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(Article begins on next page)

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# Reading Comprehension and Expressive Writing: A Comparison Between Good and Poor Comprehenders

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To fully understand a text, readers need to build an integrated and coherent mental representation of the meaning of the text (Gernsbacher, 1997). The quality of this mental representation, usually called a *mental model* (Johnson-Laird, 1983) or *situation model* (Kintsch, 1998), depends on several cognitive and metacognitive factors. From the cognitive viewpoint, reading comprehension requires the activation of adequate background knowledge (at a lexical and semantic level). This allows readers to individuate relevant information within the text and infer information not explicitly stated. In the construction of a mental model, working memory plays a crucial role. It excludes information that is irrelevant and facilitates the connection of information in the text (van den Broek, 2010). From the metacognitive viewpoint, readers need to understand the goal of reading and recognize the characteristics of different text genres in order to select the most appropriate reading strategies. In addition, while reading, readers should monitor their level of understanding from time to time. Such control processes assure the creation of a coherent representation of text meaning.

As with reading, writing (or the ability to express one's own ideas) is a complex activity, as writers utilize many cognitive abilities during the writing process. In fact, writers must have flexible access to a wide range of mental representations from long-term memory as well as a highly controlled structure for coordinating operations on these many different kinds of knowledge states. Classical views of expressive

writing (Burnett & Kastman, 1997; Hayes & Flower, 1980) showed the importance of several processes, such as planning, producing, organizing, transcribing ideas, and revising the work as a whole, all or some of which may be sensitive to a limited working memory capacity (Berninger & Swanson, 1994; McCutchen, 1996, for a review; Swanson & Berninger, 1996). In addition, the ability to relate events and represent their connections in a mental model is critical in both comprehending and producing a written story (Arfè & Boscolo, 2006; van den Broek, 1997; van den Broek, Linzie, Fletcher, & Marsolek, 2000). In this sense, it is possible to hypothesize a strict link between the ability to express ideas in writing and the ability to comprehend what others have written, as, for example, both abilities are related to vocabulary knowledge, working memory capacity, and metacognitive control. Along these lines, it can also be predicted that problems in one of these two domains may affect the other.

Despite these commonalities, few studies have examined the relationship between reading comprehension and expressive writing, especially from an individual differences point of view. Some results in this direction come from the study

by Bishop and Clarkson (2003), who analyzed the case of twin children with Specific Language Impairment (SLI) compared with normally developing children in expressive writing tasks. Bishop and Clarkson found that children with SLI demonstrated poorer performance in writing tasks than control children in terms of spelling and semantic content and that those who scored more poorly in writing tasks had problems in various aspects of language, including oral comprehension.

The current study was designed to further explore the relationship between reading comprehension and written production, analyzing the case of poor comprehenders (i.e., children whose poor comprehension is not a result of poor decoding or poor nonverbal cognitive abilities). The studies on poor comprehenders have demonstrated an extreme heterogeneity of their profiles in the verbal and cognitive domains (Cain & Oakhill, 2006; Cornoldi, De Beni, & Pazzaglia, 1996). In fact, although as a group, poor comprehenders showed problems at different levels of verbal and cognitive processing, as individuals, some poor comprehenders displayed adequate performance in some of the considered abilities.

Despite this heterogeneity, the most typical problems presented by poor comprehenders relate to the ability to draw inferences, individuate relevant information in the text and connect that information, recognize text structure, and control their level of reading comprehension (e.g., Cain & Oakhill, 2007). The development of adequate reading comprehension is related to other literacy skills, one of which is narrative production (see Peterson & Dodsworth, 1991); thus, one can hypothesize that poor comprehenders would face problems in other areas of learning involving language abilities, as in the case of expressive writing.

