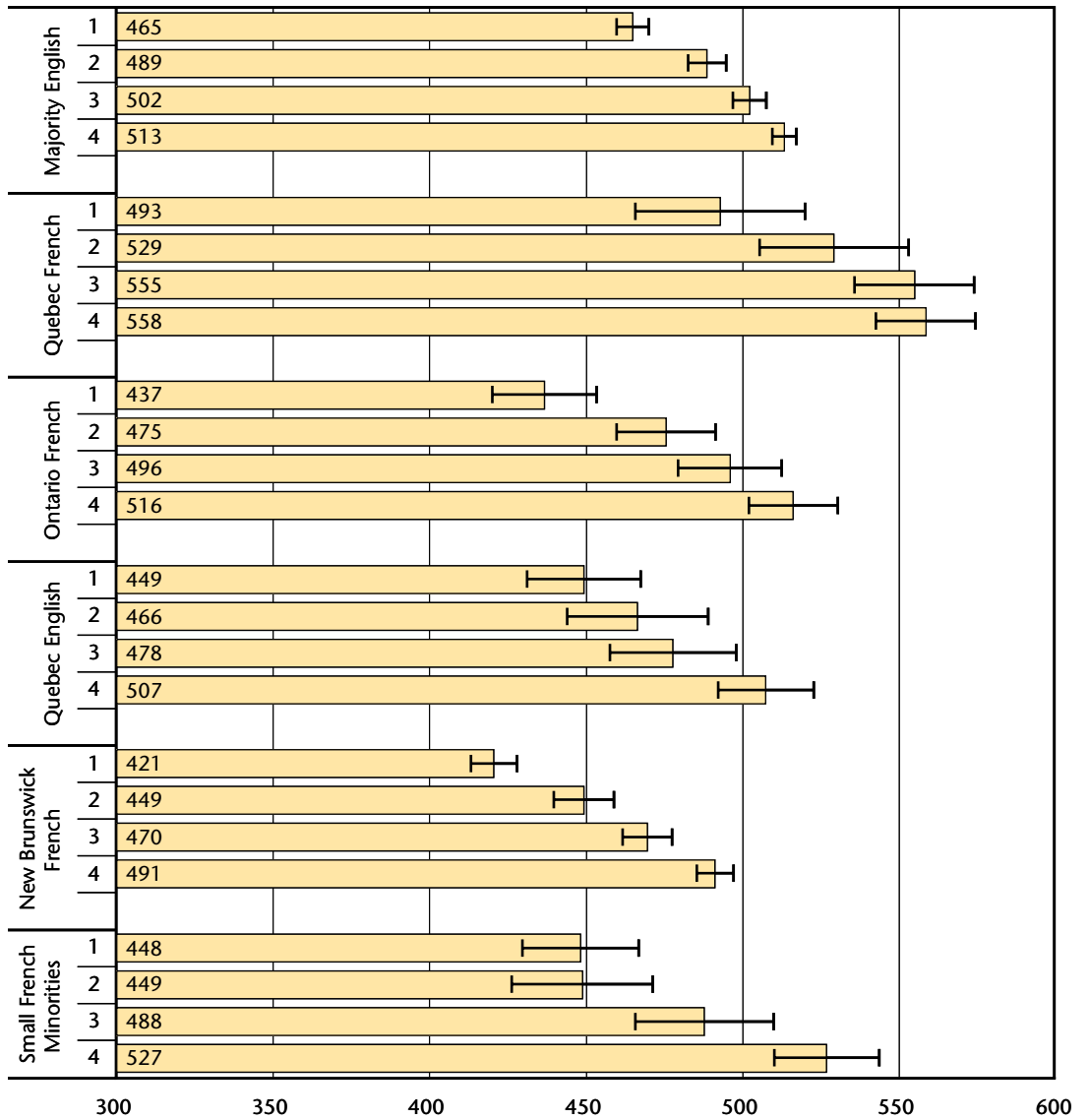


Chart 5-23⁷ shows the relationship between parent/guardian encouragement and mean reading scores. For all groups, the relationship is strong, linear, and positive.

CHART 5-23 Mean reading scores for parent/guardian encouragement of early reading quintiles by language group

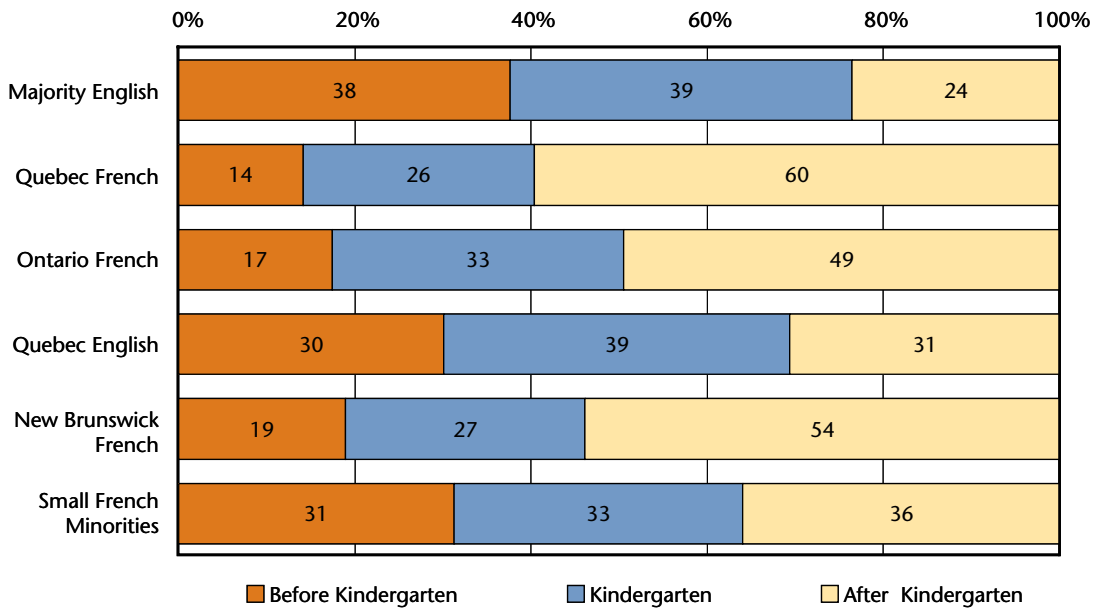


⁷ Although this chart refers to quintiles, the fourth quintile includes the fifth quintile because the distribution of scores did not allow these quintiles to be clearly separated.

Age of learning to read

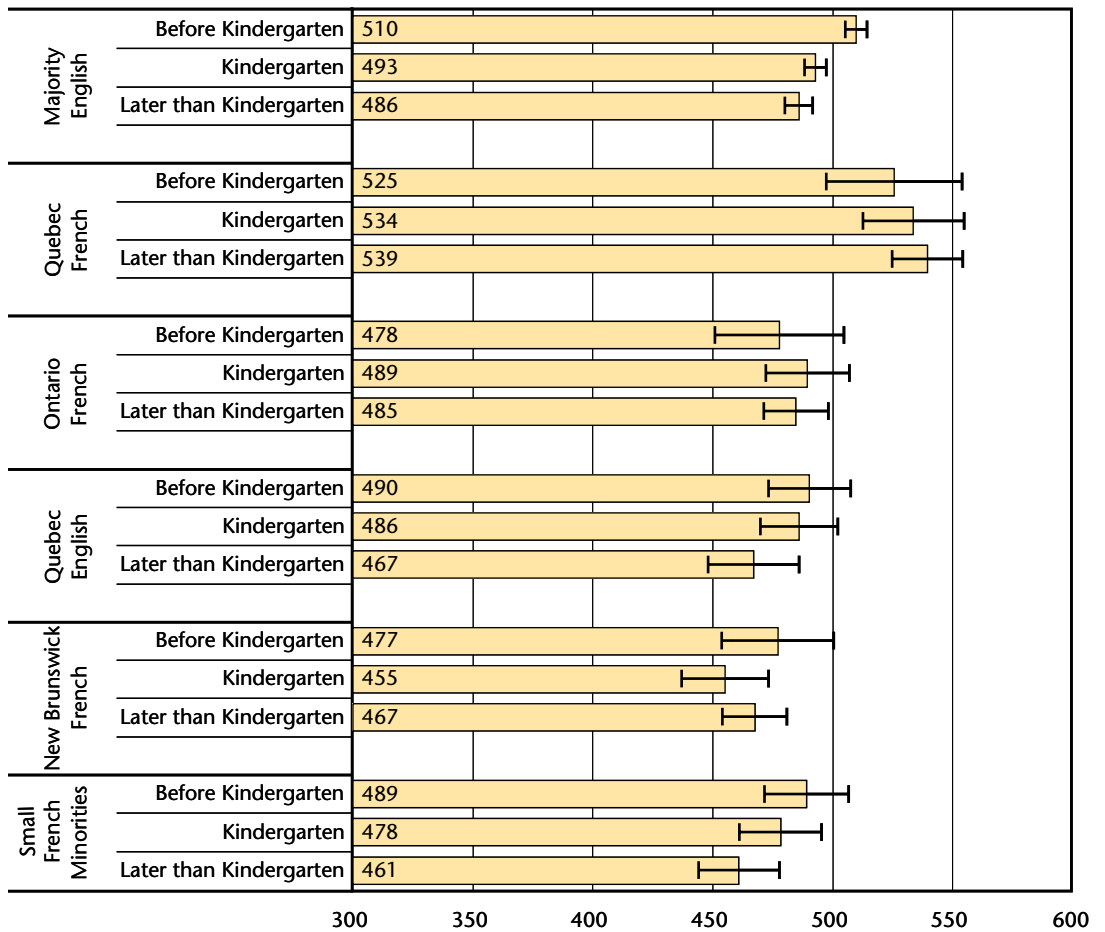
The students were asked to specify a time when they first learned to read. Response alternatives were “before kindergarten,” “during kindergarten,” “in grade 1, in grade 2, and after grade 2.” In Chart 5-24, responses are grouped in 3 time categories — 1) before kindergarten, 2) kindergarten, and 3) after kindergarten. Students from the English-speaking jurisdictions tend to have a higher percentage of students who learned to read before or during kindergarten. The Quebec French (60%), the New Brunswick French (54%), and the Ontario French (49%) groups have the highest percentages of students who learned to read only after kindergarten. Small French Minorities, among the French groups, have the highest percentage of students who report having learned to read before or during kindergarten.

CHART 5-24 Time students learned to read by language group



The relationship between age of learning and mean reading scores is presented in Chart 5-25. Results in Chart 5-25 do not indicate a consistent relationship between age of learning and present reading achievement. In the Majority English group, the relationship is linear and negative. Students who report having learned to read before kindergarten have higher scores than those who say they learned to read after kindergarten. This relationship, however, does not hold for the Quebec French group where the relationship is linear and positive. None of the differences between the subgroups, however, are statistically significant in this latter group. In the other four groups, no particular trend is evident and differences between subgroups are not statistically significant.

CHART 5-25 Mean reading scores by time students learned to read by language group

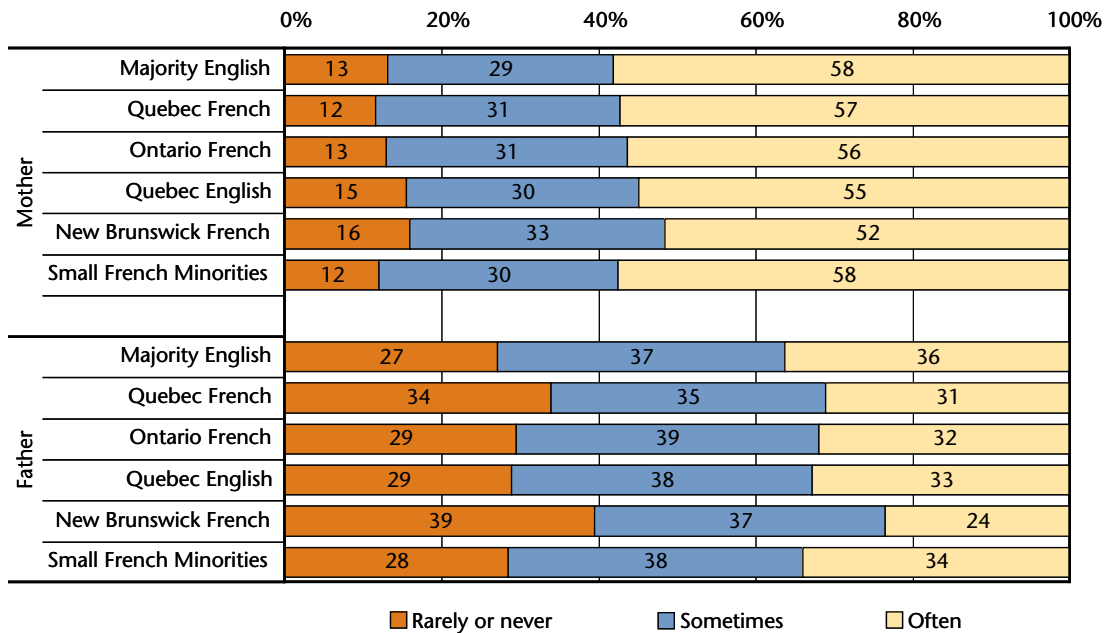


Frequency of reading by parents/guardians

The students were asked how often their parents/guardians read. Responses were given on a 3-point scale: rarely or never, sometimes, often. Results by language groups are presented in Chart 5-26 and the relationship to learning is shown in Chart 5-27 for the mother's frequency of reading and in Chart 5-28 for the father's.

As can be observed in Chart 5-26, mothers are seen by students to read more than the fathers. Between group differences tend to be small. The New Brunswick French group has the lowest percentage of students in the "often" category for both parents/guardians. The latter also has the largest percentage for fathers who never or rarely read.

CHART 5-26 Frequency of parent/guardian reading at home



Charts 5-27 and 5-28 show that frequency of reading by both the mother and the father is positively and linearly related to mean reading scores.

CHART 5-27 Mean reading scores by frequency of mother reading at home

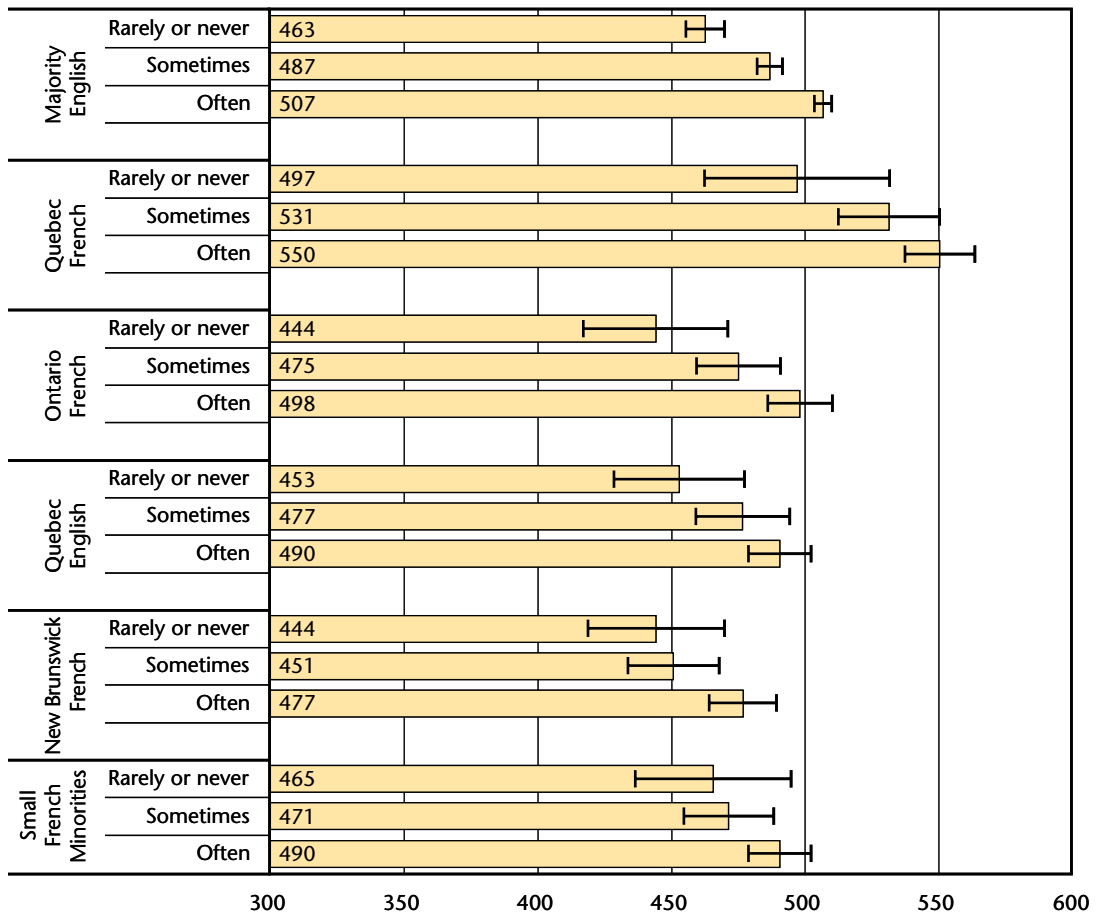
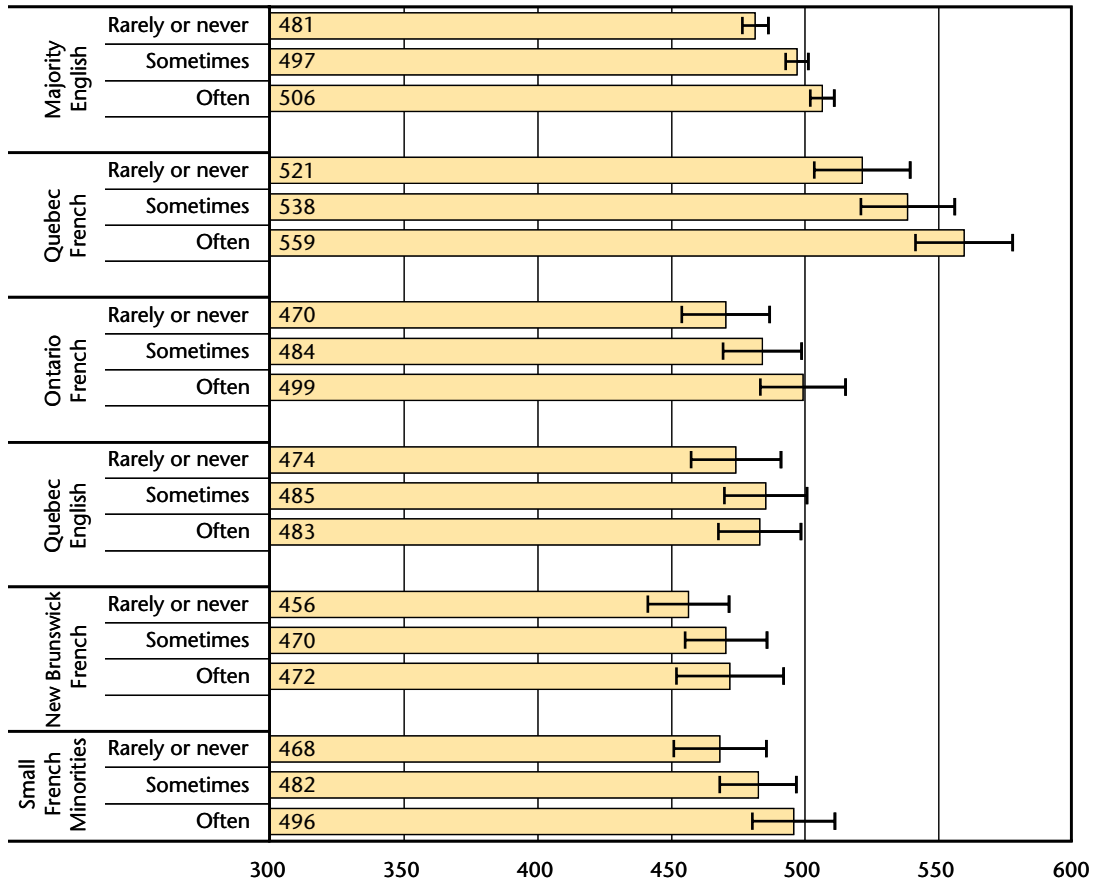


CHART 5-28 Mean reading scores by frequency of father reading at home



6

INSTRUCTIONAL VARIABLES

In the Student, Teacher, and School questionnaires, a relatively large number of questions dealt with what we call the instructional process. Based on the analyses presented in an earlier report (CMEC 2009), it was concluded that not all these instructional variables had a strong relationship with mean reading scores or showed differential effects for the language jurisdictions. In this chapter, we analyze the variables that pertain to the instructional process — time spent on teaching, modification/adaptations to the teaching process for individual students, specific teaching strategies, homework, and assessment strategies.

It is important to note that the instructional variables refer mainly to activities that occurred during the school year in which the assessment was conducted, whereas reading achievement scores might be expected to reflect the cumulative effects of all previous years of schooling. For this reason, the effects of instructional variables are likely smaller than they would have been had the cumulative effects of students' school experience also been measured. To have evaluated the cumulative effects would have involved a global overview of the instructional processes the students experienced from the beginning of schooling to the present, something which is not possible in a cross-sectional survey.

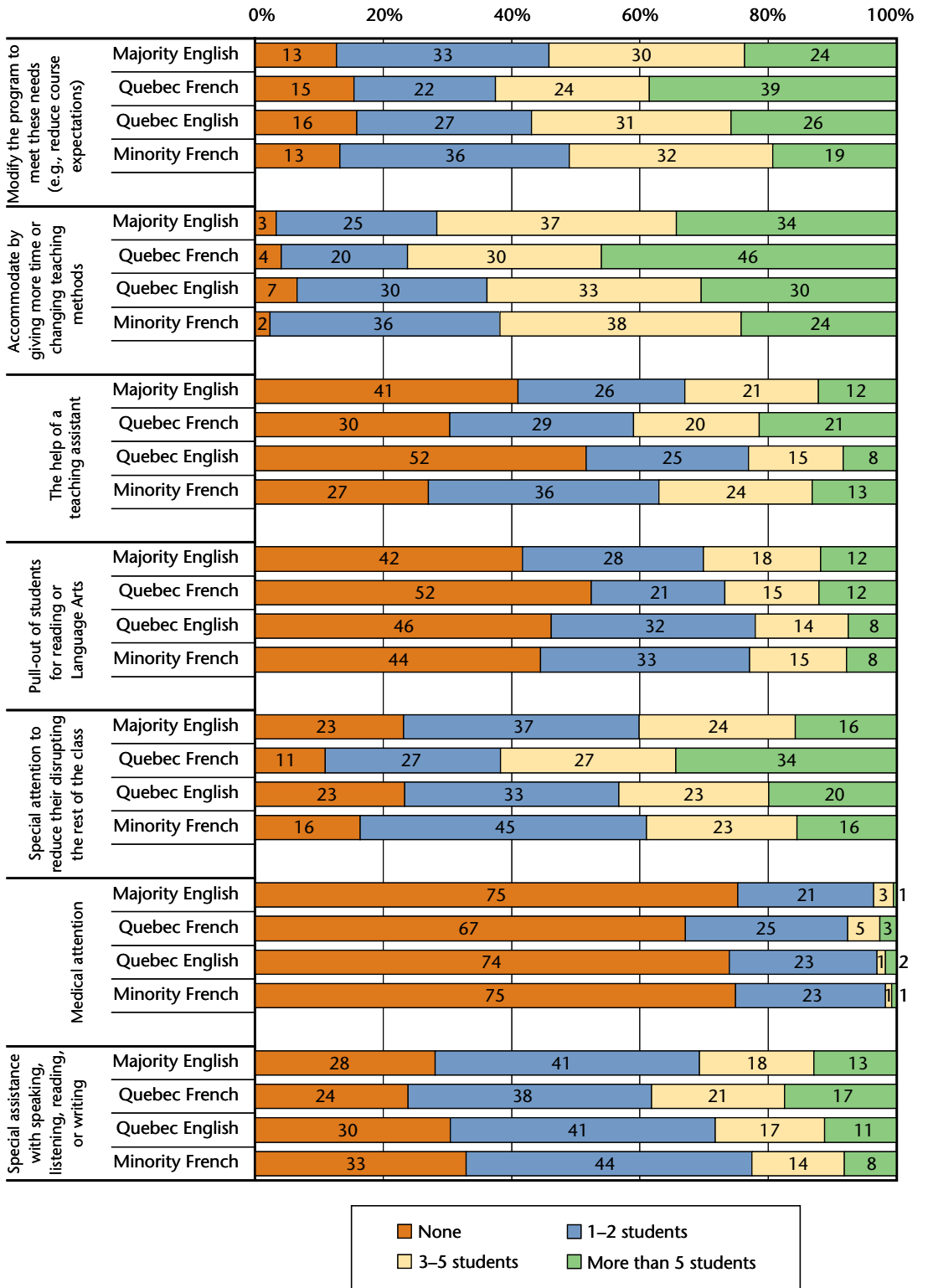
Nevertheless, as this chapter will reveal, some instructional effects are statistically significant. This suggests that the instructional process can have an impact on reading achievement even this late in a student's school career. It is also possible, of course, that the reported results for instructional variables reflect practices that are characteristic of a school, and hence they may be cumulative to some extent.

Program modifications/adaptations

One relevant factor in the schooling process is the extent to which the program needs to be modified/adapted to accommodate students with special needs. Several questions in the Teacher Questionnaire pertained to program modifications and adaptations. Teachers were asked how many students they had in their classroom for whom special modification/adaptations of the program were required. Results for this section of the Teacher Questionnaire are presented in Chart 6-1.

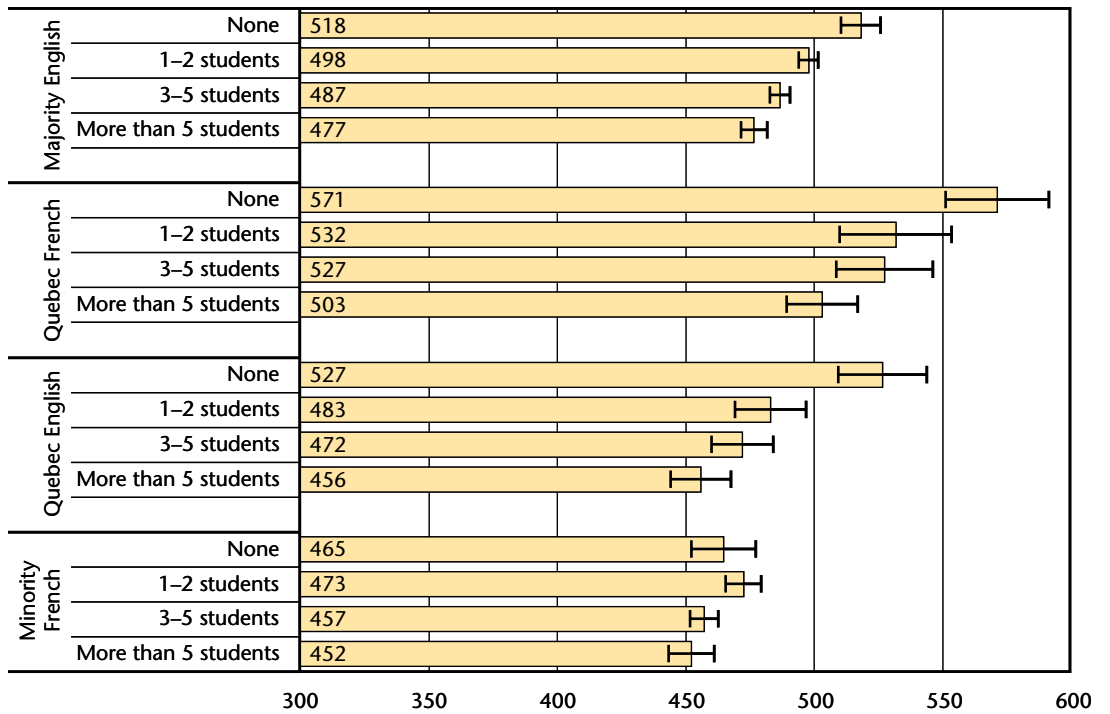
As shown in Chart 6-1, the Quebec French teachers tend to differentiate themselves from the other three groups in that a larger percentage report that five or more of their students need program modification/adaptations for special needs, or more time, or a change in the teaching method, or the help of teaching assistants, or special attention to reduce disruptions and special assistance. They differ only minimally from the other linguistic groups in the need to pull students out for reading or language arts classes and for the number of students needing medical attention. Relationships between these categories of special needs and mean reading scores are reported in charts 6-2 to 6-8.

CHART 6-1 Special modifications/adaptations to the reading program by language group



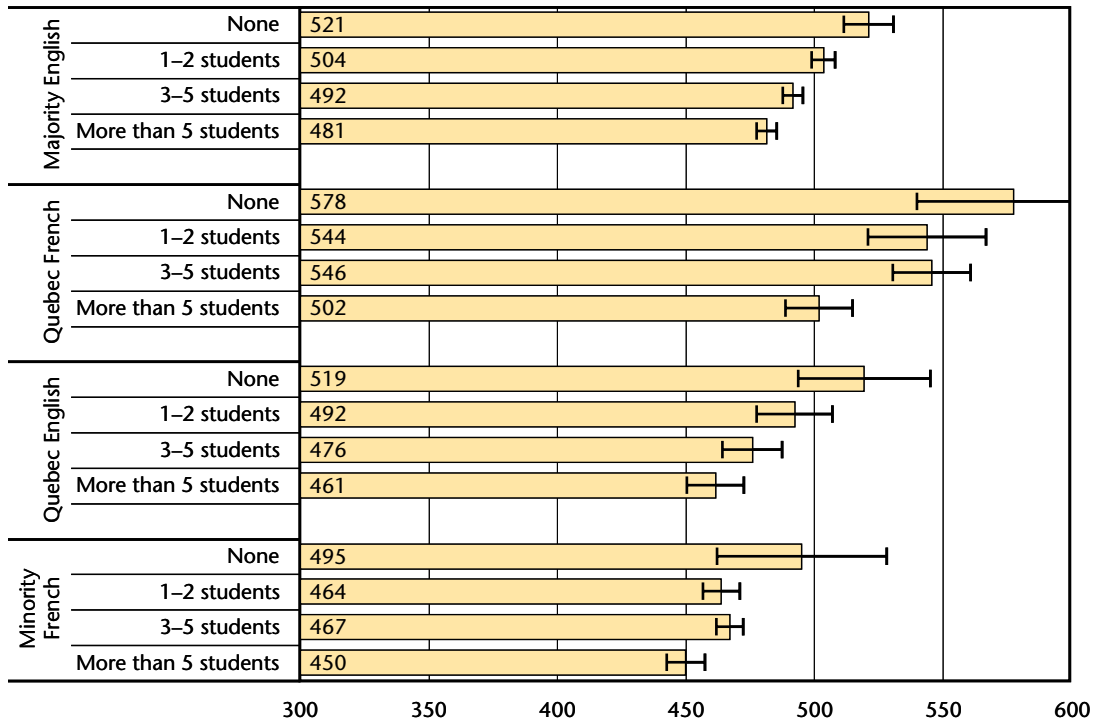
The number of students requiring program modification to meet special needs (Chart 6-2) tends to be linearly and negatively related to mean reading scores. The students of the teachers who report having more than five students in need of program modification tend to have lower scores than those of the teachers who have a lesser number of students in need of program modification. The differences are largest in the Quebec French and Quebec English groups and are not statistically significant in the Minority French group.

CHART 6-2 Mean reading scores by number of students requiring program modification to meet special needs by language group



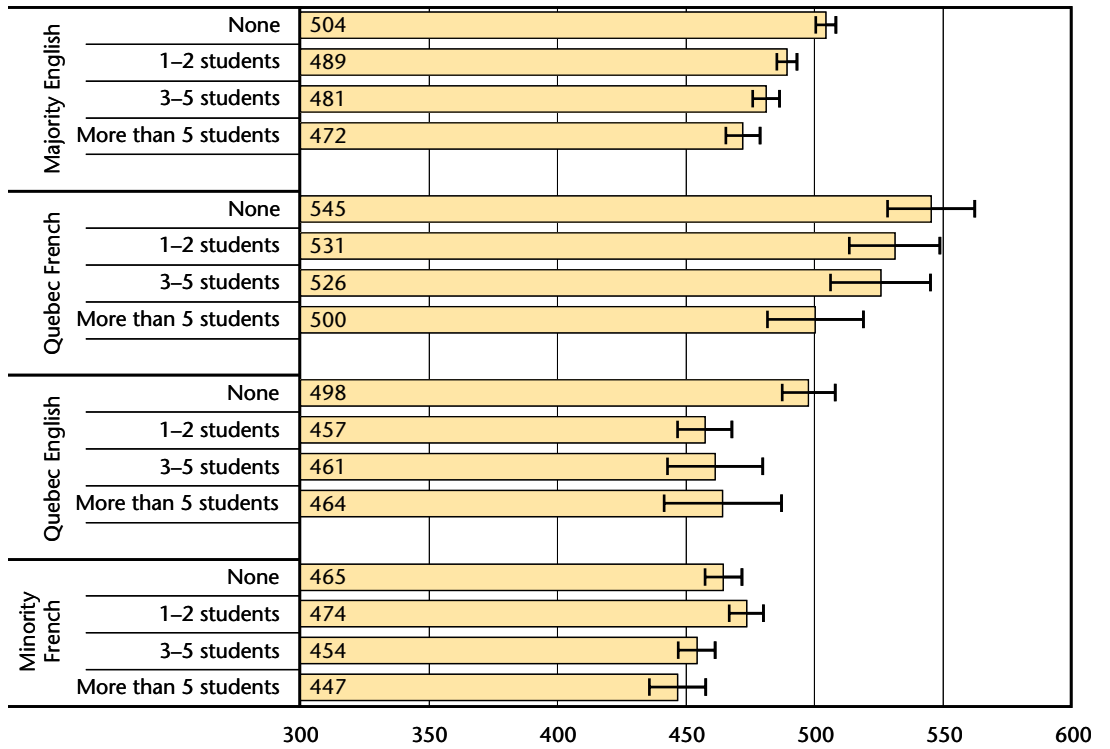
A similar trend is observed for students who require more time to meet their special needs (Chart 6-3).

CHART 6-3 Mean reading scores by number of students given more time to meet special needs by language group



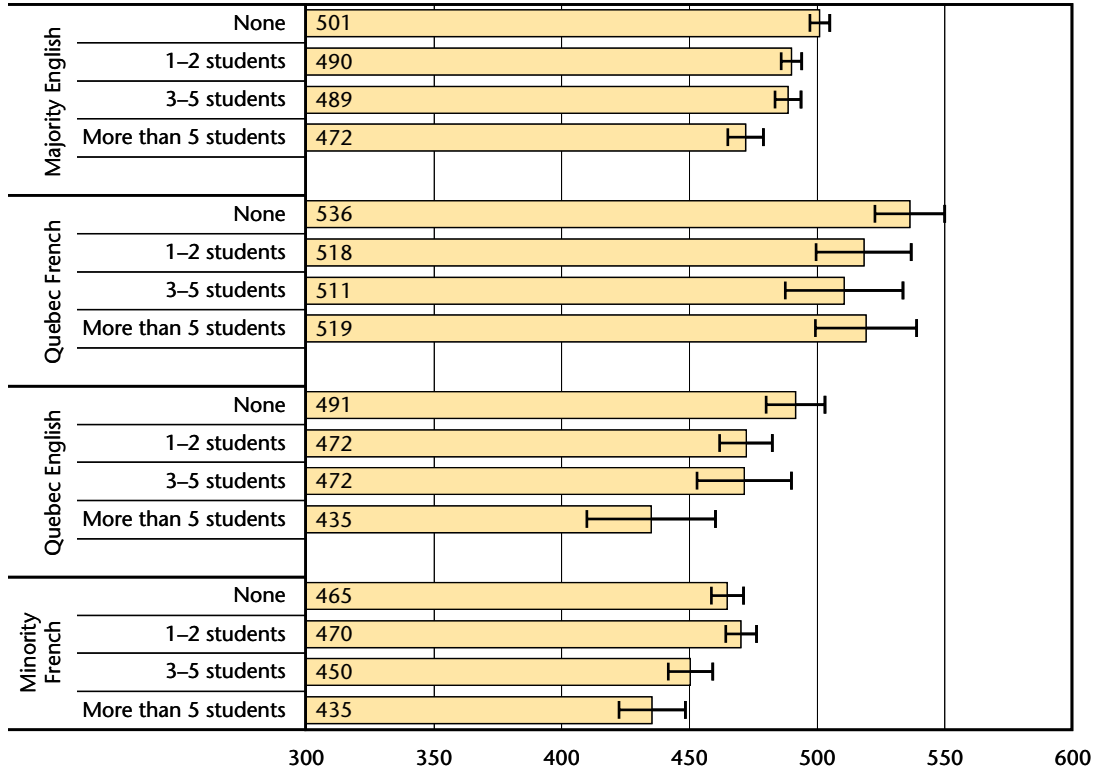
For students who need teaching assistants, the trend is linear and negative for the two majority groups but less linear for the Quebec English and Minority French groups (Chart 6-4).

CHART 6-4 Mean reading scores by number of students needing the help of a teaching assistant by language group



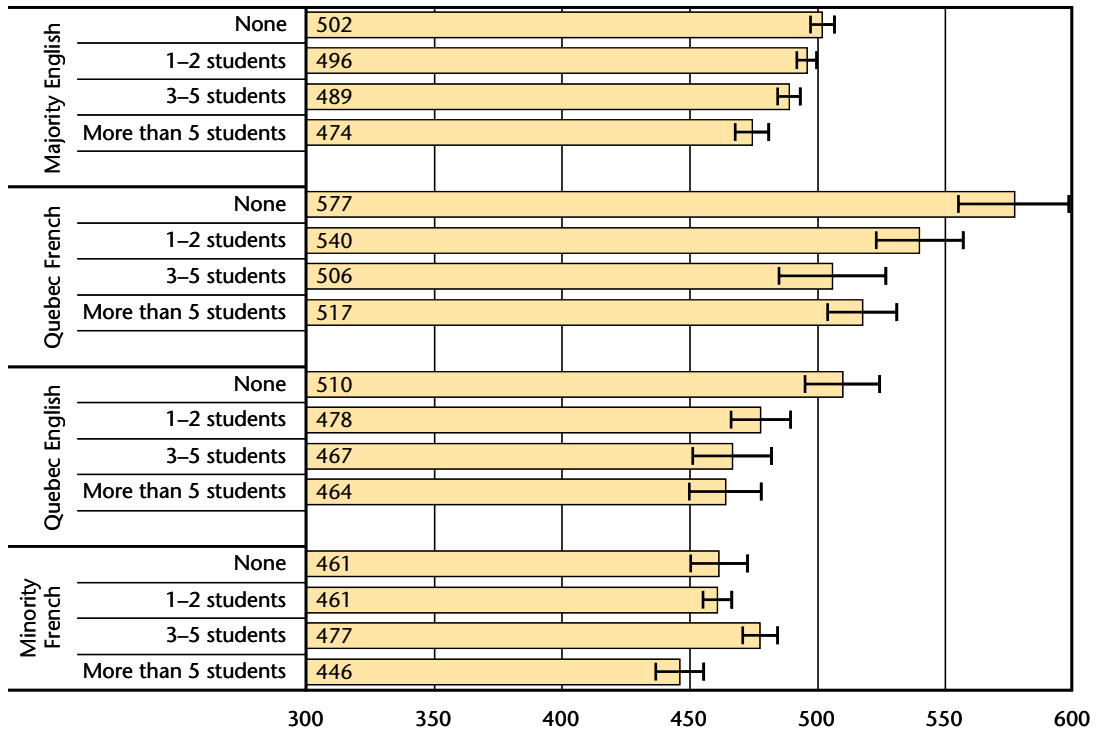
For students requiring pull-out for reading or language arts (Chart 6-5), the relationship tends to be linear and negative, as for the previous categories. However, none of the differences between subgroups are statistically significant in the Quebec French group.

CHART 6-5 Mean reading scores by number of students requiring pull-out for reading/ language arts by language group



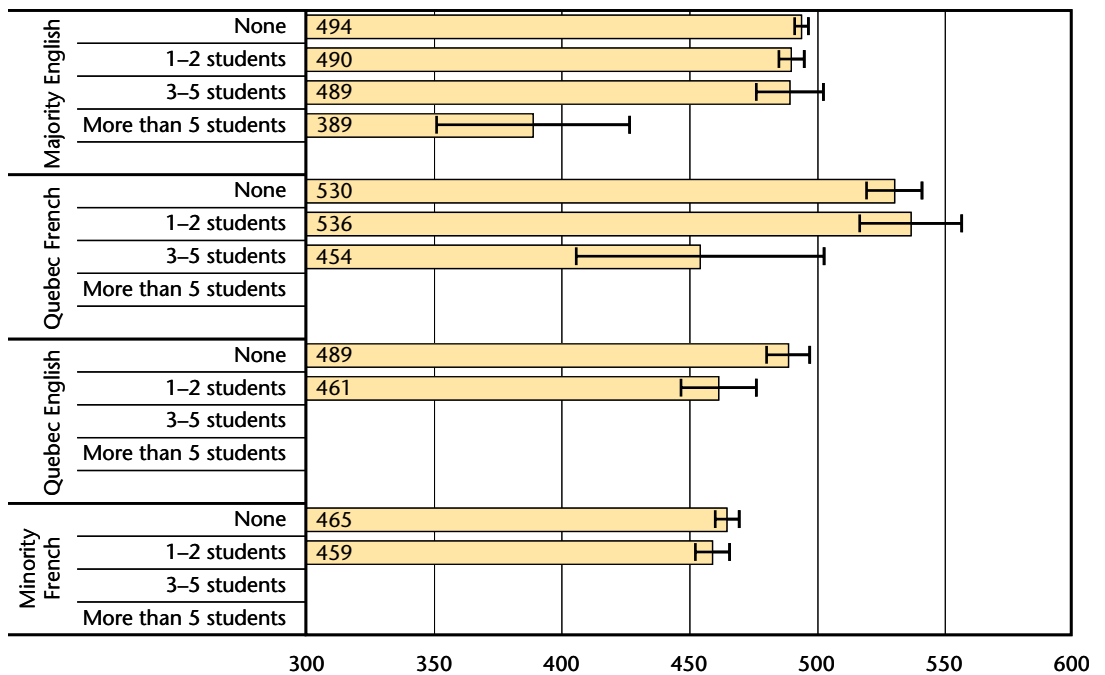
For students who require special attention to reduce class disruptions, there is a global linear and negative trend in the relationship to mean reading scores, with a few exceptions in this general trend. No consistent pattern is observed for the Minority French group (Chart 6-6).

CHART 6-6 Mean reading scores by number of students requiring special attention to reduce disruption by language group



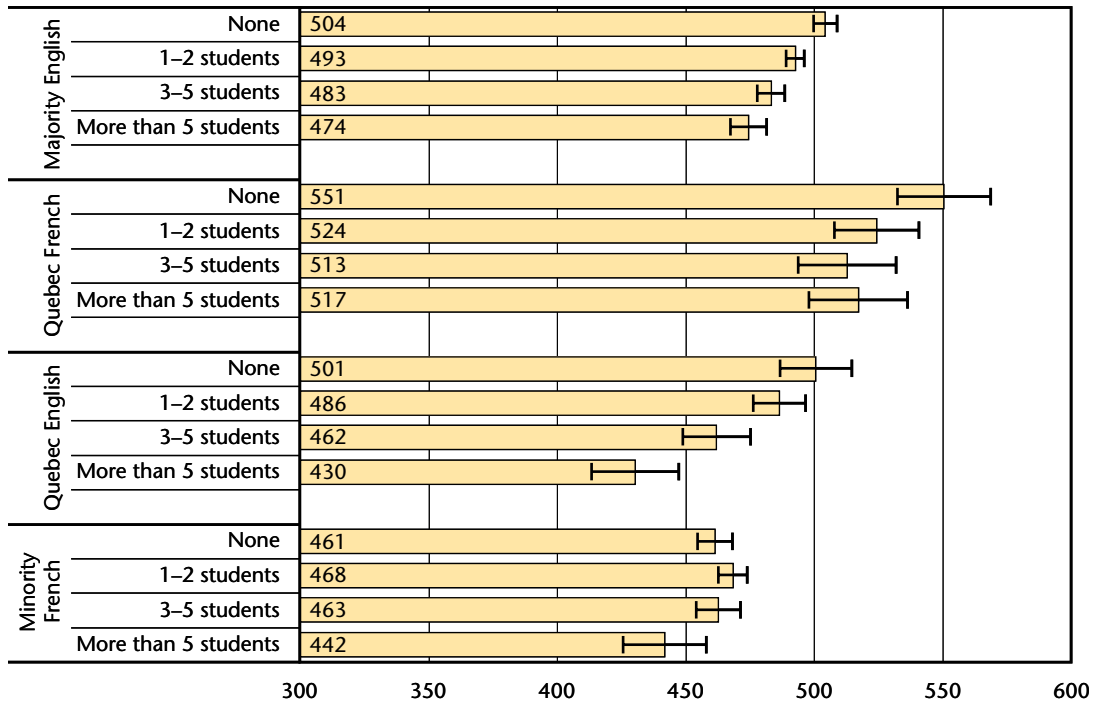
The relationship between reading and the number of students who need medical attention differs across linguistic groups, and the number of students in certain categories was too small to report (Chart 6-7). Because of missing observations for the Minority French group, no significant relationship is found. The Quebec English group also has missing observations for the last two categories, but the difference in mean reading score between the first two categories is statistically significant. In the Quebec French group, there are no observations in the “more than 5 students” category, but the mean reading scores of the first two categories are higher than that of the third category (3–5 students). In the Majority English group, students of teachers reporting “more than 5 students” who need medical attention have a mean reading score that is significantly lower from those of the other three categories, the latter not being different from each other.

CHART 6-7 Mean reading scores by number of students needing medical attention by language group



Finally, the number of students who require assistance with reading, speaking, and listening is more linearly related to mean reading scores for the Quebec English and the Majority English groups than it is for the other two groups (Chart 6-8).

