US-China Education Review A 10 (2012) 885-891
Earlier title: US-China Education Review, ISSN 1548-6613

The Writing of Expository Texts in Early Grades: What Predicative Analysis Teaches Us*

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This paper presents the results of a predicative analysis led on comparison and problem-solution texts produced by pupils of the second and third grades of primary school following a set of reading and writing instructional activities. The production of those texts is of a special challenge to the young writers because of the cognitive and linguistic processing involved. The analysis of the text corpus highlights differences from the viewpoint of the semantic content developed (predicate/arguments relations) and the various signal marks used to indicate the comparison and cause-effect relations. The results globally show that the young pupils succeed in mastering the complexity of linearizing the content of those two types of text. Thus, we have observed that a higher number of arguments (that of which we talk), related to the various properties classifying the mentioned referents, are presented in comparison texts, and problem-solution texts offer less arguments since the same one presented at the description of the problem is reintroduced for its solution associated to new predicates. Furthermore, the analysis shows that as opposed to comparison texts, problem-solution texts present a variety of relation marks without which logical causal relations would remain implicit or even non-established.

Keywords: writing, expository texts, predicative analysis, semantic content, relation marks/signals, writing instructions, teaching

Introduction

Teaching of reading and writing expository texts is no common task in primary grades. Indeed, several researches have shown how little exposure this type of texts is given compared to narrative text (Duke, 2000; Donovan & Smolkin, 2001; Moss & Newton, 2002). Hall, Sabey, and McClellan (2005) pointed that to neglect early teaching of expository text could contribute to pupil's fourth-grade slump in reading—the emergence of understanding difficulties in reading occurring at that period when they switch from "learning to read" to "reading to learn" (Sanacore & Palumbo, 2009). Furthermore, the little exposure the young pupils get to that type of text and its specific vocabulary does not stimulate the development of necessary skills to its comprehension and production even while informative texts are more in use in other school disciplines (Moss, 2005).

Accordingly, the young pupils are more familiar with: (1) the common narrative structure found in all kinds of stories than with the various structures of the informative texts which vary according to the relation

*This research was supported by Fonds de recherche Société et Culture, Québec, Canada, awarded to Renée Gagnon.
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highlighted in the text; (2) the contents of the texts showing a sequence of events lived by the various characters than with various contents presented in the informative texts; (3) the temporal relation signals which mark a sequence of events in the narrative texts (such as “at first”, “then”, “later”, and “finally”) than with the marks which indicate a relation other than temporal, as the comparison marks (such as “as”, “as opposed”, and “while”) or the causal connectors (“then”, “consequently”, etc.).

Expository Text Structures

For three decades, works led by Meyer and her collaborators (Meyer, 1985; Meyer & Poon, 2001; Meyer et al., 2010) clearly expressed the various rhetorical relations in play in the expository texts which are regrouped in five types. “Description” comes first, in which the properties of one or many elements are presented; then follows “sequence”, where elements are presented in temporal order; then comparison/contrast where the author compares and contrasts two or more similar events, topics, or objects; then “cause/effect” relation, where one or more causes are delineated and its effects are described; and finally “problem-solution”, where a problem is stated and its solution(s) are developed accordingly. Meyer’s work shows that among those types, comparison and problem-solution are the most complex because of the high number of relations (predicates) involved between the arguments, and the most useful and memorizable (Meyer et al., 2010) since each argument was the object of a still higher number of processes.

Furthermore, the writing of those last two types of text brings a challenge as regard to the cognitive and linguistic processing tasks here involved.

Writing a Comparison Text

In a comparison text, the young writer’s challenge is to consider two objects, i.e., a beaver and a muskrat, to examine their characteristics and retain only those on which likeness could be evaluated (Barth, 1987/2001). Writing that type of text implies that the choice of information and the linguistic processes used enable the reader on one hand to establish the semantic relations regarding each of the described referents, while on the other hand, induce a comparative process of those information whose tasks are cognitively more demanding (Ziarko & Pierre, 1992) and at a higher abstraction level than that of the description structure. In order to do so, the text structure is organized in such a manner as to depict alternatively the characteristics of each animal. This process is often reinforced by the presence of comparison signals (“as” and “whereas”). It is usually established that comparison text involves mostly categorization knowledge, which is relative to a hierarchical organization of the world.

On the lexical plane, other than the comparison signals, the writer must use substantives (nouns) related to the categories mentioned. The content of such a text includes an important number of arguments (that of which is talked) in relation to the various characteristics used in the classification of the presented referents (i.e., beaver = animal = mammal = rodent).

