

# ASSESSMENT MATTERS!



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## Parental Engagement in Early Literacy and Numeracy Activities and Student Achievement in PIRLS/TIMSS 2011<sup>1</sup>

The role parents play in their children’s education can have far-reaching consequences for children’s socio-emotional development, school readiness, school adjustment, and academic performance. Parental engagement promotes parent–child, parent–teacher, and/or parent–school interactions and establishes parents as active participants in their children’s learning activities. A positive relationship between parental involvement and students’ achievement is supported in the literature. For example, parents’ communication and participation in school is linked to higher teacher-reported scores in reading and mathematics for younger students, at Grades 3 through 5 (Lee & Bowen, 2006).

Parental engagement can be equally important in developing children’s early literacy and numeracy skills. As noted in a recent literature review (Saracho & Spodek, 2010), parents’ reading age-appropriate stories to their children contributes to the development of children’s listening comprehension skills, oral language skills, positive attitudes toward reading, larger vocabulary acquisition, and learning that text conveys meaning. Consequently, the findings show that greater parental engagement with storybook reading improves children’s reading achievement in academic settings. Longitudinal studies demonstrate that children’s reading and mathematics skills at the time of school entry predict higher reading and mathematics achievement in later grades, and that early math skills are a stronger predictor of later reading achievement than early reading skills are (Duncan et al., 2007). Although children’s early literacy and numeracy skills can be developed both at home and outside the home, families are arguably the most important source in developing children’s early reading and mathematics skills.

This paper explores Canadian parents’ engagement practices in children’s early literacy and numeracy development, and how these relate to students’ achievement at the Grade 4 level.<sup>2</sup>

<sup>1</sup> For TIMSS 2011, results were reported for Quebec only, as it is the only province in which the same students participated in both PIRLS and TIMSS at the Grade 4 only, level.

<sup>2</sup> Nine provinces participated in PIRLS 2011: British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick (French), Nova Scotia, and Newfoundland and Labrador. Results can only be reported for provinces that oversampled. Therefore, results for Saskatchewan and Manitoba are not included since they participated at the Canadian level only.

Fifteen items on the PIRLS/TIMSS 2011 *Learning to Read Survey* assessed how often parents engaged in literacy and numeracy activities with their child before he or she began primary school, rated on a three-point Likert scale: often, sometimes, and never or almost never. Nine items asked parents about literacy-related activities, and six items asked about numeracy-related activities.<sup>3</sup> Early literacy and numeracy activity scales were created according to the responses to these items. For the purpose of this study, the “sometimes” and “never or almost never” rating scales were combined in order to make a meaningful distinction from parents who engaged in these activities often.

### **Canadian parents are very involved in children’s early literacy and numeracy development compared to other countries... but there are differences between provinces**

Parents across all of the participating countries in PIRLS 2011 tend to be more involved in their children’s numeracy than their literacy (see Table 1). In Canada, parents report higher rates of involvement in their children’s early-literacy and numeracy activities than do parents in other countries, with at least half of Canadian

families engaging in these activities often. Parents from Nova Scotia and Newfoundland and Labrador report engaging in both literacy and numeracy activities more often than parents in other provinces do, with Quebec showing the lowest engagement.

**TABLE 1 Percentage of parents engaging in early literacy and numeracy activities with their child before he or she began primary/elementary school**

	Literacy		Numeracy	
	Often	Sometimes, never, or almost never	Often	Sometimes, never, or almost never
<b>BC</b>	50%	50%	60%	40%
<b>AB</b>	52%	48%	61%	39%
<b>ON</b>	54%	46%	64%	36%
<b>QC</b>	40%	60%	57%	43%
<b>NBf</b>	53%	47%	68%	32%
<b>NS</b>	62%	38%	69%	31%
<b>NL</b>	66%	34%	74%	26%
<b>CAN</b>	51%	49%	62%	38%
<b>INT</b>	37%	63%	49%	51%

### **Parental engagement in both early literacy and numeracy activities is related to students’ higher reading achievement**

International and Canadian results demonstrate that children whose parents reported greater parental engagement in early literacy and/or numeracy activities obtain higher reading scores (see Charts 1 and 2). These

findings are consistent and significant across all Canadian provinces for both literacy and numeracy scales. However, the gap in performance between the two groups of students is larger for literacy than for numeracy.