CHART 6-8 Mean reading scores by number of students requiring assistance with reading, writing, speaking, listening by language group

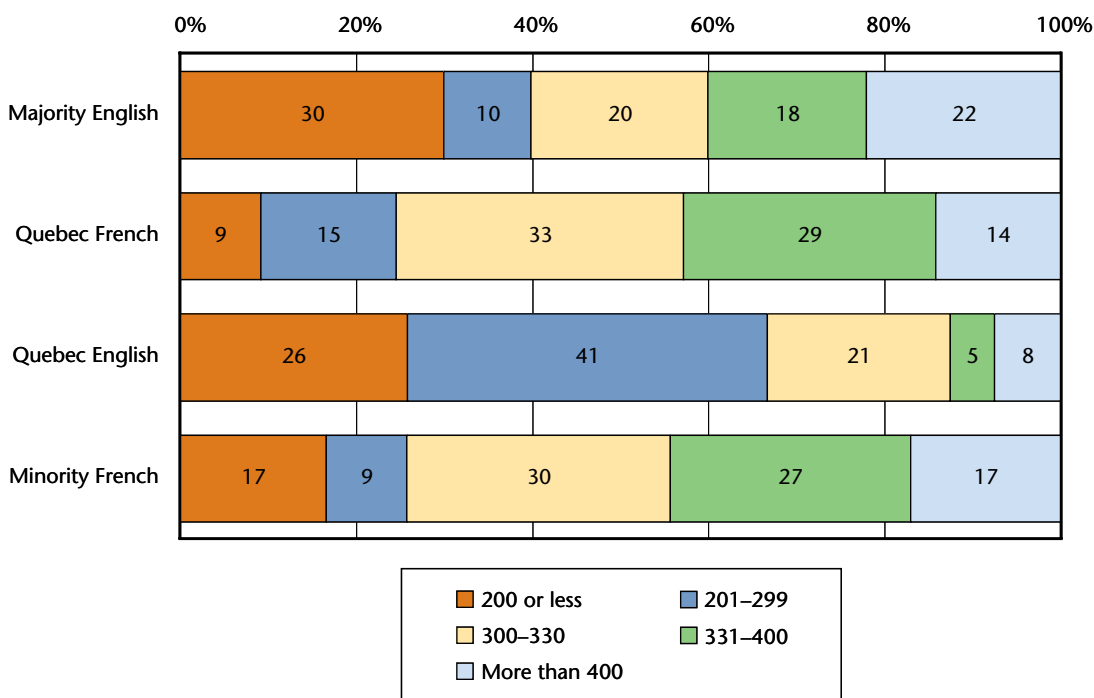


Time variables

Five selected instructional process variables are grouped in this section because they are related to time: a) minutes per week on language arts; b) frequency of homework assignment in language arts; c) the teacher-expected minutes per week spent in language arts homework; d) student average weekly total homework; and e) student average weekly language arts homework.

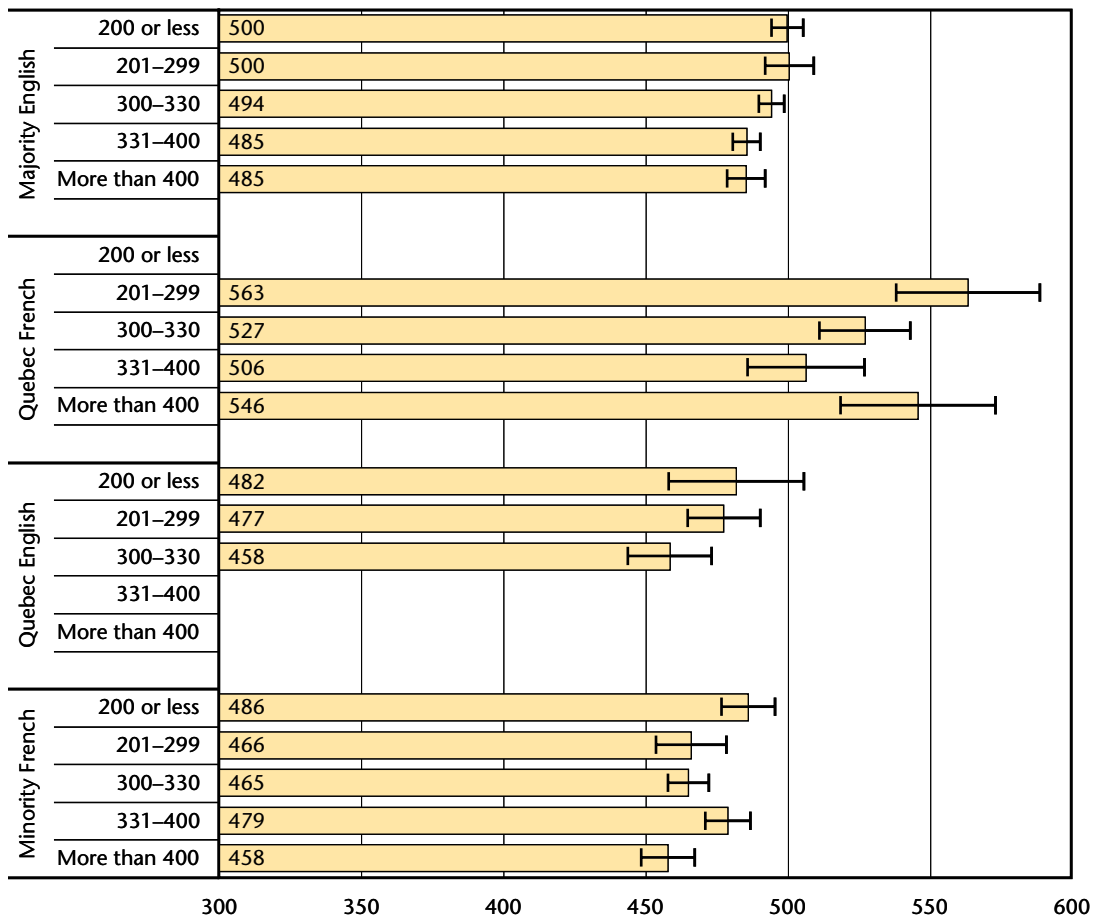
The number of minutes per week spent on language arts was reported on the School Questionnaire by school principals, and the responses were given for language arts classes attended by 13-year-old students. Responses in minutes were grouped into five categories as shown in Chart 6-9. The Majority English group has both the largest percentage of students having 200 or less minutes of language arts per week, and also the largest percentage of students having more than 400 minutes. The Quebec French and the Minority French groups have the larger percentages of students having between 331 to 400 minutes of language arts per week. The Quebec English group has the largest percentage of students, with between 201 and 299 minutes per week.

CHART 6-9 Minutes per week on language arts by language group



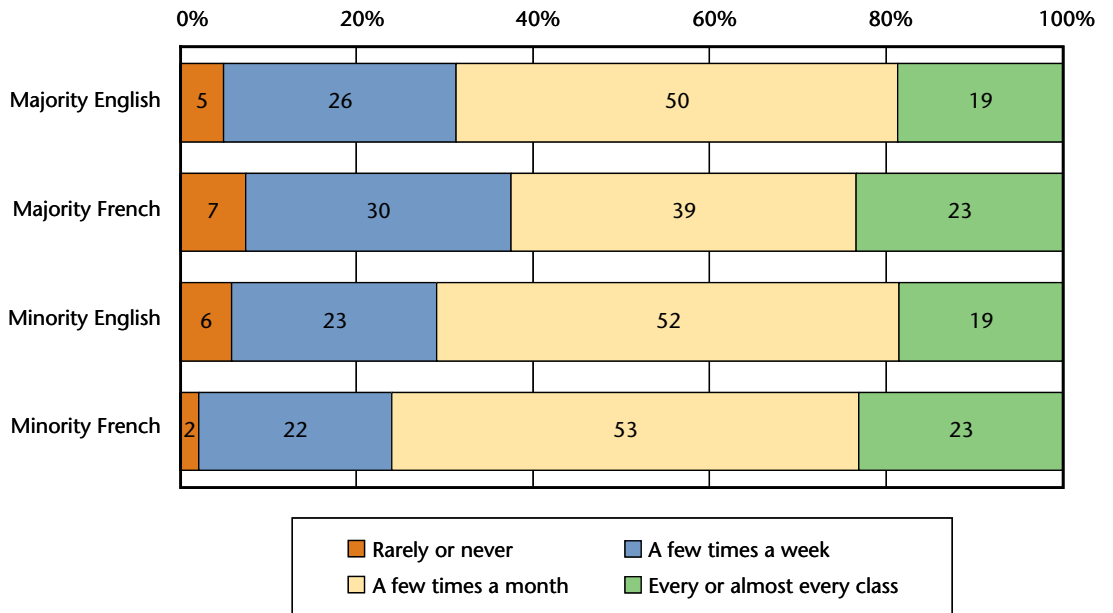
The relationship between minutes on language arts per week and mean reading scores is presented in Chart 6-10. This relationship is not consistent across groups. For the Majority English group, a modest linear and negative relationship is found. Contrary to the expected trend, scores tend to be weaker for the schools that devote the most time to language arts. These results may be explained by factors not specified in the questions and therefore unknown. For example, it is possible that the schools that had low scores in previous evaluations might have increased the time spent on language arts. The linear trend for the Quebec French group holds for only the second, third, and fourth response category subgroups; for the first subgroup (200 or less minutes per week), there were missing observations; and for the fifth subgroup (more than 400 minutes per week), the mean reading score is not statistically different from that of the other groups. The Quebec English group has valid data only for the first three subgroups, in which a negative linear trend is also observed, but the differences are not statistically significant. Finally, for the French Minority group, the results are not linearly distributed. However, two subgroups (200 or less minutes; 331–400 minutes) tend to have the highest mean reading scores.

CHART 6-10 Mean reading score by minutes per week on language arts by language group



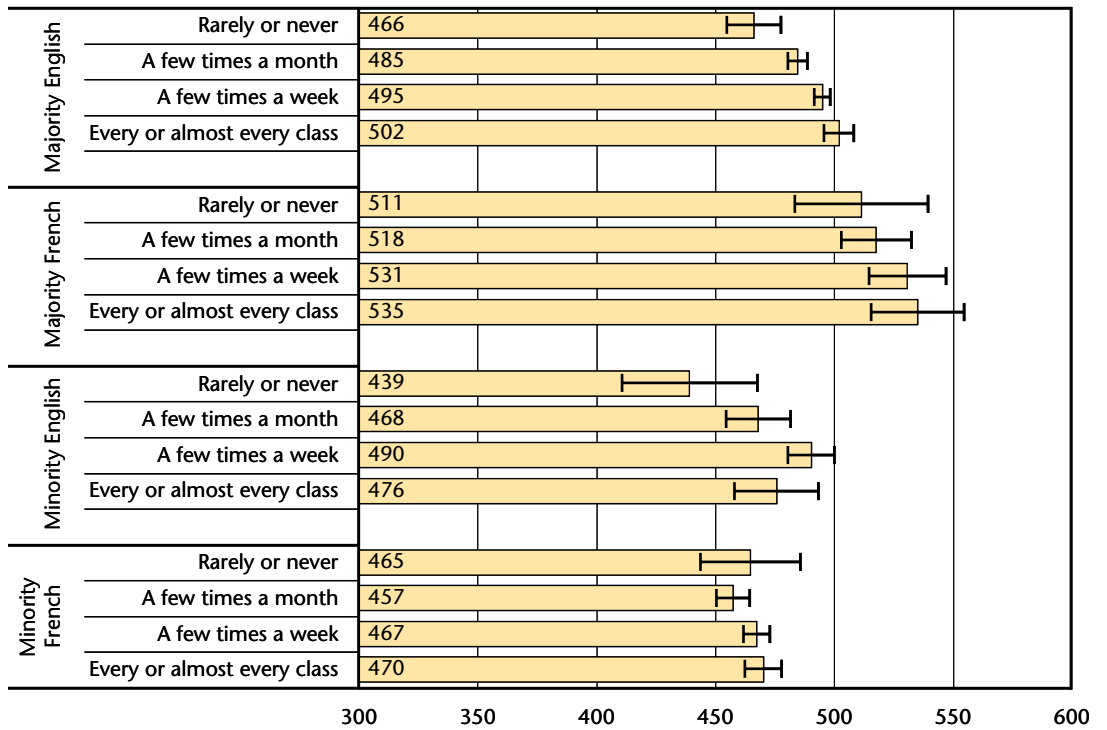
The results for frequency of homework assigned by language arts teachers are presented in Chart 6-11. As shown, very few teachers report giving language arts homework rarely or never. The Minority French group has the smallest percentage of teachers giving language arts homework a few times a week. The percentages of teachers who assign homework every or almost every class vary little across groups.

CHART 6-11 Frequency of teacher assignment of language arts homework by language group



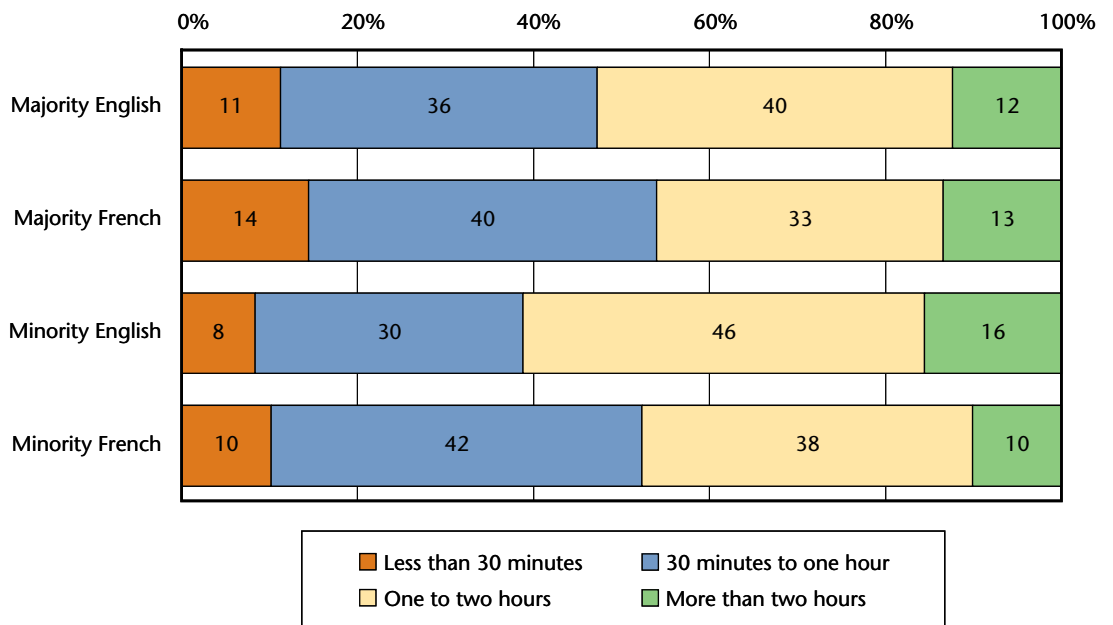
The relationship between the frequency of assigning language arts homework and mean reading scores is shown in Chart 6-12. A moderately positive linear relationship is found for the Majority English group. A similar relationship is observed in the Quebec French group, but all differences are statistically non-significant. For the Majority English group, the difference in mean reading scores between classrooms that are rarely or never assigned homework and those that are assigned homework a few times a week is statistically significant, but the differences with the other two subgroups are not. In the Minority French group, the frequency of assigning language arts homework is not related to mean reading scores.

CHART 6-12 Mean reading scores by frequency of teacher assignment of language arts homework by language groups



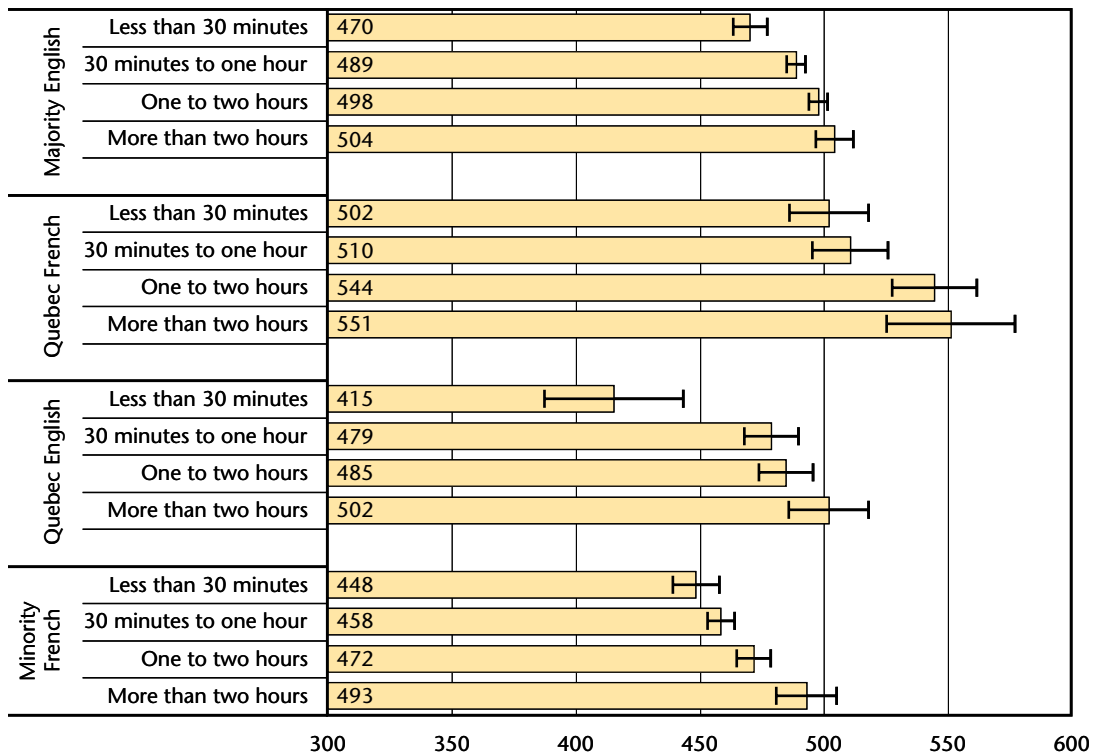
Teachers were also asked to estimate the number of minutes per week that they expected their students to spend on their language arts homework, from less than 30 minutes per week to more than two hours. Results by language group are presented in Chart 6-13. The Minority French and the Majority French groups have the highest percentages of teachers (52% and 54%, respectively) who expect their students to spend from less than 30 minutes to up to one hour per week on their language arts homework. The Minority English group has the lowest percentage (38%) in these two categories.

CHART 6-13 Expected minutes per week of language arts homework by language group



Expected time on homework and its relationship to reading achievement is presented in Chart 6-14. For all linguistic groups, the relationship is linear and positive. Higher expectations are related to higher mean reading scores. We can estimate the effect of this variable by calculating the difference in mean reading scores between the low expectation (less than 30 minutes) and the high expectation (more than two hours) categories and interpreting this difference in terms of standard deviation units. Effects for the differences between the low and the high expectations categories range from 0.34 standard deviation for the Majority English group to 0.87 standard deviation for the Quebec English group.

CHART 6-14 Mean reading scores by expected minutes per week of language arts homework by language group



Two questions on the Student Questionnaire were related to time spent on homework — the first pertained to total homework, the second to language arts homework. The results for these two variables are presented in charts 6-15 and 6-16, respectively.

For average weekly total time on homework, the New Brunswick French group has the largest percentage of students (24%) who spend less than 30 minutes a week on total homework. This group also has the largest percentage of students (53%) who spend less than an hour, and the smallest percentage (25%) of students who spend more than 2 hours on their total homework. Differences between the other groups are minimal. A similar situation can be observed in Chart 6-16 where results for average weekly time on language arts homework are presented. The New Brunswick French group again has the largest percentage of students dedicating little time to language arts homework and the smallest percentage of students doing one hour or more of language arts homework. The relationship between time on total homework and time on language arts homework as regards students' mean reading scores is presented in charts 6-17 and 6-18.

CHART 6-15 Student average weekly time spent on total homework

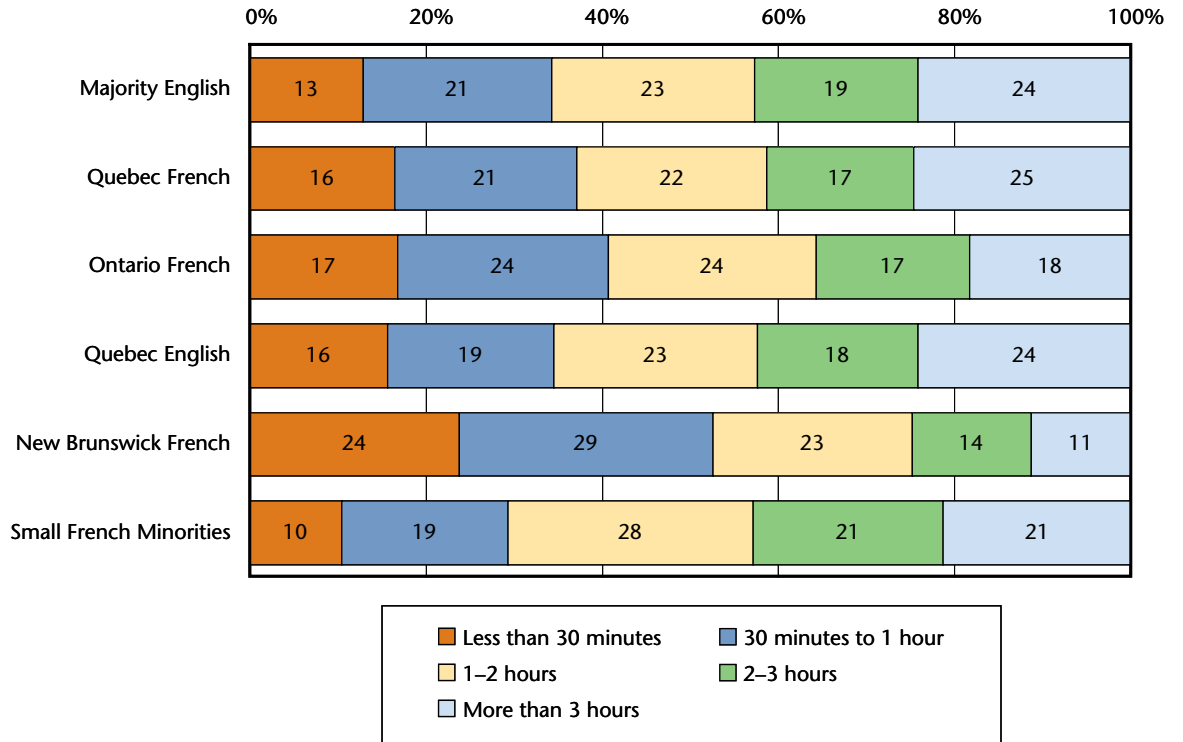
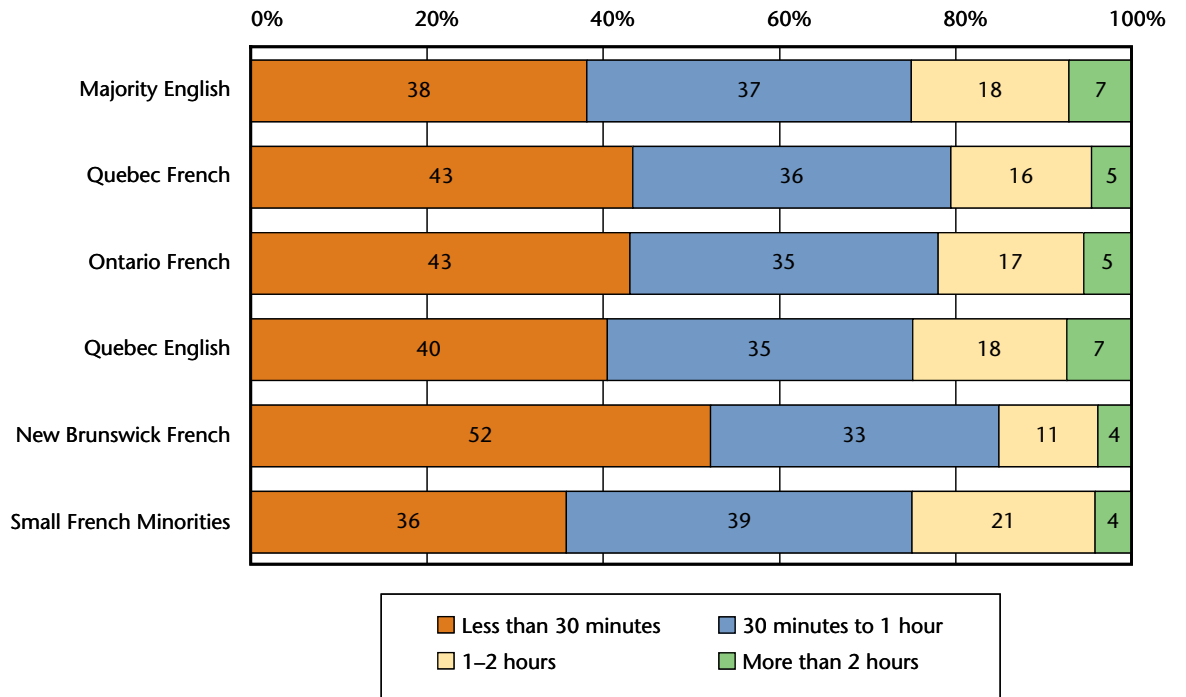


CHART 6-16 Student average weekly time on language arts homework



The general trend for the relationship of students' time spent on total weekly homework to their mean reading scores is linear and positive. Students who devote more time to their total homework generally have higher mean reading scores than students who spend less time. One exception is the subgroup of students in the New Brunswick French group who do more than 3 hours of homework per week. The effect is generally strong, even though not all subgroups differ statistically from each other.

CHART 6-17 Mean reading scores by students' average weekly time on total homework

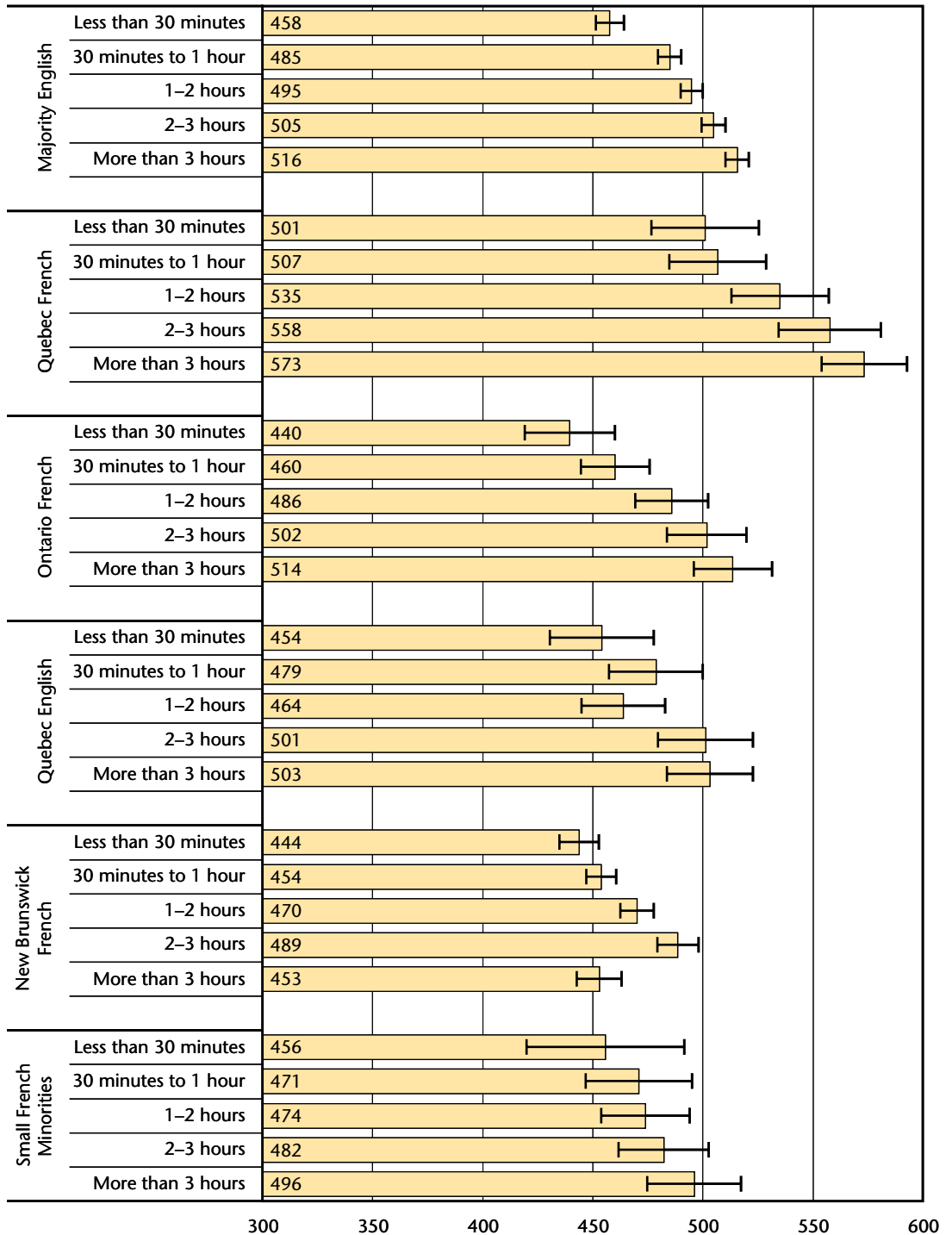
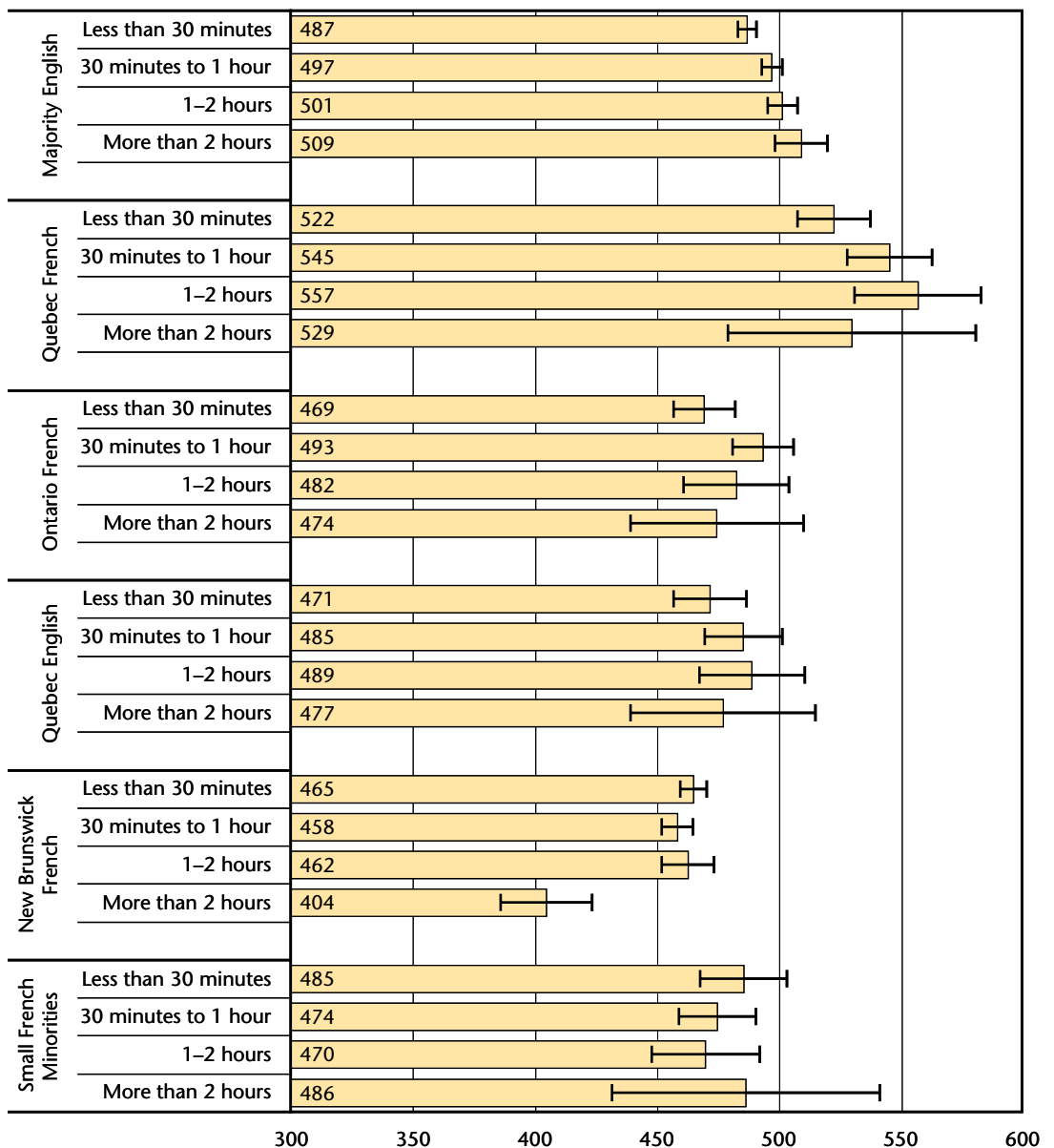


Chart 6-18 shows the relationship between time on language arts homework and mean reading scores for each language group. This relationship, although specific to the subject matter being assessed, tends to be less consistent and linear. A general linear relationship is found for the Majority English group, but the effect is smaller for time on language arts homework than for time on total homework. For four of the six groups, the 2–3 hours subgroup tends to have a lower mean reading score than the adjacent subgroup who spend 1–2 hours weekly on language arts homework. It is possible that some of the students who devote more time to homework are doing it on remedial or catch-up activities, while others could be working on regular homework or enrichment activities. Such possible diversity in homework activities make it difficult to show a consistent relationship between time on task and mean reading scores. Indeed, as shown in Chart 6-18, most of the time-on-homework subgroups are not statistically different from each other.

CHART 6-18 Mean reading scores by student average weekly language arts homework



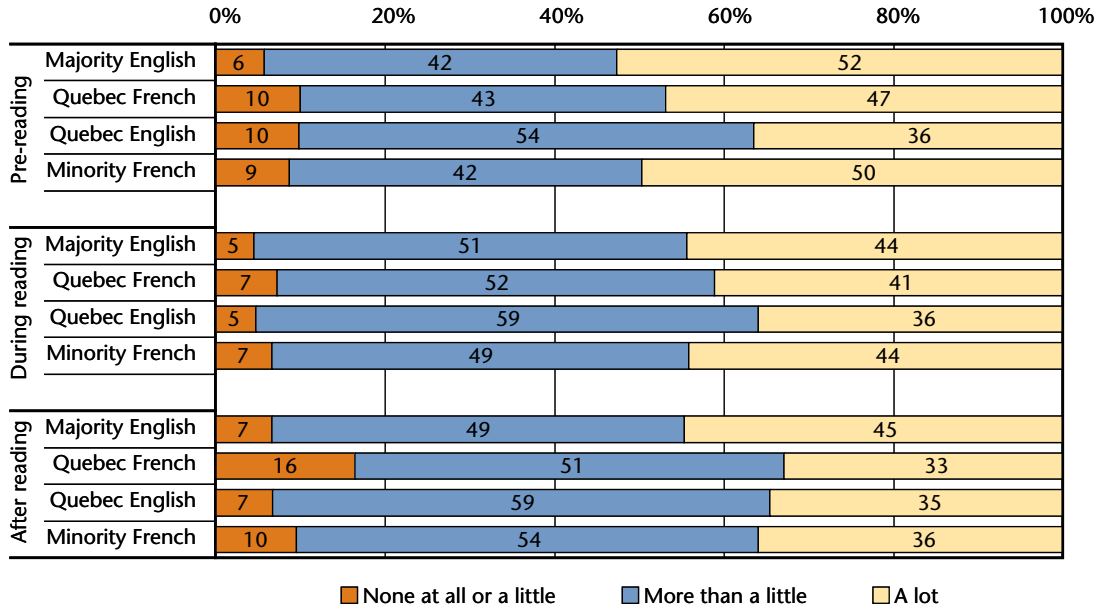
Teaching strategies

In this section, we present results mainly from the Teacher Questionnaire that pertain to reading or reading enhancement strategies. Although teaching reading as a formal activity takes place in the earlier grades, teachers can still emphasize the reading process by focusing on activities that reinforce effective reading practices.

One section of the Teacher Questionnaire dealt with teaching strategies used before, during, and after reading. The strategies measured are presented in Chart 6-19. Within the same category of strategies (before, during, and after), responses to individual items were highly correlated. A single factor emerged within each of the three categories. An average score for each teacher and for each of the response categories was calculated and rounded so that the average use of these strategies could be compared across groups.

Chart 6-19 shows for each language group the percentage of teachers using these strategies not at all or a little, or more than a little, or a lot. The Quebec English group has the lowest percentage of teachers (36%) using the pre-reading strategies a lot. This group also has a tendency to use the during reading and the after reading strategies less, but for the after reading strategies only the Majority English group has a higher average use. For the after reading strategies, the Quebec French group has the highest percentage of teachers (16%) who use these strategies not at all or a little. The Majority English group is among the highest users of all three strategies.

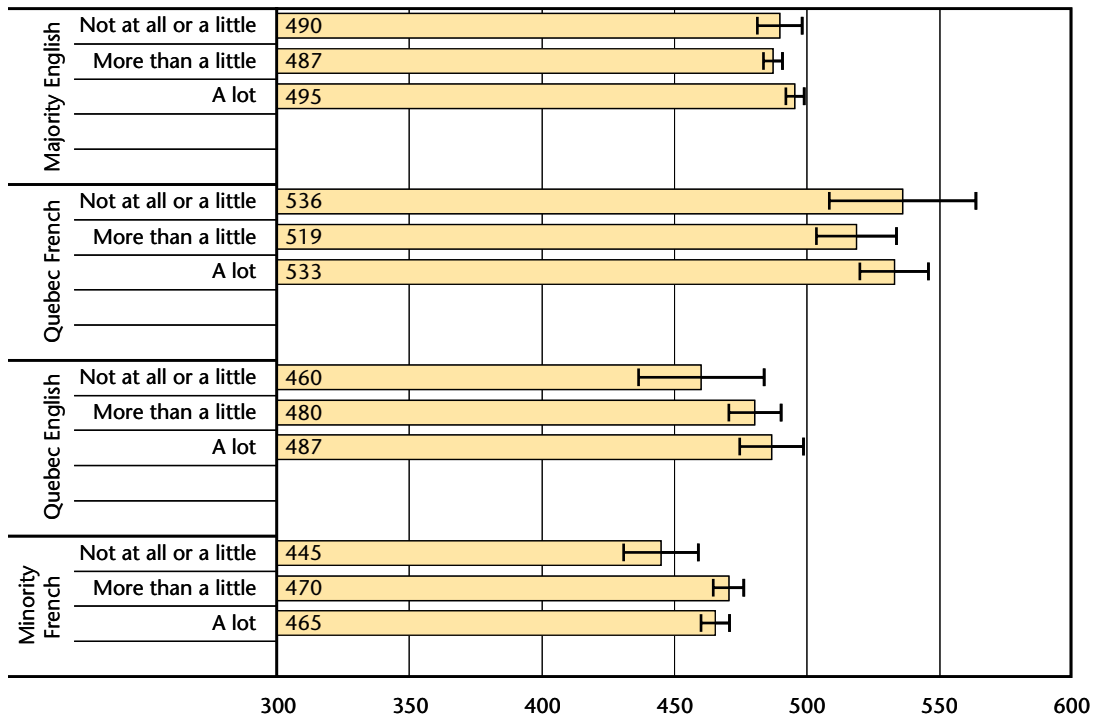
CHART 6-19 Percentage of teachers using pre-reading, during reading, and after reading strategies by language group



Charts 6-20 to 6-22 show the relationship to mean reading scores of the before, during, and after reading strategies. For some response categories, especially the “not at all” category, the number of respondents was small and the errors were very large. Those response categories are not shown in the graphs.

As seen in Chart 6-20, the use of pre-reading strategies has no systematic relationship to mean reading scores, and the patterns are different in each language group. There is, however, a statistically significant difference in the Minority French group between the students of teachers who use pre-reading strategies a little and those of teachers who use the strategies more than a little and a lot.

CHART 6-20 Mean reading scores for teacher use of pre-reading strategies by language group



For the during reading strategies (Chart 6-21), a statistically significant difference is found in the Minority French group. The students of teachers who use these strategies a little have a lower mean reading score than the students of teachers who use them a lot. A similar linear trend is observed in the Majority English group. For the other two groups, no statistically significant differences are found.

CHART 6-21 Mean reading scores for teacher use of during reading strategies by language group

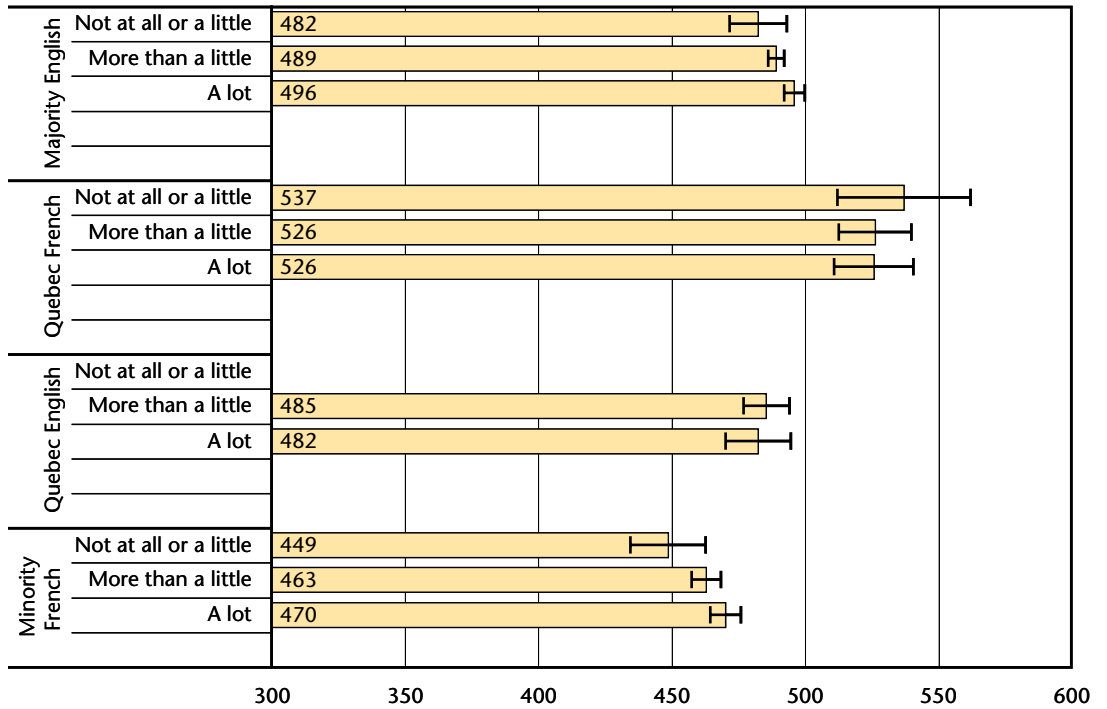
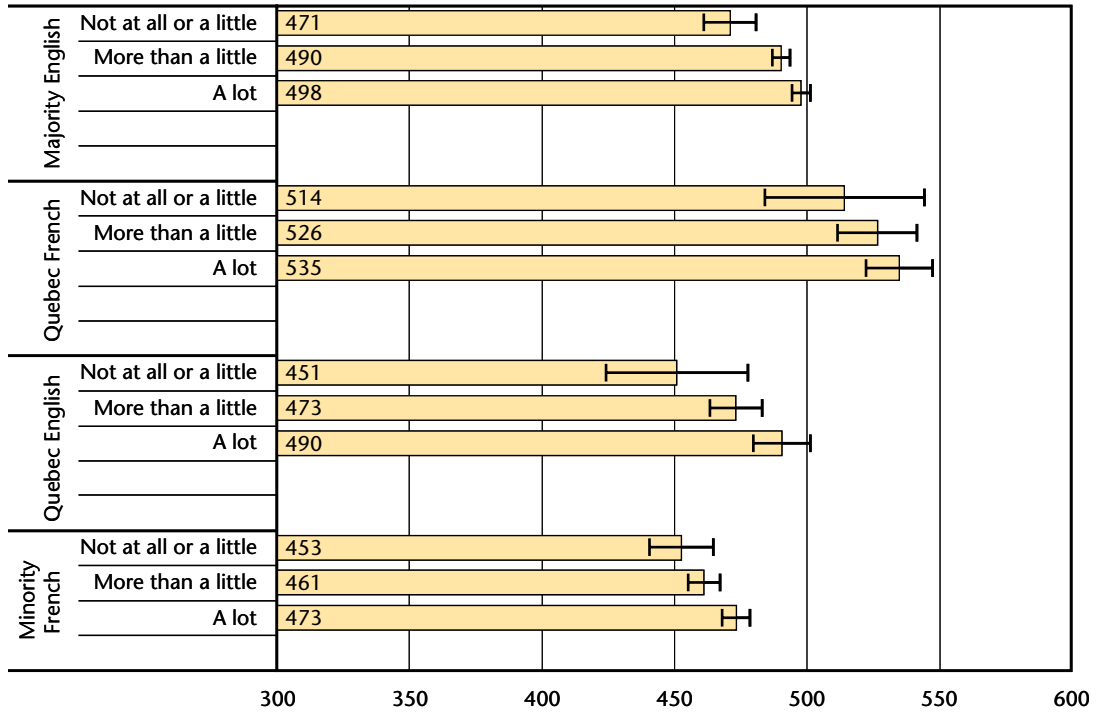


Chart 6-22 shows the relationship to mean reading scores for the after reading strategies. The use of these strategies tends to be positively and linearly related to mean reading scores for all four language groups, though not all of the adjacent categories are significantly different from each other.