Writing a Problem-Solution Text

Problem-solution text brings forward a problem event and shows the chosen action to solve the problem. It uses a logical cause-effect relation between the various events which, in the cognitive development of the child, is only later mastered. In such a text, the writer’s challenge is to sequence orderly the wording of the problem and its solution with an information re-use of information (arguments) showing the causal relations (predicates—what the authors are saying of) between the problem and its solution. To guide the readers in constructing those relations and constantly moving back and forth from the problem to the solution, the writer

uses connection signals as “because”, “then”, “consequently”, etc., making those relations explicit. Thus, opposed to the comparison text, the problem-solution text offers a lower ratio of predicates/arguments since a number of arguments used in the statement of the problem are also used in its solution.

On the lexical side, other than the causal signals, the writer must use verbs or “nominalizations” (i.e., prohibition rather than prohibit) to emphasize “actions” where changes might resolve the problem.

Because of those specifications regarding both the semantic content and the specific vocabulary used by those two types of text, we aimed at verifying if from those viewpoints, allowing that notable differences could be observed between comparison and problem-solution texts produced by young pupils of primary grades following instructional activities.

Method

Material and Procedures

To illustrate the issues relative to the writing of those texts, a predicative analysis was applied on a corpus of texts produced by the second-grade children (7−8 years old) and problem-solution by third-grade children (8−9 years old). Those texts come from our previous researches on the teaching of writing comparison texts in second grade (Gagnon, 2006) and works in progress on writing problem-solution texts in third grade (Gagnon, 2009/2012). They were written after teaching reading and writing instructional activities. Globaly, those reading activities consisted of instructions on content organization specific to the various types of text. Writing activities aimed at the mastering of the different linguistic processes related to the linearization of content, such as the use of comparison or causal signal marks.

The corpus consisted of 12 texts: six for each type. With the comparison text, the student’s task was to compare two animals (i.e., the grey wolf and the polar bear) as with the problem-solution, the task was to explain why the Peregrine Falcon is in extinction and describe the solutions found by scientists to this problem.

Predicative Analysis

The analysis we used comes from works from Le Ny (1979) and Denhière (1983) who were searching on the semantic memory. Our use of it permitted the identification of various semantic propositions defined as a “relationship between a predicate and one to noun arguments” (Denhière, 1983). They are linked together to form a coherent whole understandable by the addressee. It also enables text comparison between themselves on the microstructure level when observing the number of semantic propositions each contains. Those predictions are the key used by the reader to elaborate step by step the mental representation of what is said in the text (Denhière & Beaudet, 1992).

A text is thus constructed as a set of semantic propositions where each of them acts as an information unit made of at least two concepts in which one is assigned the role of one to noun arguments represented by variables (x1, x2, etc.) while the other plays the role of the predicate. A predicate could also be described as argument of other propositions and each proposition is described as a state or a change of state.

Furthermore, a text’s semantic density is seen as the result of the division of the number of semantic propositions by the number of arguments. Semantic density is higher with an important number of semantic propositions and a low number of arguments.

As an example (see Figure 1), comparing two sentences of sensibly equal word count (N = 26, N = 24) from each type of texts, it can be observed that predicate/argument ratio is lower in the comparison text (10

predicates for eight arguments, a ratio of 1.25) than in the problem-solution text (nine predicates for four arguments, a ratio of 2.25).