<sup>3</sup> For literacy, these activities are: reading books, telling stories, singing songs, playing with alphabet toys, talking about things they have done, talking about things they have read, playing word games, writing letters or words, and reading aloud signs and labels. The numeracy-related activities are: saying counting rhymes or singing counting songs, playing with number toys, counting different things, playing games involving shapes, playing with building blocks or construction toys, and playing board games or card games.

CHART 1 Students' reading achievement scores by parental engagement in *early-literacy* activities

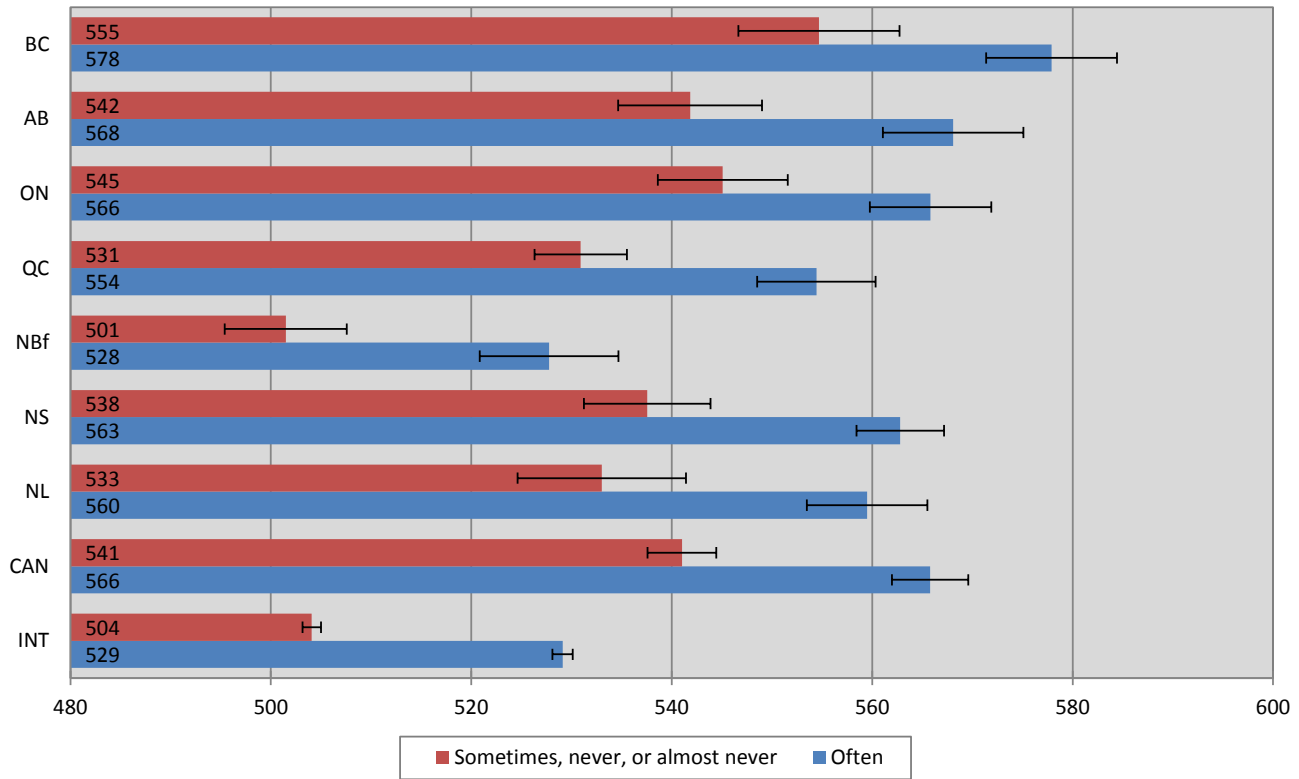


CHART 2 Students' reading achievement scores by parental engagement in *early-numeracy* activities