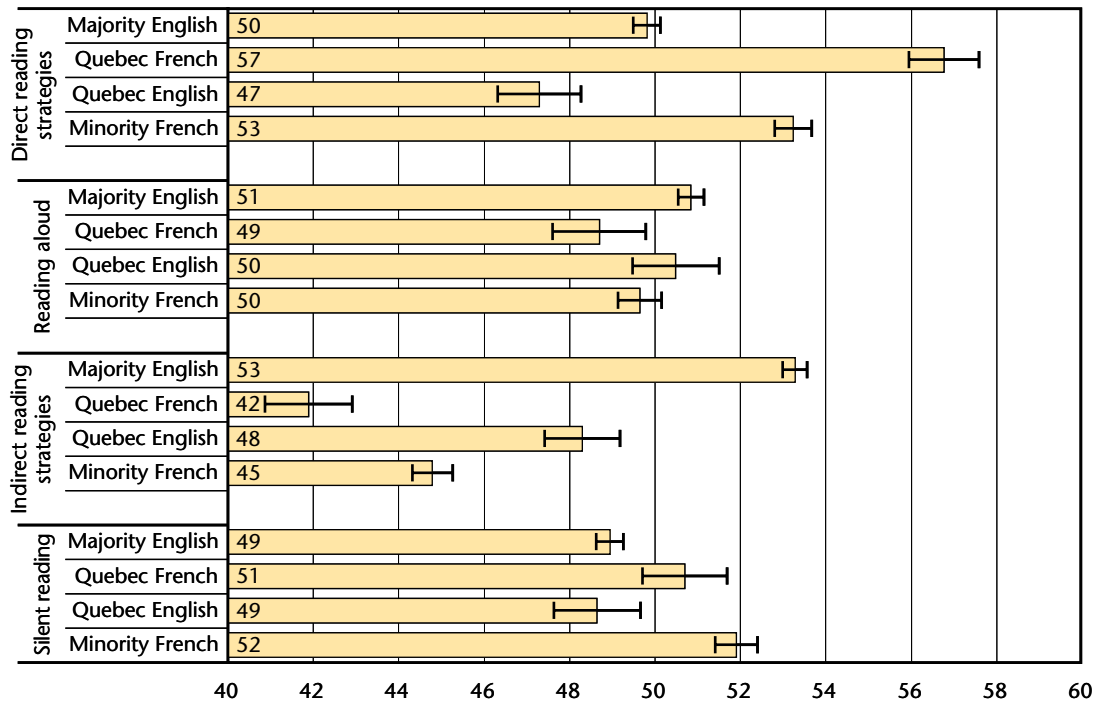
CHART 6-22 Mean reading scores for teacher use of after reading strategies by language group



A factor analysis was done on a set of eleven specific teaching strategies in reading. This yielded a four-factor solution. The first factor is labelled “direct reading” instruction since it groups together the use of strategies that consist of directly teaching certain skills to students (e.g., specific reading strategies, basic rules of language, the use of research tools such as dictionaries and encyclopedias). The second factor grouped two items that dealt with the teacher reading aloud to students and the students reading aloud to the whole class or in groups. This factor is labelled “reading aloud.” A third factor, “silent reading,” groups together two strategies that promote the use of silent reading either with teacher-selected material or with student-selected material. The fourth factor is called “indirect strategies.” It involves the use of discussion and the use of graphic organizers. In Chart 6-23, mean factor scores (Canadian mean of 50 and a standard deviation of 10) are presented for the language groups on all four types of strategies.

The Quebec French group and the Minority French group have the highest mean factor scores for the use of “direct strategies.” The Quebec English group has the lowest factor score. Groups do not vary much on the use of “reading aloud” strategies. The Majority English group has the highest mean factor score for the use of “indirect strategies,” a score that is 1.1 standard deviation above that of the Quebec French group which has the lowest mean factor score. The Minority French group also has a relatively low mean factor score, whereas the Quebec English score is the closest to the mean of 50. “Silent reading” strategies tend to be used more often by the two French groups, but differences between the groups tend to be modest. Charts 6-24 to 6-27 show the relationships between the use of these four different types of strategies and mean reading scores.

CHART 6-23 Mean factor scores for teacher reading strategies by language group



The use of direct reading strategies is not systematically related to mean reading scores (Chart 6-24). The same is observed for reading aloud strategies (Chart 6-25), indirect reading strategies (Chart 6-26) and silent reading (Chart 6-27). A positive linear relationship is found for the use of indirect reading strategies by teachers in the Quebec French group, but errors are fairly large and quintile group differences are not statistically significant.

CHART 6-24 Mean reading scores for direct reading strategies quintiles by language group

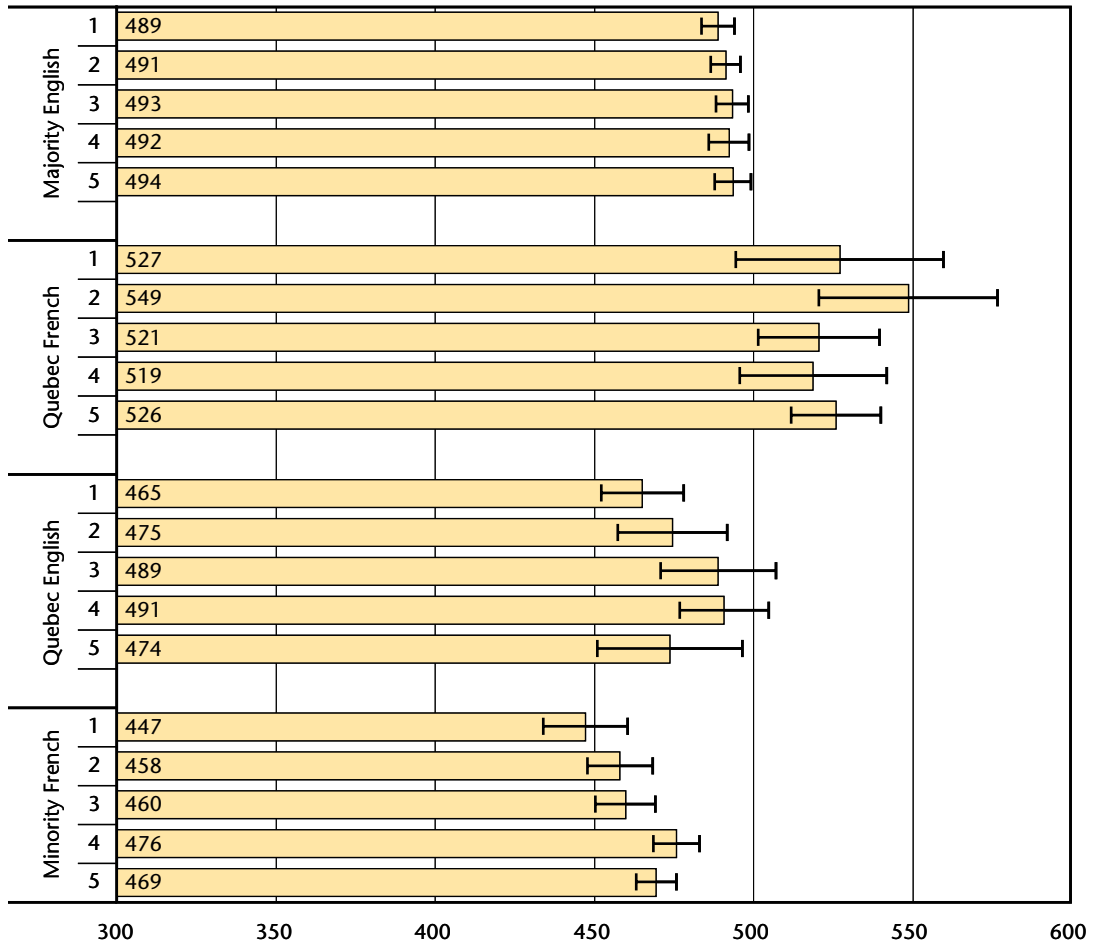


CHART 6-25 Mean reading scores for reading aloud strategies quintiles by language group

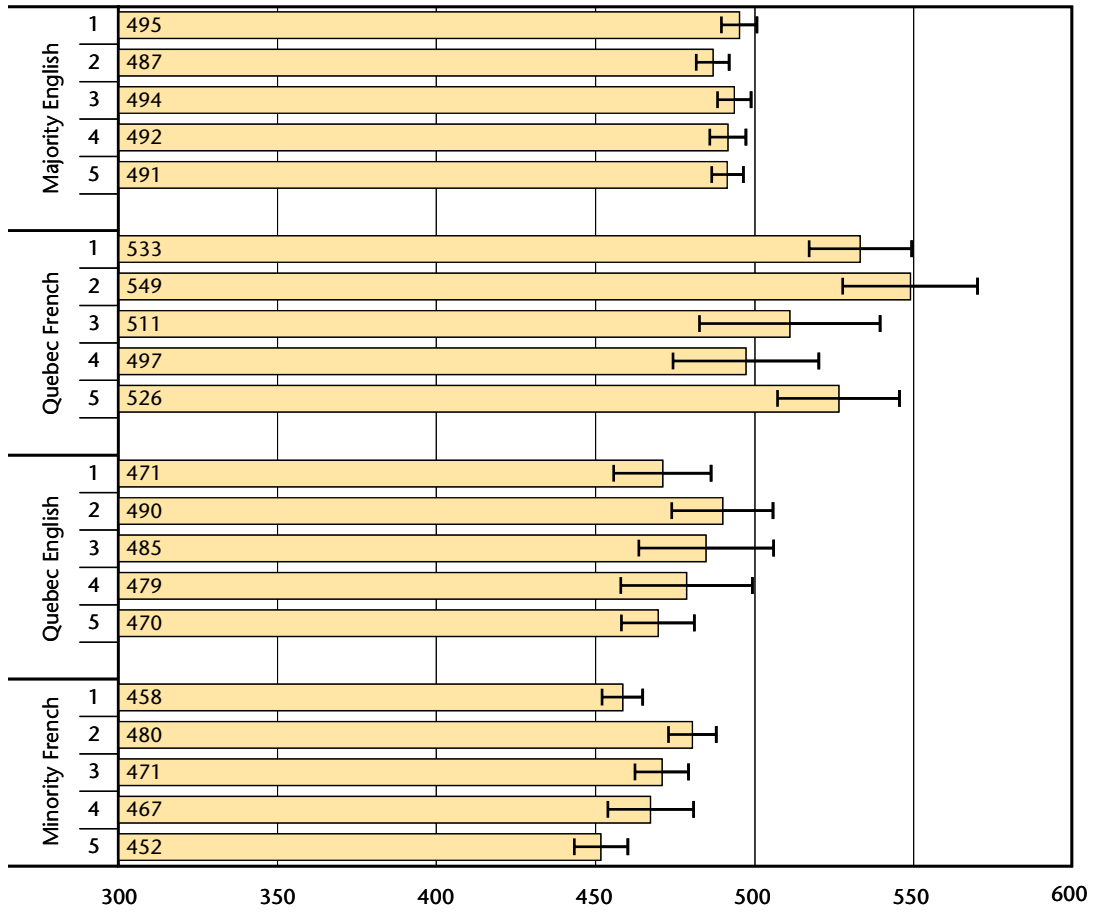


CHART 6-26 Mean reading scores for indirect reading strategies quintiles by language group

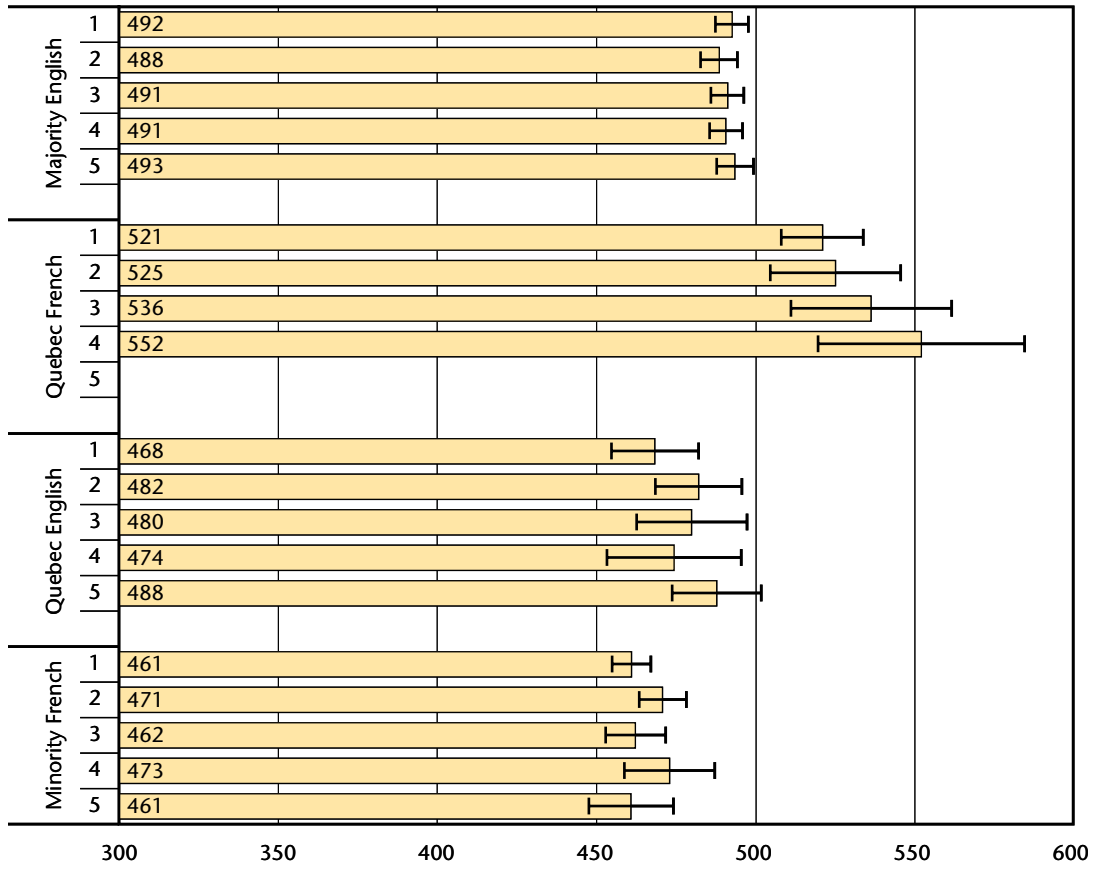
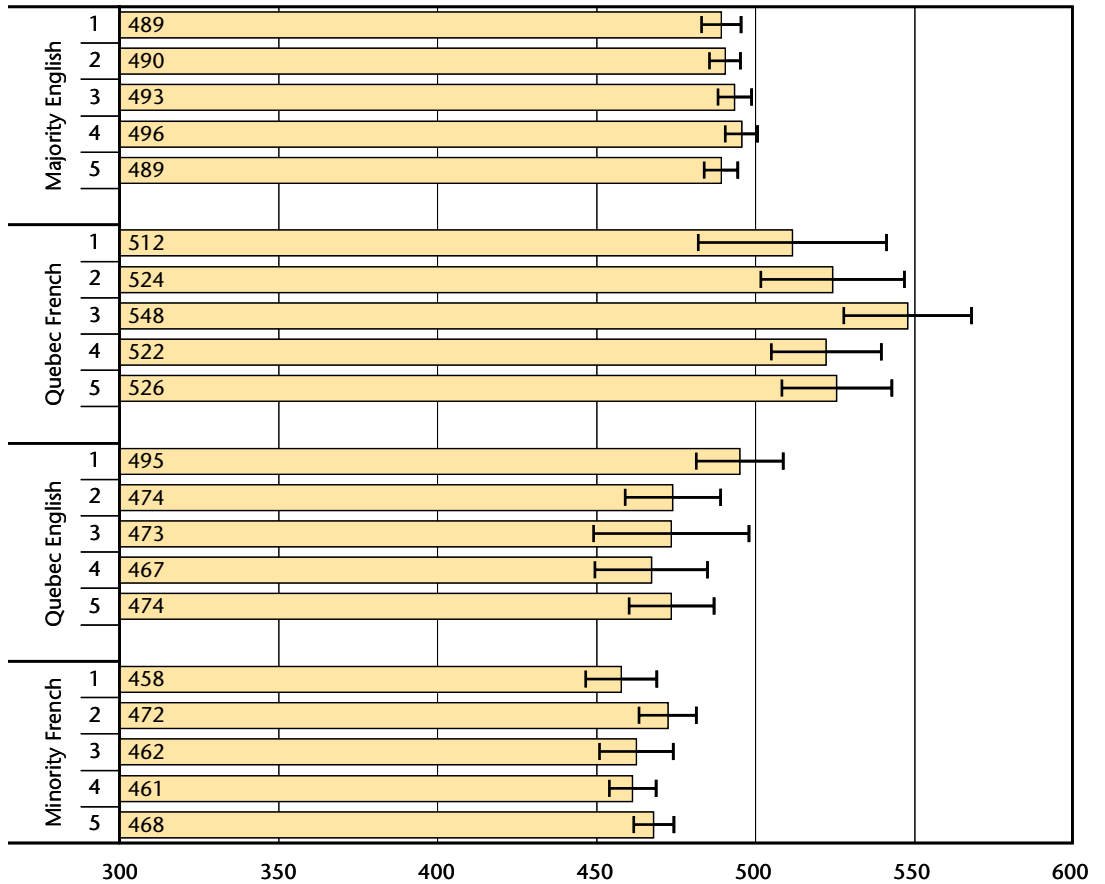


CHART 6-27 Mean reading scores for silent reading strategies quintiles by language group

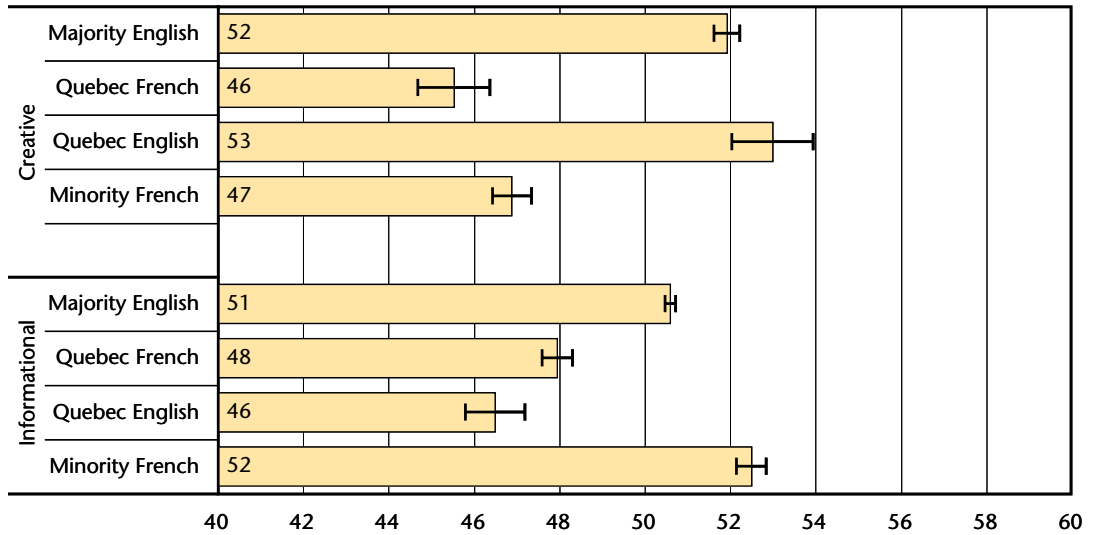


Reading materials

Teachers were asked how often they used different types of reading materials. A factor analysis grouped six types of materials into two factors. The first factor grouped together the items related to “procedural,” “informational,” and “persuasive” materials. The second factor was also related to “persuasive” materials but encompasses within it “narrative,” “poetry,” and “drama” materials. The first factor was labelled “informational” and the second “creative.” Mean factor scores showing the relative use of these two types of materials are shown in Chart 6-28.

A language difference is found in the use of “creative” reading materials. The two French groups have a lower use of these materials than the two English groups. The use of “informational” materials is the lowest among the Quebec English teachers and the highest among Minority French group teachers. All four language groups are statistically different from each other.

CHART 6-28 Mean factor scores for teacher use of reading materials by language group



Charts 6-29 and 6-30 show the relationship between the use of “creative” materials and the use of “informational” materials with mean reading scores. In all groups, the frequency of using creative materials tends to be positively and linearly related (with a few exceptions) to mean reading scores (Chart 6-29). Use of “informational” materials, however, shows no relationship to mean reading scores (Chart 6-30).

CHART 6-29 Mean reading scores for teacher use of “creative” reading materials by language group

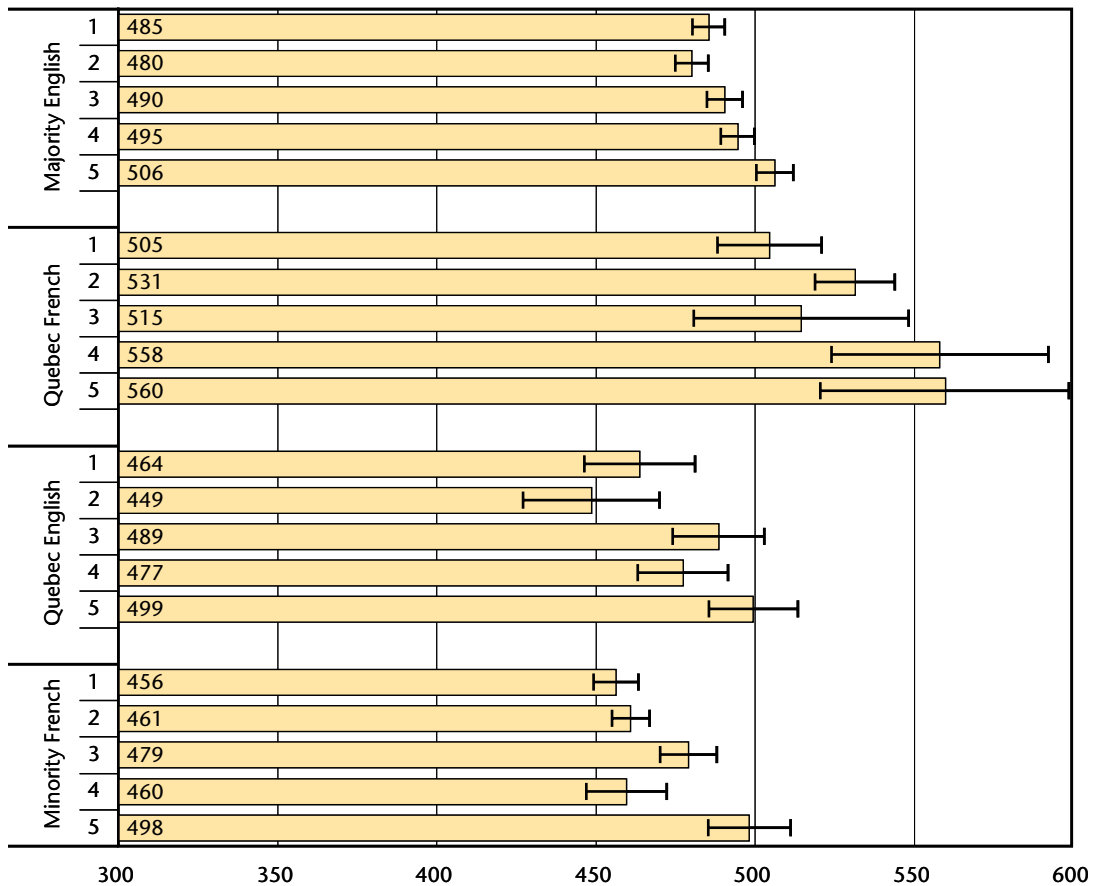
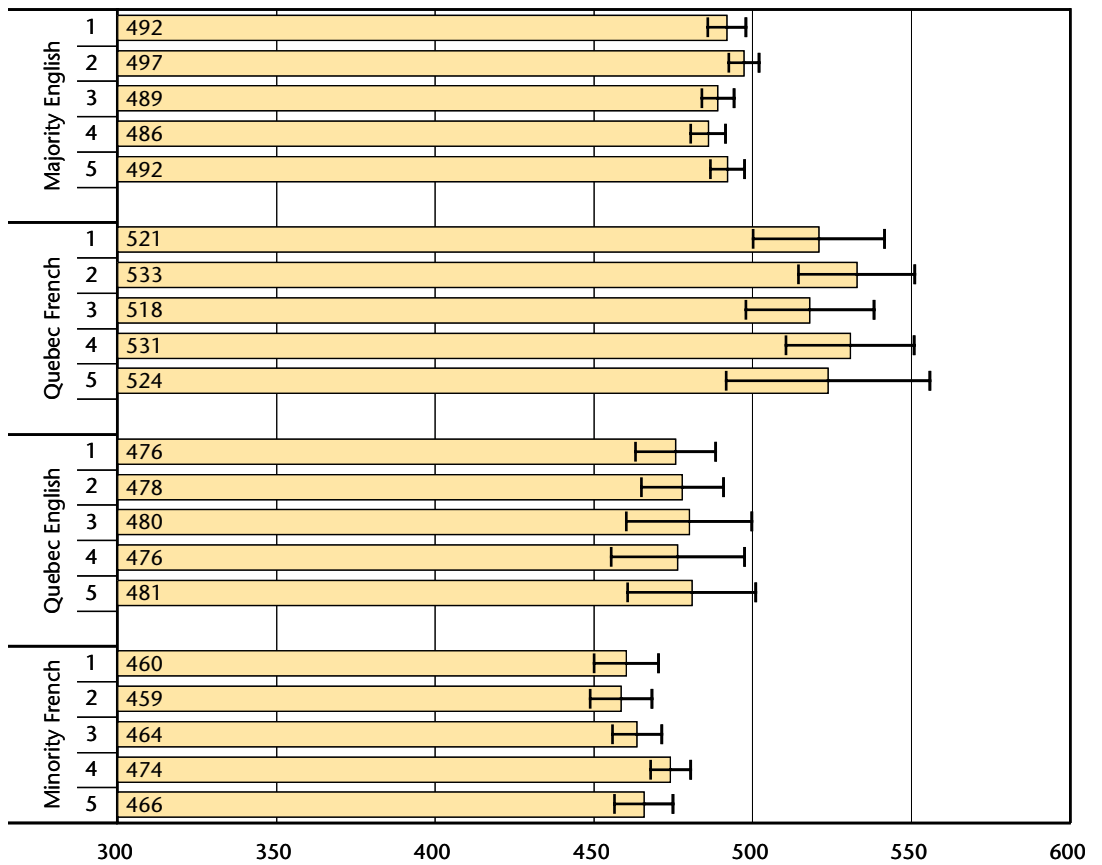


CHART 6-30 Mean reading scores for teacher use of “informational” reading materials by language group

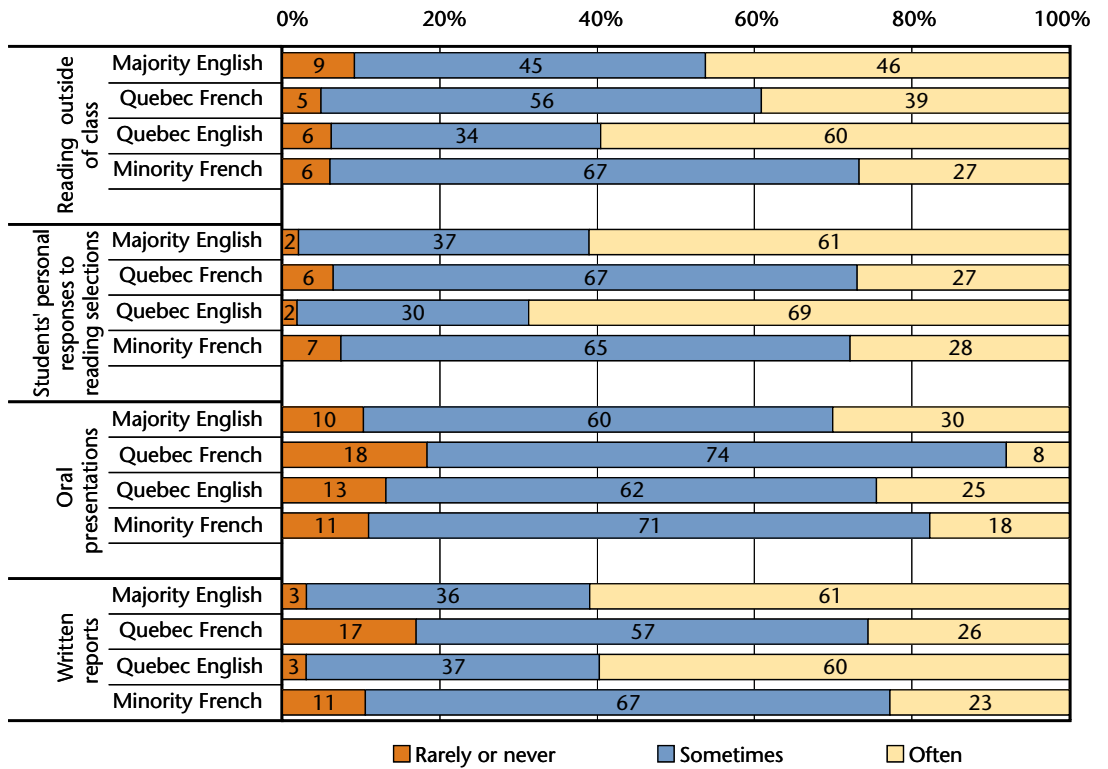


Teacher assignments

Teachers were asked how often they assigned students certain tasks related to reading. Four types of reading tasks and their frequency of use by teachers in the four language groups are shown in Chart 6-31.

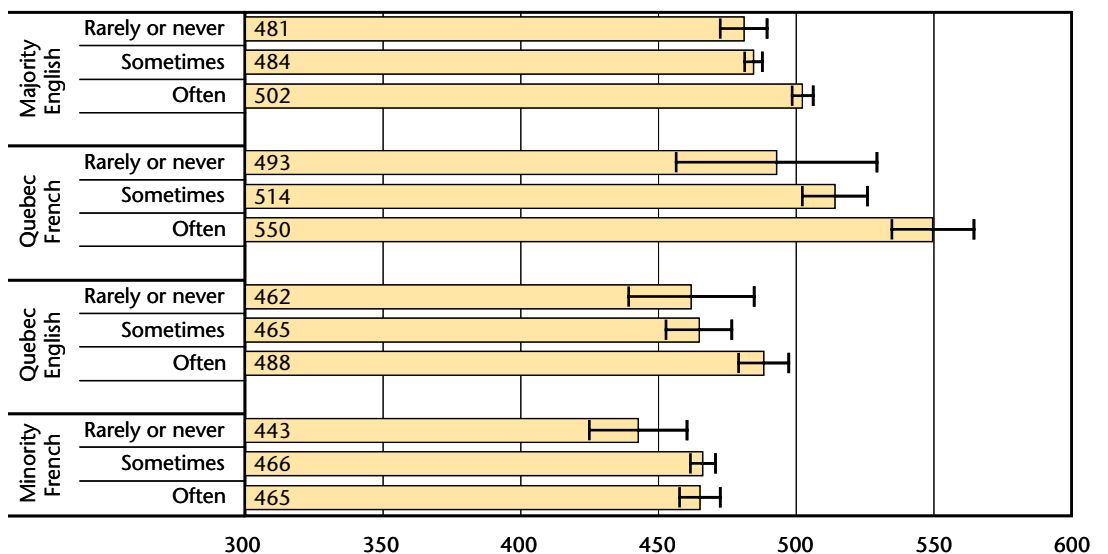
As shown in Chart 6-31, the Quebec English group has the highest percentage of teachers (60%) who often give reading assignments outside of class. The Minority French group has the lowest percentage (27%). The two French groups have by far the lowest percentages of teachers that ask students to give personal responses to selected readings. The Majority English and the Quebec English groups have the highest percentages of teachers asking students to give oral presentations; the Quebec French group has the lowest percentage. Finally, the two English groups differ from the two French groups in the percentage of teachers asking for written reports on assigned texts, the latter using this strategy much less often. The relationships between the use of these assignments and mean reading scores are shown in charts 6-32 to 6-35.

CHART 6-31 Teacher assignments of reading tasks by language groups



As shown in Chart 6-32, assignment of reading outside of class tends to be positively and linearly related to mean reading scores. The differences are the largest for the Quebec French group. Although the relationship is positive, some adjacent frequency of use categories are not statistically different from each other.

CHART 6-32 Mean reading scores by teacher assignment of reading outside of class by language group



Asking for personal responses to reading assignments is not systematically related to mean reading scores (Chart 6-33). Use of oral presentations, after reading assignments, tends to be positively related to mean reading scores for all groups except the Minority French group (Chart 6-34). However, the differences are only statistically significant for the “sometimes” versus the “often” categories. For the “rarely or never” response category, the errors tend to be large because of the small number of teachers choosing this response category. A similar trend is observed for the written reports. Except for the Minority French group, frequency of use of this strategy tends to be positively and linearly related to mean reading scores, but differences are not generally statistically significant (Chart 6-35).

CHART 6-33 Mean reading scores by teacher assignment of personal response to reading by language group

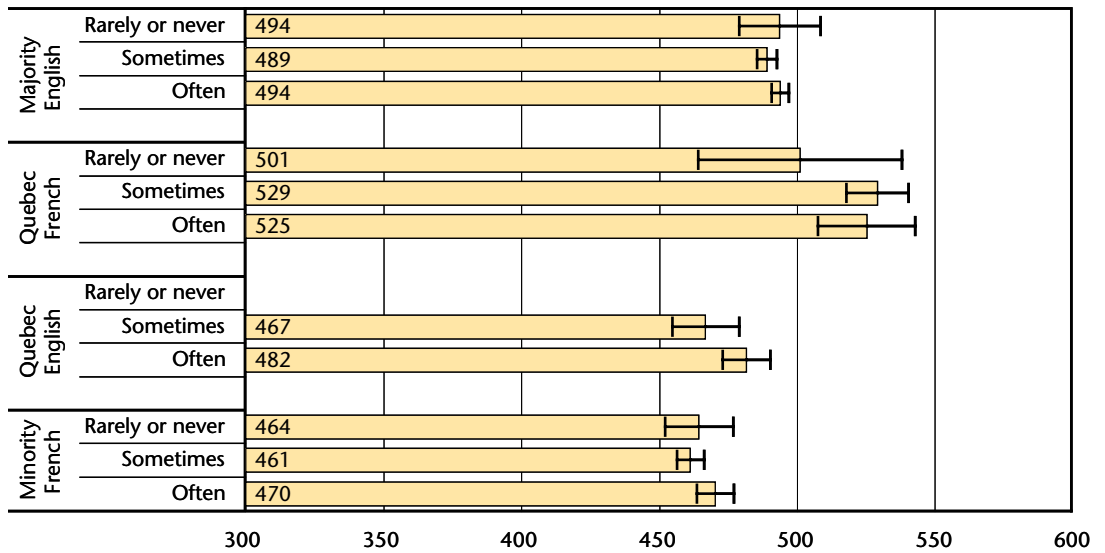


CHART 6-34 Mean reading scores by teacher assignment of oral presentations by language group

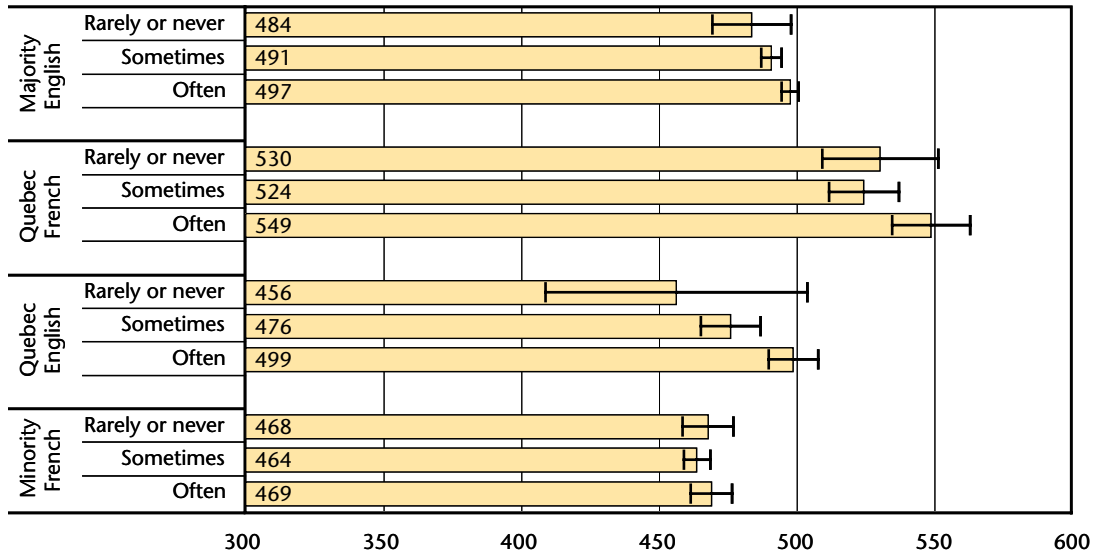
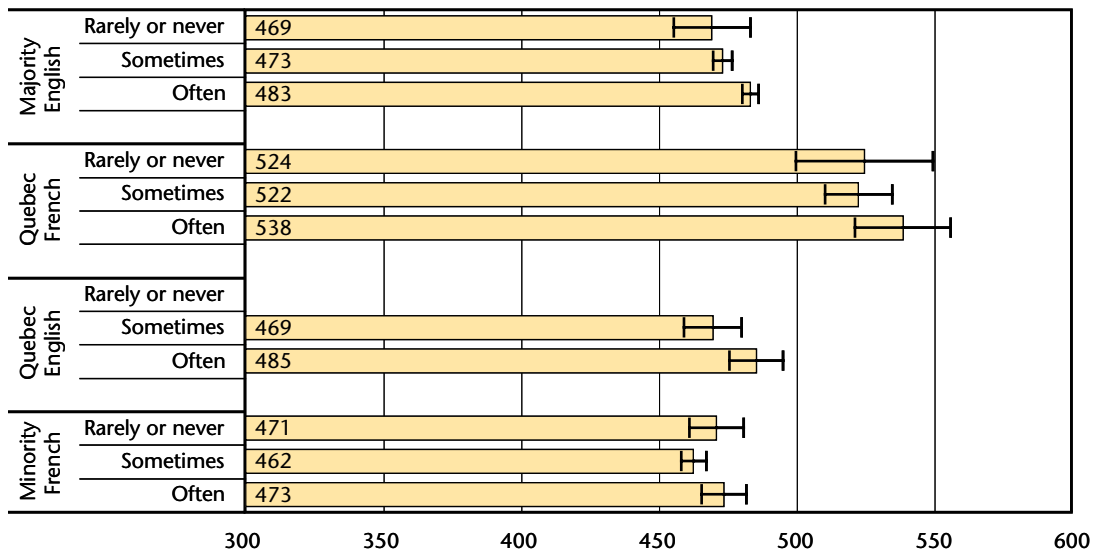


CHART 6-35 Mean reading scores by teacher assignment of written reports by language group

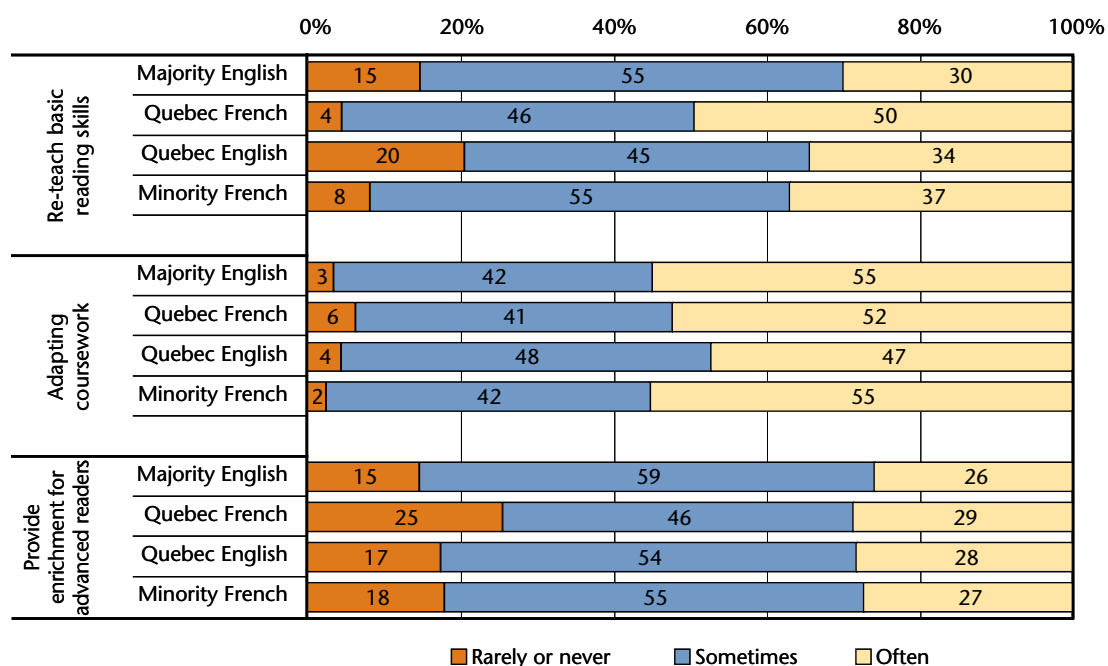


Accommodating to diversity

The literature on individual differences in learning at school generally promotes the use of accommodations to learner diversity. Teachers were asked how often they accommodated learner diversity in reading a) by re-teaching basic reading skills that should have been learned in earlier grades, b) by adapting programs to accommodate different reading styles, and c) by providing enrichment to advanced students. Results for all three teacher accommodations to student diversity are presented in Chart 6-36.

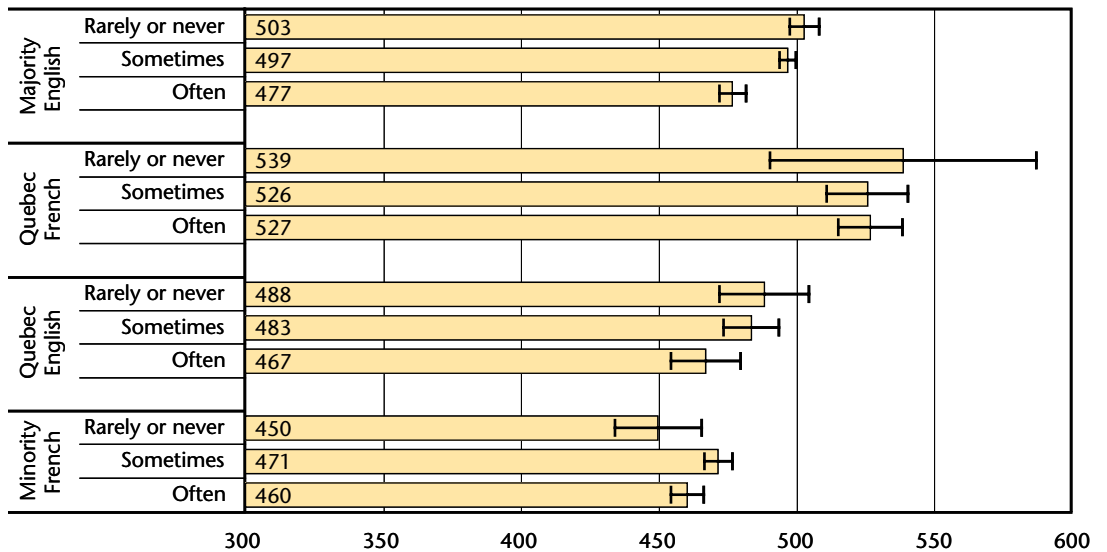
The Quebec French group has the highest percentage of teachers who report that they often re-teach basic skills to less proficient readers. The Quebec English group has the lowest percentage of teachers reporting that they often adapt their program to student reading styles but, overall, between-group differences for the use of this strategy are not high. Finally, the Quebec French group has the highest percentage of teachers rarely or never providing enrichment activities to advanced readers but, again, overall group differences are rather low. The relationship between the use of these accommodating strategies and mean reading scores are presented in charts 6-37 to 6-39.

CHART 6-36 Teacher accommodation of student diversity by language group



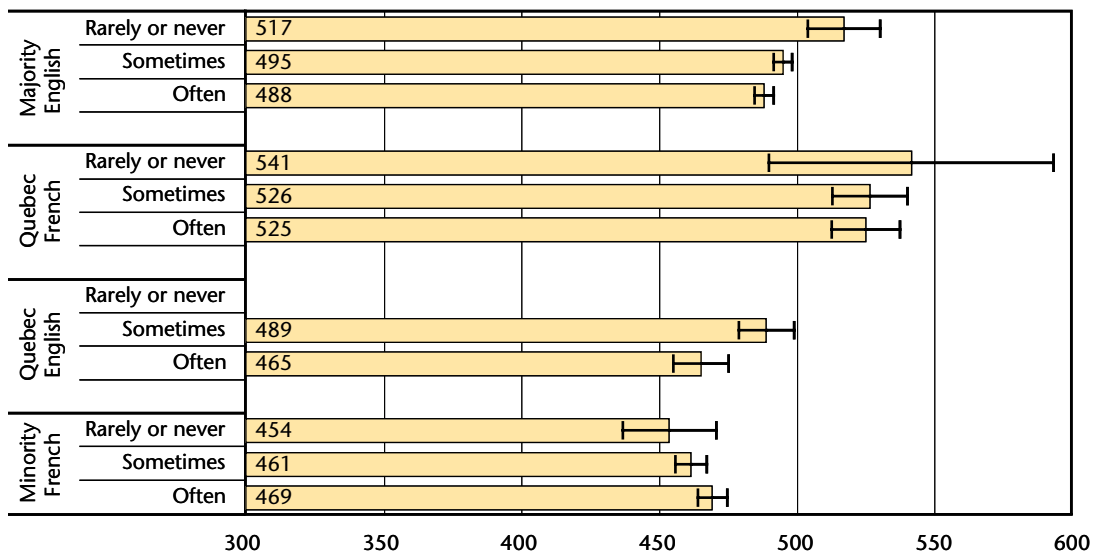
Re-teaching basic skills tends to be linearly and negatively related to mean reading scores for the two English groups, but differences are not statistically significant for the Quebec English group. In the Minority French group, students of teachers who “sometimes” re-taught basic skills tend to have the highest mean reading score. No statistically significant differences are observed for the Quebec French group (Chart 6-37).