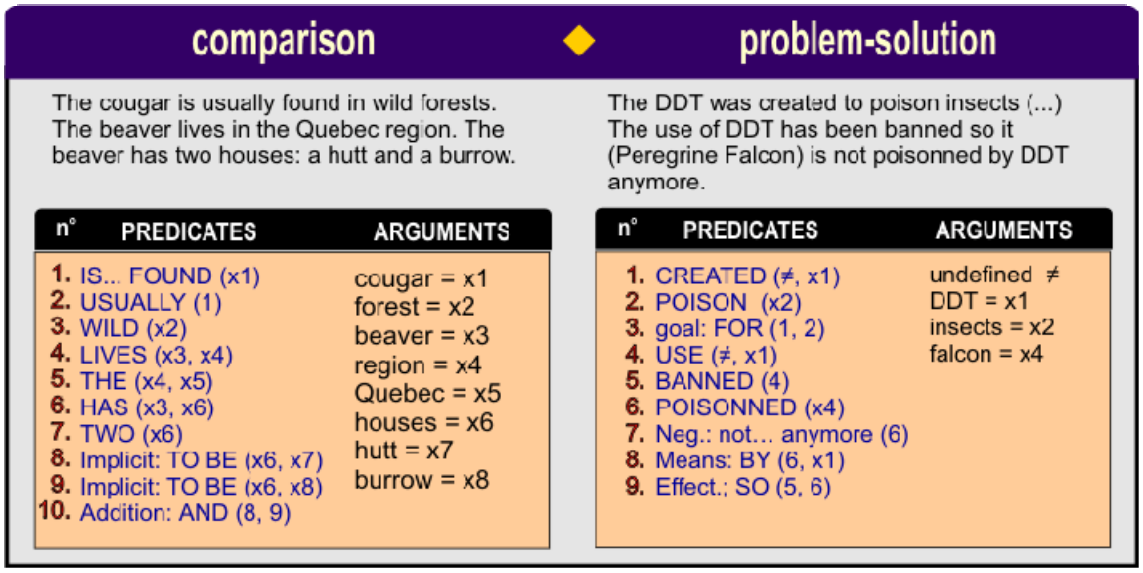
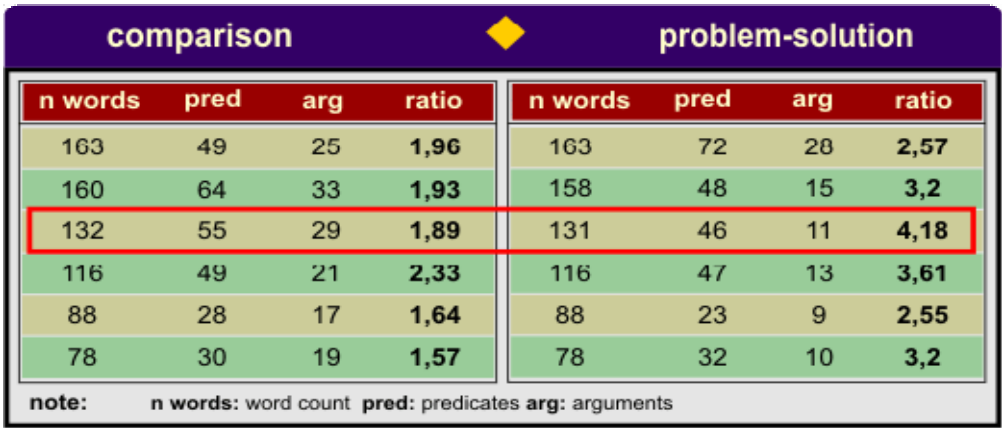


Figure 1. Predicative analysis example.

Results

Predicates/Arguments Ratios

A first observation comes from the predicates/arguments ratio observed for each type of texts. Example 1 of Figure 2 shows that for texts of same length (N = 163 words), comparison holds 49 predicates for 25 arguments opposing 72 predicates for 28 arguments in the problem-solution text. This example shows the complexity of linearization given to the writer in the second case where a higher number of relationships had to be drawn (72 predicates) with a sensibly equivalent number of arguments.



n words	pred	arg	ratio	n words	pred	arg	ratio
163	49	25	**1,96**	163	72	28	**2,57**
160	64	33	**1,93**	158	48	15	**3,2**
132	55	29	**1,89**	131	46	11	**4,18**
116	49	21	**2,33**	116	47	13	**3,61**
88	28	17	**1,64**	88	23	9	**2,55**
78	30	19	**1,57**	78	32	10	**3,2**

note: **n words:** word count **pred:** predicates **arg:** arguments

Figure 2. Predicates/arguments ratios in both texts.

Figure 2 also shows that for equal length texts, predicates/arguments ratios or semantic density is lower in comparison than in problem-solution, hitting respectively 1.57 to 2.33 and 2.57 to 4.18. In the third example, with texts counting respectively 131 and 132 words, comparison delivers 55 predicates for 29 arguments (a ratio of 1.89) where problem-solution shows 46 predicates for 11 arguments (a ratio of 4.18).

In other words, with the comparison text, each argument serves two predicates linked to both of the two referents compared while in the problem-solution text, each argument is reinvested in about four predicates processing to the elaboration of four different relationships. Thus, in the latter, each argument is part of a relationship net higher in density stemming between statements of the problem and the solution (see Figure 3). In example, the problem's statement shows two propositions: USE (DDT) and TOO MUCH, while the solution's statement shows: BAN (DDT).