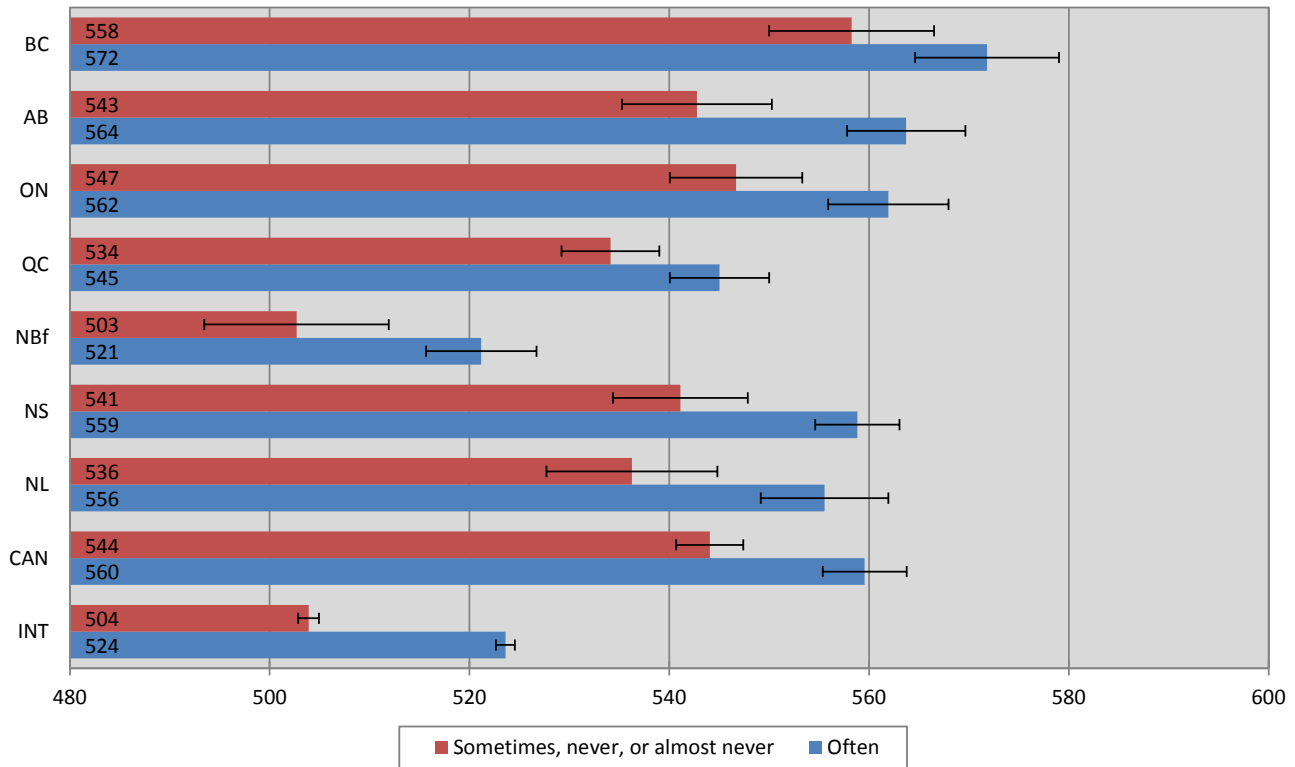


Table 2 shows the differences in average reading scores between children whose parents performed literacy and numeracy activities *often* and those whose parents

performed these activities *sometimes*, *never*, or *almost never*.

TABLE 2 Differences in students' average reading achievement by parental engagement, PIRLS 2011