CHART 6-37 Teacher accommodation by re-teaching basic skills by language group



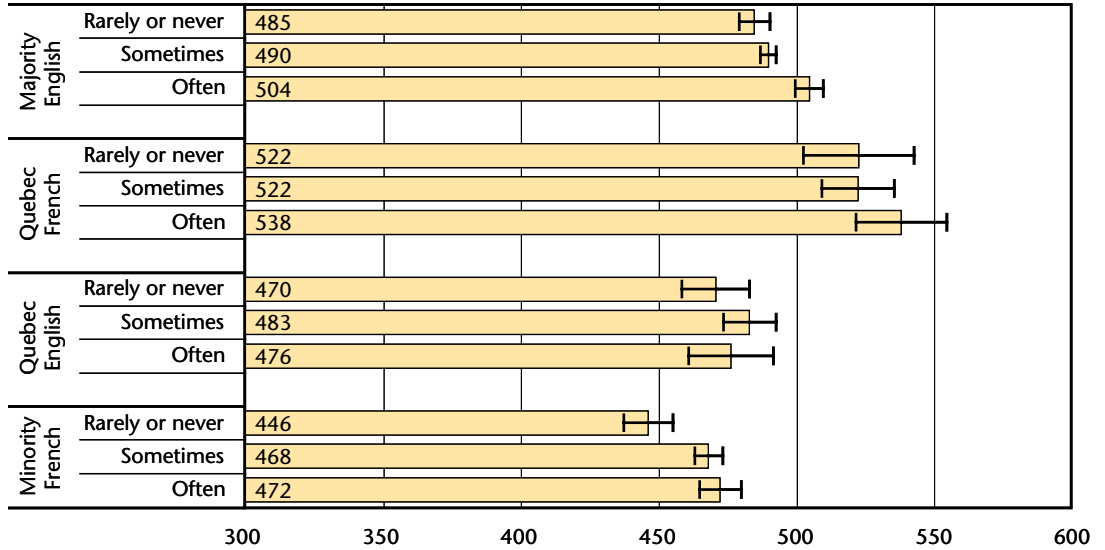
Teachers who often adapt their coursework to respond to student diversity tend to have the students with the lowest mean reading scores in the two English groups, but the opposite is observed in the Minority French group. However, differences are small and not statistically significant. No differences in the Quebec French group are statistically significant (Chart 6-38).

CHART 6-38 Teacher accommodation by adapting coursework by language group



For enrichment activities, the effect is linear but modest for the Majority English group. For the Minority French group, the students of teachers who use enrichment activities for advanced students “sometimes” or “often” have higher scores than students whose teachers “rarely or never” use such strategies. For the two Quebec groups, differences are not statistically significant between response categories (Chart 6-39).

CHART 6-39 Teacher accommodation by providing enrichment by language group



Globally, the effects of these accommodating strategies are difficult to assess because it is hard to distinguish between teachers who really adapt their strategies to learner differences in order to better promote reading performance and those teachers whose use of strategies mostly reflects class composition of proficient and less proficient readers. For example, in some cases, it may be that the teachers who have the most advanced students most often use enrichment activities, and those who have the largest proportion of poor readers most often have to re-teach basic skills. In other words, the statistical relationships shown in the charts may be as much the effect of class composition as that of the accommodating strategies.

Students' reports of teaching materials and assignments

Students were also asked questions pertaining to their use of classroom reading materials and types of assignments. A factor analysis yielded four factors. A first factor is called "use of media." It reflects the use of different media for reading activities (e.g., magazines and newspapers, Internet materials, encyclopedias, and videos). A second factor identified the "use of literature/library material." The third factor, "use of classroom material," relates to the use of textbooks and workbooks normally available in the classroom. The fourth factor labelled "use of project/group work" involves either group work within the classroom or special individual or group projects that require work outside the classroom. Results are presented in Charts 6-40 to 6-43.

Chart 6-40 shows that the students from the Quebec French group have the lowest mean factor score for "use of media." As shown in Chart 6-41, literature and library materials are less often used by students in the Quebec French, Ontario French, and New Brunswick French groups. Use of classroom material tends to be reported most often by the Quebec French students and least often by students in the Quebec English, New Brunswick French, and Small French Minorities groups (Chart 6-42). Groups vary little in the use of project/group work as shown in Chart 6-43. Relationships of these four types of assignments to mean reading scores are presented in Charts 6-44 to 6-47.

CHART 6-40 Mean factor scores for use of media by language group

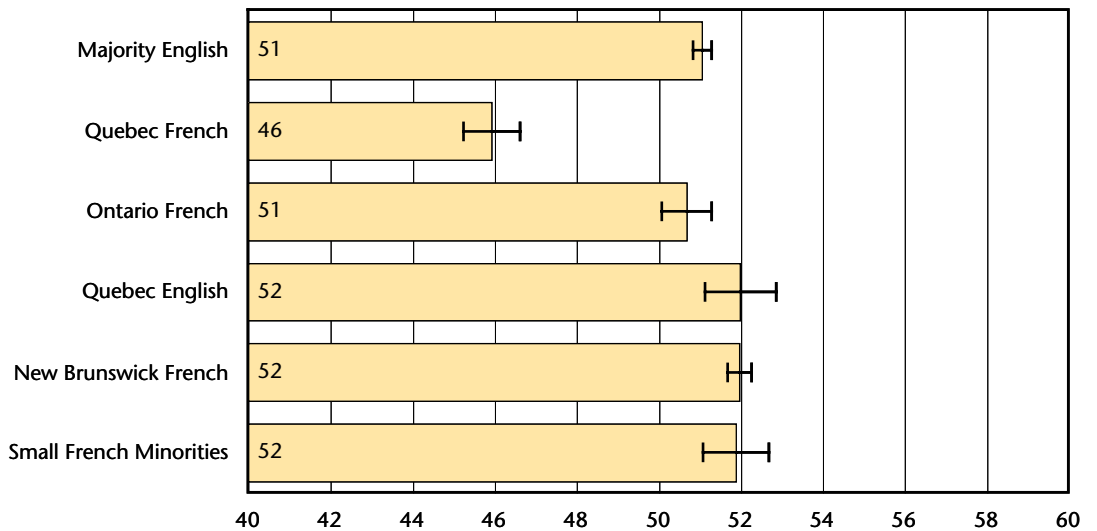


CHART 6-41 Mean factor scores for use of literature/library sources by language group

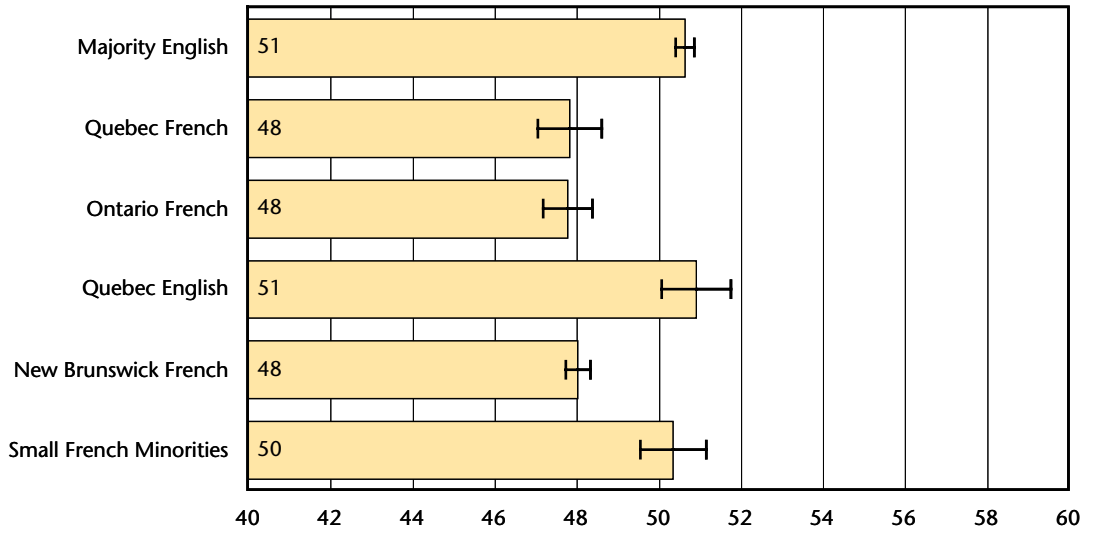


CHART 6-42 Mean factor scores for use of classroom material by language group

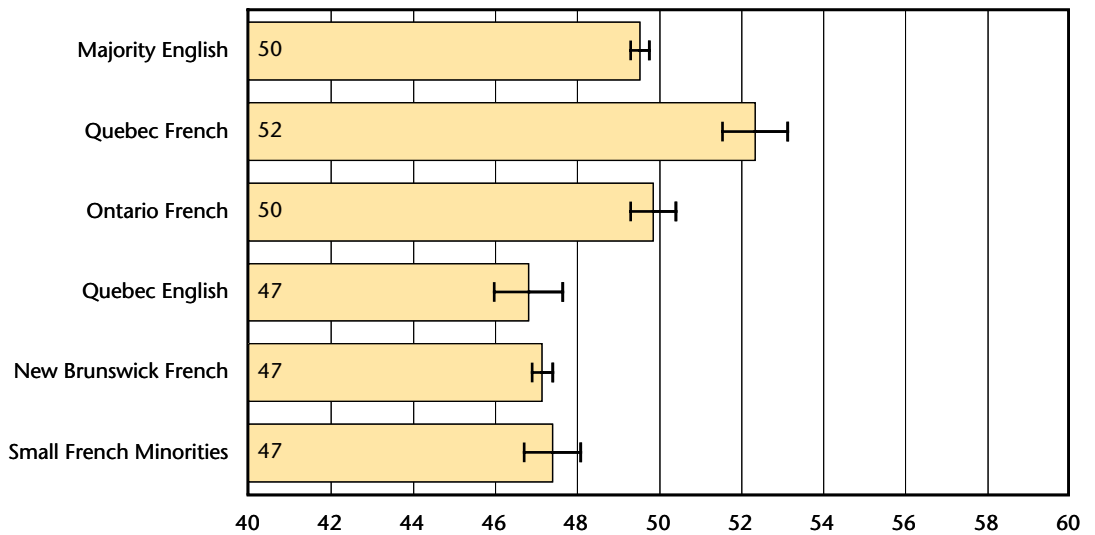
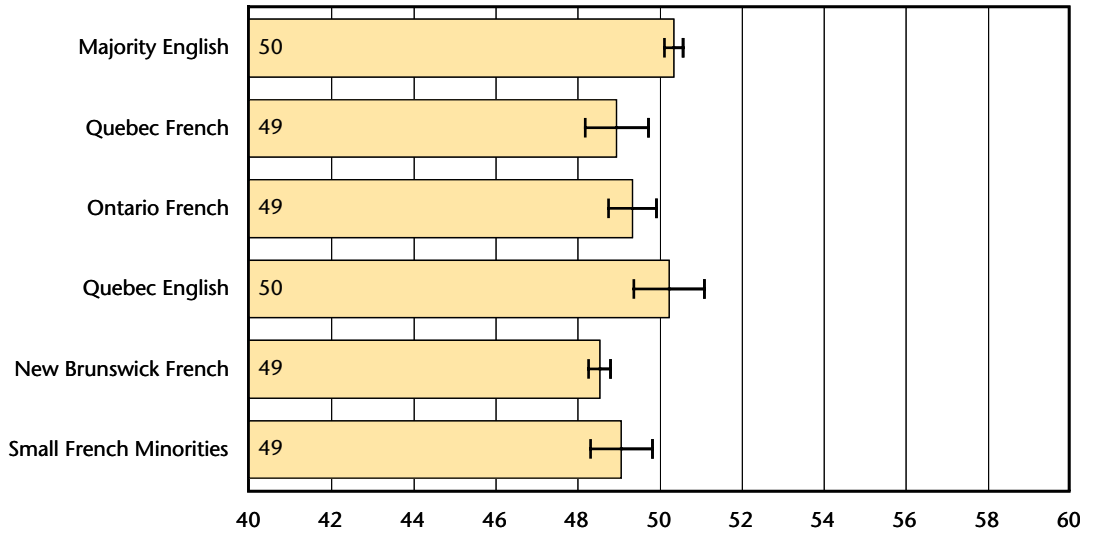


CHART 6-43 Mean factor scores for use of projects by language group



Reading through the media tends to be linearly and negatively related to mean reading scores for all language groups as shown in Chart 6-44. The effect is also relatively strong. However, it is not known if the effect is due to the strategy per se — and to what degree — or if teachers who have a larger proportion of less proficient readers tend to use these materials most often. In contrast, the use of literature and library materials tends (with a few exceptions for specific quintiles) to be linearly and positively related to mean reading scores although differences tend not to be statistically significant (Chart 6-45).

CHART 6-44 Mean reading scores for use of media quintiles by language groups

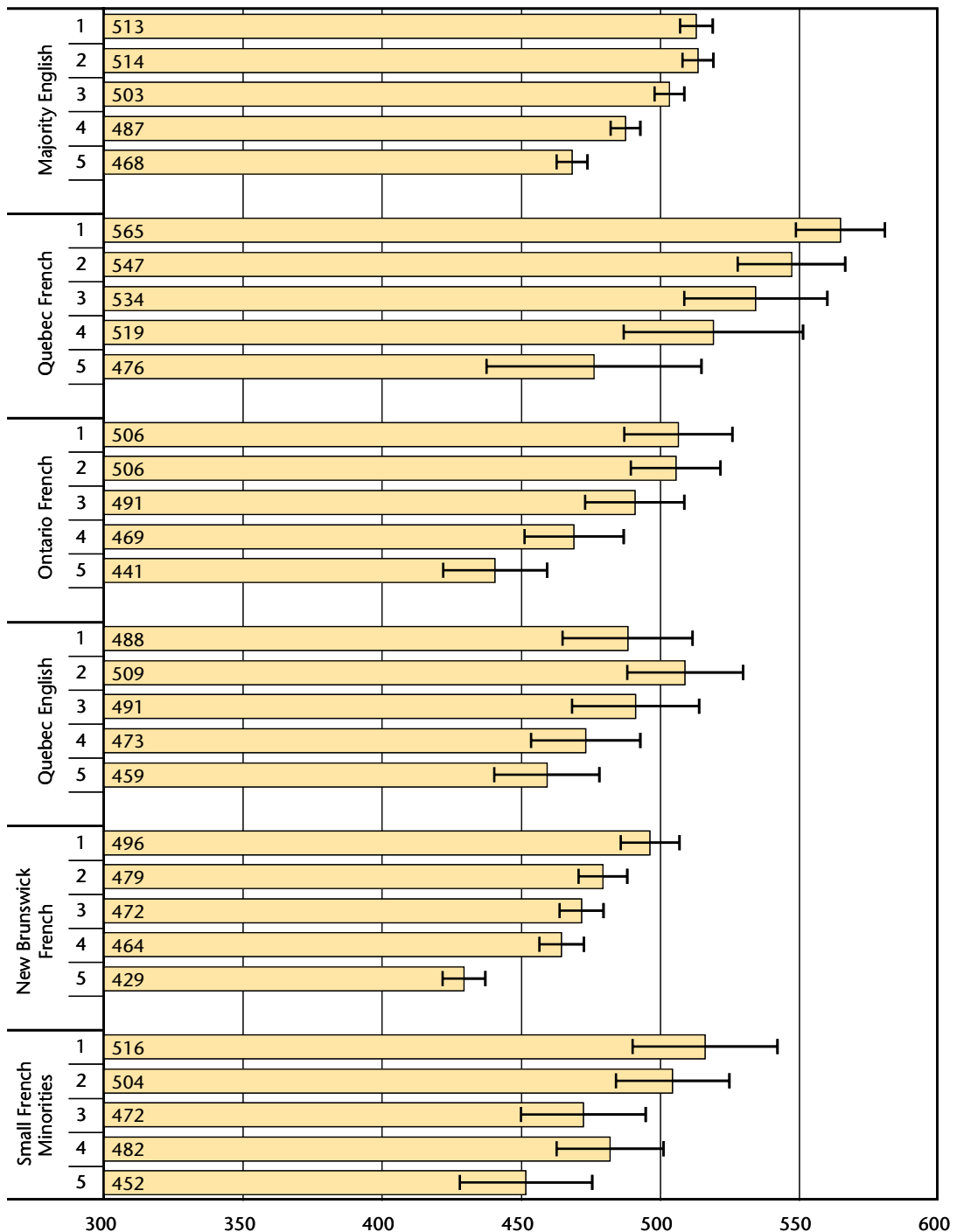
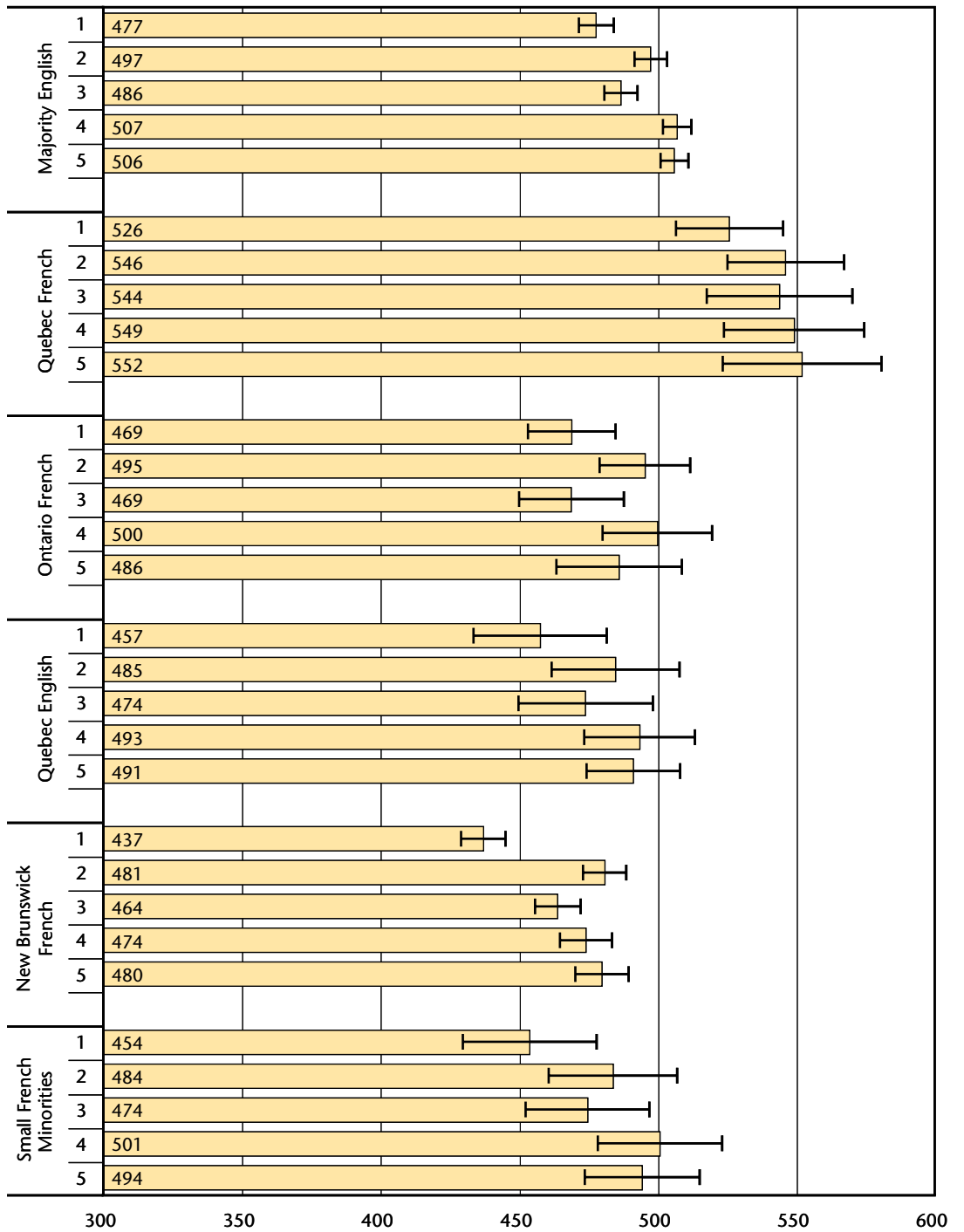


CHART 6-45 Mean reading scores for use of literature/library sources quintiles by language group



Reading through textbooks tends to be positively related to mean reading scores for the four French groups, but not for the two English groups. The trend is more completely linear for the Quebec French and New Brunswick French groups than for the other French groups for which the effect seems to level off after the first two quintiles (Chart 6-46). Finally, as shown in Chart 6-47, no systematic effects on mean reading scores are observed for the frequency of using project/group work.

CHART 6-46 Mean reading scores for use of classroom material quintiles by language group

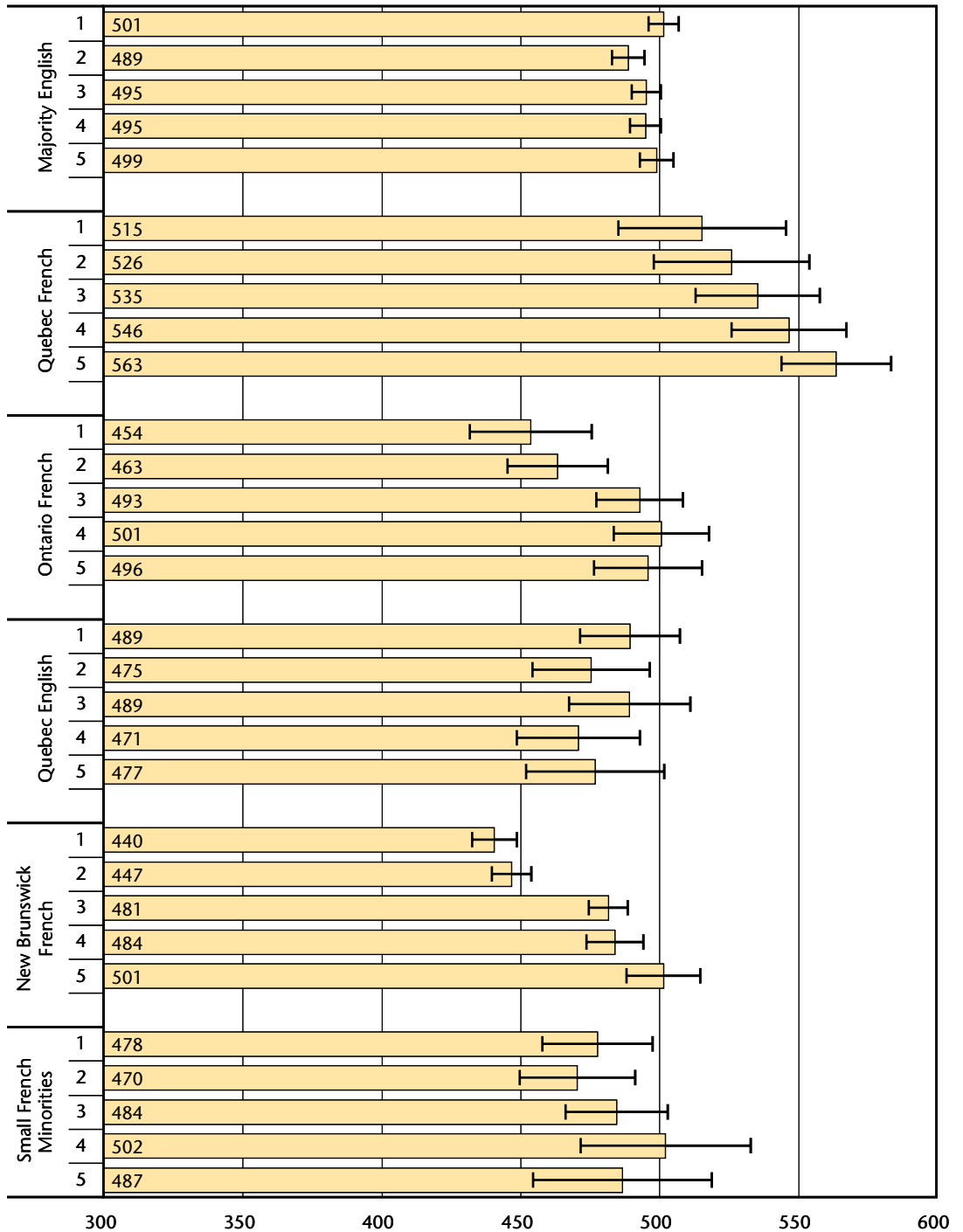
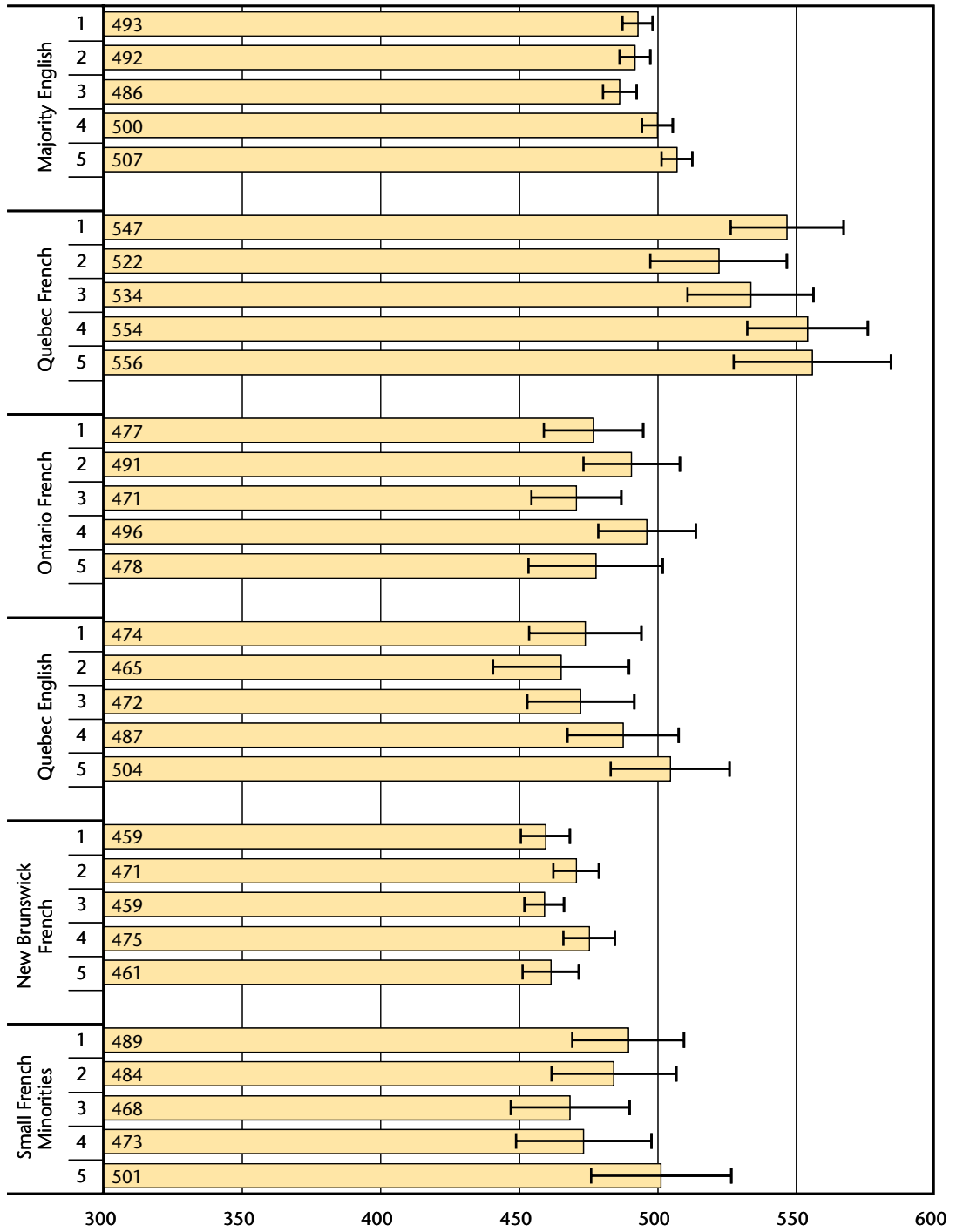


CHART 6-47 Mean reading scores for use of projects quintiles by language group

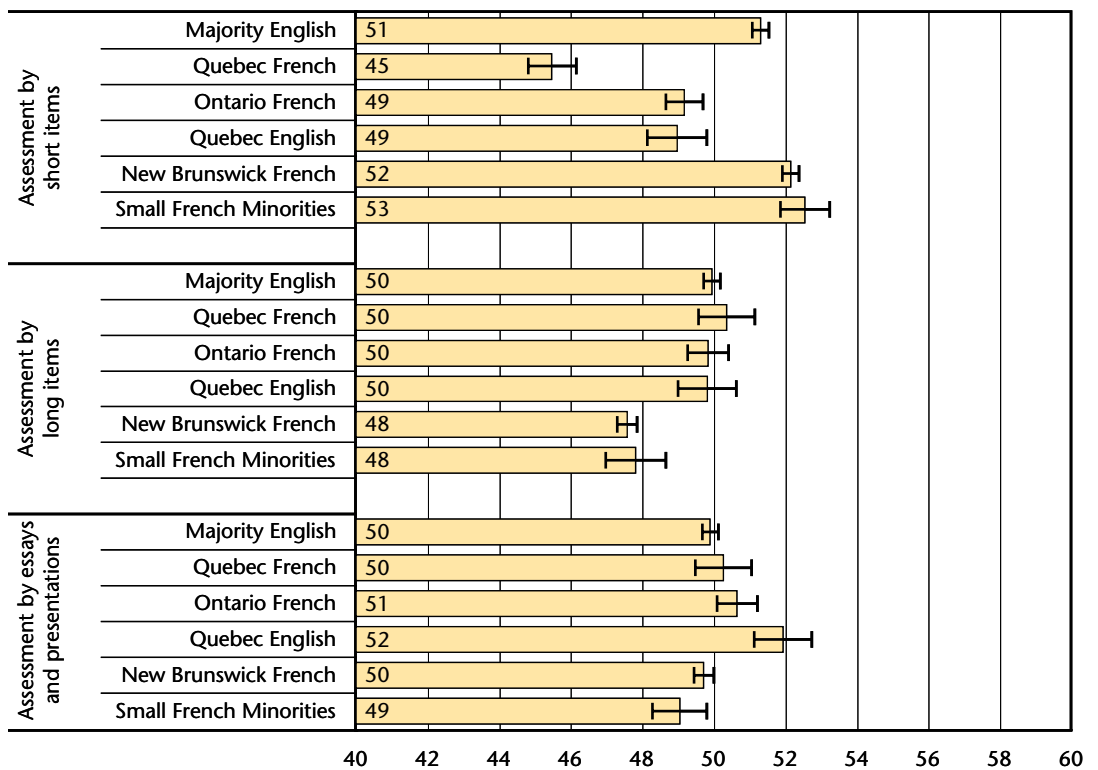


Assessment

Assessment methods are also part of the instructional process. Similar questions were posed to both teachers and students about the types of assessment methods used. The students' responses about the various test forms they experienced were factor analyzed, and a three-factor solution emerged. The first factor, called "short-response items," groups together the true/false, matching, multiple choice, and fill-in-the-blanks questions. The second factor, labelled "long-response items," groups together the short-answer questions (a sentence or two) and the long-answer questions (a paragraph or more). The third factor pooled together the use of essays (one page or more) and the use of presentations, speeches, and other performances. Mean factor scores for these three types of assessment methods, as reported by students, are presented in Chart 6-48.

The students in the Quebec French group reported the lowest use of short-response items assessment; the highest use was reported by the students in the Small French Minorities and the New Brunswick French groups. The latter two groups also show the least use of long-response items assessment. The Quebec English group reported the most frequent use of essays and presentations. Relationships to mean reading scores are shown in charts 6-49 to 6-51.

CHART 6-48 Mean factor scores by student-reported assessment methods



Use of short-response items assessment tends to be linearly and negatively related to mean reading scores, as shown in Chart 6-49, even though some quintile groups overlap. The opposite trend is observed for the use of long-response items assessment (Chart 6-50). Use of essays and presentations is modestly and linearly related to mean reading scores for the Majority English group, but for the other language groups, no systematic effects are found (Chart 6-51).

CHART 6-49 Mean reading scores by student-reported short-response items assessment methods

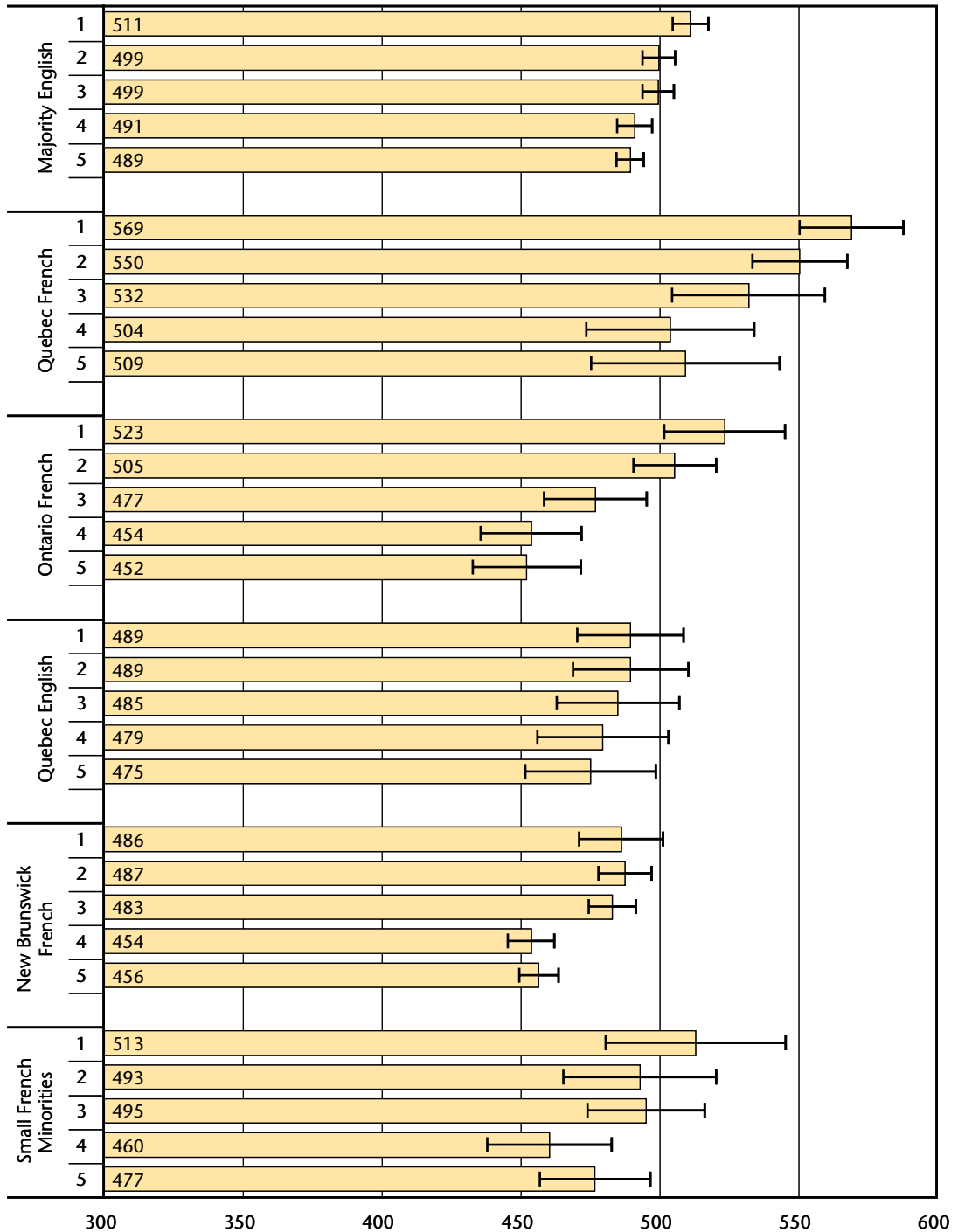


CHART 6-50 Mean reading scores by student-reported long-response items assessment methods

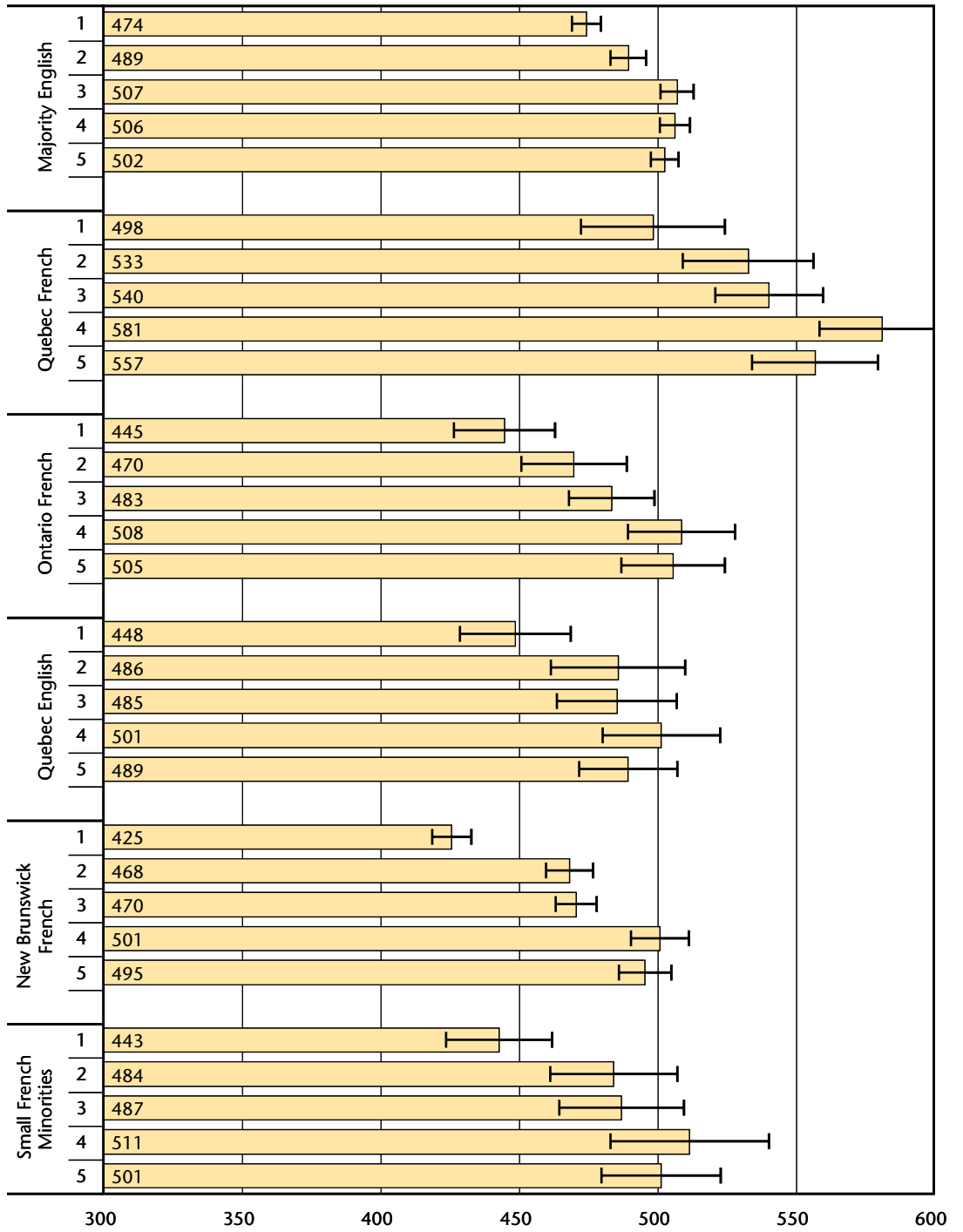
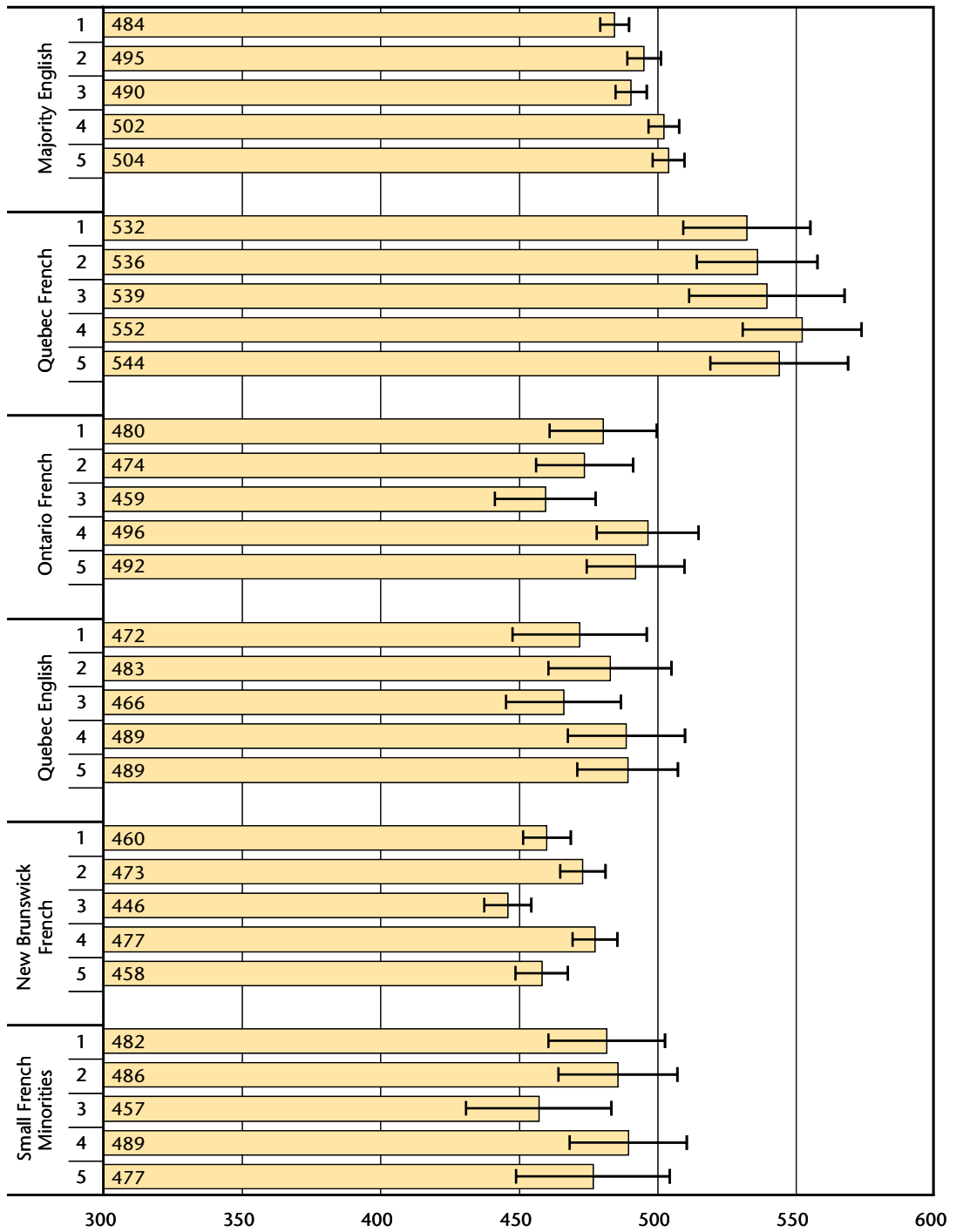
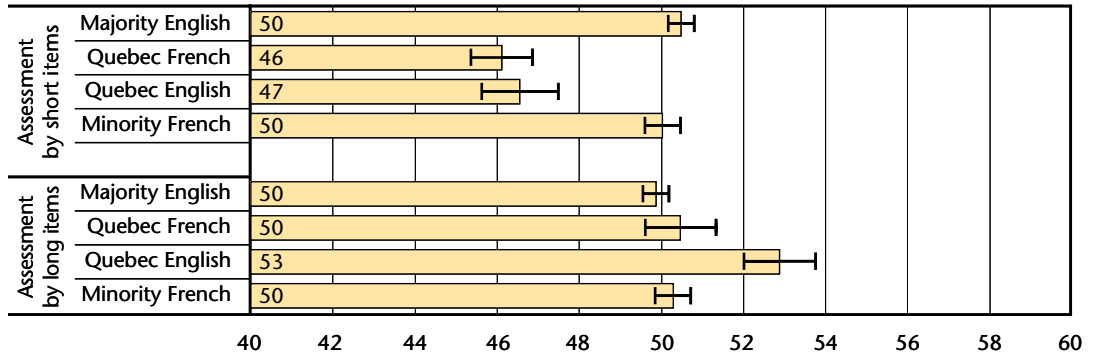


CHART 6-51 Mean reading scores by student-reported essay and presentation assessment methods



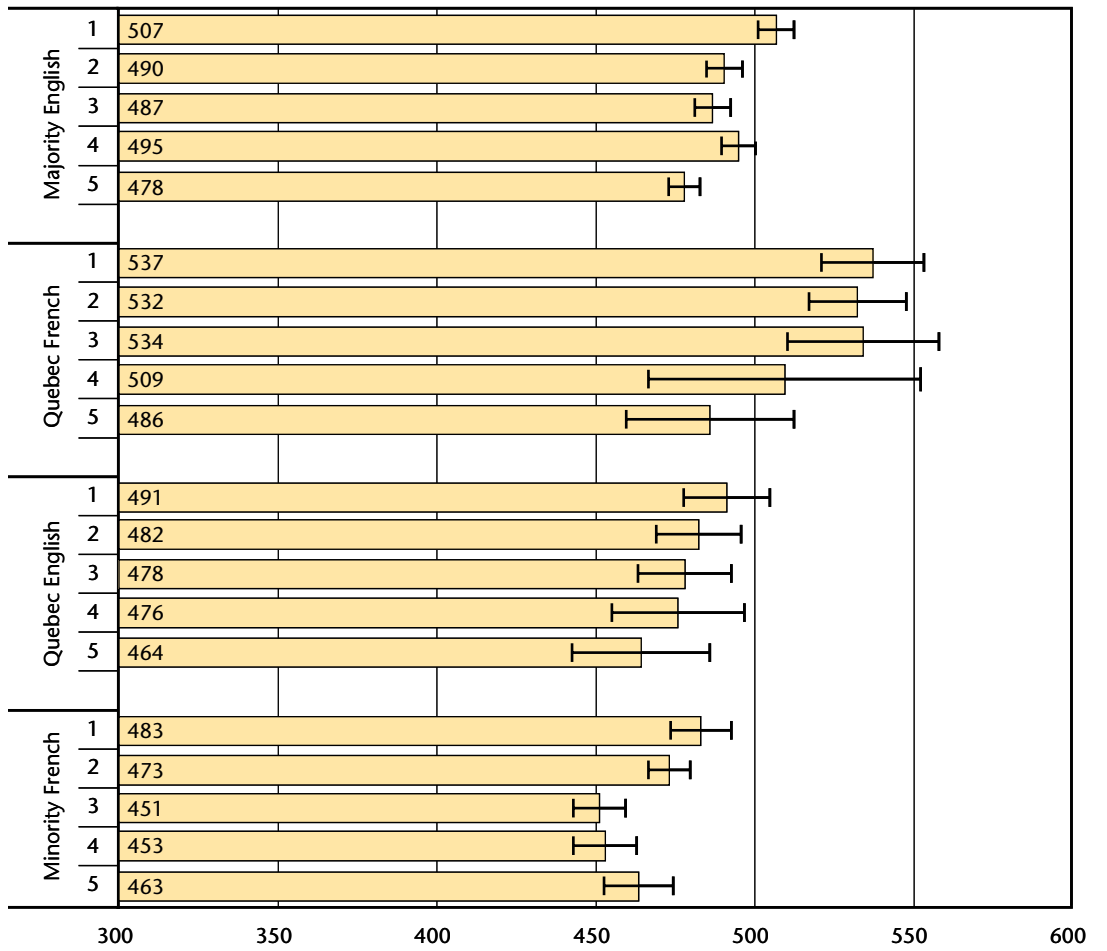
A similar set of assessment questions was answered by teachers. A factor analysis on the teacher responses yielded only a two-factor solution — a short-response items factor and a long-response items factor. The essays and presentations items loaded on the long-response items factor, and the use of short-answer questions (a sentence or two) loaded equally on both factors. The mean factor scores for the use of these two assessment strategies by teachers are presented in Chart 6-52. Teachers in the two Quebec groups report using short-response items assessment less often, and teachers in the Quebec English group report using long-response items assessment most often.

