



## Reading Comprehension and Inferences: Comparison of Learning Disabled and Second Language Speakers”

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### **Abstract**

*Poor readers struggle in making inferences in reading comprehension tests (Cain & Oakhill 1999). Both Second Language (L2) and Learning Disabled (LD) students demonstrate reading comprehension problems. In the Quebec context, L2 and LD students are found together in the same classrooms. To make better-informed decisions regarding classroom remedial measures in reading, it is important to determine if the reading problems of these two populations share a common ground or existing independently of each other.*

*Do L2 and LD students have trouble with inferences? If so, are difficulties caused by the same sources for L2 and LD students?*

*In a reading task, we tested 580 participants from grade 3 to grade 6 on inferences. We found differences between these students. First language speaker students were better than L2 students who were better than LD students. LD students are weaker because they lack of reading strategies and L2 students have a lack of vocabulary. Boys were weaker for both groups. We propose different classroom remedial measures in reading for each of them.*

### **1. Context**

#### **1.1 Reading comprehension**

Since many years, researches in reading comprehension refer to Kintsch and Van Dijk (1978) [1] and Kintsch (1988) [2] model. They explain that during reading, learners process information triggering the elaboration of mental representations essential for comprehension. Kintsch (1988) [2] suggest two phases in the reading process: construction and integration. For construction phase, readers choose informations, activate schemas, and store pertinent informations in the long-term memory. For integration phase, they prune non-essential information. Finally, readers build new networks for the information from the text being read. Readers make inferences during construction-integration process.

Reading comprehension depends on linguistic knowledge related to: syntax, text structure, vocabulary that includes deep knowledge of a word, and prior knowledge. Word knowledge is central in the systems involved in reading comprehension (Perfetti and Stafura, 2014 [3]).

According to Nation (2001) [4], knowledge of a word includes underlying knowledge of form, meaning and use. The form of a word includes speaking, writing and morphemes; meaning of a word involves concepts and associations; and use of a word implies grammar, collocations and constraints.

#### **1.2 Inference**

Inference is going beyond the explicit information in the text. For inferencing, we should activate our prior knowledge, link information. To infer, we must first have a good lexical representation (Perfetti 2007) [5], which means: phonological representation, orthographic representation and semantic information. While reading, lexical representation is activated depending on the context. When reading a well-known word, we have a rich semantic representation.

Poor readers underperformed in making inferences in reading comprehension tests (Cain et Oakhill 1999) [6]. The quality of the lexical representation of second language speakers influences their ability to make inferences (Cain 2010) [7]. Inferences are related to prior knowledge; the more background knowledge linked to the text content that has an individual, the easier it is for him to make inferences. A second language learners' lack of vocabulary affects his reading comprehension.



Both, second language (L2) and learning disabled (LD) students demonstrate reading comprehension problems. The links between the ability to infer and reading comprehension are documented (Yuill et Oakhill 1991, Cain et Oakhill 1999) [8] [6].

According to Cain & Oakhill (1999) [6], we grouped inferences in two types: gap-filling inferences for integration of general knowledge with information provided in the text, and text-connecting inferences for mapping an instance of a specific noun to a later specific referent (Baker and Stein's 1981 terminology)[9]. Some authors use global and local inferences terminology; global inference applies for all the text like gap-filling, while local inference concern a part of the text like text-connecting. Cain and Oakhill (2014) [10] showed that deep knowledge of vocabulary is strongly related to inference making, mainly for global coherence inferences.

In reading comprehension, the gap between boys and girls get larger as the grade level increase (Klecker, 2006) [11]. Pisa (2009) [12] showed that girls outperformed boys in reading literacy. Consequently, the Council of Ministers of Education in Canada decided to search what could explain this difference, and Chuy and Nitulescu (2013) [13] conducted a research for the Council. They used Pisa (2009) [12] data set. Pisa's assessment asked students many questions about strategies they used. They found that girls used more control and summarization strategies than boys.

Considering the previous researches, our research question is: are difficulties in making inferences are the same for second language and learning disabled students? Do boys and girls have same scores?

## 2. Method

Participants are 580 students from grade 3 to grade 6 attending French school in Montréal area: 386 French first language (L1), normal achiever; 152 French second language (L2) normal achiever; 42 French first language with learning disabilities. We used a narrative text with inferences questions. It was a group task in the classroom. Text was available to the students for answering questions. For external validity, we correlated our reading comprehension test with other linguistic tasks with same group and we obtained good correlations, for example: correlation with writing production  $r=0,443$  at  $p=0,000$ .

## 3. Results

### 3.1 Reading comprehension

For reading comprehension, we found significant differences between-grades:  $F(4, 579) = 44,643$   $p=0,000$  but, ANOVA showed that there was no significant difference between first and second language students, and between boys and girls. Nevertheless, we found significant differences between first language normal achiever students and learning disabled students  $F(1,427)=39,975$   $p=0,000$ , and between normal first language and normal second language students  $F(1,537)=16,358$   $p=0,00$  as we can see on figure 1.