Research on poor comprehenders has shown that this group generally performs well in decoding but has difficulty in semantic aspects of language (oral and written) that are related, for example, to the understanding of discourse structure (Bishop & Snowling, 2004). Therefore, they might have similar difficulty expressing their own ideas. Cain and Oakhill (1996) explored this issue by presenting two narrative tasks to groups of 7- and 8-year-old children at different levels of reading comprehension (less-skilled comprehenders, skilled comprehenders, and comprehension-age matched children who were paired in reading comprehension age with less-skilled comprehenders but younger when compared in terms of chronological age). In one task, children were required to produce a story orally from a topic prompt (e.g., "pirates"), and in the other, they started from a sequence of six pictures. The results showed that when narrating from topic prompts, children with weak reading comprehension skills were more likely to produce stories in which the main events were not causally related, to the stories produced by both same-age skilled comprehenders and the younger comprehension-age matched group. Therefore, Cain and Oakhill's study suggested a

strong correlation between story comprehension skills and the quality of oral story production. However, the less-skilled comprehenders' performance improved when they narrated from the picture sequences, and they were more likely to produce stories that contained a causally integrated sequence of events in this condition. In a subsequent study, Cain (2003) deepened the analysis by proposing two kinds of verbal prompts: a very short title, as in the previous study, and a more informative title, with the aim of guiding narrative production. In fact, in Cain and Oakhill's study, the differences might have been dependent on the fact that the pictures condition was more informative, thereby providing a skeleton for narrative construction. Cain's results demonstrated again that poor comprehenders produced oral narratives that had less integrated event structures than did those of both skilled comprehenders and a comprehension-age matched group, particularly when topic titles were used as story prompts. However, the less-skilled comprehenders' performance improved with more informative story prompts. In other words, oral stories generated from directed titles and picture sequences had more coherent event structures than those generated from topic title prompts. Moreover, the more informative prompts aided the coherence of less-skilled comprehenders' stories to a greater degree than it did that of the other groups: Group differences apparent in the topic title condition were not evident when either directed titles or picture sequences were used as prompts.

Cragg and Nation (2006) analyzed specifically the case of written narrative. In their study, groups of poor and good comprehenders were required to write an extended narrative about an event depicted in a sequence of 15 pictures. In addition, after a delay, participants were required to orally recall the story. The results of the study showed that poor comprehenders had age-appropriate spelling skills, and their narratives did not differ from those produced by control children in terms of length or syntactic complexity. However, their narratives captured less of the story content; in fact, they reported a lower number of main ideas, and their narratives contained a less sophisticated story structure, suggesting that poor comprehenders were not able to capture the causal meaning of the story. The results from the story recall task mirrored those obtained from the written production task.

In conclusion, from this later study, it emerged that poor comprehenders' expressive writing skills prompted by pictures are not completely adequate when compared to those of children with good reading comprehension. However, this result contrasts with the results obtained by Cain (2003) and Cain and Oakhill (1996), who found that pictorial prompts facilitated poor comprehenders' narratives. However, it should be noted that these studies are not completely comparable. On the one hand, the discrepancy between the results can depend on the differences in task request, as Cragg and Nation (2006) asked participants to write a story while Cain and collaborators focused on oral expression. As writing a

**Table 1.** Descriptive Statistics by Groups and Effect Size (*d*), Expressing the Magnitude of the Differences Between Groups

	Good comprehenders		Poor comprehenders		<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Reading comprehension	11.97	1.00	6.16	1.46	4.60
Word search	15.71	3.37	16.89	3.61	-0.33
Vocabulary	24.45	5.40	23.18	4.48	0.25
Working memory recall	12.04	1.80	10.47	2.58	0.70
Working memory intrusions (in percentage)	42.74	25.80	65.35	55.56	-0.52

story is generally more demanding than narrating it orally, it is possible that the first task is much more sensitive to poor comprehenders' difficulties.

In addition, from the comparison of the tasks used, some further differences emerged in relation to their complexity: the number of pictures (6) included in Cain's (2003) studies was around half of that of Cragg and Nation's (2006) task (15), with clear differences in the involvement of working memory capacity. As it has been demonstrated that processes involved in comprehension from different media (text, pictures, discourse) are substantially the same (see, e.g., Gernsbacher, Varner, & Faust, 1990), it can be hypothesized that the task proposed by Cragg and Nation was simply more sensitive to comprehension difficulties than Cain's tasks, requiring a greater effort to reach a complete comprehension of the events. In agreement with this hypothesis, Cragg and Nation reported that poor comprehenders demonstrated a lower level of comprehension of the gist of the story than good comprehenders. It is not clear, however, how much the written production difficulties of poor comprehenders may have depended on their problems comprehending pictorial narrative sequences or on a specific difficulty in writing.