CHART 6-52 Mean factor scores for teacher-reported assessment methods



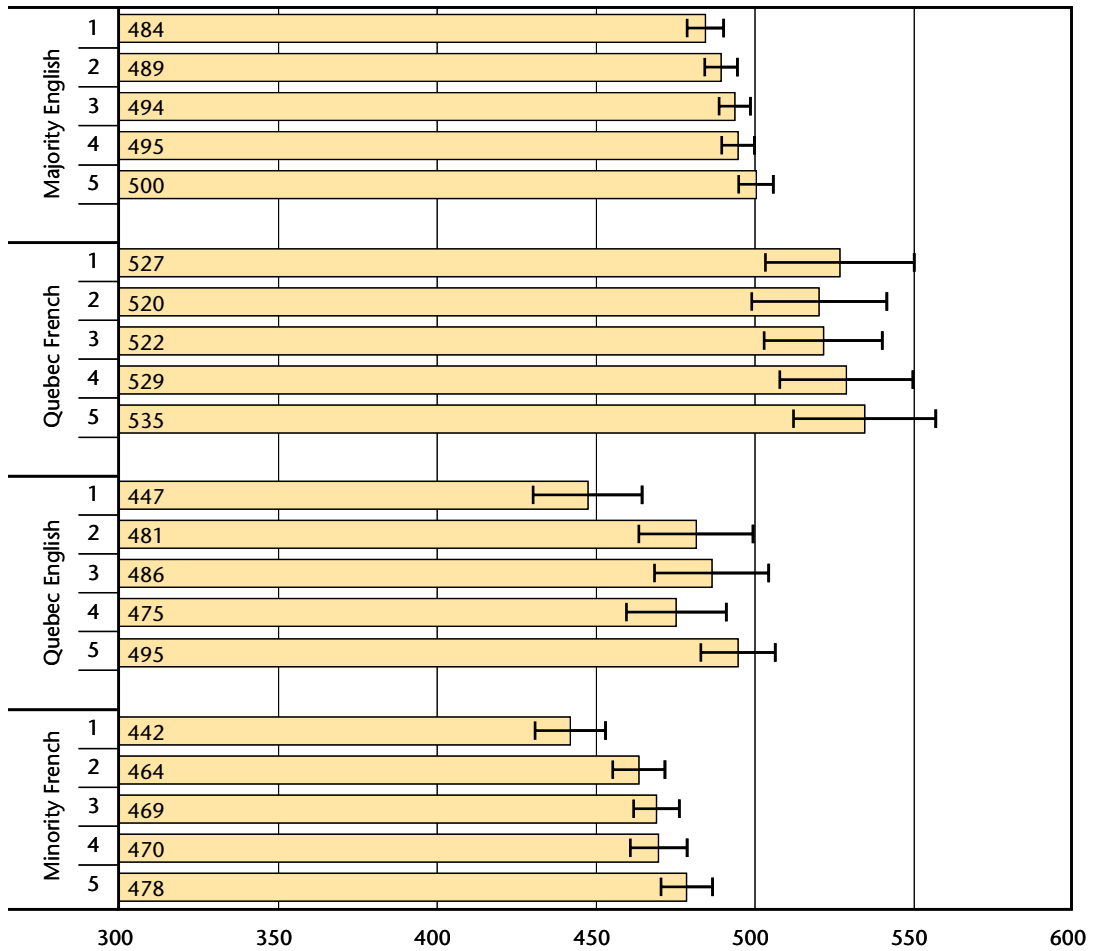
The relationship between the teachers' two assessment methodologies and the mean reading scores of their students is presented in Chart 6-53 and Chart 6-54. As with the students, the use of short-response items assessment tends to be linearly and negatively related to mean reading scores (Chart 6-53). For the Minority French students, however, the relationship is not linear. The first two quintile groups have the highest mean factor scores in reading, but the trend is not linear for the other three quintiles. For the Quebec French group, there are no differences between the first three quintiles. The only statistically significant differences are between the fifth quintile and the first three. For the Majority English group, mean reading scores tend to decrease linearly with a slight deviation at the fourth quintile. For the Quebec English group, mean reading scores decrease as use of short-response items decrease, but differences are not statistically significant.

CHART 6-53 Mean reading scores by teacher-reported assessment using short-response items quintiles



Also, as observed for students, the use of long-response items assessment is positively and somewhat linearly related to mean reading scores (Chart 6-54). The linear effect is modest for the Majority English group, that is, a difference of 0.16 standard deviation between the bottom and top quintiles. For the Quebec French group, the effect is also modest, and differences between quintiles are not statistically significant. The effect is stronger for the Quebec English group, but its fourth quintile deviates from the general positive trend. For the Minority French group, the difference between the top and bottom quintiles is moderate (0.36 standard deviation), but the differences tend to level off after the second quintile.

CHART 6-54 Mean reading scores by teacher-reported assessment using long-response items quintiles



In the next chapter, each language group is given a summary profile showing strengths and weaknesses in factors related to reading achievement. Multivariate modelling techniques are applied to evaluate these effects by controlling for other variables.

Statistical Note

Multiple Regression Analysis. Achievement is influenced by a large number of factors which may act independently or in combination to affect the outcome. For example, results presented in previous chapters indicate that both a student's mother's education and the number of books in the home influence reading achievement. However, these two factors themselves are correlated. If taken together, one may be more prominent than the other or one may have no effect once the other is accounted for. In survey research, the standard statistical technique for isolating effects is known as **multiple regression analysis** or **regression modelling**. This technique is based on an equation in which the outcome (or dependent variable) is seen as a linear combination of a series of predictors or independent variables. The contribution of any one predictor to the outcome is represented by a regression coefficient, the value of which depends on the effect of the predictor itself and of the other variables in the model. The relative sizes of the **regression coefficients** in a particular model may be used to indicate the relative contributions of the factors of interest. Models which include and exclude a particular variable may also be compared to identify the unique contribution of that variable while controlling for others.

Multilevel Modelling. The PCAP sampling model is a two-stage one, with schools sampled at a first stage and students within schools at a second. Students are thus said to be "nested" within schools. Multilevel modelling is a variation on regression analysis used in situations where the samples exhibit such a hierarchical structure. Models are developed at each level (i.e., the school level and students-within-school level), and the models are then combined to yield regression coefficients that represent effects at both the student level and school level. Both student and school level variables can be included as predictors in the model. Most of the regression models used in this report are of this nature. For the most part, the results may be interpreted in the same way as for single level models. However, the confidence intervals are different in the two cases because of the way the errors are computed.

Proportions of Variance. A common way of looking at how well a regression model "fits" the data is to examine how much of the total variation (technically a statistic called the variance) in the dependent variable (in this case, mean reading scores) is "explained" by the model compared to how much remains "unexplained" and is thus considered error. Generally, models with more variables explain more of the variance. Comparing the proportions of variance explained by different models gives an indication of how much "better" one model fits the data compared to another model. In this study, variance is found at both the student and the school levels (multilevel modelling). An initial model, called a "null model" with no predictor variables, may be used to estimate the proportions of the total variance in mean reading scores that can be attributed to differences between schools and to differences between students within schools. Subsequent models give the proportions of the variance from each of these sources that is explained by the predictor variables. Building models in stages allows us to examine the incremental effects of adding particular predictors to the model. In this chapter, these increments are reported for several model stages for each language group.

The following hypothetical example illustrates how variance may be partitioned:

Standard deviation of mean reading scores $SD = 100$ (defined by way the scores are scaled)

Total variance of mean reading scores $V = 10\,000$ (SD squared)

Two-level null model (no predictors):

Total variance $V_{tot} = 10\,000$

Average variance of students within schools $V_{st} = 8\,700$

Average variance between schools $V_{sc} = 1\,300$

Two-level model with instructional variables as predictors:

Total variance $V_{tot} = 9\,000$

Average variance of students within schools $V_{st} = 8\,000$

Average variance between schools $V_{sc} = 1\,000$

The effect of including the instructional variables is thus to reduce the total variance by 1000 or 10%. We can thus say that the instructional variables “explain” 10% of the total variance. These variables also reduce the student variance by 700 or about 9 per cent and the school variance by 300 or about 23 per cent. We can thus say that the instructional variables account for 9 per cent of the variance among students and 23 per cent of the variance among schools.

Interpreting Regression Coefficients. Many of the results in this chapter are presented in the form of regression coefficients. In general, a regression coefficient may be interpreted as representing the change in the outcome (in this case, reading achievement) that would be expected from one unit change in the predictor. **Bivariate** coefficients (sometimes called “absolute effects”) are those for the relationship between a single predictor and the outcome, without controlling for other variables. **Multivariate** coefficients (sometimes called relative or unique effects) refer to the effects of a particular predictor while controlling for all other predictors in the equation.

The statistical significance of regression coefficients is determined from the confidence interval in the same way as described in an earlier statistical note. The specific reference point is a coefficient of zero which would indicate that the factor has no correlation with the outcome variable (reading achievement in this case). A coefficient may thus be said to be statistically greater than (or less than) zero if the error bar does not overlap the zero point. The absolute values of the coefficients for different variables cannot be compared directly in all cases because these depend on the scales used. We can say that one variable has a larger or smaller effect than another only if the two scales are the same.

Contextual variables

In this chapter, we focus on the identification of contextual variables that may have differential effects on reading performance for the language groups. First, a summary profile has been prepared which showed the position of each of the six language groups on the contextual variables that have been analyzed in the previous chapters. Variables have been grouped by their chapter headings and coded in three categories reflecting the groups' mean scores. The code L indicates that the group is significantly below the Canadian reading mean or the reading mean of the other groups. The code M indicates that the group is close to or equal to the Canadian results or the results of the other groups. Code H indicates that the group is higher than the Canadian results or the results of the other groups. It should be noted that when the analysis was done on school-level variables and involved only four language groups, the code for the Minority French group was given to each of the francophone groups outside Quebec, that is, Ontario, New Brunswick, and the Small French Minorities. The variables have also been coded into different types (e.g., demographic, instructional). Moreover, for each variable, its relationship to reading performance was coded.

In Table 7-1, under Relation, the letters S, M, W, and N refer, respectively, to strong, moderate, weak, and non-significant relationships of the variable with reading achievement. The plus (+) and minus (-) signs refer to the direction of the relationship. A relation is positive when an increase in the contextual variable score is related to an increase in mean reading score. A relation is negative when an increase in the contextual variable score is associated with a decrease in the mean reading score. For example, an S+ relationship means that the variable is strongly and positively related to reading performance. The term "varies" indicates that the relationship varied in direction or size across groups or was grossly inconsistent. For example, speaking French in the home was positively related to mean reading scores for francophone groups whereas it was negatively related to the mean reading scores for the anglophone groups. The opposite was found for use of English in the home. The strength of the relationship between the contextual variable and mean reading scores was not measured directly. It was estimated by looking at the general trend across the six groups. When for most groups the relation was weak (generally differences between top and bottom subgroups on a scale or between quintiles of less than 0.2 standard deviation), the code W was used. Code M was used when generally, across groups, differences between top and bottom subgroups was between 0.2 and 0.4 standard deviation. Code S was used when, generally, for most groups, differences between top and bottom subgroups tended to be 0.4 standard deviation or more. These estimated relations may be more or less accurate. Sometimes the trend in differences was not always linear (i.e., in the same direction for all subgroups) or the trend was similar for some groups and not as clear for others. Hence, codes should be interpreted as a general estimate and not as a precise measure of strength or direction.

In this chapter, the relationship between the contextual variables and the mean reading scores is examined separately for each of the six language groups. The goal is to find robust relationships between contextual variables and mean reading scores for each of the language groups. That is why not all the variables shown in Table 7-1 are used in the analyses done for this chapter. As can be seen in Table 7-1, which provides a profile of each group, a language group may have high (H), moderate (M), or low (L)

scores on contextual variables that may be strongly (S), moderately (M), weakly (W), or not related (N) to mean reading scores. A high score on a variable that is strongly and positively related to reading indicates a positive attribute of the group. A low score on a variable that is strongly related to reading indicates a domain where the group's reading performance could be increased if the group could improve its situation in that contextual domain. Similarly, a high score on a variable that is strongly but negatively related to reading indicates a situation in need of improvement. Conversely, a low score on a variable that is negatively related to reading indicates a positive attribute of the group. It should be noted, however, that these relationships are correlations and not cause-and-effect relationships.

TABLE 7-1 Summary profiles of contextual variables for the six language groups

Variable	Type	Relation	ME	QCe	QCf	ONf	NBf	SFM
Chapter 3								
French in the home	Demographic	Varies	L	L	H	M	H	M
English in the home	Demographic	Varies	H	H	L	M	L	M
Books in the home	Demographic	S+	H	H	M	M	L	MH
Mother's education	Demographic	S+	M	M	M	M	L	MH
School governance	Demographic	S+	L	H	H	L	L	L
Community size	Demographic	Varies	M	H	M	L	L	L
Language spec. training	Demographic	M+	M	M	H	L	L	L
Language spec. self-report	Demographic	M+	L	M	H	L	L	L
Chapter 4								
Enjoyment of school	Attitude	M+	M	M	M	M	M	M
Sense of belonging to school	Attitude	W+	M	M	M	M	M	M
Enjoyment of reading	Attitude and motivation	S+	M	M	M	M	L	M
Good reader	Attitude and motivation	S+	M	M	M	M	L	M
Reading for information	Attitude and motivation	N	M	M	M	M	M	M
Ext. attributions of failure	Attitude and motivation	N	M	M	L	L	L	L
Ext. attributions of success	Attitude and motivation	N	M	M	M	M	M	M
Fatalism*	Attitude and motivation	S-	M	M	M	M	H	H
Int. attributions of success	Attitude and motivation	Varies	M	H	L	M	M	M

* Fatalism: attributing one's successes and failures to luck

Legend: ME = Majority English, QCe = Quebec English, QCf = Quebec French, ONf = Ontario French, NBf = New Brunswick French, SFM = Small French Minorities

For group scores: L = Low (significantly below the Canadian results or the results of the other groups), M = Moderate (not different from the Canadian results or the results of the other groups), H = High (significantly above the Canadian results or the results of other groups)

For relation to mean reading scores: Varies = relation mostly inconsistent across groups, N = no relation, W = weak relation (generally small effect of less than 0.2 standard deviation for most groups), M = moderate relation (between 0.2 and 0.4 standard deviation for most groups), S = strong relation (greater than 0.4 standard deviation for most groups). Relations may be positive (+) or negative (-).

Variable	Type	Relation	ME	QCe	QCf	ONf	NBf	SFM
Chapter 5								
Reading for meaning	Reading behaviours	S+	M	M	M	M	L	M
Reading by decoding	Reading behaviours	S-	H	M	L	L	L	L
Reading routines	Reading behaviours	S+	M	M	M	M	L	M
External reading sources	Reading behaviours	N	M	H	L	L	M	M
Out-of-school reading	Reading behaviours	S+	M	M	M	M	L	M
Out-of-school entertainment	Reading behaviours	W+	M	M	M	M	L	M
Academic/cultural activities	Reading behaviours	M+	M	M	M	M	M	M
Being tutored	Reading behaviours	S-	L	M	H	M	H	M
Parent/guardian help	Early reading	S+	M	M	M	M	M	M
Teacher help	Early reading	M+	M	M	M	M	M	M
Parent/guardian encouragement	Early reading	S+	M	M	M	M	M	M
Age learned to read	Early reading	Varies	L	L	H	H	H	M
Mother reading	Reading behaviours	M+	M	M	M	M	M	M
Father reading	Reading behaviours	M+	M	M	M	M	L	M
Chapter 6								
Special needs	Instructional	S-	M	M	H	M	M	M
More time	Instructional	S-	M	M	H	M	M	M
Teaching assistants	Instructional	M-	M	M	H	M	M	M
Pull-out	Instructional	M-	M	M	M	M	M	M
Disrupting students	Instructional	M-	M	M	H	M	M	M
Medical assistance	Instructional	W-	M	M	M	M	M	M
Special assistance	Instructional	M-	M	M	M	M	M	M
Minutes per week LA	Instructional	M-	H	L	M	M	M	M
Frequency LA homework	Instructional	M+	M	M	M	M	M	M
Expected homework	Instructional	S+	M	M	L	L	L	L
Weekly total homework	Instructional	S+	M	M	M	M	L	M
Weekly LA homework	Instructional	W+	M	M	M	M	L	M
Pre-reading	Instructional	W+	M	L	M	M	M	M

Legend: ME = Majority English, QCe = Quebec English, QCf = Quebec French, ONf = Ontario French, NBf = New Brunswick French, SFM = Small French Minorities

For group scores: L = Low (significantly below the Canadian results or the results of the other groups), M = Moderate (not different from the Canadian results or the results of the other groups), H = High (significantly above the Canadian results or the results of other groups)

For relation to mean reading scores: Varies = relation mostly inconsistent across groups, N = no relation, W = weak relation (generally small effect of less than 0.2 standard deviation for most groups), M = moderate relation (between 0.2 and 0.4 standard deviation for most groups), S = strong relation (greater than 0.4 standard deviation for most groups). Relations may be positive (+) or negative (-).

Variable	Type	Relation	ME	QCe	QCf	ONf	NBf	SFM
Chapter 6 (continued)								
During reading	Instructional	W+	M	L	M	M	M	M
After reading	Instructional	M+	H	M	M	M	M	M
Direct reading instruction	Instructional	N	M	L	H	H	H	H
Reading aloud	Instructional	N	M	M	M	M	M	M
Silent reading	Instructional	N	M	M	H	H	H	H
Indirect strategies	Instructional	N	H	L	L	L	L	L
“Creative” reading materials	Instructional	M+	H	H	L	L	L	L
“Informational” materials	Instructional	N	M	L	L	H	H	H
Reading out of class	Instructional	M+	M	H	M	L	L	L
Personal representations	Instructional	N	H	H	L	L	L	L
Oral presentations	Instructional	W+	H	H	L	M	M	M
Written reports	Instructional	M+	H	H	L	L	L	L
Re-teaching basic skills	Instructional	M-	M	M	H	M	M	M
Adapting coursework	Instructional	M-	M	M	M	M	M	M
Enrichment	Instructional	W+	M	M	M	M	M	M
Reading through the use of media text	Instructional	S-	M	H	L	M	H	H
Reading through the use of literature/library	Instructional	M+	M	M	L	L	L	M
Reading through the use of classroom material	Instructional	M+	M	L	H	M	L	L
Reading through the use of projects	Instructional	N	M	M	M	M	M	M
Assessment short response (Student)	Instructional	M-	M	M	L	M	H	H
Assessment long response (Student)	Instructional	S+	M	M	M	M	L	L
Assessment essay (Student)	Instructional	N	M	H	M	M	M	M
Assessment short response (Teacher)	Instructional	M-	M	L	L	M	M	M
Assessment long response (Teacher)	Instructional	M+	M	H	M	M	M	M

Legend: ME = Majority English, QCe = Quebec English, QCf = Quebec French, ONf = Ontario French, NBf = New Brunswick French, SFM = Small French Minorities

For group scores: L = Low (significantly below the Canadian results or the results of the other groups), M = Moderate (not different from the Canadian results or the results of the other groups), H = High (significantly above the Canadian results or the results of other groups)

For relation to mean reading scores: Varies = relation mostly inconsistent across groups, N = no relation, W = weak relation (generally small effect of less than 0.2 standard deviation for most groups), M = moderate relation (between 0.2 and 0.4 standard deviation for most groups), S = strong relation (greater than 0.4 standard deviation for most groups). Relations may be positive (+) or negative (-).

Regression Model

The group profiles presented in Table 7-1, however, are not adequate to infer the group's strengths and weaknesses. The large number of contextual variables listed in the table are not necessarily independent of each other. Indeed, many of them can be highly intercorrelated. A strong relationship for a group may not hold once other variables are accounted for statistically. That is why, in this chapter, we present multiple regression results for each group, these being presented in a graphic format that shows bivariate and multivariate effects. A bivariate effect is the relationship between a contextual variable and mean reading scores when other variables are not controlled. The multivariate effect is the relationship between the contextual variable and the mean reading scores when all other variables in the regression model are controlled statistically.

These effects are presented as regression coefficients based on a two-level model with students as the first level and schools as the second. The coefficients, however, cannot be directly compared because they were not all measured on a similar scale. For example, the coefficient for a dichotomous variable (e.g., gender) indicates the change in mean reading score when the scores of males are compared with the scores of females. However, if a variable were measured on a 6-point scale, the coefficient would indicate a change in mean reading score for each unit of the scale. If a factor score with a mean of 50 and a standard deviation of 10 were used to describe the results of a contextual variable, the coefficient would be related to a change of one unit on this score. Since the standard deviation on this measure is 10, multiplying the coefficient by 10 could be interpreted as a change in mean reading score for each standard deviation of change in the contextual variable. The reader is invited to be careful in interpreting these coefficients because each has to be estimated in accordance with the measurement scale.

Another consideration is the sequence in which the variables were entered in the regression model. For example, when demographic variables such as socioeconomic status (SES) are entered first, all other variables (e.g., instructional variables) that are entered after that are controlled for SES. If the opposite were done and SES variables were entered last, coefficients for the SES variable would be adjusted for its relationship to all variables entered in the previous steps.

In the charts in this chapter, all the estimated coefficients for each variable are not shown. To account for the size of the coefficient in relation to its position in the variables sequence would be very difficult because of the large number of variables. The charts show, as already mentioned, the bivariate and the multivariate coefficients. The first is the effect of the variable alone without controlling for other variables; the latter is the effect of the variable when all other variables are taken into account. Not seen in the charts are the coefficients in the intermediate steps of the regression model.

The variables in the model were entered in the following five-step sequence. First, the instructional variables were entered. These are variables that the school system can change by modifying particular teaching practices. Instructional variables include approaches to the teaching of reading, assessment practices, and classroom climate variables. Second, reading behaviours were entered. Although not all reading behaviours are under a school's control, many of these can be influenced by instructional practices. The same can be said for attitude and motivation variables, and these were entered in the third step of this five-step sequence. These cannot all be attributed to educational policies, but they can be influenced by certain teaching practices and assessment

procedures. Entered fourth in the model are parental/guardian help and early reading behaviours. These are less under a school's control because they are largely dependent on parental/guardian characteristics and home variables. Finally, the last group of variables entered was the demographic variables that are not under a school's control — except for school size, which is influenced by demography but also by school district or department decisions. In short, the logic of the model was to enter first the variables that are the most amenable to school policy changes and then to gradually add variables that are less and less under a school's control.

At the end of each block of variables in the sequence, the model allows for the calculation of the percentage of variance explained by the block of variables at both the student level and the school level. Student level variables are the measures that are available for each individual student; school level variables are those that were measured at the teacher and school levels. For the purpose of this report, teacher-level variables were aggregated at the school level to reduce the complexity of the model. Although not shown in the charts, we present in separate tables for each language group the amount of variance explained by each block of variables.

The results for each group are presented in the following sequence. The Majority English group results are presented first. This being the largest group, it is the group whose reading results are closest to the mean of the total population. Next, we present the Quebec English group, allowing for immediate comparison with the Majority English group. Then the results of the four francophone groups are presented in order of group size: Quebec French, Ontario French, New Brunswick French, and Small French Minorities. As already mentioned, the latter groups had to be pooled because of the insufficient number of students in each of the participating provinces⁸.

Multivariate regressions: Majority English group

With an average score of 493, the Majority English group has a reading performance slightly below the Canadian average (mean of 500, standard deviation of 100). This difference with the Canadian average is due to the exceptionally high average score of the Quebec French group (mean = 532). Globally, the regression analyses on this group's mean reading scores show that 87 per cent of the variance is related to student variables and 13 per cent to variables at the school or community level.

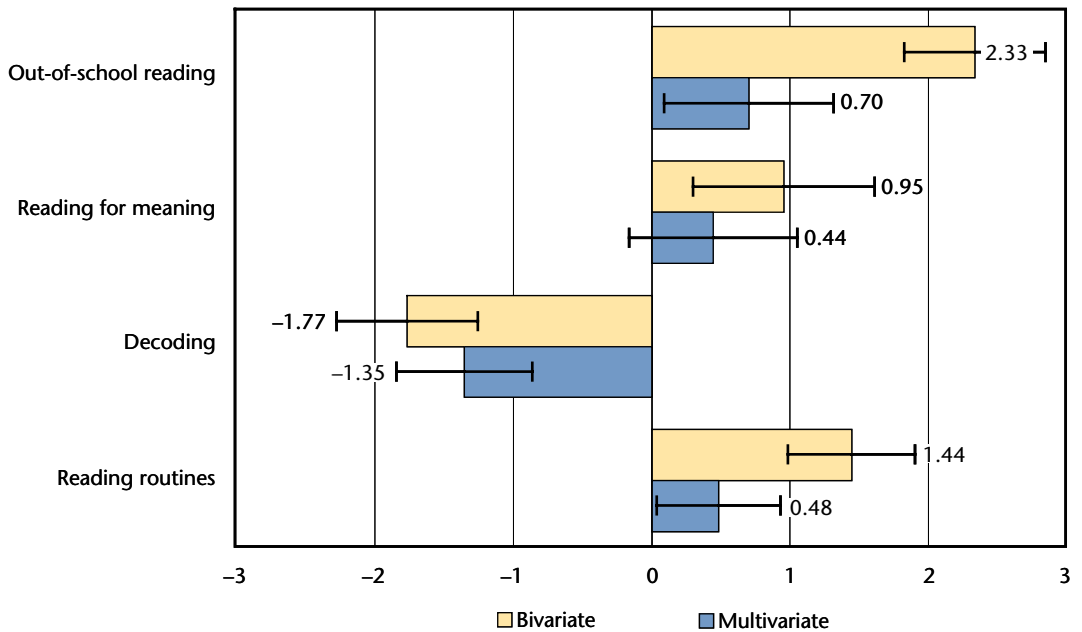
After the instructional variables were entered (the first of the five-step sequence), these variables accounted for 8 per cent of the student variance and 13 per cent of the school variance. Another way of stating this, is to say that 8 per cent of the variation in mean reading scores that stems from contextual variables measured at the student level (i.e., for each individual student) was explained by the variables in the instructional category. On the other hand, 13 per cent of the variation in mean reading scores that stems from variables measured at the school level (i.e., measures given by teachers or principals concerning school or classroom practices or characteristics) was explained by instructional variables (see Table 7-2 at the end of the section).

⁸ The reader is referred to Chart 2-2 in Chapter 2 for a general overview of the mean reading scores of the language groups.

An additional 9 per cent of explained student variance and 7 per cent of explained school variance are added when reading behaviours were entered in the model. Coefficients for these variables are shown in Chart 7-10.

All four reading behaviour variables have significant bivariate effects. Reading for meaning is no longer statistically significant when controlling for all the other variables in the model. Although the other three variables remain statistically significant, their effects are small. Reading by decoding is negatively related to mean reading scores, whereas out-of-school reading and having reading routines have a positive effect. The largest effect is that of reading by decoding, a negative effect of 13.5 points for a standard deviation difference in that variable.

CHART 7-10 Regression coefficients for reading behaviour variables (factor scores) for the Quebec English group

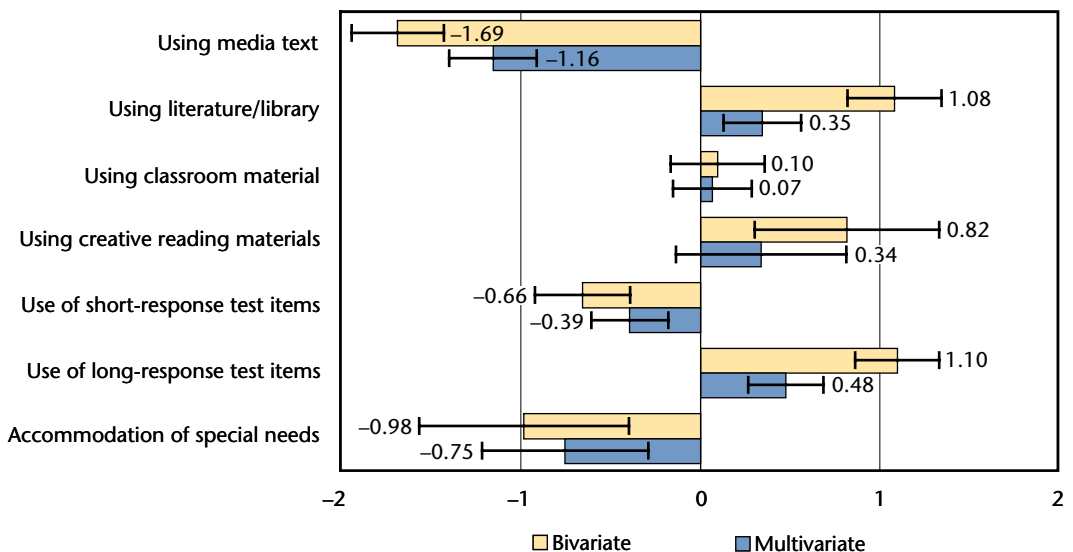


The instructional variables and their relationship to mean reading scores are presented in two charts (Chart 7-1 and Chart 7-2). The Chart 7-1 groups together all the instructional variables that have factor scores, and the Chart 7-2 groups all the remaining variables. The latter were measured on 3-, 4-, and 5-point scales.

In Chart 7-1, two variables have a statistically significant positive relationship with reading achievement, and three have a statistically significant negative relationship after the coefficients have been adjusted for the relationship with other variables in the model. Reading through the use of literature/library material has a bivariate effect of 1.08 (a 10.8-point difference on reading for one standard deviation change), but this effect is significantly reduced when other variables are taken into account. The multivariate coefficient is 0.35 or a 3.5 point change in mean reading score for a change of one standard deviation on this contextual variable. The effect is therefore statistically significant but weak in practical terms. In other words, a change of one standard deviation in the contextual variable is related to only 3.5 points on a scale of 500 (or a 0.035 standard deviation difference in mean reading score). A similar small positive effect is found for the use of long-response items in assessment procedures. Although using creative materials for teaching reading is positively related to mean reading scores as a bivariate effect, the effect is not statistically significant when other variables are controlled.

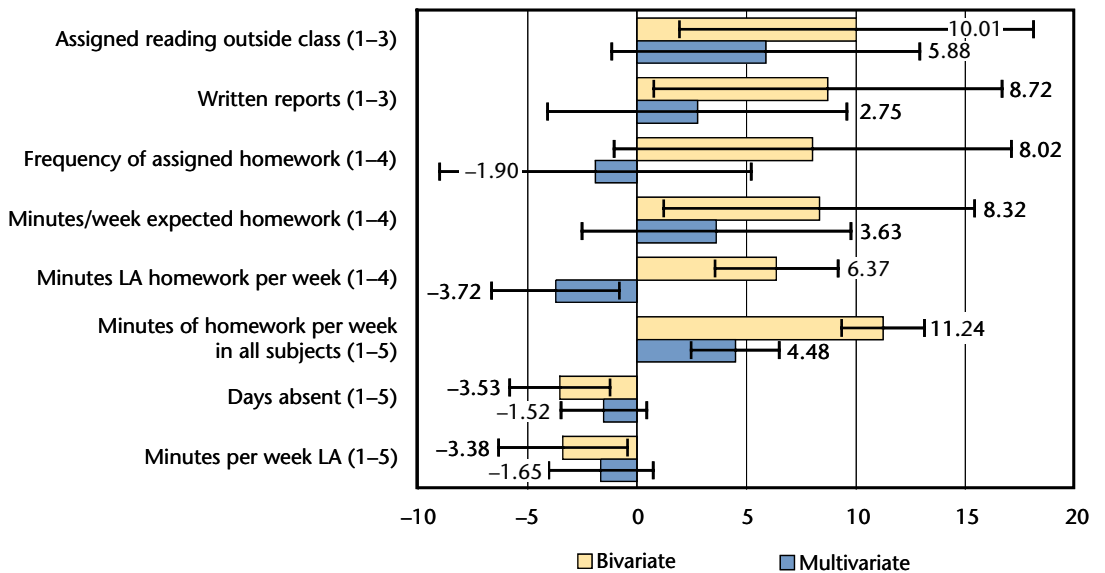
As shown in Chart 7-1, three of the variables are negatively related to mean reading scores. These can be interpreted in the same way as the variables discussed in the previous paragraph. Use of short-response test items in assessment is significantly related to lower mean reading scores (multivariate effect of -0.39) as well as accommodations to special needs (-0.75). The strongest negative effect is related to reading through the use of media text. The multivariate effect is 11.6 points less in mean reading scores for each standard deviation of change on this variable.

CHART 7-1 Regression coefficients for instructional variables (factor scores) for the Majority English group



The remaining instructional variables are presented in Chart 7-2. Although several variables have significant bivariate effects, only two multivariate effects are statistically significant. Even when all other variables are controlled, the total minutes of homework per week is positively related to mean reading scores. Since this variable was measured on a 5-point scale (less than 30 minutes to more than 3 hours per week), each unit of change is related to an increase of 4.48 points on the reading scale. Students who were assigned more than three hours of homework per week would have a mean reading score 17.92 points (4×4.48) higher than students assigned less than 30 minutes of homework per week. This variable may be more a reflection of the work ethic of the school than an effect of time since a time variable more directly related to language arts has a different effect. Positive as a bivariate effect, minutes of language arts in homework assignments have a statistically significant negative effect when other variables are controlled. It is possible that this reflects a tendency to assign extra language arts homework when reading achievement is low.

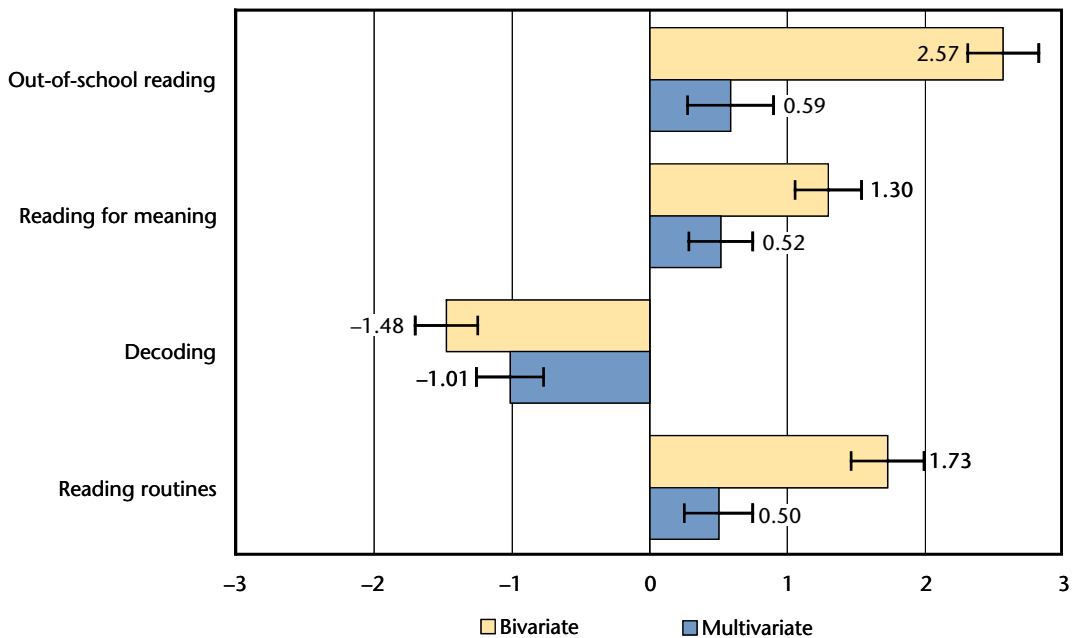
CHART 7-2 Regression coefficients for other instructional variables for the Majority English group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



When reading behaviours are added in the second of the five-step sequence in the regression model, the explained student variance is 17 per cent (9% more than the 8% explained by the instructional variables) and the explained school variance is 29 per cent (16% more than in the first step) — see Table 7-2 at the end of the section. The bivariate and multivariate effects of the reading behaviour variables are presented in Chart 7-3.

All reading behaviours were expressed as factor scores (mean = 50, standard deviation = 10). Therefore, the coefficients in Chart 7-3 can be directly compared to each other. The largest bivariate effect is related to out-of-school reading. The effect is less strong when the other variables in the full model are controlled, but it remains statistically significant. Students who do more out-of-school reading have higher mean reading scores than students who do less. Students who read for meaning also tend to have higher scores. The same is observed for students who have reading routines. One has to consider, however, whether these reading behaviours are consequences of being a good reader or whether these behaviours actually contribute to better mean reading scores. Reading by decoding is a reading behaviour that is negatively related to reading achievement. Again, it is not known whether weaker readers read more by decoding or whether reading by decoding has a negative effect on reading performance. None of these effects, however, are particularly strong.

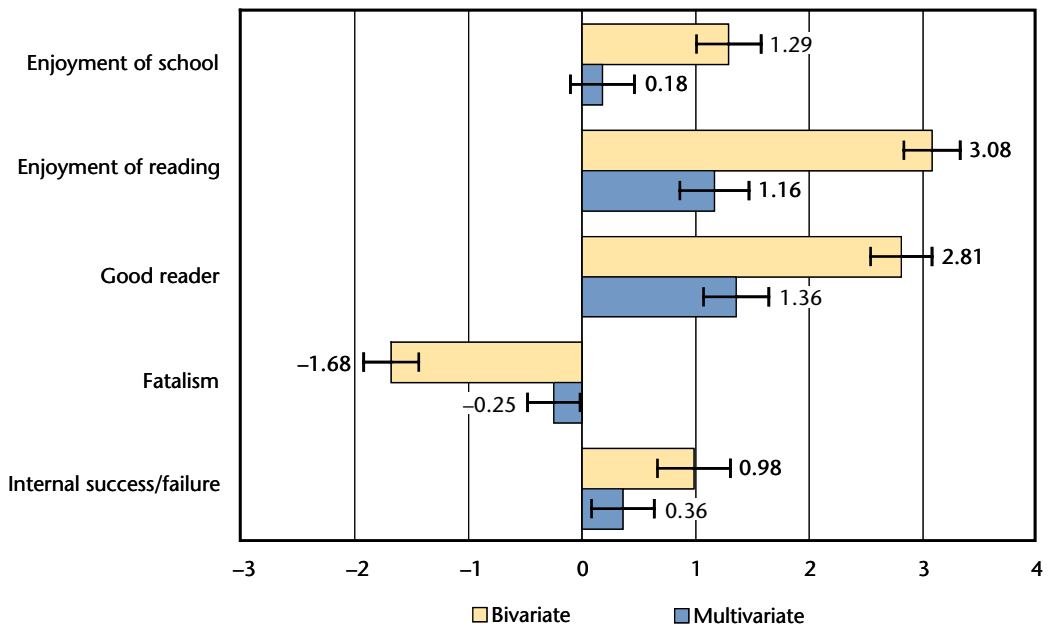
CHART 7-3 Regression coefficients for reading behaviour variables (factor scores) for the Majority English group



Attitude and motivation variables were the third group of variables entered in the regression model. These variables add another 6 per cent of explained student variance (23% for the first three steps) and another 5 per cent of school variance (three-step total of 34%) for the Majority English group mean reading scores. The results are presented in Chart 7-4. As in the previous chart, all variables are factor scores.

The two larger effects among the attitude and motivation variables are related to enjoyment of reading and perceiving oneself as a good reader. Both have a statistically significant positive multivariate effect although each is strongly reduced from its bivariate effects. As already stated for other variables, it is difficult to ascertain whether these variables are causes or effects of reading performance. The enjoyment of school and the fatalism factors have significant bivariate effects — the first positive and the second negative — but these are no longer statistically significant when other contextual variables are controlled. Finally, having an internal attribution of success or failure is positively, but weakly, related to reading performance.

CHART 7-4 Regression coefficients for attitude variables (factor scores) for the Majority English group

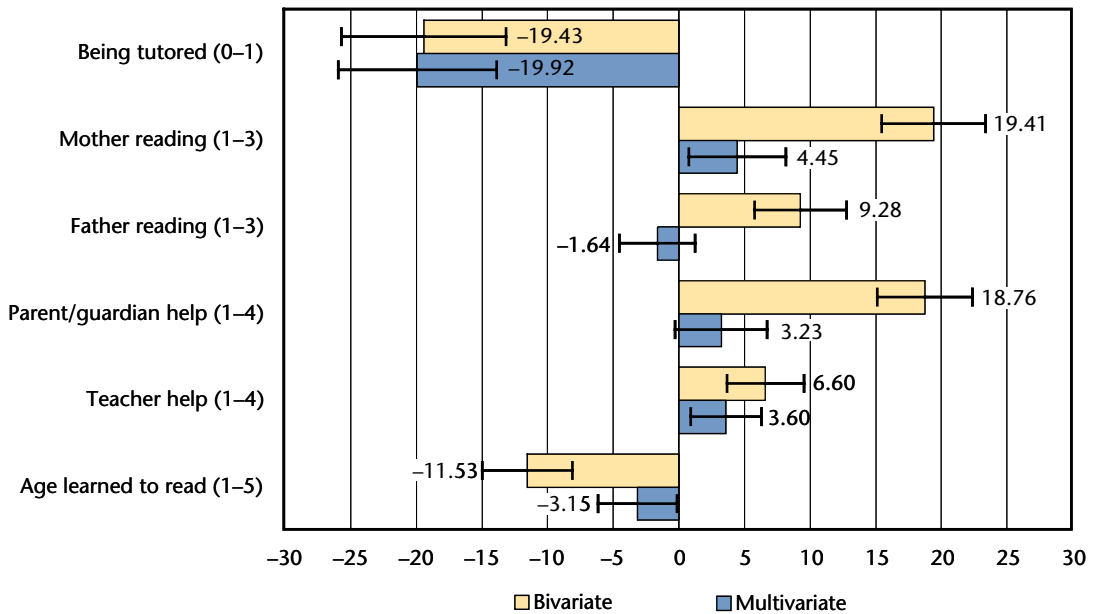


In the fourth step of the regression sequence, we entered variables pertaining to receiving help (e.g., being tutored) and to early reading behaviours. These variables add only 1 per cent of explained student variance and 1 per cent of explained school variance in the mean reading scores. These results are presented in Charts 7-5 and 7-6.

As observed in Chart 7-5, being tutored has a negative bivariate relationship with mean reading scores (approximately 20 points or one-fifth of a standard deviation), and the multivariate effect remains the same as the bivariate effect. Students who are tutored have lower scores than students not being tutored. This is expected because tutoring is typically offered to students in need. Learning to read at a later age is negatively related to mean reading scores. This multivariate effect is statistically significant. A 3.15-point decrease in the mean reading score is associated with each unit of change in a 5-point scale. Students who have reported receiving more help from teachers in their early learning, and students who have more often seen their mother read have higher reading scores than students reporting lower levels on these variables. This is true for both the bivariate and multivariate models. Receiving parental/guardian help has a strong bivariate effect, but this variable is not significantly related to mean reading scores when other contextual variables are controlled. Observing one's father read is not significantly related to students' mean reading scores after the mother's reading and other variables are controlled.