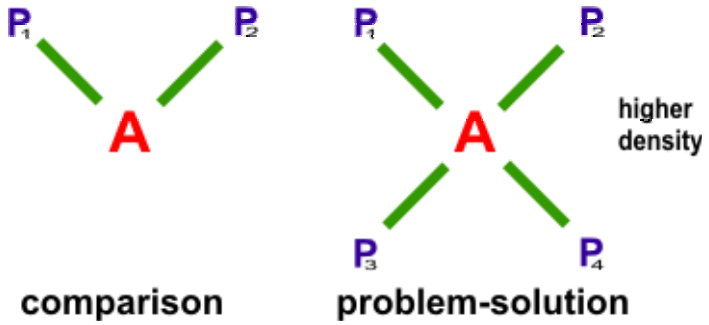


Figure 3. Predicates/arguments relationship in both types of text.

Relationships Signal Marks

From the viewpoint of the relationship signals used (see Figure 4), we could see that students have not or almost not used any to point the comparison relationship to the reader—which does not invalidate the comparison since it is otherwise sustained by the alternation of paragraphs. The writer can thus juxtapose information from one or the other referent using no explicit link between the paragraphs without impeding the comparison relationship (Gagnon, 2006). In problem-solution texts, the students used causal signal marks, necessary to establish the causal relationship between elements of the problem and the proposed solutions.

RELATIONSHIPS			
	comparison	causal	
Text		cause	effect
1	-	because of (i)	consequently, so, so
2	otherwise	because of	then, then, the fact of… it's that
3	-	because of (i)	then
4	then	because	consequently, so, thereby
5	-	because	so, so
6	-	-	thereby, so, (so)

note: (i): implicit

Figure 4. Signal marks from comparison and problem-solution texts.

Analysis also shows that students were able to reinsert some information (arguments) from the wording of the problem to the solution's wording (see example 1 as follows):

> Example 1: … But in 1960 it all went wrong, we were using too much DDT consequently the food chain made devastating effects because insects were poisoned and then the mammals were eating them and all the peregrine falcons were also eating them and so it was sad…
>
> Scientists and bird lovers found two solutions: The first one was to ban the use of DDT…

Here, the child has marked the causal relationship by using the signal marks: consequently and then. He took “We were using too much DDT” from the problem’s wording and “to ban the use of DDT” from the solution’s statement. This example also shows that some pupils used nominalization (utilization for utilizer—the use instead of used). This nominalization acting here as “agent” of the awaited change in the solution’s wording.

Furthermore, analysis showed that some pupils were unable to explicitly signal the causal relationship. It was then implicit, as shown in the following examples.

> Example 2: The problem with the Peregrine Falcon is that we use too much DDT. DDT is used as insect repellent to kill unwanted insects in our houses. But the little (mammals) eat insects... the falcon eats little mammals. The egg shell breaks easily.
>
> Two solutions have been found. The first was to ban DDT as pesticide ...
>
> Example 3: Captive-bred peregrine falcons were able to reproduce.

Discussion

The study aimed to verify notable differences from the semantic content (predicate/argument ratio) and signal marks used viewpoint, in comparison and problem-solution texts produced by the young second and third grades pupils following instructional activities. From the corpus of texts examined, we could see that the young writers produced valid content (predicate/arguments) in regards of the type of texts given. Accordingly, the predicative analysis revealed that the number and diversity of arguments in the comparison texts were related to the various properties of the exposed referents, while in the problem-solution text, they show the writer’s ability to involve arguments describing the problem and re-using them in elaborating the solution. Writing instructions given as soon as the second and third grades proved the children be able to linearize a semantic content related to the pragmatic aims of each type of text.

Furthermore, predicative analysis shows that from the viewpoint of the signal marks used, the writing process of those two types of text does not engage the same linguistic resources on the part of the students. With the comparison text, the writer unfolds the informational content while altering the properties of the various referents described without establishing any explicit link between those information which is monitored by the low number of signal marks (predicates) identified in the texts. In opposition, problem-solution text cannot dispense of causal marks while establishing explicit relationships. The use of those marks by the young writers testifies a blink of understanding of those relationships and their roles in making them explicit.

Cases of implicit causal relationship have also been noted in certain texts. The processing of such relationship is still hardly mastered at that early stage, especially when the semantic content of the text given to read or write is unfamiliar (Williams, Nubla-Kung, Pollini, Stafford, Garcia, & Synder, 2007).