Early literacy and numeracy activities	Difference (Often vs. sometimes, never, or almost never)								
	BC	AB	ON	QC	NBf	NS	NL	CAN	INT
a) Reading books	<b>34</b>	<b>34</b>	<b>33</b>	<b>32</b>	<b>28</b>	<b>44</b>	<b>31</b>	<b>35</b>	<b>36</b>
b) Telling stories	<b>19</b>	<b>21</b>	<b>18</b>	<b>26</b>	<b>28</b>	<b>18</b>	<b>21</b>	<b>21</b>	<b>25</b>
c) Singing songs	<b>14</b>	<b>13</b>	8	6	6	<b>14</b>	<b>13</b>	<b>11</b>	<b>11</b>
d) Playing with alphabet toys (e.g., blocks with letters of the alphabet)	<b>15</b>	<b>17</b>	<b>11</b>	<b>11</b>	<b>8</b>	<b>13</b>	<b>18</b>	<b>15</b>	<b>13</b>
e) Talking about things you had done	8	<b>14</b>	<b>18</b>	<b>12</b>	<b>11</b>	<b>20</b>	<b>20</b>	<b>15</b>	<b>16</b>
f) Talking about what you had read	<b>13</b>	<b>16</b>	<b>16</b>	<b>14</b>	10	<b>18</b>	<b>19</b>	<b>18</b>	<b>14</b>
g) Playing word games	<b>19</b>	<b>16</b>	<b>13</b>	<b>15</b>	<b>19</b>	<b>21</b>	<b>17</b>	<b>17</b>	<b>14</b>
h) Writing letters or words	<b>17</b>	<b>18</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>22</b>	<b>13</b>	<b>15</b>	<b>11</b>
i) Reading aloud signs and labels	<b>20</b>	<b>18</b>	<b>19</b>	<b>11</b>	<b>18</b>	<b>20</b>	<b>28</b>	<b>17</b>	<b>16</b>
j) Saying counting rhymes or singing counting songs	<b>15</b>	<b>13</b>	<b>14</b>	<b>9</b>	<b>14</b>	<b>15</b>	<b>18</b>	<b>13</b>	<b>13</b>
k) Playing with number toys (e.g., blocks with numbers)	10	<b>13</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>10</b>	<b>18</b>	<b>11</b>	<b>11</b>
l) Count different things	11	<b>19</b>	<b>17</b>	<b>15</b>	<b>21</b>	<b>19</b>	<b>26</b>	<b>17</b>	<b>19</b>
m) Playing games involving shapes (e.g., shape sorting toys, puzzles)	<b>16</b>	<b>22</b>	<b>14</b>	<b>10</b>	<b>18</b>	<b>21</b>	<b>18</b>	<b>15</b>	<b>21</b>
n) Playing with building blocks or construction toys	<b>15</b>	<b>15</b>	<b>10</b>	5	6	8	<b>14</b>	<b>11</b>	<b>16</b>
o) Playing board games or card games	4	<b>15</b>	<b>8</b>	3	10	<b>12</b>	10	<b>6</b>	<b>9</b>
Literacy scale	<b>23</b>	<b>26</b>	<b>21</b>	<b>24</b>	<b>26</b>	<b>25</b>	<b>26</b>	<b>25</b>	<b>25</b>
Numeracy scale	<b>14</b>	<b>21</b>	<b>15</b>	<b>11</b>	<b>18</b>	<b>18</b>	<b>19</b>	<b>16</b>	<b>20</b>

Note: Throughout this paper, when the confidence intervals overlapped slightly, an additional test of significant (t-test) was conducted in order to determine whether the difference was statistically significant. Statistically significant differences are in bold.

Canadian results are similar to international results in that greater parental engagement with any of the 15 literacy and numeracy activities is related to students' higher reading achievement. In Canada, children whose parents often engaged in *literacy* activities with them before the beginning of primary/elementary school have an advantage of 11 to 35 points over students whose parents engaged in these activities only sometimes, never, or almost never. Reading books and telling stories have the strongest impact on students' reading achievement, with a difference of 35 and 21 points, respectively. The difference is significant across all provinces for six out of

nine literacy activities, except for singing songs, talking about things parents had done, and talking about things they had read.

A similar impact is observed for students whose parents are often engaged in *numeracy* activities, with students having a 6–17-point advantage in reading scores. For Canada overall, parental involvement in counting different things and playing games involving shapes has the strongest impact on reading achievement, with a 17- and 15-point advantage in scores, respectively. The difference is significant across all provinces.

## The extent of parental engagement and students' reading achievement is different between parents whose children are enrolled in English- or in French-language school systems

Parental involvement for both literacy and numeracy development is higher for students enrolled in English-language school systems than for students in French-language school systems (see Table 3). For numeracy activities, the difference in reading performance between students with more-involved parents and those with less-involved parents is significant in both school systems, but the gap is larger in English-language systems (16 vs. 11). For literacy activities, students in English- and

French-language school systems have a similar advantage in reading scores over students with less-involved parents (23 vs. 22).

Overall, students whose parents were frequently engaged with them in literacy and numeracy activities obtain higher scores in reading in English-language school systems than do students with equally engaged parents in French-language school systems.