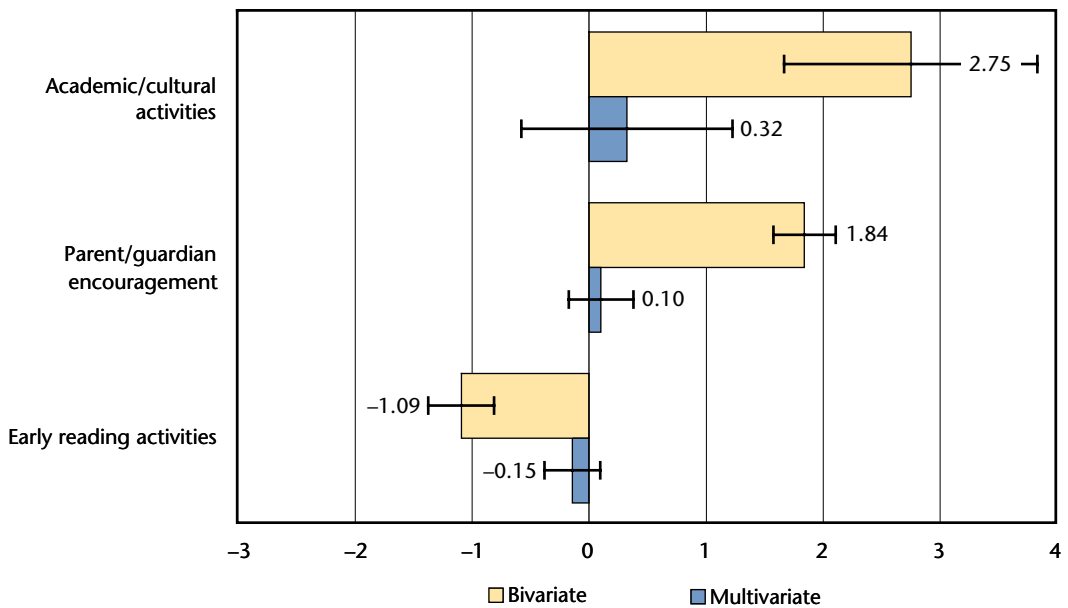
CHART 7-5 Regression coefficients for help and early reading variables for the Majority English group

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



None of the variables shown in Chart 7-6 have a statistically significant multivariate effect on reading behaviour. However, all three variables are significantly related to reading when other contextual variables are not controlled. Participating in academic/cultural activities and receiving parental/guardian encouragement have a positive relationship to mean reading scores whereas what students remembered as early reading strategies are negatively related to reading performance.

CHART 7-6 Regression coefficients for academic/cultural activities, parent encouragement, and early reading variables (factor scores) for the Majority English group



Demographic variables were added last in the regression model. They add another 5 per cent of explained student variance (for a total of 29% for the model) and 8 per cent of school variance (for a total of 43%). Results are shown in Chart 7-7.

Five of the demographic variables have significant multivariate effects. Girls have higher scores than boys although the bivariate effect is significantly reduced by taking into account the contextual variables. Students who are in higher grades have higher mean reading scores. This effect is strong and is not strongly reduced by other variables. Each grade difference is equal to 18.5 points in reading performance, close to one-fifth of a standard deviation. Books in the home and the mother's education, two socioeconomic variables, have reduced multivariate effects compared to their initial bivariate effects, but they remain statistically significant. Books in the home were measured on a 5-point scale (from 0–10 books to more than 200), with the difference between the lowest

category and the highest being 25 points (4×6.3) or one-quarter of a standard deviation. The mother's education was measured on a 6-point scale (less than high school to university degree) and, typically, this variable is highly correlated with books in the home. The remaining effect is not strong, as evidenced by the difference between the top and the bottom categories on the scale being 12 points on the reading scale or one-eighth of a standard deviation (5×2.41).

English spoken in the home and French spoken in the home are two variables that tend to cancel each other in a regression model because use of one language is tantamount to not using another language. In this study, the full model was run with home use of the school language as the positive variable — French for the French-language schools and English for the English-language schools. Therefore, for the Majority English group, this effect compares the students who most often speak English at home with students who use a language other than English at home, that is, French or another language. As shown in Chart 7-7, the bivariate positive effect of speaking English in the home is strong, but this effect is considerably reduced when other variables are taken into account. The multivariate effect is nonetheless statistically significant. Students who most often speak English at home have, on average, a score 8 points above that of the students who most often use another language at home.

CHART 7-7 Regression coefficients for demographic variables for the Majority English group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

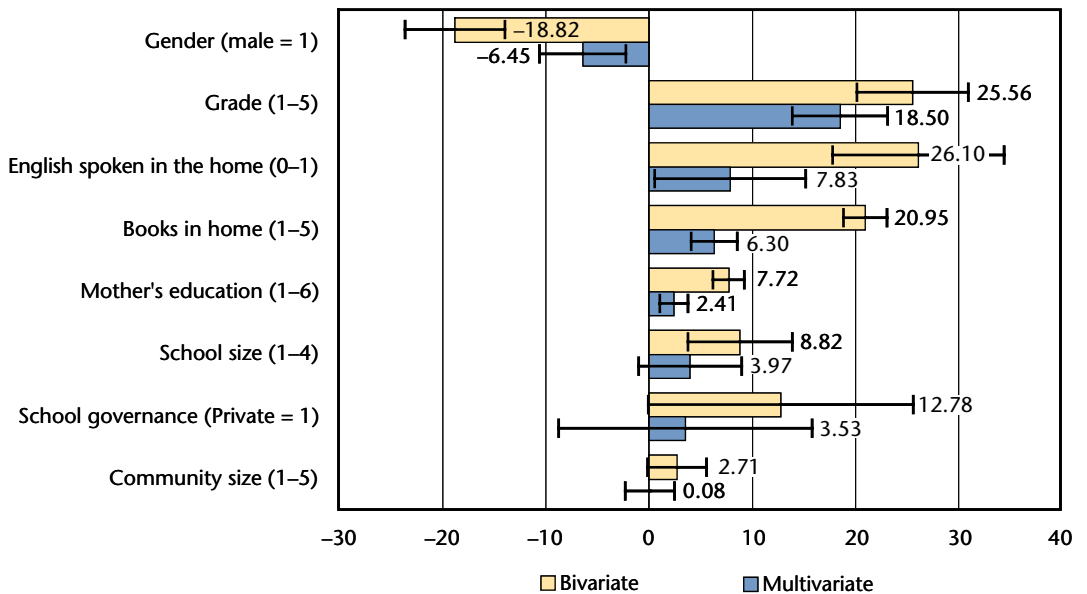


Table 7-2 summarizes the percentages of variance explained by five categories of variables entered in the model for the Majority English group. Differences in instructional variables explain 8 per cent of the variance at the student level and 13 per cent of the variance at the school level. Reading behaviours account for a similar proportion of variance after the instructional variables have been accounted for (9% and 16% at the student and school levels, respectively). Attitude and motivation variables account for an extra 6 per cent of student variance and an extra 5 per cent of school variance. Help and early reading behaviours explain very little extra variance (1% at each level) after the first three categories of variables are controlled. Finally, demographic variables explain an extra 5 per cent of student variance and an extra 8 per cent of school variance after the first four categories of variables were entered in the regression model.

TABLE 7-2 Percentage of the total variance accounted for by student and school level and change at model steps for the Majority English group

Variable categories (Model step)	Student level 87%		School level 13%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	8	8	13	13
Reading behaviours	9	17	16	29
Attitudes	6	23	5	34
Help and early reading	1	24	1	35
Demographics	5	29	8	43

Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

Multivariate regressions: Quebec English group

The Quebec English group had a mean reading score of 479, approximately one-fifth of a standard deviation below the Canadian mean and one-half of a standard deviation below the Quebec French group's average score of 532. The mean for the Quebec English group is significantly below the mean of 493 for the Majority English group and above that of the New Brunswick French group (458) but not different from the East French, West French, and Ontario French groups (ranging from 471 to 478).

The instructional variables explain a large part of the school variance in the mean reading scores of the Quebec English group (36%), which is more than two-thirds of the total variance explained by the model at the school level (50%). This seems to indicate that schools of the Quebec English group differ considerably in their instructional practices. At the student level, the amount of school variance explained (10%) is similar to that explained by these variables in the Majority English group (8%). The charts showing the coefficients for the instructional variables are shown in charts 7-8 and 7-9.

Instructional variables measured as factor scores are presented in Chart 7-8. Two factors have statistically significant multivariate effects: reading through the use of media text is negatively related to reading performance; use of long-response test items in assessment is positive. Similarly in Chart 7-9, most of the instructional variables that have strong

bivariate effects are no longer significant when other variables are controlled. For instance, frequency of assigned homework and minutes per week of expected homework have very strong bivariate effects that are reduced when other variables are controlled. Only the expected minutes per week of homework (a school variable) is statistically significant in the final model. This variable has a strong effect (more than 27 points in mean reading score for each unit of change on the scale).

CHART 7-8 Regression coefficients for instructional variables (factor scores) for the Quebec English group

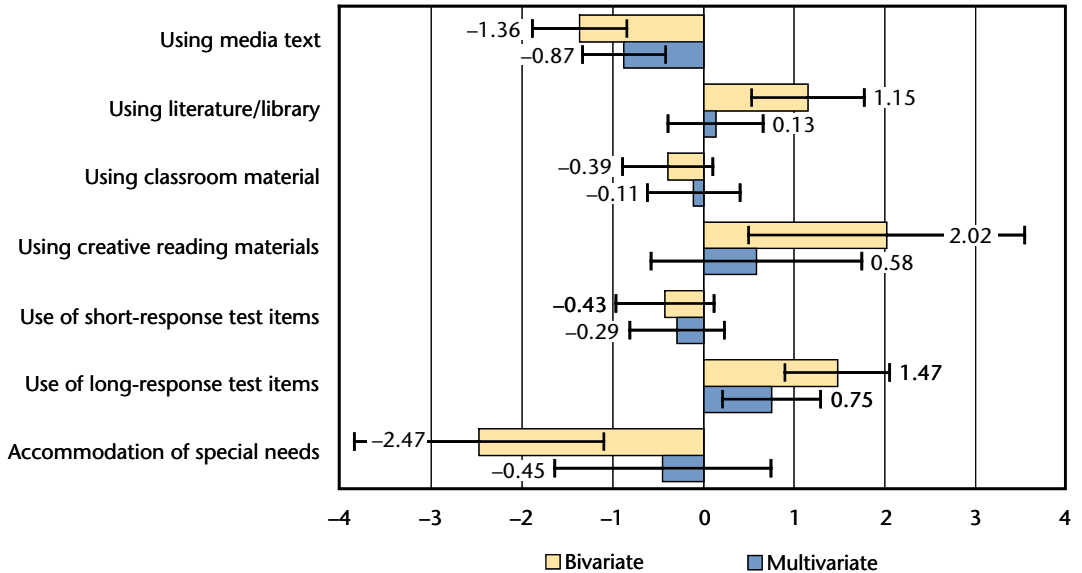
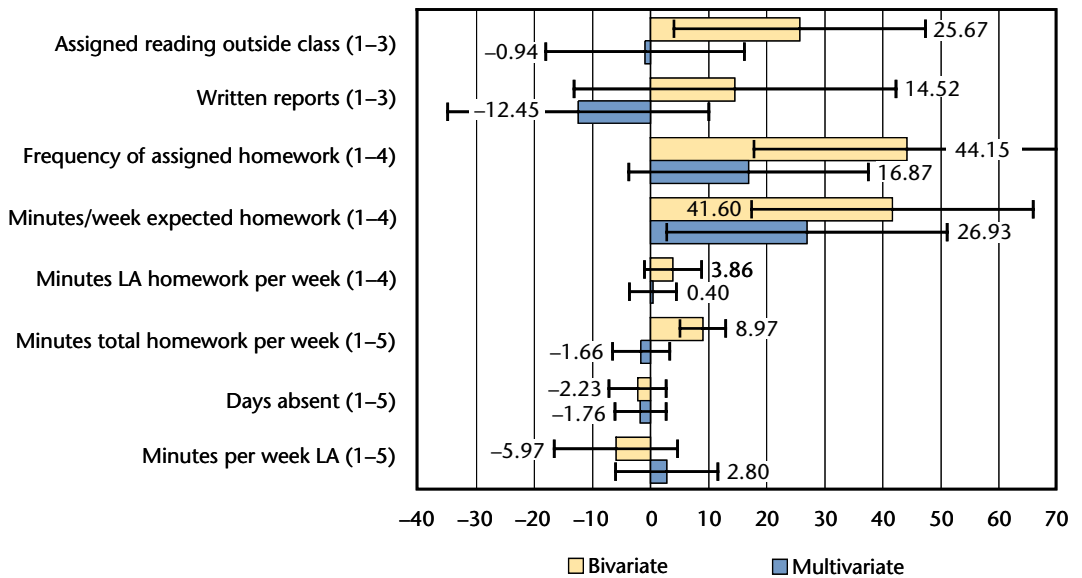
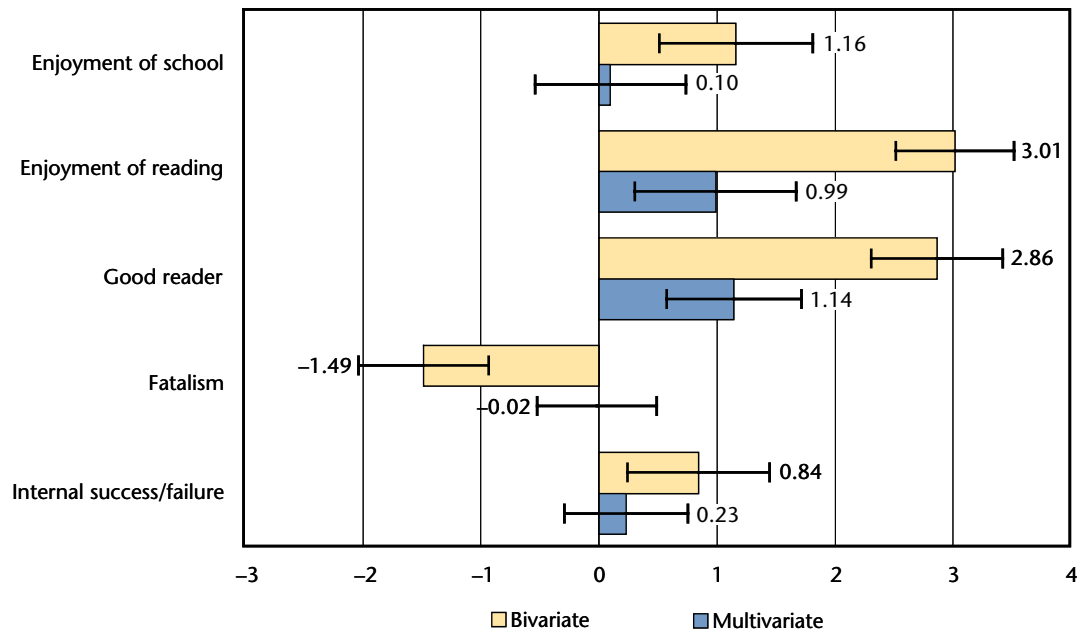


CHART 7-9 Regression coefficients for other instructional variables for the Quebec English group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



Adding the attitude variables in the model in step 3 adds 5 per cent of student variance explained and reduces the school variance explained by 3 per cent. As shown in Chart 7-11, only two variables have statistically significant multivariate effects, the latter being less strong than their bivariate effects. When we account for all variables in the model, the “enjoy reading” and “good reader” variables still account for student differences in mean reading scores. The differences in mean reading scores range from 10 to 11 points for each standard deviation difference in these variables, approximately one-tenth of a standard deviation in reading performance. As already mentioned, these variables may be as much a product of reading performance as a causal variable.

CHART 7-11 Regression coefficients for attitude variables (factor scores) for the Quebec English group



In step 4 of the model, the variables for help and early reading behaviours were entered. The latter explain 3 per cent of additional student variance and 6 per cent of school variance. The bivariate and multivariate coefficients are shown in charts 7-12 and 7-13.

In Chart 7-12, by far the largest effect is that of the “being tutored” variable. The effect remains statistically significant although it is associated with a large confidence interval. Students who are tutored have lower scores than students who are not tutored. This does not mean that tutoring as an activity is negatively related to reading performance, but most likely that students with lower mean reading scores tend to be tutored more often than students with a higher reading performance. The only other statistically significant effect is that related to seeing the father reading. When all other variables are controlled (including the frequency of seeing one’s mother reading), this effect is negative. Most likely this relationship is indicative of some other variables correlated with the variable of father reading that was not measured in the present study. In Chart 7-13, all variables are factor scores. Only the factor for early reading activities has a significant multivariate effect (a 6-point change in mean reading score for a standard deviation change in this variable). This effect is negative. What students remember as early reading activities tends to correlate negatively with reading performance.

CHART 7-12 **Regression coefficients for help and early reading variables for the Quebec English group**

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

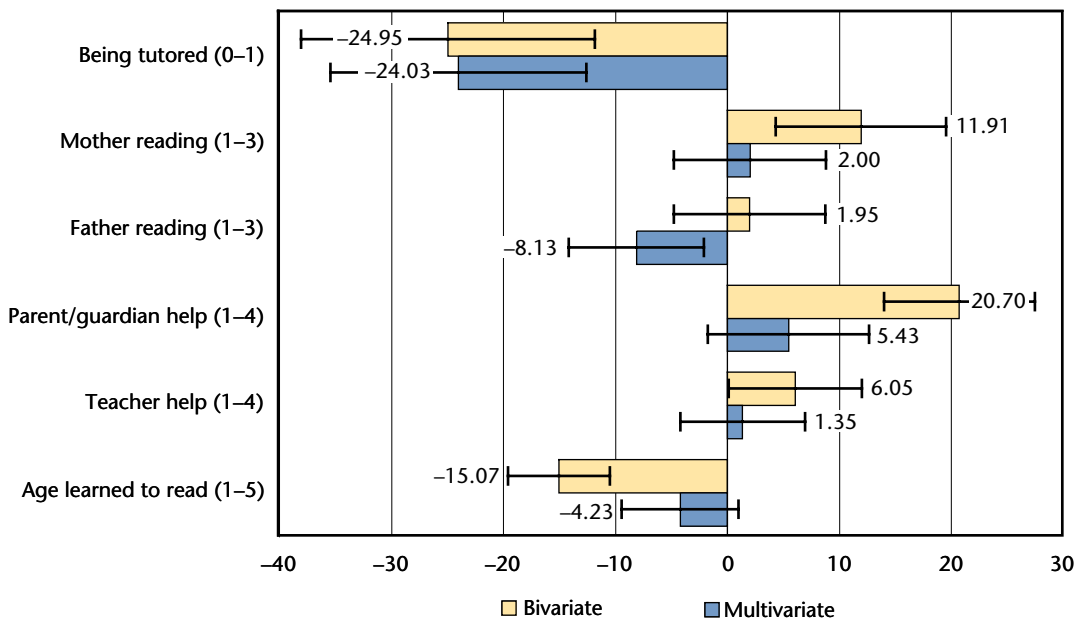
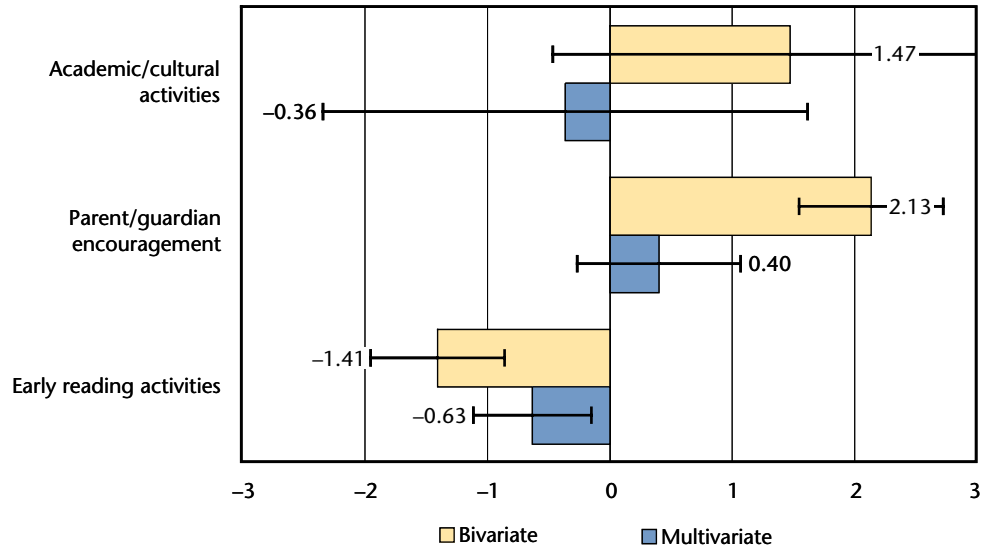


CHART 7-13 Regression coefficients for academic/cultural activities, parent/guardian encouragement, and early reading variables (factor scores) for the Quebec English Group



Introducing in the last step of the model the demographic variables adds 3 per cent of the explained student variance and 4 per cent of the explained school variance. Bivariate and multivariate coefficients are presented in Chart 7-14.

Although gender has a statistically significant effect, with girls having higher scores than boys, the multivariate effect is not statistically significant. It is possible that the gender effect is related to attitude and reading behaviour variables and that once these are controlled, the gender difference is no longer statistically significant. Since demographic variables were entered last in the model, these relationships cannot be observed. As was the case for the Majority English group, grade has a significant relationship to reading results, with students in higher grades having higher scores than students in lower grades. Speaking English at home is positively related to mean reading scores, but the multivariate effect is not statistically significant. Therefore, students who do not use the language of the school at home differ on other variables, possibly socioeconomic variables that are related to reading performance.

Mother's education has a positive significant effect even when other variables, including books in the home, are controlled. The only other statistically significant multivariate effect is that of school governance. Students in private schools tend to score approximately one-quarter of a standard deviation above the students in public schools, even when socioeconomic, instructional, and other student variables are controlled.

CHART 7-14 **Regression coefficients for demographic variables for the Quebec English group**
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

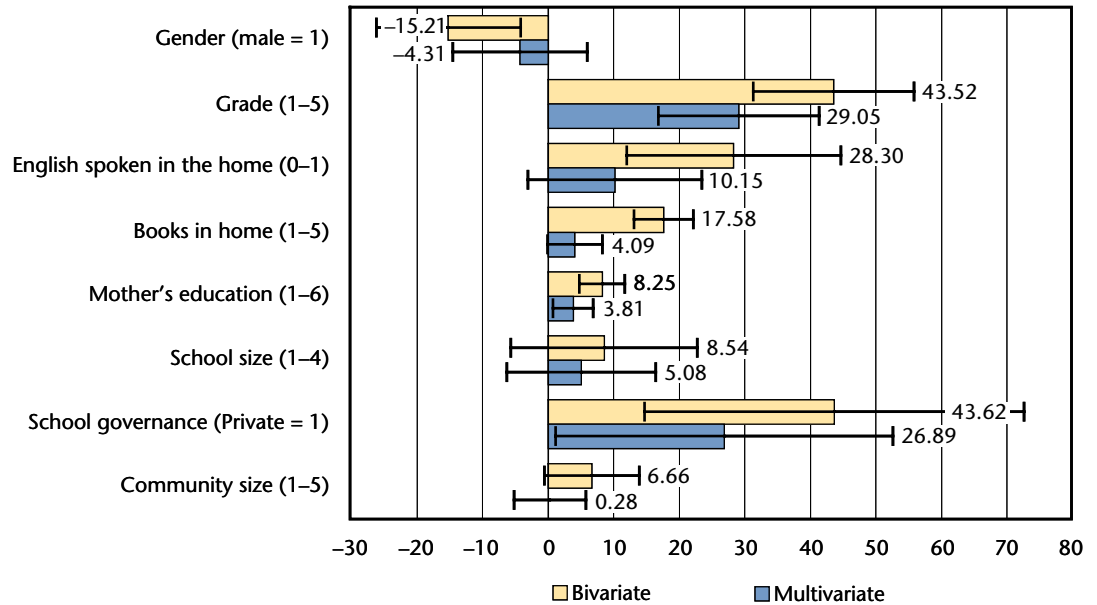


Table 7-3 summarizes the effects of the five categories of variables entered in the model in terms of percentage of variance explained at both the student level and the school level. Note that school variance (24%) is about twice that of the Majority English group (13%) — see Table 7-2 in the previous section — and that instructional variables account for a large part of this variance (36%). This may be related to the relatively strong presence of private schools in this jurisdiction (30%). Private and public schools may differ on important instructional variables.

TABLE 7-3 **Percentage of the total variance accounted for by student and school level and change at model steps for the Quebec English group**

Variable categories (Model step)	Student level 76%		School level 24%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	10	10	36	36
Reading behaviours	9	19	7	43
Attitudes	5	24	-3	40
Help and early reading	3	27	6	46
Demographics	3	30	4	50

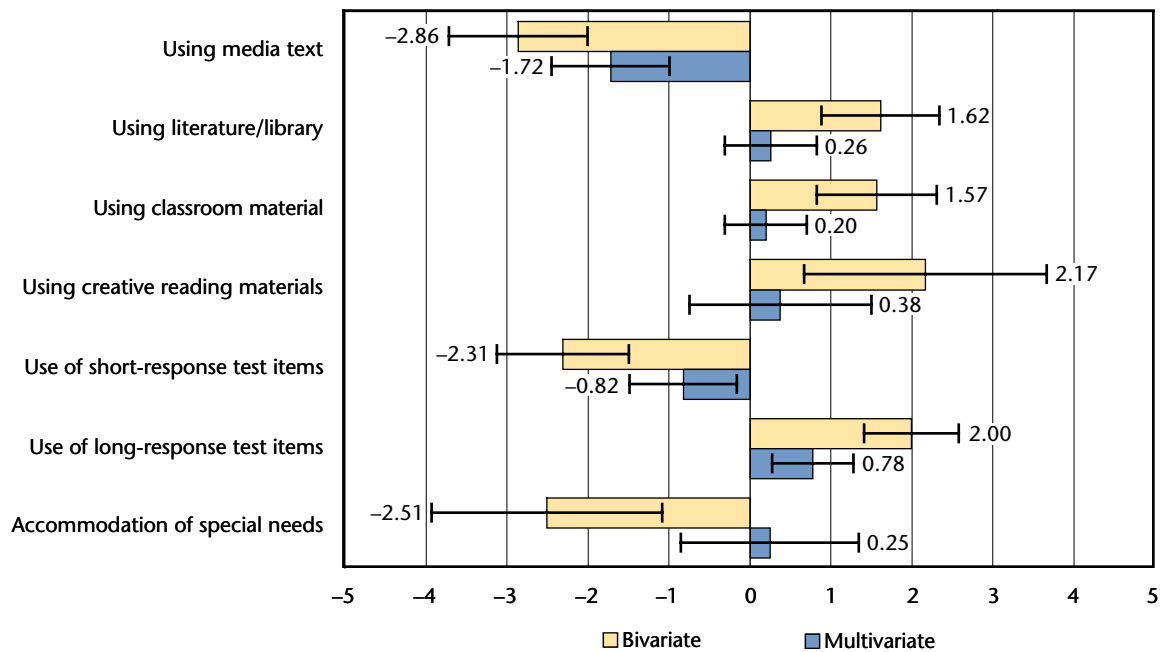
Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

Multivariate regressions: Quebec French group

With a mean reading score of 532, the Quebec French group is one-third of a standard deviation above the Canadian average, and also the group with the highest mean score among the six groups compared. In this section, the contextual variables that are related to their mean reading scores are analyzed. These variables account for 41 per cent of the student variance and 84 per cent of the school variance. A relatively large amount of the school variance is related to the instructional variables, which explain 56 per cent of this variance (see Table 7-4 at the end of this section). Again, as for the Quebec English group, this seems to indicate that schools in this jurisdiction differ considerably in their instructional approaches. The bivariate and multivariate coefficients for these instructional variables are shown in charts 7-15 and 7-16.

In Chart 7-15, three of the multivariate effects are statistically significant. Reading through the the use of media text has a significant negative effect on reading. A standard deviation difference on the factor score is related to a change of 17.2 points on the mean reading score. Use of short-response items in assessment is related to lower mean reading scores and long-response items are related to higher scores. Less than 10 points on a scale of 500 is related to a standard deviation of change on the factor scores that measure these assessment procedures.

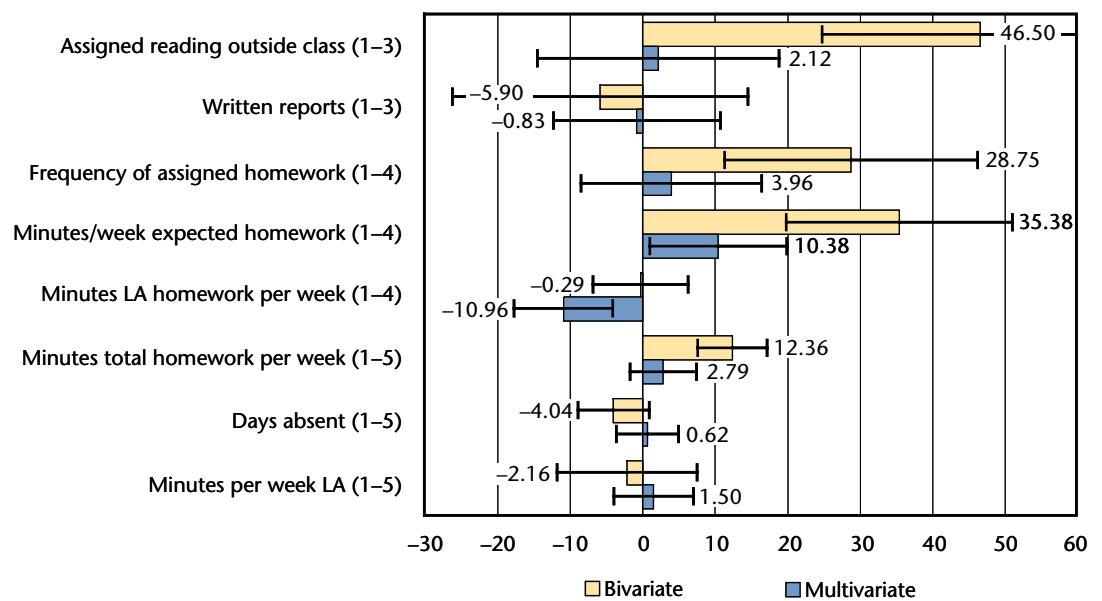
CHART 7-15 Regression coefficients for instructional variables (factor scores) for the Quebec French group



For the instructional variables shown in Chart 7-16, two variables have a significant multivariate effect — minutes devoted by students to language arts homework; minutes of expected homework. Unexpectedly, the time devoted to language arts homework is negatively related to mean reading scores. This could mean that students who have lower mean reading scores tend to spend more time on their language arts homework, possibly on corrective or remedial activities. As for the positive effect of expected total time on homework, this may reflect the work ethic of the school. Schools in which there exists an expectation of more work from their students tend to have higher achieving students. This effect is relatively strong — more than 10 points of score change is related to each level of the 4-point scale.

CHART 7-16 Regression coefficients for other instructional variables for the Quebec French group

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



Bivariate and multivariate coefficients for reading behaviours are shown in Chart 7-17. All variables are factor scores. The strongest bivariate effect is related to the amount of out-of-school reading. As a bivariate effect, a change of one standard deviation in this variable is related to approximately one-third of a standard deviation (34 points) change in mean reading scores. However, this effect is related to only 8 points of change in mean reading scores when all other variables are controlled. From 10 to 12 points in mean reading scores can be attributed to reading routines, reading for decoding, and reading for meaning. All multivariate effects are considerably smaller than their bivariate effects, reading for decoding being negatively related to reading performance.

CHART 7-17 Regression coefficients for reading behaviour variables (factor scores) for the Quebec French group

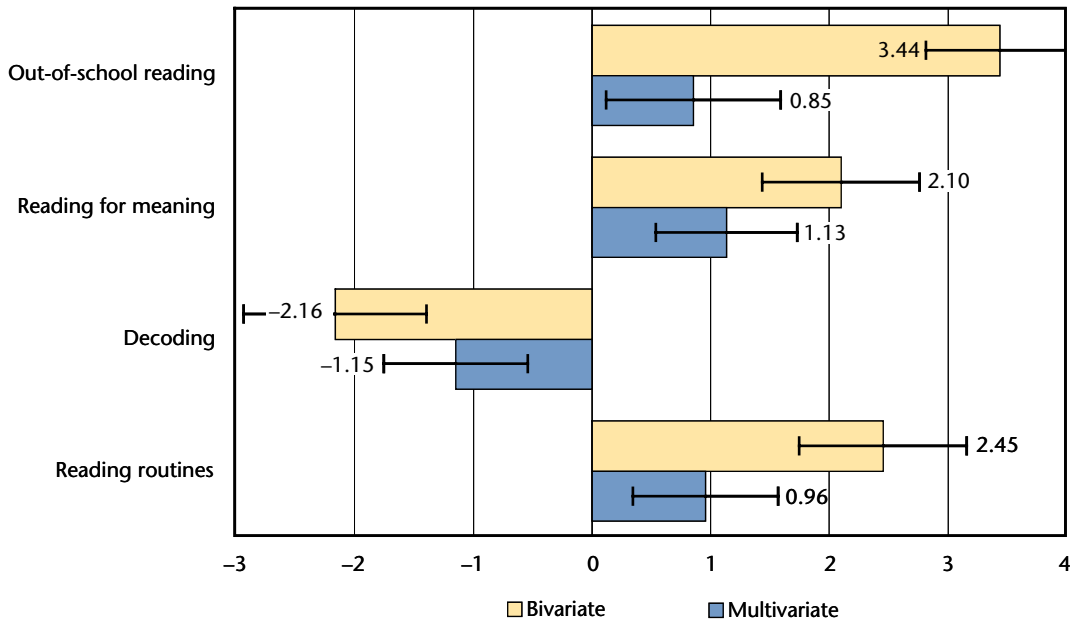


Chart 7-18 shows coefficients for attitude and motivation variables. Three of the five factors have a significant multivariate effect. Seeing oneself as a good reader and enjoying reading are positively related with mean reading scores, whereas the fatalism factor (attributing one's successes and failures to luck) is negatively related to reading performance. As already mentioned, it is not known to what extent these variables are the result or the cause of reading performance.

CHART 7-18 Regression coefficients for attitude variables (factor scores) for the Quebec French group



Coefficients of early reading and help variables are shown in Charts 7-19 and 7-20. In Chart 7-19, only one variable is still statistically significant once other variables are controlled. As for the previous groups, students who are tutored have lower scores than non-tutored students. None of the factor scores shown in Chart 7-20 have a significant multivariate effect.

CHART 7-19 Regression coefficients for help and early reading variables for the Quebec French group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

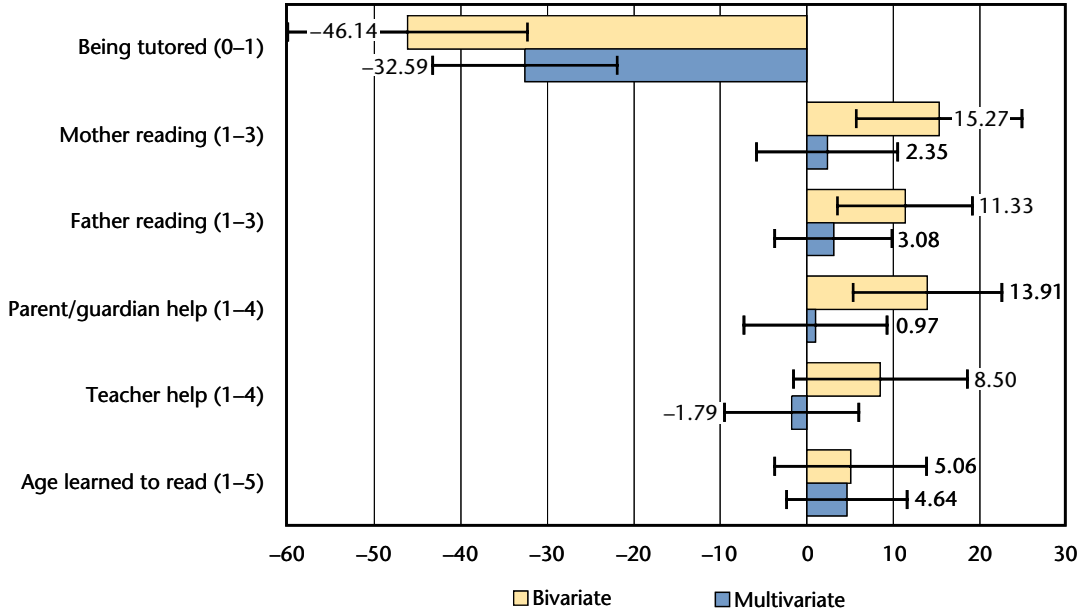
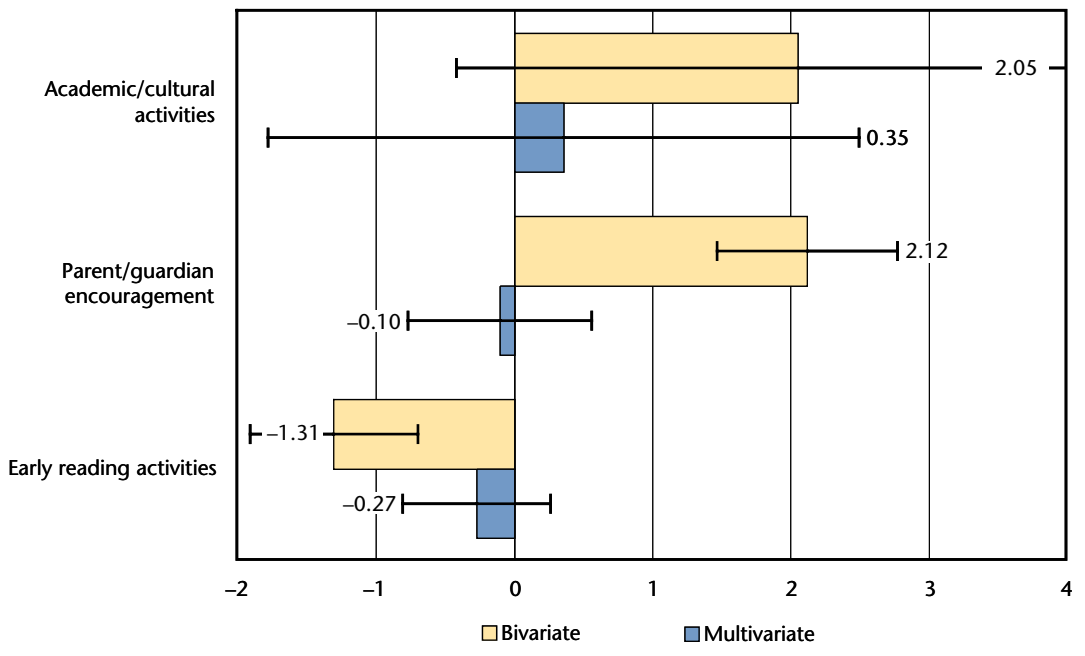


CHART 7-20 Regression coefficients for academic/cultural activities, parent/guardian encouragement, and early reading variables (factor scores) for the Quebec French group



Coefficients for demographic variables are shown in Chart 7-21. Several variables have significant multivariate effects. The gender variable is statistically significant even when all other variables are controlled, the effect being approximately one-fifth of a standard deviation. A strong grade effect is also observed, as was the case for the other groups. A very strong bivariate effect is related to the use of French in the home. This effect decreases from 64.70 to 28.32 when other variables are controlled but is still statistically significant.

The multivariate effect of books in the home is not as strong as the bivariate effect, but it remains moderate and statistically significant. School size is also statistically significant. Students from larger schools tend to score higher than students from small schools. Finally, the very large school governance bivariate effect (70.12) is considerably reduced when other variables are entered in the model, but the effect remains statistically significant and moderately strong (28.77). Students from private schools score 29 points more than students in public schools, even when all contextual variables are controlled.

CHART 7-21 Regression coefficients for demographic variables for the Quebec French group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

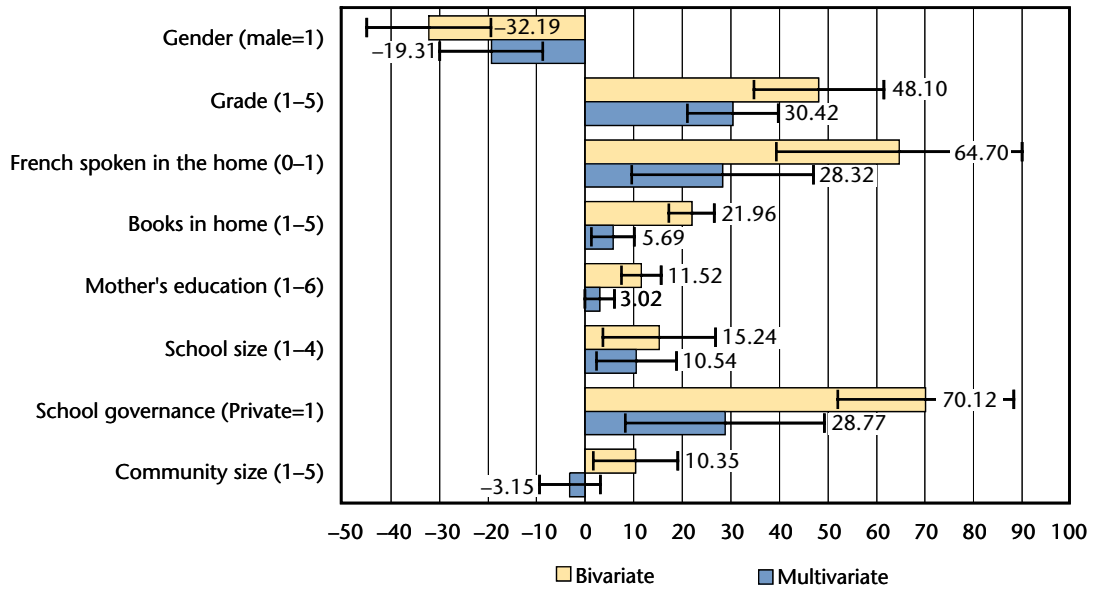


Table 7-4 summarizes the effects of the five categories of contextual variables. A relatively large part of the total variance is related to school variables (20%). This is close to twice the amount for the Majority English group. The only other group having such a high amount of school variance includes the Quebec English schools (24%). The two Quebec groups are the ones having the largest percentage of private schools. School governance may therefore be an important factor related to the percentage of variance at the school level. As was the case in the Quebec English group, instructional variables account for a large portion of the school variance (56%) for the Quebec French group, with some of these effects possibly related to differences between public schools and private schools. As shown above, the strong bivariate effect of the school governance is largely diminished by control of other factors such as instructional activities and reading behaviours. Demographics still account for a considerable amount of student (12%) and school (10%) variance even though it was entered in the last step of the regression model.

TABLE 7-4 Percentage of the total variance accounted for by student and school level and change at model steps for the Quebec French group

Variable categories (Model step)	Student level 80%		School level 20%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	9	9	56	56
Reading behaviours	9	18	12	68
Attitudes	4	22	0	68
Help and early reading	7	29	6	74
Demographics	12	41	10	84

Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

Multivariate regressions: Ontario French group

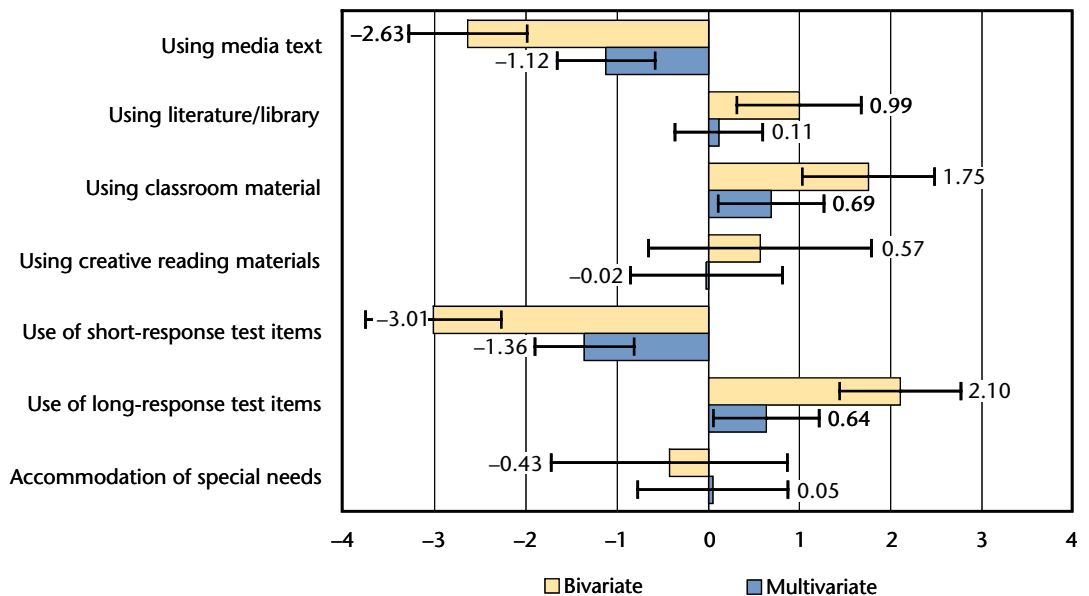
With a mean score of 478, the Ontario French group does not distinguish itself statistically from other minority groups in reading performance except New Brunswick (458). This score, however, is statistically lower than those of both majority groups: Quebec French (532) and Majority English (493).

The regression model applied to the reading data of the Ontario students explains 38 per cent of the student variance and 65 per cent of the school variance. The student variance accounts for 90 per cent of the total variance whereas the school variance accounts for the remaining 10 per cent (see Table 7-5 at the end of the section).

Instructional variables account for 14 per cent of the student variance which is slightly more than one-third of the variance explained by the model at this level. The instructional variables explain 39 per cent of the school variance, which is more than half of the 65 per cent explained by the model. Bivariate and multivariate coefficients are shown in charts 7-22 and 7-23.