Conclusions

Teaching of writing must focus on the learning of the cognitive processes supporting the writing tasks, such as planning and revision. However, this supposes that the beginning writer becomes able to word the view she wants to output, which means to decide what she says first, what she says afterwards, and so on, in the sentence and between the sentences. This decision in turn must take care of the content to word and the goal aimed at in the text, which could be linked to the rhetoric relationship sustained by the expository text (Gagnon & Ziarko, 2009).

Whether its goal is to compare or expose a problem and its solution, the task of writing an expository text following the acquisition of specific linguistic procedures is an essential tool in the development of cognitive processes of comparison and the appropriation of cognitive causal relationships of high level essentials to interrelate the ideas into a coherent whole (Meyer, 2003).

While the results shown here are based on a limited number of texts and added to our prior works on writing a comparison text in the second grade (Gagnon, 2006), it brings us to argue that instructions on writing comparison and problem-solution texts. Therefore, it is not only possible but useful in primary grades and that as soon as the second and third grades.

References

Barth, B. M. (1987/2001). *L'apprentissage de l'abstraction*. Paris: Éditions Retz.

Denhière, G. (1983). Ouvrir (x, fenêtre) et ouvrir (x, yeux): De l'analyse expérimentale à l'étude sur le terrain de la compréhension de textes. *Rééducation Orthophonique, 21*, 431-451.

Denhière, G., & Beaudet, S. (1992). *Lecture, compréhension de texte et science cognitive*. Lille: Presses universitaires de Lille.

Donovan, C. A., & Smolkin, L. B. (2001). Genre and other factors influencing teacher's book selections for science instruction. *Reading Research Quarterly, 36*, 412-440.

Duke, N. K. (2000). 3, 6 minutes per day: The scarcity of informational texts in the first grade. *Reading Research Quarterly, 35*, 202-224.

Gagnon, R. (2009/2012). *L'enseignement et l'apprentissage de l'écriture du texte de type problème-solution en 3e année du primaire: Interactions entre lecture, écriture et communication orale*. Projet de recherche subventionné par le Fonds de recherche sur la société et la culture, Québec, Canada.

Gagnon, R. (2006). Les effets d'une séquence didactique sur les opérations de textualisation d'un texte documentaire de comparaison par des élèves de 2e année du primaire. (Thèse de doctorat inedited, Québec: Université Laval)

Gagnon, R., & Ziarko, H. (2009). Apprendre à écrire un texte documentaire de comparaison en 2e année du primaire: Etude comparée d'interventions didactiques contrastées. *Revue des Sciences de L'éducation, 35*(3), 127-148.

Hall, M. K., Sabey, L. B., & McClellan, M. (2005). Expository text comprehension: Helping primary-grade teachers use expository texts to full advantage. *Reading Psychology, 26*, 211-234.

Le Ny, J. F. (1979). *La sémantique psychologique*. Paris: Presses Universitaires de France.

Meyer, B. J. F. (1985). Prose analysis: Purpose, procedures and problems. In B. K. Britton, & J. B. Black (Eds.), *Understanding expository text* (pp. 11-64). Hillsdale, N. J.: LEA.

Meyer, B. J. F. (2003). Text coherence and readability. *Topics in Language Disorders, 23*, 204-224.

Meyer, B. J. F., & Poon, L. W. (2001). Effects of structure strategy training and signaling on recall of text. *Journal of Educational Psychology, 93*(1), 141-159.

Meyer, B. J. F., Wijekumar, K., Middlemiss, W., Higley, K., Lei, P., Meier, C., & Spielvogel, J. (2010). Web-based tutoring of the structure strategy with or without elaborated feedback or choice for fifth-and-seventh-grade readers. *Reading Research Quarterly, 45*, 62-91.

Moss, B. (2005). Making a case and a place for effective content area literacy instruction in the elementary grades. *The Reading Teacher, 59*, 46-55.

Moss, B., & Newton, E. (2002). An examination of the informational text genre in basal readers. *Reading Psychology, 23*, 1-13.

Sanacore, J., & Palumbo, A. (2009). Understanding the fourth-grade-slump: Our point of view. *The Educational Forum, 73*, 67-74.

Williams, J. P., Nubla-Kung, A. M., Pollini, S., Stafford, B., Garcia, A., & Synder, A. E. (2007). Teaching cause-effect text structure through social studies content to at-risk second graders. *Journal of Learning Disabilities, 40* (2), 111-120.

Ziarko, H., & Pierre, R. (1992). L'apprentissage de concepts par les textes en sixième année du primaire. *Scientia Paedogogica Experimentalis, XXIX* (1), 45-64.