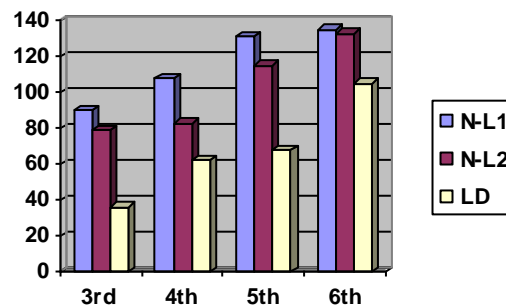


Figure 1. Results by grade for L1, L2 and learning disabled students

### 3.2 Types of inferences

We analyzed answers by text connecting and gap filling inferences. We also looked literal information for which the answer is given explicitly in the text.



For text connecting by grade, we found a significant difference:  $F(3,579) = 7,919$   $p = 0,000$ . But, when we analysed by language, it was not so clear even if it is significant  $F(1,537) = 6,073$   $p < 0,014$  and mean L1 = 115,45 and mean L2 = 98,9; in fact in grade 5, L2 are better than L1. For learning disabled students, we also have a significant difference  $F(1,427) = 12,958$   $p = 0,000$ . We also examined by gender and found a significant difference:  $F(2,579) = 6,855$   $p < 0,001$ .

For gap filling inference we found a significant difference by grade:  $F(3, 579) = 15,464$   $p = 0,000$ . We also found a significant difference by language:  $F(1, 537) = 12,364$   $p = 0,000$ . For learning disabilities students, we also found significant difference  $F(1,427) = 25,233$   $p = 0,000$ ; as for gender:  $F(2,579) = 3,327$   $p < 0,037$ .

For literal questions, we found a significant difference by grade:  $F(3, 579) = 11,756$   $p = 0,000$ ; by language:  $F(1,537) = 9,706$   $p < 0,002$ ; for learning disabled students  $F(1,427) = 25,742$   $p = 0,000$ ; and by gender:  $F(1,580) = 4,849$   $p < 0,008$ .

#### 4. Discussion

In this study we found gap filling inferences were easier than text connecting inferences for all types of students, contrary to Cain and Oakhill (1999) [6] who found the opposite with realistic narrative text; we used fantastic narrative text. As them, we found that less skilled readers are the worst for all types of inferences. Cain & Oakhill (1999) [6] showed that poor readers improved their text-connecting inferences when they could look back at the text. In the present study, as in Yuill and Oakhill (1988) [14], even when the text is present less-skilled readers were poorer. Bower-Crane and Snowling (2005) [15] have demonstrated that "different reading tests tap different types of inference skills. Our results show that gender differences are significant for all types of inferences what adds to the existing researches showing that boys have more difficulties with reading comprehension (PISA, 2009) [12].

#### 5. Implications

It is important to do training of all types of inferences: gap filling, text-connecting with different kinds of narrative texts. We should begin with gap filling, then, text-connecting inferences. Like Cain and Oakhill (1999) [6], we observed difficulties in making inferences for learning disabled students. Training in making inferences could be helpful for them.

For training inferences as a helpful strategy for reading comprehension, we should know that explicit teaching of reading comprehension strategy have a size effect = 1.18 such as demonstrated in the mega-analysis of Bissonnette, Richard and Gauthier (2010) [16]. So, explicit teaching is the best way to do it.

Mc Gee and Johnson (2003) [17] did inference training by using these steps: first, make a lexical training explaining the meaning of specific words; second: generate questions by students who formulate their own questions about the text; and third, students make predictions by guessing the missing segments and making an inference. They concluded this is a ready-made inference training because they had a great success (student 6-10 years old improve over 17 months in Neale Analysis of reading Ability test). In their study, poor readers improved more than other groups of students.

Elbro and Iversen (2013) [18] trained 16 Grade 6 classes, with 236 participants for 8 lessons of 30 minutes in text filling with explicit teaching. First, they used pre-filled organizers; second when students were familiar, they filled in the box; third, last 2 sessions, they read the text and answered inference questions without the organizers support. They found that students improved their ability to make gap-filling inferences (size effect = 0.92). Training was associated with a significant advance in reading comprehension.

We have to work systematically to build the lexical knowledge of the L2 and LD children because inferencing depend of it. Finally, we need more researches to investigate differences between girls and boys. According to Graham and Harris (2010) [19] meta-analysis, we know how important is explicit teaching of summarization strategy (Size effect: 0,82). Chuy and Nitulsecu (2013) [13] found boys used less summarization strategy. So, we should teach them.

#### 6. Conclusion

Our results show that second language students are different of learning disabled students. We have few learning disabled students; it is a limitation of this study. We can see students with learning disabilities are weaker than second language students for all types of inferences. For students with learning disabilities, the access to semantic memory where vocabulary is stored, the lack of strategies





and the ability to use general knowledge to interpret a text could explain differences. For second language students, only the lack of French vocabulary could explain the difference with first language students. In this study with a fantasy narrative text, we found gap filling was easier than text connecting inferences.

This study supports the fact that it is important to give special attention to learning disabled students and second language students especially for boys. We should teach them inferences and summarization strategies by using explicit teaching.

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