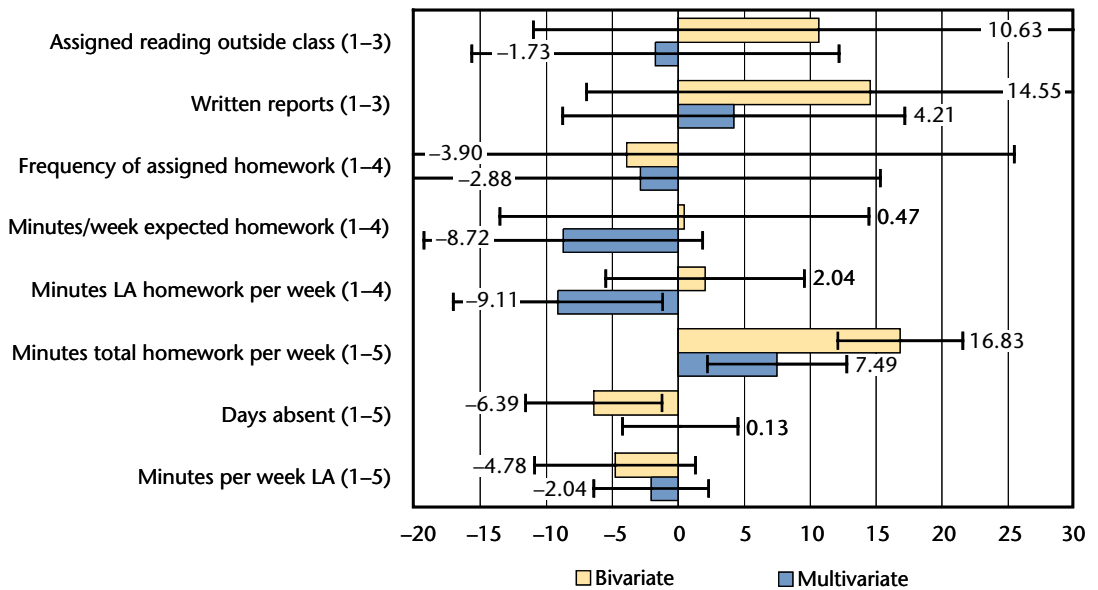
Chart 7-22 shows the instructional variables measured as factor scores. Five of the seven factors have significant bivariate effects, four of which have significant multivariate effects of small magnitude. Mean reading scores are negatively related to reading through the use of media text and to the use of short-response test items in assessment. Using classroom material to read and using long-response test items for assessment are positively related to reading performance.

CHART 7-22 Regression coefficients for instructional variables (factor scores) for the Ontario French group



Coefficients for the remaining instructional variables are shown in Chart 7-23. Only two of these variables have significant multivariate effects. Students who spent more time on their language arts homework have lower scores than students spending less time. As mentioned before, this could be an indication that students who need corrective or remedial activities tend to spend more time on their language arts homework. However, students who spend more time on their total homework have higher mean reading scores. This may reflect the work ethic of students. The more studious of them tend to have higher mean reading scores, even when other factors such as language arts homework, reading behaviours, attitudes, and socioeconomic status are controlled.

CHART 7-23 Regression coefficients for other instructional variables for the Ontario French group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



Coefficients for reading behaviours are shown in Chart 7-24. All four factors have significant bivariate effects, but only two of the multivariate effects are statistically significant. As was the case for other groups, reading by decoding is negatively related to mean reading scores, and having reading routines is positively related to these. Contrary to some groups, the amount of out-of-school reading does not have a statistically significant multivariate effect when other variables are controlled.

CHART 7-24 Regression coefficients for reading behaviour variables (factor scores) for the Ontario French group

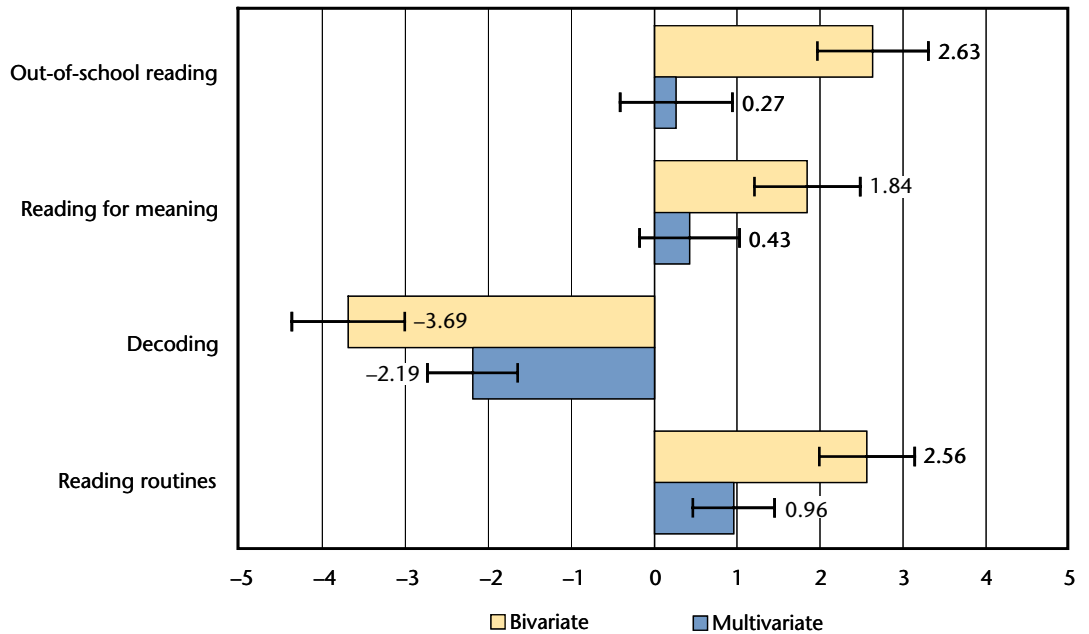
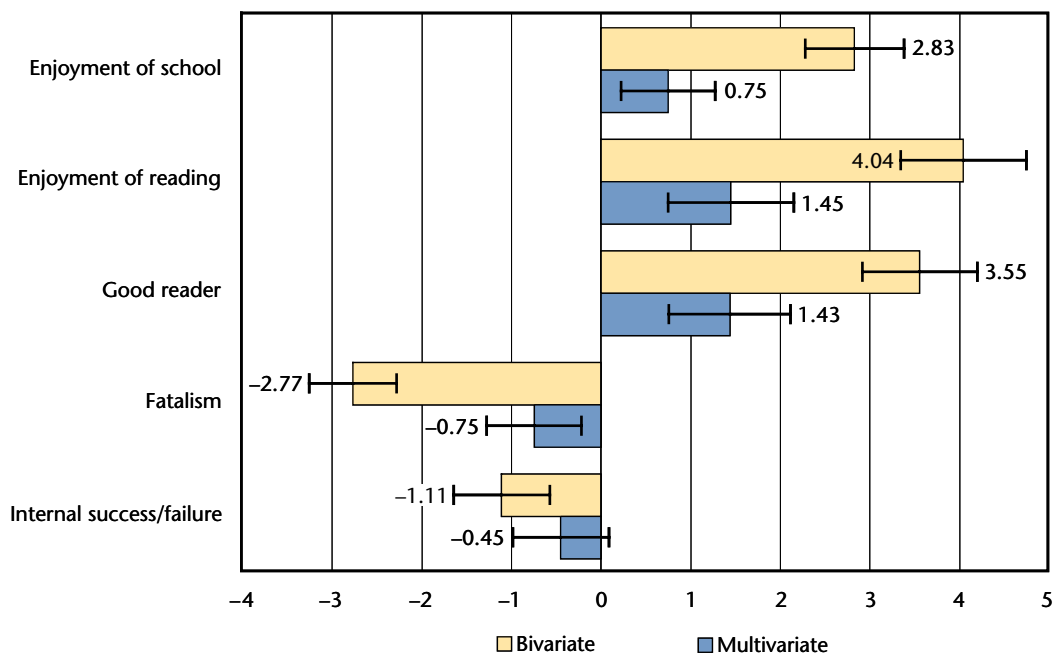


Chart 7-25 shows the bivariate and multivariate coefficients for attitude and motivation variables. These are all measured as factor scores. All five of these variables have significant bivariate effects and four have significant multivariate coefficients. Enjoying school, enjoying reading and perceiving oneself as a good reader are all positively related to reading performance. On the other hand, the fatalism factor is negatively related to mean reading scores. Students who attribute their success and failures to luck and who therefore see themselves as having little control of their achievement have lower mean reading scores. A standard deviation of change on the variable is related to 7.5 points on the reading scale, a relatively small effect.

CHART 7-25 Regression coefficients for attitude variables (factor scores) for the Ontario French group



Coefficients for help and early reading are shown in charts 7-26 and 7-27. In Chart 7-26, only two of the help and early reading variables have statistically significant multivariate effects. As was the case for the other groups, students who are tutored have lower scores than non-tutored children. On the other hand, students who received parental/guardian help in learning to read have higher scores. It is interesting that this effect remains relatively strong (a 37.5 points difference between the high and low ends of the scale), even when socioeconomic factors such as mother's education and books in the home are taken into account. Chart 7-27 shows that participating in academic/cultural activities, having had parental/guardian encouragement, and having participated in early reading activities are all significantly related to mean reading scores (the latter negatively), but these effects are not statistically significant when other contextual variables are entered in the model.

CHART 7-26 Regression coefficients for help and early reading variables for the Ontario French group

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

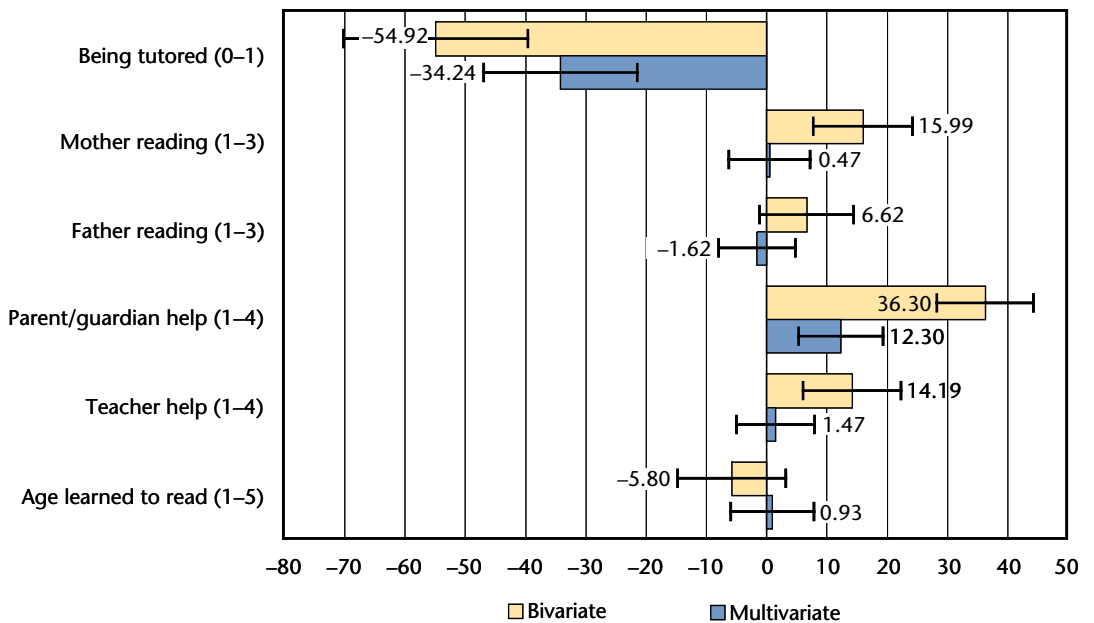
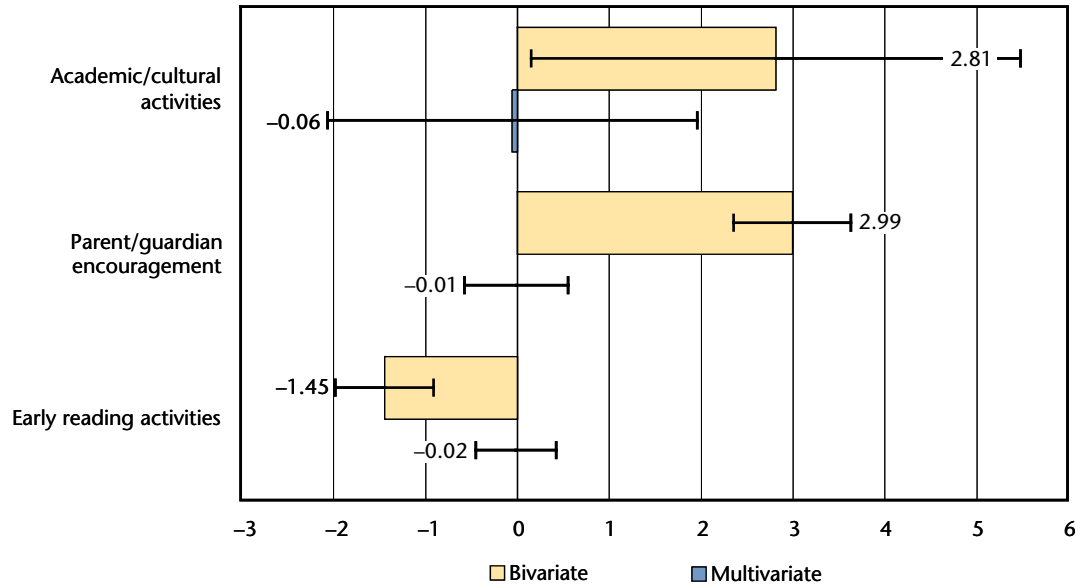
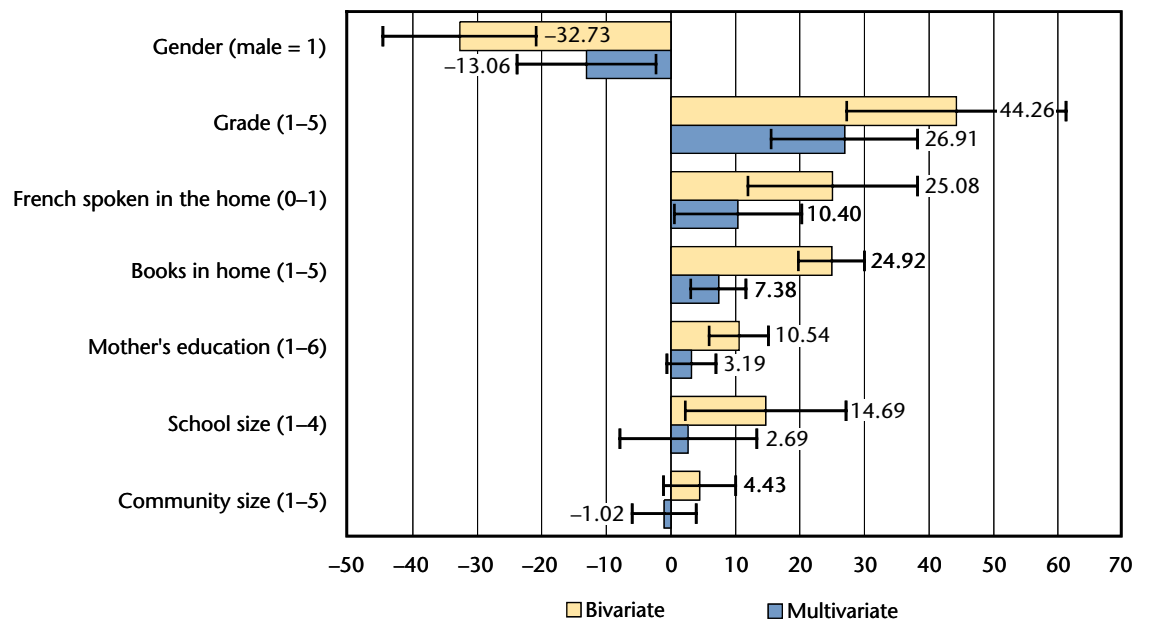


CHART 7-27 Regression coefficients for academic/cultural activities, parent/guardian encouragement, and early reading variables (factor scores) for the Ontario French group



Coefficients for demographic variables are shown in Chart 7-28. Aside from the expected effects of gender and grade, books in the home and the use of French at home have a statistically significant multivariate effect. Both of these effects are reduced significantly from their initial bivariate effects but remain statistically significant.

CHART 7-28 Regression coefficients for demographic variables for the Ontario French group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



Explained variances by the five categories of variables entered in the regression model are shown in Table 7-5. The largest amounts of variance explained at both the student level and the school level are associated with the instructional variables. Reading behaviours also account for an important portion of the student variance and of the school variance. Demographic variables account for a larger portion of the school variance than of the student variance.

TABLE 7-5 Percentage of the total variance accounted for by student and school level and change at model steps for the Ontario French group

Variable categories (Model step)	Student level 90%		School level 10%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	14	14	39	39
Reading behaviours	11	25	9	48
Attitudes	8	33	1	49
Help and early reading	2	35	5	54
Demographics	3	38	11	65

Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

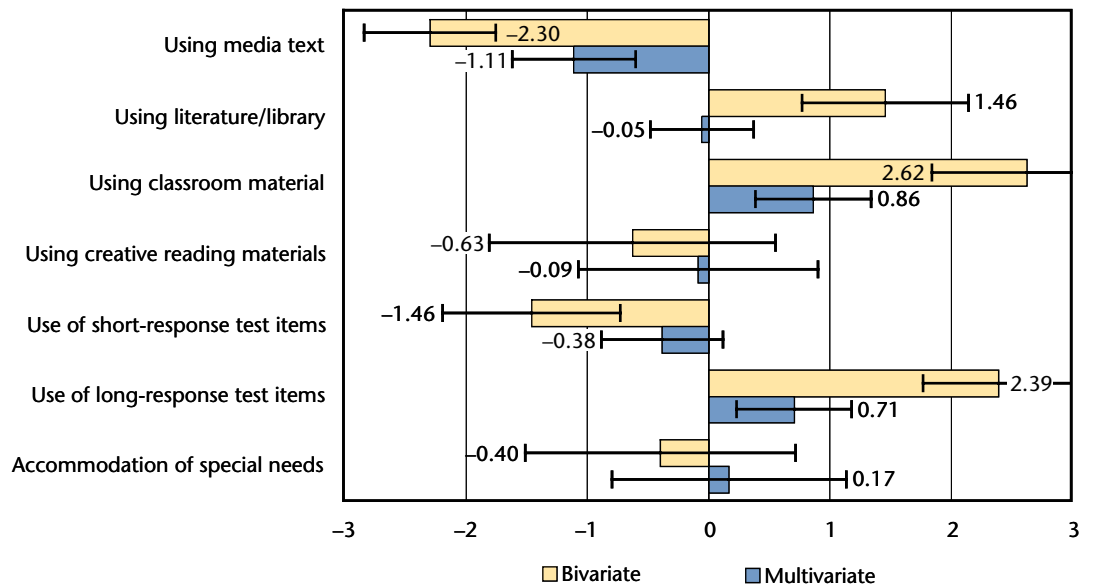
Multivariate regressions: New Brunswick French

The New Brunswick French group had the lowest mean reading score (458) of all language groups. Most of the variance, however, is at the student level, accounting for 94 per cent of the total variance. The low amount of variance at the school level (6%) can be contrasted with the Quebec groups where a much greater amount of variance can be attributed to differences between schools: Quebec French (20%), Quebec English (24%). The latter two groups have the largest percentage of variance attributed to the school level, possibly due to the important presence of private schools in the Quebec sample.

Coefficients for the instructional variables in the New Brunswick French group are presented in Charts 7-29 and 7-30. These variables account for 14 per cent of the student variance or approximately one-third of the total variance explained at this level (45%). Contrary to other groups, especially the Quebec groups, the instructional variables account for only 8 per cent of the school variance, less than one-fourth of the total variance explained at this level (36%).

Instructional variables that were grouped into factors are shown in Chart 7-29. Although five of these factors have significant bivariate effects, only three have significant multivariate effects. As was the case for other groups, reading through the use of media text is negatively related to mean reading scores and teaching reading through textbooks has a modest positive effect. Reading through the use of literature/library material had a significant bivariate effect that is no longer significant when other context variables are controlled. For the New Brunswick French group, the use of short-response test items in assessment is negatively related to reading as a bivariate effect, but is not statistically significant as a multivariate one. However, the use of long-response test items is positively related to reading performance, both as a bivariate and as a multivariate effect.

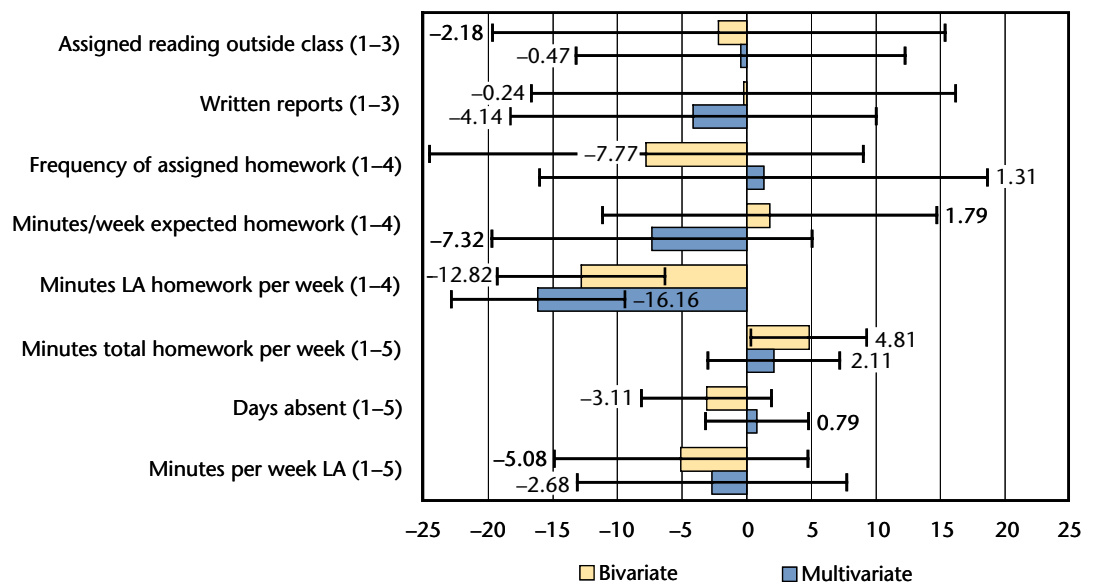
CHART 7-29 Regression coefficients for instructional variables (factor scores) for the New Brunswick French group



Of all the other instructional variables shown in Chart 7-30, only two have a statistically significant bivariate effect — minutes devoted to total homework (a positive effect) and minutes devoted to language arts homework (a negative effect). Only the latter has a statistically significant multivariate effect. As for other groups, this negative relationship to mean reading scores is possibly related to extra homework for low-scoring students who have remedial needs.

CHART 7-30 Regression coefficients for other instructional variables for the New Brunswick French group

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



Bivariate and multivariate coefficients for reading behaviours are shown in Chart 7-31. All four reading behaviours calculated as factor scores have statistically significant bivariate effects. However, only reading by decoding (a negative effect) and having reading routines (a positive effect) have statistically significant multivariate effects.

CHART 7-31 Regression coefficients for reading behaviour variables (factor scores) for the New Brunswick French group

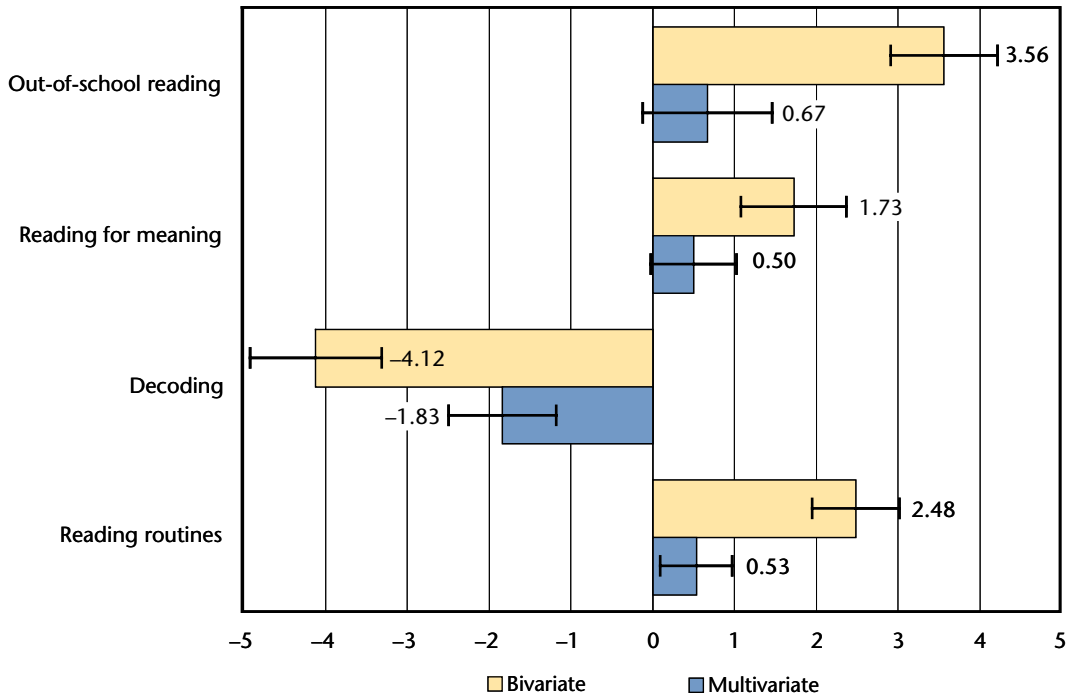
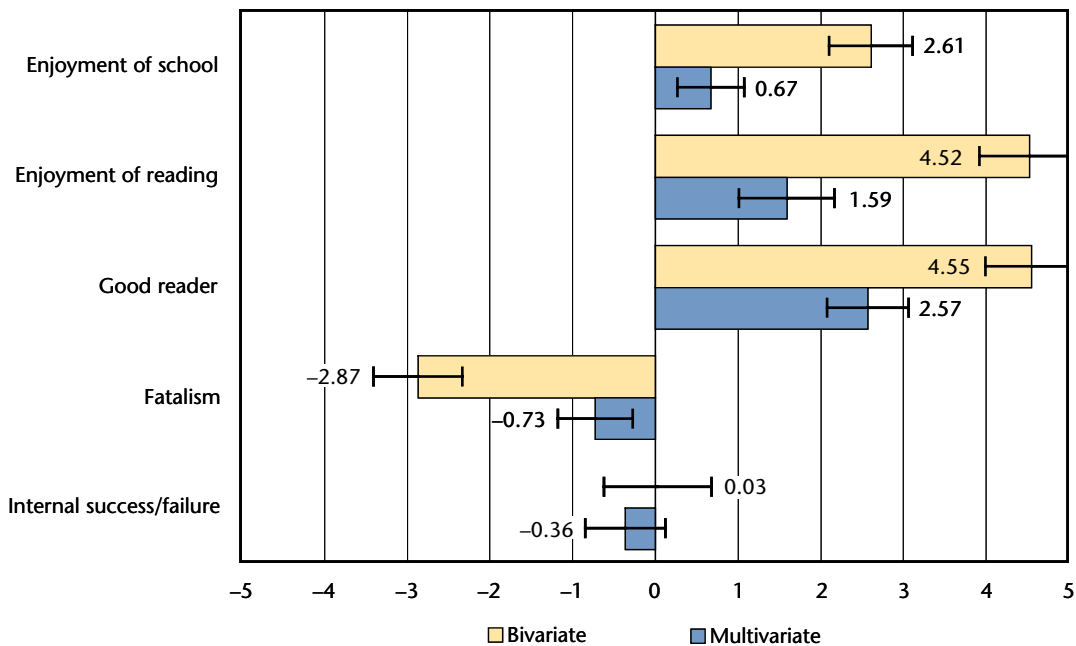


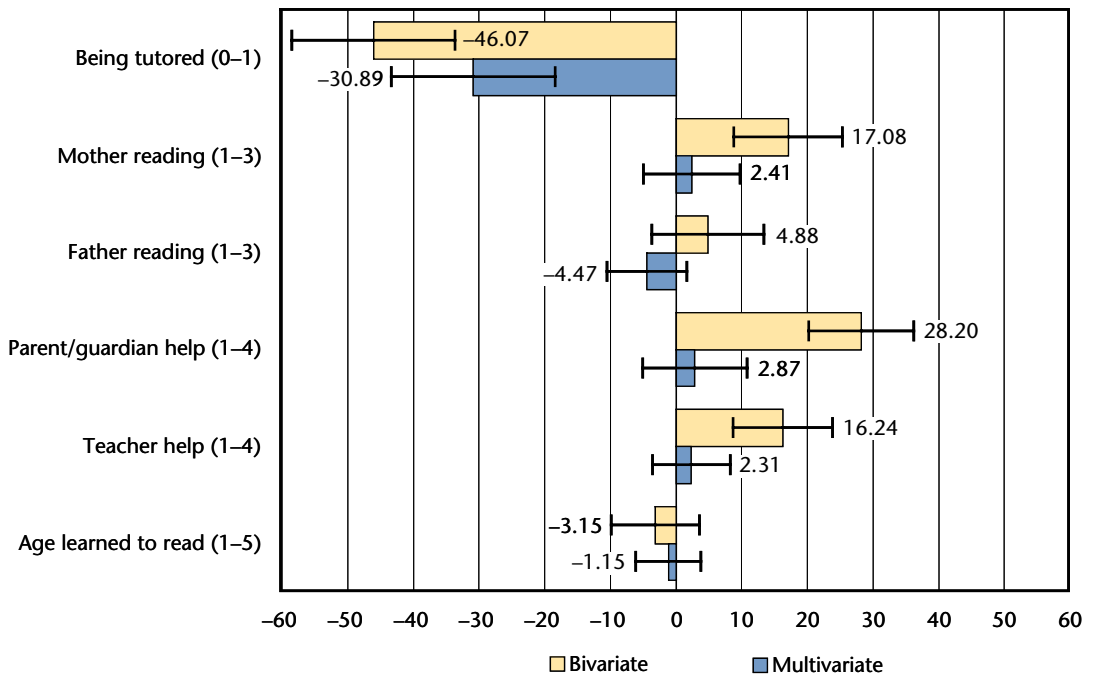
Chart 7-32 shows the effects of attitude and motivation variables. As was the case for other groups, enjoying school, enjoying reading, and perceiving oneself as a good reader have both positive bivariate and multivariate effects. As was the case for the Ontario French group, the fatalism factor is statistically significant as a negative multivariate effect, but the size of the effect is considerably reduced when the other contextual variables are controlled.

CHART 7-32 Regression coefficients for attitude variables (factor scores) for the New Brunswick French group



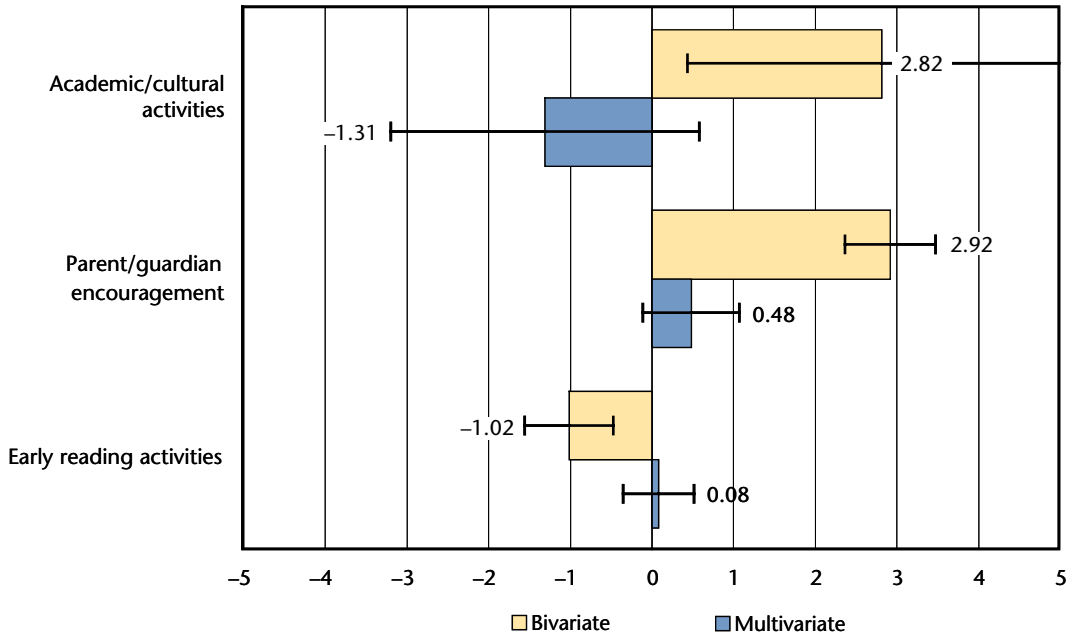
Coefficients for help and early reading are presented in Chart 7-33 and in Chart 7-34. Of all the help and early reading variables shown in Chart 7-33, only one has a statistically significant multivariate effect. As constantly observed in the other language groups, students who are tutored have lower scores than students who are not. Seeing the mother read, receiving parental/guardian help, and receiving teacher help had positive bivariate effects that were not sustained when other contextual variables were introduced into the model.

CHART 7-33 Regression coefficients for help and early reading variables for the New Brunswick French group
(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



As shown in Chart 7-34, participating in academic/cultural activities and receiving parental/guardian encouragement during early reading have relatively strong positive bivariate effects, but these factors are not significantly related to mean reading scores when other variables are controlled. What students remember of their early reading activities is negatively related to mean reading scores, but this variable may be confounded with other variables since it is not statistically significant as a multivariate effect.

CHART 7-34 Regression coefficients for academic/cultural activities, parent/guardian encouragement, and early reading variables (factor scores) for the New Brunswick French group



Coefficients for demographic variables are shown in Chart 7-35. What we can observe are the expected effects of gender and grade. Girls have higher mean reading scores than boys. Although all students were 13 years old, those in later grades have higher scores than those in earlier grades. Speaking French in the home has a strong bivariate effect of 42 points on the reading scale, which is not statistically significant when other variables are controlled. As discussed later, the language variables may be confounded with socioeconomic variables. Both books in the home and the mother's education, which have important bivariate effects, remain statistically significant as multivariate effects, but the size of these effects is considerably reduced when other contextual variables are controlled.

Interestingly, school size, which has a positive not statistically significant relationship to mean reading scores as a bivariate effect, has a negative statistically significant and relatively strong multivariate effect on mean reading scores. Students from larger schools have lower scores in French reading than students in smaller schools. The smaller schools tend to be in rural regions that are predominantly French which may explain their higher mean reading scores in French. Community size is positively related to mean reading scores as a bivariate effect, but this effect is not statistically significant as a multivariate effect, possibly due to its relationship to school size.

CHART 7-35 Regression coefficients for demographic variables for the New Brunswick French group

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

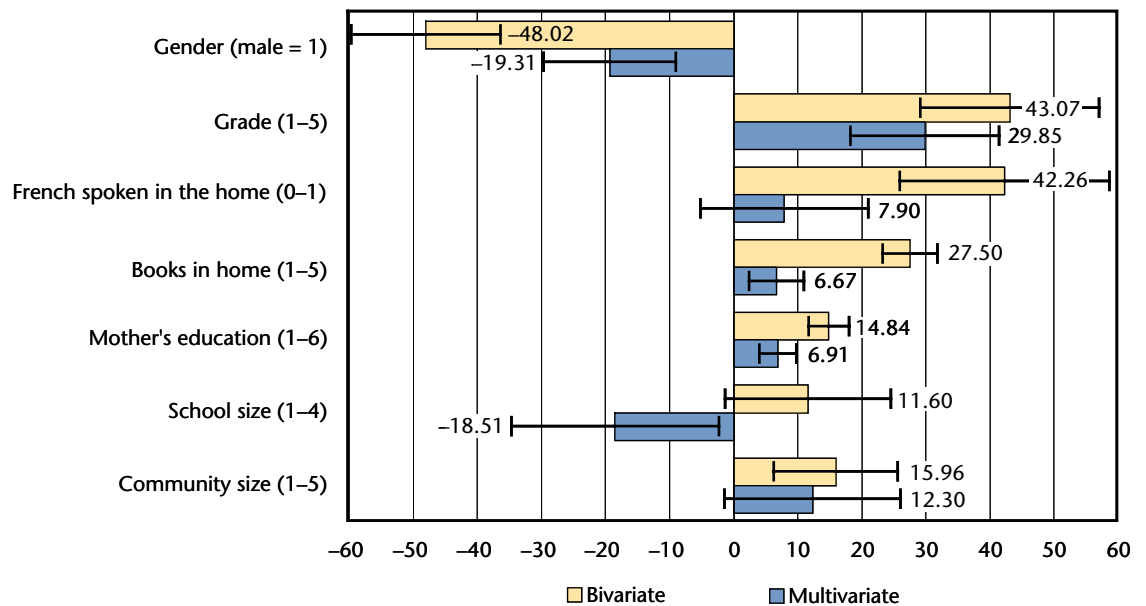


Table 7-6 shows the percentage of variance associated with each category of contextual variables at both the student level and the school level. The higher amounts of variance are associated with instructional variables (14%), reading behaviours (12%), and attitudes (11%) at the student level, but it is differences in reading behaviours that account for the most variance (21%) at the school level.

TABLE 7-6 Percentage of the total variance accounted for by student and school level and change at model steps for the New Brunswick French group

Variable categories (Model step)	Student level 94%		School level 6%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	14	14	8	8
Reading behaviours	12	26	21	29
Attitudes	11	37	3	32
Help and early reading	2	39	-2	30
Demographics	6	45	6	36

Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

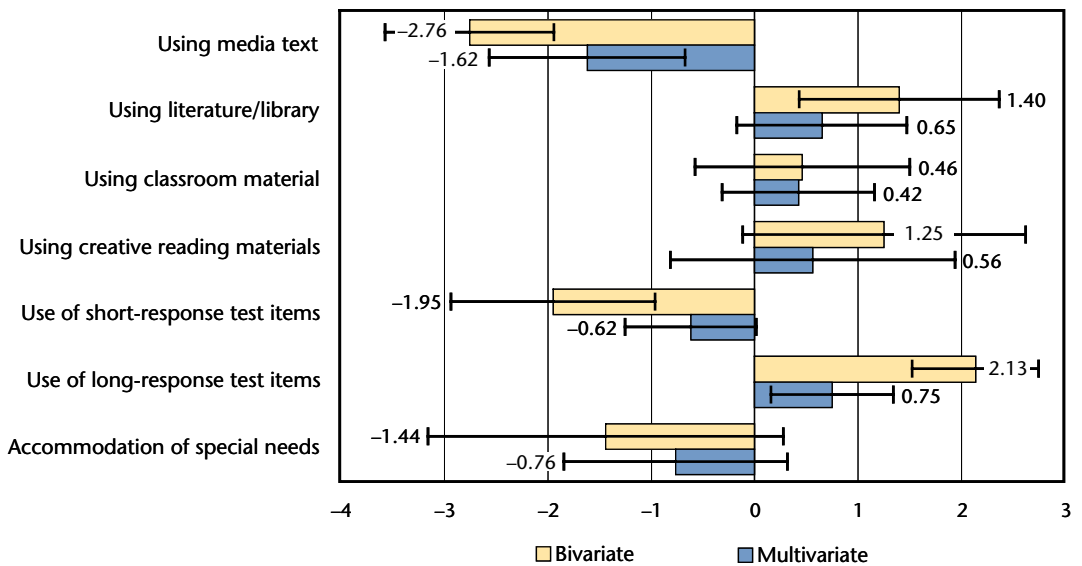
Multivariate regressions: Small French Minorities

As previously mentioned, the small sample sizes in several provinces meant that students from the minority French-speaking communities outside Ontario and New Brunswick were grouped together into a single group. The Small French Minorities group includes students from the East (mean reading score of 477) and from the West (mean reading score of 471). These two groups are not statistically different in their mean reading scores, nor are they different from the francophone students in Ontario nor the anglophone students in Quebec. Their mean scores are higher than that of the New Brunswick French group but lower than those of the Majority English group and of the Quebec French group. Combining these groups was done for statistical reasons. It can be noted, however, that both the East and the West groups already combined students from several jurisdictions: British Columbia, Alberta, Saskatchewan, Manitoba, and the Yukon for the West French group, and Nova Scotia, Prince Edward Island, and Newfoundland and Labrador for the East French group.

Most of the variance in reading scores for this group is at the student level (91%). The regression model accounts for 39 per cent of the student variance, more than one-third of which (15%) is accounted for by instructional variables. The model accounts for 70 per cent of the variance at the school level.

Bivariate and multivariate coefficients for instructional variables are shown in charts 7-36 and 7-37. Of the variables calculated as factor scores presented in Chart 7-36, only two have statistically significant multivariate effects. Reading through the use of media text is negatively related to mean reading scores. Also, the use of long-response test items is positively related with reading performance. The use of short-response test items is negatively related to mean reading scores, and the multivariate effect is close to statistical significance.

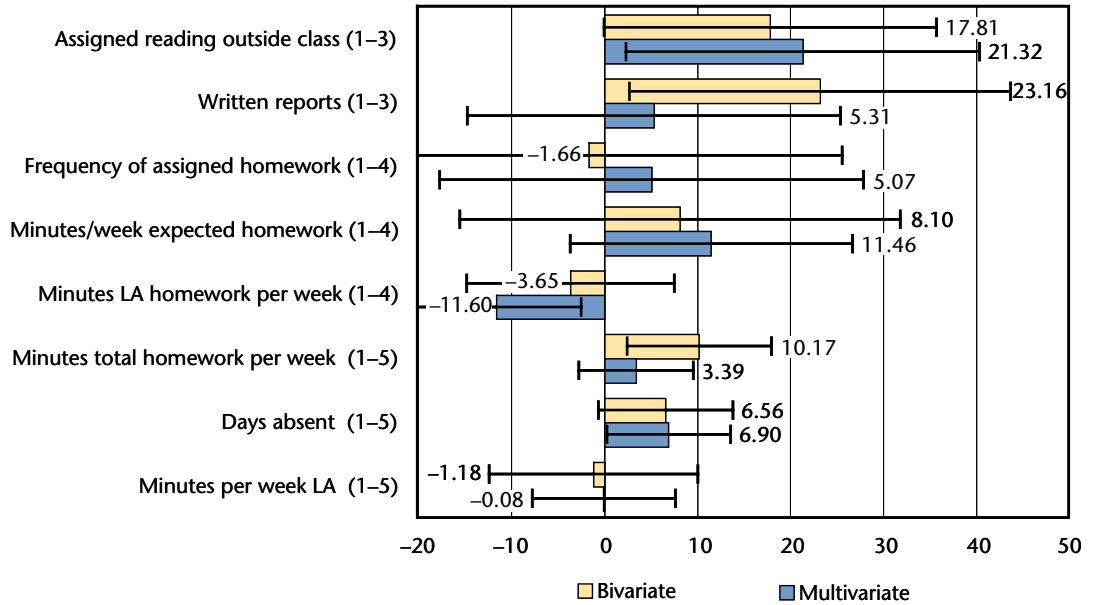
CHART 7-36 Regression coefficients for instructional variables (factor scores) for the Small French Minorities group



For the instructional variables shown in Chart 7-37, only two have statistically significant multivariate effects. First, a strong bivariate effect is found for reading outside of class assigned by the teacher. Interestingly, this effect becomes even stronger when other contextual variables are controlled. Second, as was the case for the other language groups, students who spend more time on their language arts homework have lower scores than students spending less time. Again, this is probably indicative of students with lower scores or remedial needs spending more time on their homework.

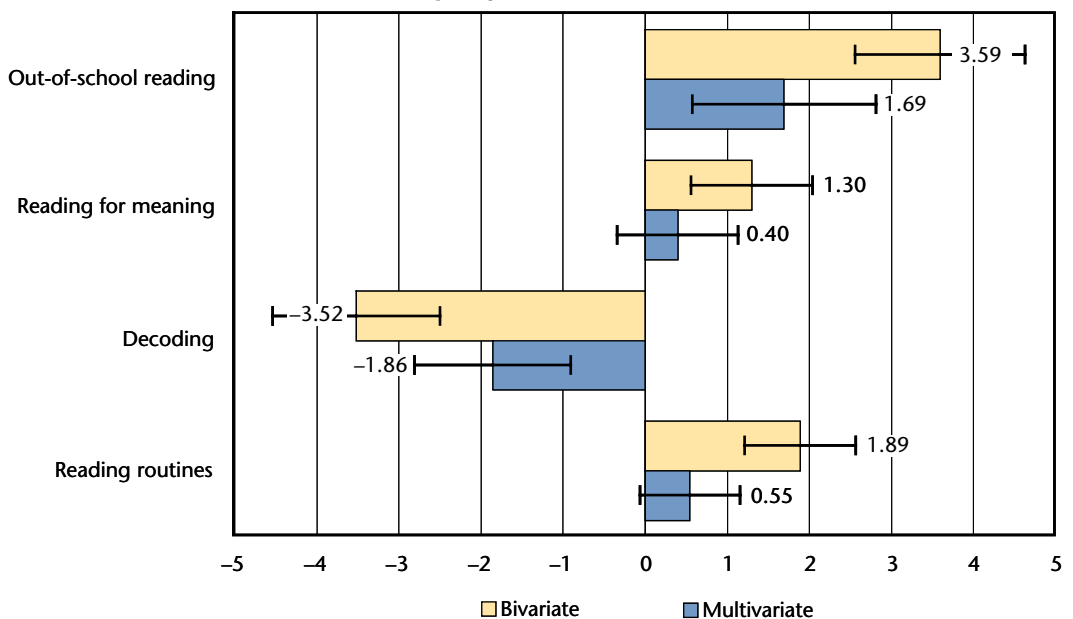
CHART 7-37 **Regression coefficients for other instructional variables for the Small French Minorities group**

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



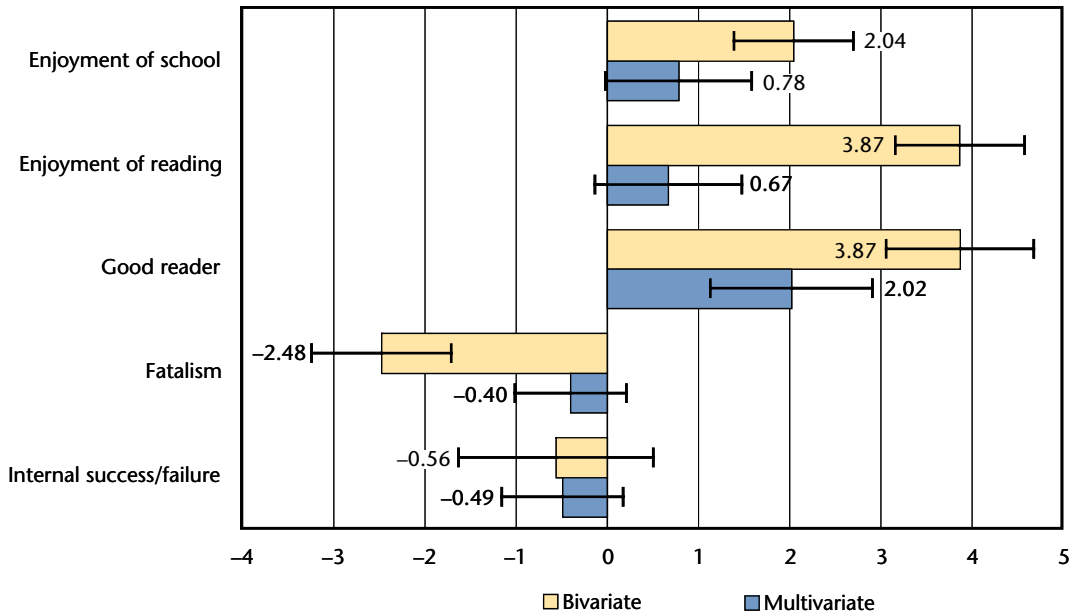
Coefficients for reading behaviours are shown in Chart 7-38. Consistent with the instructional effect shown in Chart 7-37 for assigned out-of-school reading, students who report doing more reading outside of school have higher mean reading scores than students who read less. A standard deviation change on this variable is related to 16.9 points on the reading scale. The other multivariate effect that is statistically significant is related to decoding behaviours. As was the case for other groups, it is related negatively with mean reading scores.