TABLE 3 Proportion, average scores, and differences in students' average reading achievement by parental engagement and by language, PIRLS 2011

	English-language school systems					French-language school systems				
	Often		Sometimes, never, or almost never			Often		Sometimes, never, or almost never		
	%	Average score	%	Average score	Score difference	%	Average score	%	Average score	Score difference
<b>Literacy scale</b>	54	570 (2.3)	46	547 (2.3)	<b>23</b>	40	549 (2.9)	60	527 (2.3)	<b>22</b>
<b>Numeracy scale</b>	63	566 (2.6)	37	550 (2.2)	<b>16</b>	57	541 (2.5)	43	530 (2.5)	<b>11</b>

## Parental engagement in literacy and numeracy activities before children begin primary/elementary school is related to higher reading, mathematics, and science achievement

Because TIMSS and PIRLS programs share the same *Learning to Read Survey*, it is possible to compare the impact of parental engagement on student performance across three domains: reading, science, and mathematics. TIMSS was administered in Alberta, Ontario, and

Quebec in 2011, but only Quebec has administered TIMSS and PIRLS to the same sample of students. Therefore, the comparison between the TIMSS and the PIRLS results in relation to parental engagement can be observed in Quebec only.<sup>4</sup>

<sup>4</sup> The total sample is  $N=4,142$ , Quebec data set. To compare PIRLS and TIMSS 2011 results, students who participated in only one of these assessments were eliminated from this analysis.

TABLE 4 Differences in students' average achievement scores in reading, science, and mathematics by parental engagement, PIRLS/TIMSS 2011 – Quebec

Early literacy and numeracy activities	Difference (Often vs sometimes, never, or almost never)		
	PIRLS 2011 Reading	TIMSS 2011 Science	TIMSS 2011 Mathematics
a) Reading books	32	26	21
b) Telling stories	26	20	16
c) Singing songs	6	0	4
d) Playing with alphabet toys (e.g., blocks with letters of the alphabet)	11	6	6
e) Talking about things you had done	12	8	3
f) Talking about what you had read	14	12	5
g) Playing word games	15	11	8
h) Writing letters or words	15	9	7
i) Reading aloud signs and labels	11	7	5
j) Saying counting rhymes or singing counting songs	9	3	1
k) Playing with number toys (e.g., blocks with numbers)	9	5	6
l) Count different things	15	12	9
m) Playing games involving shapes (e.g., shape sorting toys, puzzles)	10	8	9
n) Playing with building blocks or construction toys	4	10	10
o) Playing board games or card games	3	3	6
Literacy scale*	24	17	12
Numeracy scale	11	9	10

\*Note. The TIMSS 2011 data set does not include the literacy-scale variable.

As described previously, students' whose parents often performed any of the early literacy activities scored significantly higher on PIRLS reading achievement than did students whose parents engaged in these activities only sometimes, never, or almost never. When comparing the differences in the results for Quebec by parental engagement, they show that parental engagement in many literacy activities is also related to higher science and mathematics achievement on TIMSS (see Table 4). Notably, reading books and telling stories are not only strongly related to students' higher reading achievement, but also to higher science and mathematics performance.

Parental engagement in most of the numeracy activities was associated with higher achievement on both PIRLS reading and TIMSS mathematics and science assessments. Students whose parents engaged in numeracy activities

often had a significant advantage of 9 to 15 points in reading, 8 to 12 points in science, and 9 to 10 points in mathematics. Parental engagement in such activities as counting different things and playing games involving shapes was related to higher performance on the PIRLS reading and the TIMSS mathematics and science assessments, whereas greater parental involvement in playing with building blocks or construction toys with their child was related only to higher scores on the TIMSS mathematics and science assessments. Further research is needed to explain why parental involvement in numeracy activities has higher impact on reading achievement than on mathematics and science achievement.

Overall, the difference in performance between students with more-involved parents and those with less-involved parents was greater for the literacy scale than for the

numeracy scale, and this is true for all three domains — reading, science, or mathematics. This indicates that early literacy activities build a solid learning foundation for all school subjects, and not just reading.

## Conclusion

- Provinces vary in how often parents engage in the early literacy and numeracy development of their children. In Canada overall, the high rate of parental engagement in early literacy and numeracy activities confirms the role of the parent as their child's first teacher.
- Greater parental engagement has a great impact on students' achievement scores in reading, science, and mathematics, especially on those with very involved parents who often tell stories and read books to their children.
- Parents of students enrolled in English-language school systems are more involved in literacy and numeracy activities than parents of students enrolled in French-language school systems.
- Parents can boost their children's early reading and math skills as well as their school preparedness by becoming actively engaged in their children's early education.

## References

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