CHART 7-38 **Regression coefficients for reading behaviour variables (factor scores) for the Small French Minorities group**



Coefficients for attitude variables are shown in Chart 7-39. One variable only has a statistically significant multivariate effect. Students who perceive themselves as good readers have higher scores than students having lower scores on this variable.

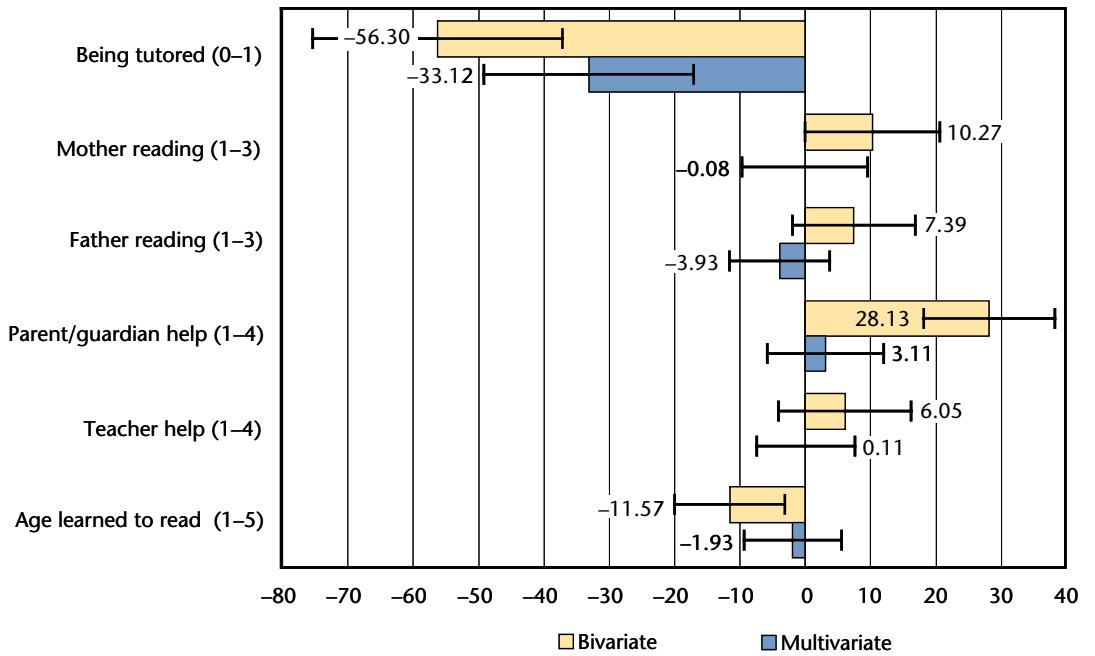
CHART 7-39 Regression coefficients for attitude variables (factor scores) for the Small French Minorities group



Charts 7-40 and 7-41 show bivariate and multivariate coefficients for help and early reading. Among the help and early reading variables shown in Chart 7-40, only one multivariate effect is statistically significant. As for all other language groups, students who are tutored have lower scores than non-tutored students.

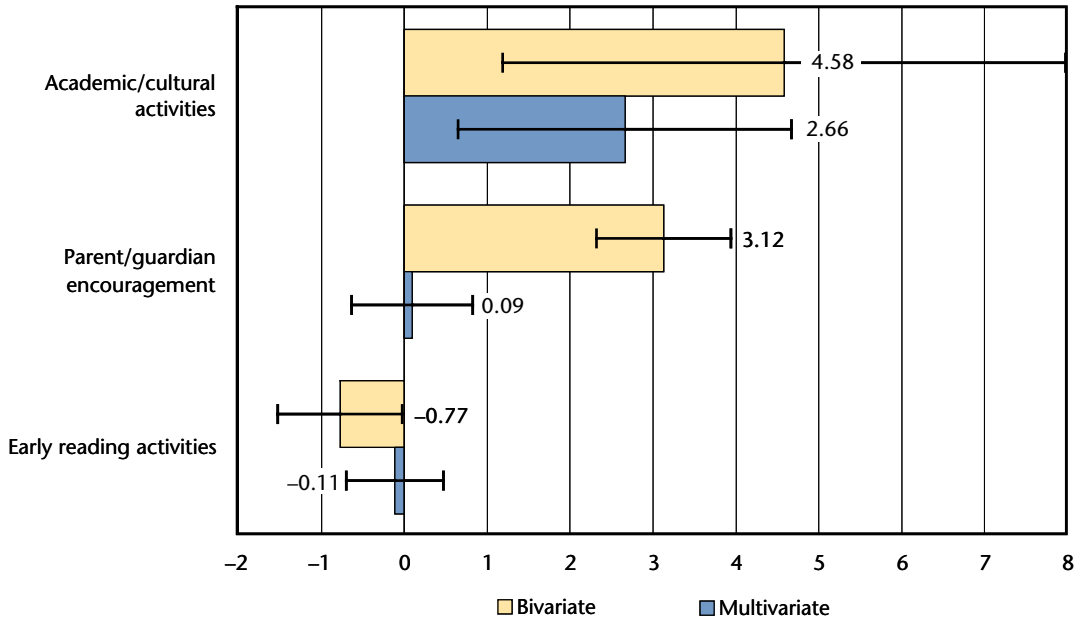
CHART 7-40 **Regression coefficients for help and early reading variables for the Small French Minorities group**

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)



As shown in Chart 7-41, students in the Small French Minorities who participate in cultural activities have higher mean reading scores than students who participate less. A strong bivariate effect for this variable is still robust when other variables are controlled. A standard deviation change on this variable is related to a 26.6 point change on the reading scale. Although parental/guardian encouragement has a strong bivariate effect, it is not statistically significant as a multivariate effect.

CHART 7-41 Regression coefficients for academic/cultural activities, parent/guardian encouragement, and early reading variables (factor scores) for the Small French Minorities group



Coefficients for demographic variables are shown in Chart 7-42. For this group, the generally robust gender effect is not statistically significant when other contextual variables are taken into account. The grade effect is statistically significant, as was the case for all other groups. Speaking French in the home has a strong bivariate coefficient (32.17), but is not statistically significant when all other contextual variables are controlled. The only other statistically significant multivariable effect is that of the mother's education. It is a relatively strong effect (9.92 points for each interval of a 6-point scale).

CHART 7-42 **Regression coefficients for demographic variables for the Small French Minorities group**

(The numbers in parentheses following the name of each variable represent the scale on which the variable was measured.)

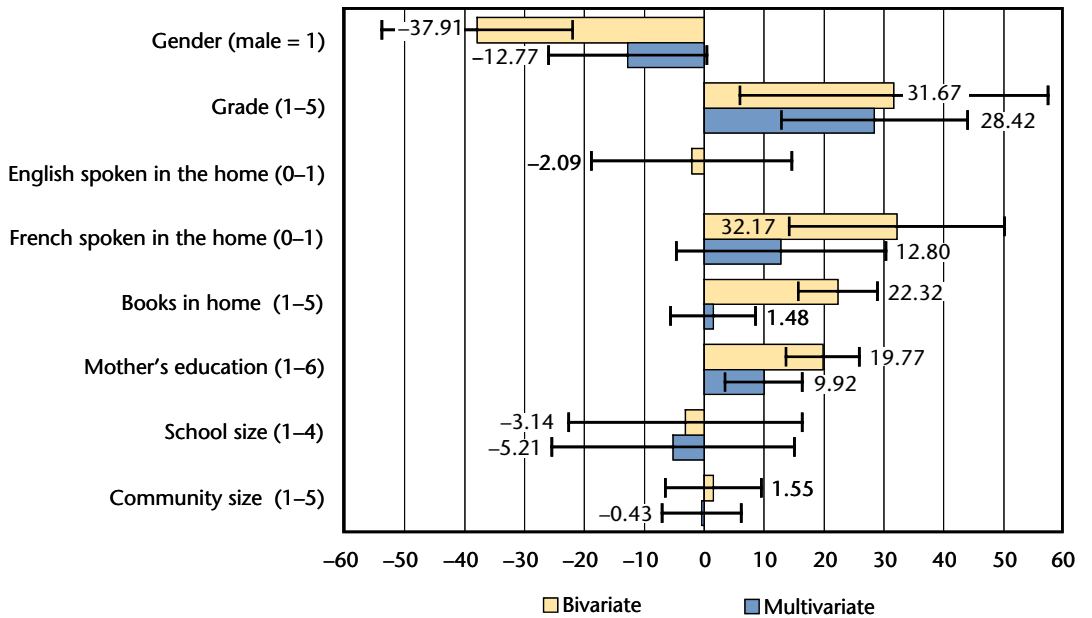


Table 7-7 summarizes the amount of variance explained by the five categories of contextual variables at both the student and school levels. As with the Majority English group and the other French-language minority groups, a small amount of variance is associated with differences between schools (9%). The largest percentage of variance explained at the student level is related to instruction (15%) and reading behaviours (12%). The largest proportion of explained variance (36%) at the school level is associated with reading behaviours and instructional variables (21%).

TABLE 7-7 Percentage of the total variance accounted for by student and school level and change at model steps for the Small French Minorities group

Variable categories (Model step)	Student level 91%		School level 9%	
	Variance explained	Cumulative variance explained	Variance explained	Cumulative variance explained
Instruction	15	15	21	21
Reading behaviours	12	27	36	57
Attitudes	6	33	16	73
Help and early reading	2	35	-1	72
Demographics	4	39	-2	70

Note: For an explanation on how to interpret these percentages, please see the statistical note at the beginning of this chapter.

The next chapter summarizes the results presented in this chapter and discusses educational implications.



In this last chapter of the report, we discuss the educational implications of the results presented in the previous chapters. These results encompass reading achievement scores, a large number of contextual variables, and analyses of the relationships between contextual variables and reading performance. Moreover, the results have been presented for six different language groups.

To infer the educational implications of the data is not a simple and straightforward task. As discussed in chapter 7, not all contextual variables are under the control of the schools; many of them are isolated indices of a complex reality where variables interact and influence each other. It is likely that many of the variables have a bidirectional relationship with reading, a relationship that cannot easily be measured statistically. For example, a moderate to strong relationship between the enjoyment of reading and reading scores was found in each of the six language groups, and this relationship was maintained even when instructional variables, other attitude variables, reading behaviours, and socioeconomic variables were controlled statistically. Does this mean that, if teachers found ways to foster the students' enjoyment of reading, their reading achievement would improve? Probably. However, it is just as likely that students develop their interest in and enjoyment of reading as they become better readers.

Most likely, students' reading behaviours and their motivation interact. Motivational factors may be instrumental in the learning process, and these motivational dispositions may be reinforced or weakened by reading experiences. Different theories of motivation in education would explain this process of reciprocal influence in different ways.

In this chapter, the goal is to specify important relationships between contextual variables measured in the PCAP study (2007) and the reading scores for each of the six language groups. We try to identify both the relationships that are common to all groups and the relationships that are prevalent only in specific groups. When educational implications are discussed, they are not suggested as precise instructional techniques or as recommendations for a particular approach to teaching. A large number of variables were analyzed, and the resulting data are indices of a wide variety of contextual influences that may or may not impact reading practices and literacy. These variables are not components of a comprehensive education theory of reading. Nevertheless, they measure many relevant aspects of the learning environment. When we make educational inferences, we do not necessarily relate them to any single variable. In fact, educational implications may be derived from a set of variables and their particular relationship to reading scores. These variables may be indicative of a need to emphasize certain aspects of the teaching process, but we cannot infer from the results that we need to put into practice any particular approach to teaching.

In the following sections, each language group's profile of contextual influences is summarized separately, and the educational implications are discussed for each group if we can derive particular group features from the data. However, as was shown in chapter 7, most of the relationships found between contextual variables and reading achievement were similar across groups. Some of the educational implications, therefore, are common to all groups, and these will be discussed at the end of the chapter, where we also suggest areas for future research.

Language groups, context, and reading achievement

In this section, contextual variables that have robust relationships with reading scores are analyzed conceptually in an attempt to infer general implications for education in each language group. The groups are described in the same sequence as in chapter 7. The Majority English group is presented first, followed by the Quebec English group. Then, the French language groups are presented in the following order: Quebec French, Ontario French, New Brunswick French, and the Small French Minorities.

a) The Majority English group

The Majority English group, being by far the largest, has the most similar profile to the Canadian average profile for most variables (see Table 7-1). Yet it is far from a homogeneous group. For example, 15 per cent of the students do not use English, the school language, most often at home. There is also much variability in socioeconomic status among the students. Most students (94%) are in public schools, but instructional practices vary across schools. Students also live in a wide variety of communities that differ in size and socioeconomic characteristics. Students in English-language schools, both in Quebec and outside Quebec, tend to be of a higher socioeconomic status (as measured by the number of books in the home) than French students in Quebec and outside Quebec (with the exception of the francophone students in the West French group). Teachers in the Majority English group, according to their self-report, tend to be less specialized in language arts than teachers in Quebec. Interestingly, the students from this group along with the anglophone students in Quebec had the highest scores for reading by decoding, a variable that was shown to be systematically negatively related to reading scores. The Majority English group had the lowest number of students being tutored. This group also had the highest percentage of students who learned to read before kindergarten. Both anglophone groups distinguish themselves from the other groups in the percentage of teachers reporting the use of “creative materials” to teach reading.

Which variables were the most strongly related to reading scores in this group? Differences on instructional variables did not account for a large proportion of the student variance on reading scores (8%). Higher scores were associated with teaching through literature and using long items for assessment. Lower scores were associated with the use of the media to teach reading and the use of short items for assessment. Although statistically significant in their relationship to reading scores, these variables did not have strong multivariate effects. As already mentioned, the use of creative materials was relatively strong for this group, but this instructional approach was not related to reading scores after controlling for other variables.

Certain reading behaviours were related positively or negatively to reading scores. Students who did more out-of-school reading, who read for meaning, and who had established reading routines tended to have higher scores in reading than students who had lower scores on these behaviours. Reading by decoding (i.e., recognizing the sound/symbol correspondences of words), a contextual variable found more frequently among students in the English-language schools, is negatively related to reading scores. However, it is not clear how decoding is influenced by instructional processes. Reading by decoding seems to be a characteristic of students who have lower reading scores. Yet, as mentioned in chapter 5, there seems to be a language influence on this behaviour

that could be related to basic ways of teaching reading in the two languages. It is not possible to distinguish the reader effect (poor readers more inclined to use decoding as a reading strategy) from the instructional effect (particular ways of teaching reading that influence the use of decoding as a strategy). Concerning the other reading behaviours, it is possible that teaching students to read for meaning and to encourage them to read texts of interest to them outside of school would have positive effects on their reading achievement. Yet, for students inclined to use decoding because of poor reading skills, these strategies would need special attention. As most teachers know, when students have problems decoding words, it is difficult for them to focus on meaning.

No clear educational implications can be inferred from the facts that students who perceive themselves as good readers and who enjoy reading have higher scores than students who have less positive attitudes toward reading. It is not known to what extent these relationships can be explained as the result of reading performance or as the positive influences of attitudes on reading performance. However, as discussed below, some education theories suggest that motivational techniques that reinforce the autonomy of the student can have an impact on reading behaviours that will have a positive influence on their reading performance.

A small multivariate effect was associated with having an internal locus of control, that is, attributing success and failure to one's own abilities and efforts. Promoting an internal regulation of one's motivation has been found to be associated with experiences that foster the satisfaction of the basic needs for autonomy, competence, and relatedness (Deci and Ryan 2002). Some educators (e.g., Reeve 2002) argue that promoting learner autonomy by satisfying these basic needs can have strong implications for learning in school. Students whose needs for autonomy, competence, and relatedness are satisfied to some degree tend to be more motivated toward school learning than students who experience school learning as a more controlling environment.

Several variables such as early help and tutoring were significantly related to reading performance for the Majority English group. However, as was the case for all groups, tutored students had lower reading scores than students not tutored. The only valid interpretation seems to be that some students are tutored because they need remedial help. Therefore, it is more likely that poor performance in reading is the initial reason for tutoring rather than that tutoring has a negative effect on reading. Only an experimental design or a longitudinal study could reliably assess the effect of tutoring on reading achievement.

The age at which students learned to read was negatively related to reading scores. Students who learned to read at an earlier age had higher reading scores. Because this relationship is statistically significant, even when other help and encouragement variables as well as socioeconomic variables are controlled, it may be indicative of the possible advantages for students to be exposed early to the reading process. However, this variable was not statistically significant in the other language groups.

Seeing one's mother reading was positively related to reading performance, as was receiving help from teachers. It is therefore possible that the extra encouragement and help from teachers that some students experienced in the early learning process is helpful. It is also possible that when this help is combined with parental encouragement or seeing one's parents read, a student's reading performance is enhanced.

Five demographic variables had a significant multivariate effect for the Majority English group. All were expected. Girls have higher scores than boys, and students in higher grades do better than students in lower grades. The number of books in the home and the mother's education are both positively related to reading, and reflect the effect of socioeconomic status on school achievement. Finally, the advantage of speaking at home the same language as used in school remains statistically significant when other contextual variables such as socioeconomic status are controlled, but the effect is small (less than one-tenth of a standard deviation). As discussed below, the use of the majority language at home for minority-language students who attend a majority-language school (English in this case) may be less detrimental to their learning than not speaking at home the minority language of the school. The dominance of English in most societal contexts that students experience contributes to its acquisition whereas, outside of the school, there is often very little incentive to learn the language of the minority.

For the Majority English group, the five categories of contextual variables explain a greater proportion of the school variance (43%) than of the student variance (29%). However, most of the variance in the reading scores (87%) is student variance. This is normally expected, because reading is an individual process more directly influenced by personal attributes and the variables that influence a student's personal characteristics. Differences between schools account for 13 per cent of the variance in reading scores. Most of the explained variance at the school level was related to instructional variables (13%) and reading behaviours (16%). Differences in demographics explain less school variance (8%). This may indicate that students in schools where teachers put more emphasis on effective reading processes and whose students do more reading tend to do better than students in other schools.

b) The Quebec English group

The Quebec English group is similar to the Majority English group on some contextual variables (e.g., books in the home, age of learning to read, use of "creative" materials), but is more similar to the Quebec French group on others (e.g., the relatively large proportion of private schools, the lower use of short-response item assessment). The Quebec English group also distinguishes itself from all other groups on some variables. Teachers of this group have the highest factor score for assessment by long items. This group also has the highest percentage of teachers who expect their students to spend one hour or more per week on language arts homework. It also has the largest percentage of students who live in communities that have more than 500,000 inhabitants. This is probably due to the large proportion of the English-speaking population of Quebec who reside in Montreal.

One major difference between the Quebec English group and the Majority English group is the percentage of the variance in reading that can be attributed to the school as opposed to the students. The school accounts for 24 per cent of the variance in reading scores of the Quebec English group (36% of which is related to instructional variables) whereas it accounts for only 13 per cent of the variance for the Majority English group. The larger percentage of private schools in the former group (30%) than in the latter group (6%) may explain this larger amount of school variance.

Among all the instructional variables, only three had a statistically significant multivariate effect in the Quebec English group. As was the case for the other groups, reading through the media and use of long items for assessment had relatively small effects (less than one-tenth of a standard deviation), the first negative and the second positive. However, expected minutes of language arts homework had a large multivariate positive effect (27 points or slightly more than one-quarter of a standard deviation for each interval in a 4-point scale). As mentioned previously, the Quebec English group had the highest percentage of teachers who expect their students to spend one hour or more per week on their language arts homework. However, it is not known if the differences in scores between schools can be attributed to the school governance variable. A large portion of the school variance (36%) for this group is explained by instructional variables, and the expected minutes of homework is the only instructional variable that has a large effect for this group.

Differences in reading behaviours among students had moderate bivariate effects that were reduced when other variables were controlled. Patterns were similar to those of other groups, with decoding as a reading strategy being negatively related to reading scores and out-of-school reading and having reading routines being positively related to these scores.

Attitude scores had small statistically significant effects on reading performance. As was the case for students in other groups, enjoying reading and perceiving oneself to be a good reader are both positively related to reading scores.

The variables related to receiving help and reading early do not account for much of the reading score differences in the Quebec English group. By far the largest effect is one found in most other groups — tutored students tend to score 24 points lower than non-tutored students even when all other contextual variables are accounted for. When interpreting this result, remember that we do not know the performance level of the students before they began to study with a tutor. Differences in demographics account for only 3 per cent of the student variance and 4 per cent of the school variance. The Quebec English group is the only one for which the gender variable is not statistically significant as a multivariate effect. Girls and boys may differ in certain attitudes and behaviours that account for the observed difference in scores. Once these are controlled statistically, differences between boys and girls may be minimal. As in all the other groups, the grade effect is positive and relatively strong. The use of the school language, English, in the home is positively related to reading scores as a bivariate effect, but this effect is not statistically significant when other contextual variables are controlled. A mother's education is the only socioeconomic variable that has a statistically significant multivariate effect, although the number of books in the home had the strongest bivariate effect. The largest demographic effect is that of school governance. Even when all other contextual variables are controlled, students in private schools still score 27 points more than students in public schools.

Only one contextual variable stands out for the Quebec English group as an important instructional variable. The expected minutes of language arts homework, a school variable, is very strongly related to reading scores even when all other variables —

instruction, attitude, reading behaviour, and socioeconomic status — are accounted for. We interpret this finding more as a “work ethic” variable than as a time variable. In other words, it seems the schools that expect more from their students do actually attain more in terms of their students’ reading performance. As previously discussed, however, it is not certain that this difference in reading scores is related to school governance. Only the two Quebec groups have a high percentage of private schools, and it is only in these groups that 20 per cent or more of the variance is accounted for as differences between schools. In both of these groups, the instructional variables account for a relatively large proportion of the school variance (36% in the case of the Quebec English group).

c) The Quebec French group

The Quebec French group is unique in terms of reading achievement. It is the only language group whose mean reading score is above the national average (one-third of a standard deviation higher) and the only province where French is the majority language. However, along with the Quebec English group, the Quebec French group has the feature of having a high percentage of private schools in their sample. It is also the group in which the highest percentage of teachers identify themselves as language arts specialists, both by training and by self-report.

As was the case for the Quebec English group, a relatively large proportion of the variance in reading scores is at the school level (20%), and an important proportion of this variance is explained by the instructional variables (56%). As with other groups, reading through the media is related negatively to reading scores as well as assessment with short test items, while assessment with long test items is positively related to reading performance. By far, the two largest instructional effects are related to homework. As was the case for the Quebec English group, the expected minutes of language arts homework is strongly and positively related to reading performance (10.38 reading points for each interval on a 4-point scale). As already proposed, this effect seems to be more a work ethic variable than a time variable. Indeed, the actual time that students spend on language arts homework, which also had a large effect (10.96 points per unit of a 4-point scale), is negatively related to reading scores. This seems to indicate that much of the extra time students devote to language arts homework is spent on remedial activities by the less proficient readers. In future research studies, it might be helpful to have students respond to questions about time on homework by specifying the proportion spent on regular homework, remedial or corrective activities, and enrichment activities.

All four reading behaviours had significant multivariate effects for the Quebec French group. Each of the four effects is approximately equal to one-tenth of a standard deviation. Out of school reading, reading for meaning, and having reading routines are positively related to reading scores, whereas reading by decoding has a negative effect.

Three of the five attitude variables had statistically significant multivariate effects. Enjoying reading and perceiving oneself as a good reader were positively related to reading scores. This is consonant with other groups. However, fatalism (attributing one’s successes and failures to good luck or bad luck) is negatively related to reading performance. The bivariate effect is quite strong (28 points for each standard deviation of change on the variable) but is reduced to 7 points as a multivariate effect.

Of all the help and early reading variables, being tutored was the only one to have a statistically significant multivariate effect. As with all other groups, tutored students scored lower than non-tutored students. For the Quebec French group, the difference between tutored and non-tutored students is one-third of a standard deviation (33 points).

Several of the demographic variables had statistically significant effects. Gender and grade had effects similar to most other groups — girls outscore boys by 19 points and students in later grades score 30 points higher for each grade interval. The socioeconomic variables did not have particularly strong multivariate effects although they remain statistically significant. Each unit of change on the variable of the number of books in the home is related to 5.69 points on the reading scale, and each change in the 6-point scale for mother's education is related to 3 points on the reading scale. French spoken in the home had a very strong bivariate effect (65 points). After controlling for other contextual variables, the multivariate effect still accounts for 28 points on the reading scale, a relatively large effect. Another very strong bivariate effect (70 points), which remains statistically significant and relatively strong (29 points) as a multivariable effect, is that of school governance. Students in private schools do better than students in public schools even when controlling for a large number of contextual variables. Because a large percentage of school variance (56%) is related to instructional variables, as for the Quebec English group, it is not known how much private schools differ from public schools in their instructional approaches and to what extent they account for this large proportion of variance. These patterns are observed only in the two Quebec groups, the only groups that have a large proportion of private schools. This might prove an interesting area for further study.

Finally, students in large schools in the Quebec French group have higher reading scores than students in smaller schools. The multivariate effect remains relatively strong (10.54 points for each interval on a 4-point scale) and is unique to the Quebec French group. The effect may be related to community size, which is not a statistically significant multivariate effect but is a relatively strong bivariate one.

d) The Ontario French group

More than half of all the francophone students who attend a French-language-minority school in Canada reside in Ontario. The Ontario experience is, therefore, often representative of the average situation for French-language-minority students. As shown in Table 7-1 in chapter 7, the contextual variables profile of Ontario French students, when not similar to the average Canadian profile, tends to resemble the profiles of the groups in the Small French Minorities.

Unlike the two Quebec groups but like the Majority English group and the other Small French Minorities groups, the variance at the school level is relatively low (10%). This means that 90% of the variance in reading scores is at the student level. A relatively large part of the school variance (39%) is explained by instructional variables. The largest percentage of student variance is also explained by instructional variables (14%).

As for most of the other language groups, several instructional effects were statistically significant but of weak magnitude. Reading through the media and using short test items for assessment were related negatively to reading scores. Teaching through textbooks and using long test items for assessment were related positively to reading scores. Relatively strong effects, however, are related to homework. As for other groups, students who spend more time on their language arts homework have lower scores than students whose spend less. As mentioned, this is probably due to the extra remedial activities done by students who have more reading difficulties. Interestingly, expected time on homework has a weak positive bivariate effect (0.47 per unit of a 4-point scale), but this effect becomes stronger and negative (-8.72 per scale interval) as a multivariate effect. The latter is not statistically significant, however. Rather, it is the minutes devoted to total homework by students that have a relatively strong and positive multivariate effect (7.49 points for each interval of a 5-point scale). For francophone students in Ontario, it is the time spent on total homework that seems to represent a work ethic variable. Students who spend more time on their global homework tend to have a higher score in reading. This work ethic concept is discussed in the last section of this chapter.

Only two reading behaviours had statistically significant multivariate effects in the Ontario French group. As for other groups, reading by decoding has a negative relationship to reading scores, whereas establishing reading routines is positively related to reading performance.

Four of the five attitude variables have both strong bivariate effects and statistically significant, albeit reduced, multivariate effects. Enjoying school is statistically significant for this group, even though enjoying reading and perceiving oneself as a good reader were also statistically significant. The effects are of modest to moderate magnitude (7.5 points, 14.5 and 14.3 points for a standard deviation of change on these variables, respectively). As for the Quebec French group, the fatalism factor has a statistically significant and small negative multivariate effect. It is also of similar magnitude as in the Quebec French group (-7.5 points for each standard deviation of change). The bivariate effect, however, was relatively strong (28 points for a standard deviation change on the variable). It is not known if this feeling of not being in control of one's fate as a learner is a consequence of poor reading abilities or a variable contributing to low reading performance. Most likely, it has a bidirectional effect.

Only two of the variables related to help and early reading had statistically significant multivariate effects. One is similar to that in the other groups — tutored students have lower scores than non-tutored students. One variable, however, is unique to the Ontario French group as a multivariate effect (it is a positive bivariate effect in most groups): the students who reported receiving parental help during their early learning experiences have higher scores than the students who reported receiving little help. This effect remains relatively strong (12.3 points for each interval on a 4-point scale) even when other variables (such as parental encouragement and socioeconomic status) are controlled. For the francophone students in Ontario, it seems a helpful strategy that parents get involved with their children during the early learning process. It certainly is a helpful strategy elsewhere, but it seems indistinguishable from other variables such as the student's mother's education and the number of books in the home.

As for the other groups, variables such as gender, grade, and the number of books in the home have the expected effects for the Ontario French students. French in the home is the only other demographic variable that has a significant multivariate effect. Slightly more than 10 points on the reading scale is attributed to students who most often speak at home the language of the school (one-tenth of a standard deviation). The bivariate effect was 25 points.

e) The New Brunswick French group

The New Brunswick French group is unique from several perspectives. The francophone students reside in the only officially bilingual province in Canada, and it is the province where French has the highest vitality. This fact is reflected in the present study by the higher rate for the students' use of French in the home in contrast with students in Ontario and the other provinces (except Quebec). On other factors, this group of students has the lowest scores on the socioeconomic variables, a high score on the fatalism factor (attributing their performance to luck), the lowest scores on both enjoyment of reading and perception of being a good reader, as well as the lowest score for out-of-school reading. As shown in chapter 2, the New Brunswick French group has both the lowest mean reading score of all six language groups, and has among the lowest scores for expected homework and the lowest score for total homework by students.

The New Brunswick French group is the group for which the least amount of reading score variance is associated with differences in schools (6%) and, hence, the group for which the most variance is found at the student level (94%).

The effects of instructional variables for this group are similar to those for other groups. Teaching reading through the media is negatively related to reading scores, and the use of long test items for assessment is positively related. Teaching through textbooks, as was found for the Ontario French group, is positively related to reading performance. Also, as in the Ontario French group and other groups, total minutes spent by students on language arts homework is negatively related to reading scores. The multivariate effect is even stronger than the bivariate effect (16 points for each interval on a 4-point scale).

For the New Brunswick French group, only two reading behaviour variables have a statistically significant multivariate effect — decoding (a negative effect) and having reading routines (a small positive effect).

Four of the five attitude variables have both bivariate and multivariate effects. As for the Ontario French group, enjoying school has a statistically significant modest effect even though enjoying reading and perceiving oneself as a good reader are also both statistically significant. The strongest effect is related to the good reader attitude (26 points for a standard deviation of change on the variable). Also as in Ontario, the fatalism factor shows a strong bivariate effect which is reduced to a 7-point (for a standard deviation of change) multivariate effect.

A single variable from the help and early reading variables, being tutored, shows a statistically significant multivariate effect. Tutored students score approximately 30 points lower than non-tutored students.

The gender and grade effects in the New Brunswick French group are similar to those in other groups. Three variables have strong bivariate effect — the number of books in the home, the mother's education, and French spoken in the home. The two socioeconomic variables have a reduced multivariate effect that remains statistically significant. However, although students who speak French at home have a 42-point advantage in reading score, this effect is not statistically significant when other variables are controlled. Interestingly, the school size variable has a moderately strong and positive bivariate effect (12 points for each interval on a 4-point scale), but the variable has an even greater effect (18.5 points for each interval on the same scale) and becomes negative when other contextual variables are controlled. It seems, therefore, that when other contextual variables are the same, students in smaller schools tend to have higher reading scores than students in larger schools. These smaller schools tend to be in rural areas where the francophone population is more concentrated. These regions tend to be of a lower socioeconomic status than the urban areas, which may explain why, as a bivariate variable, school size is positively related to reading performance. However, with French spoken in the home and socioeconomic variables controlled, the fact of living in a predominantly French region seems to be positively related to reading performance in French.

f) Small French Minorities

The Small French Minorities group constitutes a rather heterogeneous group. Reading scores for various groups range from a low of 436 in Manitoba⁹ to a high of 505 in Alberta. Especially in the West, the group tends to have a high socioeconomic status but a low frequency of speaking French in the home. The percentage of children of right-holders according to Section 23 of the *Canadian Charter of Rights and Freedoms* (1982) who attend the French school tends to be lower than in Ontario and much lower than in New Brunswick (Corbeil, Grenier, and Lafrenière 2007). This at least partly explains why students from these jurisdictions tend to be of a higher socioeconomic status. Parents who choose the French schools in these low vitality contexts tend to be more highly educated on average than parents from regions where the francophone population is more densely concentrated and where a larger percentage of the children of the right-holders attend French schools (Allard, Landry, and Deveau 2009; Landry, Allard, and Deveau, in preparation). As discussed in chapter 2, children in contexts of low French vitality may constitute a more selective sample, their parents actively and voluntarily choosing the French school, whereas in contexts of higher French vitality with a more densely concentrated French population, the selective effect is weaker because parents do not have to actively choose a French school. In such a societal context, going to the French school is often the only alternative offered. Therefore, it is possible that socioeconomic status and the use of French in the home cancel each other out to some extent in some regression models. In many contexts where the use of French in the home is strong, the socioeconomic status is weaker; and in many contexts where socioeconomic status is high, the use of French in the home is low because of the low vitality of the French-language-minority community in the region and the high rate of exogamous marriages.

⁹ This score includes French immersion students who were excluded for the multivariate regression analyses.

Most of the reading score variance for the Small French Minorities group stems from student variables (91%), 39 per cent of which is explained by the regression model. The model constituted by the selected contextual variables also explains 70 per cent of the variance at the school level.

As in other groups, teaching reading through the media is negatively related to reading scores whereas the use of long test items in assessment has a positive effect. The largest instructional effect for this group is by far the amount of assigned reading outside class, an effect unique to this group. The multivariate effect is positive and is even greater than the bivariate effect; each interval on a 3-point scale is associated with 21 points on the reading scale. Students in these Small French Minorities have few contacts with French outside the home and the school. As already mentioned, the use of French tends to be low even in the home. There is also little contact with French media (Landry, Allard, and Deveau, in preparation). It can therefore be expected that the availability of reading materials outside the school would help their reading performance. An important educational implication for low vitality francophone minority groups may be to encourage out-of-school reading in French as much as possible to compensate for the lack of opportunities to read in French in most societal contexts.

The other instructional multivariate effect that is statistically significant for this group is the low amount of language arts homework done by students. As for other groups, this effect is related negatively to reading scores.

Two of the reading behaviour variables have a statistically significant multivariate effect. Consistent with the strong effect of out-of-school reading assigned by teachers, students who actually do more out-of-school reading have higher scores than students who do less. Each change of a standard deviation on this variable is related to an increase of 17 points on the reading scale. The other effect is similar to that in other groups. Reading by decoding is negatively related to reading scores.

One effect of the attitude variables is close to statistical significance ($p = 0.056$) — students who enjoy school tend to have higher reading scores. The multivariate effect (7.8 points on the reading scale for a standard deviation of change on the variable) is reduced from its bivariate effect. The multivariate effect is of small magnitude, but is consistent with that found in Ontario French and New Brunswick French for this effect where reading scores are not only related to enjoying reading but also to enjoying school. In the Small French Minorities group, however, enjoying reading does not have a statistically significant multivariate effect. For this group, perceiving oneself as a good reader is moderately related to reading scores; a change of one standard deviation on this variable is related to a 20-point change on the reading score scale.

The two variables of receiving help and beginning to read early have a moderately strong effect on reading scores, even when all contextual variables are controlled. As for other groups, tutored children have lower scores than non-tutored students. One effect, however, is unique to the Small French Minorities. Students who participated in cultural activities tended to have higher reading scores than students who had less

participation in these activities. The multivariate effect is relatively strong (27 points on the reading scale for each change of a standard deviation on the variable). This variable may have educational implications. As for out-of-school reading, the encouragement of participation in cultural activities in French may be related to increased reading achievement. The importance of cultural activities in French may be enhanced in these low vitality contexts because of the few opportunities normally available to the students in their everyday societal contexts. However, in the present study, we cannot determine in which language the students experienced these cultural activities.

As was the case for the Quebec English group, the gender effect for the Small French Minorities is not statistically significant when other contextual variables are controlled. And, as with all other groups, the grade effect is positive and strong. The variable of the number of books in the home is not statistically significant as a multivariate effect for this group, but the effect of a student's mother's education is strong (10 points for each interval on a 6-point scale). For the Small French Minorities, one difficulty with the variable of the *number* of books in the home is that we cannot distinguish the number of books from the *language* of the books. For example, a large number of English books in the home might be negatively related to reading scores in a French school, whereas a smaller number of books in French in the home would be more conducive to reading in French. As already mentioned, access to French books and other French reading materials is difficult in the context of a community with low French vitality. Finally, although French in the home has a relatively strong bivariate effect of one-third of a standard deviation, the multivariate effect is reduced to 13 points and is not statistically significant. As already discussed in chapter 2, because of the high rate of exogamous marriages in these small francophone minority groups, English tends to dominate as the language most often spoken at home. Other measures of the use of French in other contexts would help to better understand the effects of language use on reading achievement.

Educational implications

Although each of the language groups was discussed separately, it can be concluded that there are many similar relationships between contextual variables and reading performance across groups. In this section, we attempt to infer general educational implications from these results and suggest further implications.

The many contextual variables analyzed are not mutually exclusive. Many are interrelated. That is why it might be helpful to look at conglomerations of variables rather than just individual ones. Moreover, we have emphasized in our analyses the multivariate effects because the bivariate effects are not as reliable; the latter are sometimes the indirect reflection of other variables that are correlated with them. For example, fatalism generally had a strong bivariate effect, but when other motivation variables and socioeconomic characteristics were controlled, its relationship to reading was not as strong. That, however, does not make fatalism as an attitude any less real or any less related to reading achievement. It just means that it is part of a more global and complex reality that may encompass other motivational traits and student characteristics.

Some of these motivational dispositions were consistent, however. In all groups, either enjoying school or enjoying reading, or both, and perceiving oneself as a good reader were moderately related to reading scores even when many contextual variables were controlled. This is indicative of the effect of two important motivational traits in all school learning. A student must want to learn (as reflected by the reading and school enjoyment factors) and must believe that the learning goal can be attained (a trait at least partly measured by the confidence of being a good reader factor). When interest or confidence (or both) are lacking, students tend not to make an effort in the reading process. One problem in deriving educational implications from these results is that these two basic motivational traits are explained differently by different motivational theories. That is why, as we look at a conglomeration of the variables related to reading scores, we can interpret them differently from different theoretical perspectives. Different theoretical perspectives may even bring us to see different conglomerations altogether.

Generally, however, results show that students who are involved in active reading strategies (e.g., reading for meaning, out-of-school reading) and who have established reading routines tend to be better readers than the less-involved students even when attitudes and socioeconomic variables are controlled. As noted earlier, reading routines can also be interpreted as the active and persistent processing of content in a search for meaning.

Although the above behaviours are not individually related very strongly to reading scores, the results may be further enhanced by requiring the students to produce more elaborate responses during assessment than by requiring short responses. Such an assessment approach brings students to more active processing than when they only have to fill in blanks or answer multiple choice questions. Also, the work ethic of the school (i.e., expecting that students will spend time on language arts homework and actually assigning them out-of-school reading) was also related to improved reading performance for several of the language groups. For the Small French Minorities group, requiring out-of-school reading was strongly related to reading scores. For some groups, reading performance was also related to receiving parental help or parental encouragement and being able to observe parents reading at home. And, as discussed above, two attitude variables were consistently related to reading performance — enjoying reading and having confidence in one's abilities, that is, perceiving oneself to be a good reader.

What does this conglomeration of variables and relationships tell us about the reading process? As mentioned above, it does not allow us to infer specific strategic or even instructional approaches to the teaching of reading. Altogether, however, the observed robust relationships may give us a relatively simple message that we can relate to two educational theories that have been widely used. The first would involve a mastery approach to reading (Bloom 1976, 1984; Guskey 1985; Guskey and Gates 1986), although we are referring here not so much to the mastery techniques as to the underlying philosophy. In other words, we get improved reading performance if we expect more from the students and if we believe in the possibility of their attaining a higher level of performance.

In a national study, the reading comprehension scores of francophone students in minority-language communities were recently interpreted in such a way (Landry, Allard and Deveau, in preparation). Low scores tend to contribute to lower expectations, and lower expectations lead to an assignment of less challenging tasks. Perhaps a mastery approach could break this vicious cycle and transform it into a virtuous cycle.

Such an approach to success, however, should foster learner autonomy and learner confidence. This brings us to the second theoretical framework that has been elaborated with just such a goal in mind. Taken together, the conglomeration of relationships that have been observed throughout this study seems to imply that students become better readers if we expect them to become better readers and if we get them to read more. But how do we inspire students to read more? There seems to be a need to make reading enjoyable and to develop the readers' confidence in their reading abilities. Especially, there is a need to help students become autonomous readers, that is, help them internalize these external expectations and transform them into personal goals. Self-determination theory (Deci and Ryan 1985, 2000) is being applied internationally in a wide spectrum of human behaviours and, in its application to teaching (Deci and Ryan 2002; Reeve 2002), it proposes that students will learn to become better autonomous learners when teaching strategies aim to satisfy three basic needs — autonomy, competence, and relatedness. Autonomy is fostered when students are given choices in their learning activities (e.g., each student being able to choose reading materials that are of interest to him or her). Feelings of competence are fostered when students are given optimal challenges (not too easy and not too difficult) and when they are provided with positive and informational feedback that encourages them to aim for mastery. The philosophical principles underlying the mastery approach to teaching (e.g., Bloom 1984; Guskey 1985; Landry and Richard 2002) are especially relevant to improving self-confidence and engendering feelings of competence. Relatedness is fostered by working in a pleasant atmosphere that gives the students a sense of belonging and personal respect. Sometimes, learning in groups fosters feelings of relatedness. Research consistently shows that when these three basic needs are relatively well satisfied by the social learning environment, students become more intrinsically motivated and become more autonomous in their learning behaviours (Deci and Ryan 2002). In short, when the learning experience is more “self-directed” and less “controlling,” students become more internally motivated and generally become more focused on the actualization of their learning potential.

The questionnaires developed for PCAP-13 were not planned to test self-determination theory. However, when the robust relationships that are consistently observed are conceptualized as a global configuration, they seem to be quite consonant with the educational principles of self-determination theory. The journal *Theory and Research in Education*, Volume 7(2) 2009 has recently published a whole issue related to the theory of self-determination and education.

Self-determination theory has been applied in the study of literacy in the context of French-language-minority communities (Landry, Allard, and Deveau 2009) as well as in the study of identity development (Landry, Allard, and Deveau 2007; Deveau, Allard, and Landry 2008). Students who develop an internal motivation to learn the

minority language tend to have higher reading scores in the minority language, and these competencies in the minority language are strongly correlated with similar competencies in the majority language. In other words, one means of fostering “additive bilingualism” is by promoting mastery of the minority language — fluency in one’s mother tongue is a strong predictor of achieving literacy competencies in the majority language.

An important educational implication for the Small French Minorities is to foster mastery of the minority language by applying principles similar to those presented above, but also by encouraging reading behaviours and participation in cultural activities in French outside the school. According to the observed relationships in the present study, these activities seem to be especially important in contexts of low French vitality.

We conclude by proposing additional studies that would focus on the biliteracy of most students in linguistic minority contexts, that is, francophones outside Quebec and anglophones within Quebec. Both of these groups of students are highly bilingual and the cognitive academic skills of the francophone students are very often stronger in English than in French, even though they are schooled completely in French except for their English language arts courses (Landry, Allard, and Deveau, in preparation). Additional research into the biliteracy skills of these students could yield more informative results to complement the current findings on their reading performance in only one language. By recognizing these students as biliterate, we might better understand the interdependence between their competencies in the two languages (Cummins 1979, 1981, 2000) which could enhance their contribution as bilinguals to Canada’s human capital.

Finally, it is important that studies similar to the present study contain more language-related variables. A single variable (language most often used at home) dealt with language contacts. There is a need to have more information on the language experiences of the students in the home and in their social networks and, especially, in the activities related to literacy such as out-of-school reading and media use. These variables are of utmost importance not only to better understand their literacy skills in their school language but also to better understand their reading performance as biliterate individuals.

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