Another issue that, in our opinion, deserves attention relates to the generalization of these writing problems encountered by poor comprehenders. In previous studies, the participants were required to produce narrative texts (in written or oral modality); thus, having explored only narrative production, it is impossible to generalize these results to other expressive writing tasks.

To address both of the aforementioned issues, the present study required groups of poor and good comprehenders to produce both a descriptive and a narrative text.

To answer the first point, the participants were required to produce written narratives both from pictorial and verbal prompts. In the case of the pictorial prompts, we used a limited number of pictures (5), as in Cain and collaborators' studies (Cain, 2003; Cain & Oakhill, 1996), making the task less demanding in terms of information to be processed. The verbal prompts were informative, as in the study by Cain (2003), to avoid the possibility of differences between the two tasks emerging from the differences in the information

provided. If poor comprehenders have problems in narrative writing per se, one would expect that the type of prompt should not make a difference.

With regard to the second issue, the expressive writing tasks were presented in two conditions: One required the writing of a narrative text, and the second required the writing of a descriptive text. Both used a pictorial prompt to be consistent with literature on expressive writing and individual differences in reading comprehension. If poor comprehenders' difficulties in writing are generalized, we expect differences between the two groups in both writing tasks.

In addition, as expressive writing and reading comprehension are both strictly related to working memory, and as poor comprehenders usually show low working memory capacity (for a meta-analysis, see Carretti, Borella, Cornoldi, & De Beni, 2009), the participants were presented with an updating working memory task, thus allowing to control for the role of working memory in the individual differences analyses on writing.

## Method

### Participants

Study participants were 38 poor comprehenders (19 males and 19 females), ages 8 to 10 years, and 38 good comprehenders (21 males and 17 females), matched for grade and type of school. They were selected from an original sample of 230 children attending the third, fourth, and fifth grades. All children came from families who speak Italian as their first language. The two groups were selected based on the general criteria proposed by Cornoldi et al. (1996) and were matched for scores on the vocabulary subscale of the *Primary Mental Ability intelligence test* (PMA; Thurstone & Thurstone, 1963), with an estimated IQ ranging from 85 to 130 for both groups, and a reading-decoding task measured using the "word search" subtask (Cornoldi, Miato, Molin, & Poli, 2009). The two groups differed in a standardized reading comprehension test appropriate for their age (Cornoldi & Colpo, 1998). Poor comprehenders obtained scores below the 25th percentile, while good comprehenders obtained scores above the 75th percentile (see Table 1).

## Materials

**Working memory updating task.** This task was an adaptation of the relevance-based updating task proposed by Palladino, Cornoldi, De Beni, and Pazzaglia (2001; see also Belacchi, Carretti, & Cornoldi, 2010). The task consisted of six lists, each composed of eight words with high values of concreteness and familiarity (Barca, Burani, & Arduino, 2002), and referred to objects easily comparable for size. The task required participants to listen to each list of word-objects and then select the three smallest objects from each list. The number of correctly recalled words and the percentage of intrusion errors (computed by dividing by the number of correctly recalled words and multiplying by 100) were the dependent variables.

**Expressive writing tasks.** In the case of pictorial expressive writing tasks, we used the unique standardized expressive writing battery available in Italy (Tressoldi & Cornoldi, 2000), which was also used in previous studies with children with attention-deficit/hyperactivity disorder (ADHD) profiles (see Re, Caeran, & Cornoldi, 2008; Re, Pedron, & Cornoldi, 2007). Regarding the writing tasks from verbal prompts, no standardized writing tasks from verbal prompts are available in Italy. We selected a title from Berninger and colleagues' (1992) studies. The authors asked children to produce narratives in response to a topic title, selected for its reference to a very familiar event. In Berninger et al.'s original assignment, children were presented the following narrative frame: "One day \_\_\_\_\_ had the (best/worst) day at school" and asked them to produce a narrative on that topic. We administered the same task in adapting the assignment (see the following).

**Narrative task (pictorial prompt).** The narrative task was taken from the standardized Italian battery for the assessment of writing skills (Tressoldi & Cornoldi, 2000). The narrative task was based on a series of five cartoons telling the story of a child falling off a tree. Each participant was required to write down the story represented in the cartoons to explain to a friend what happened to the child.

**Narrative task (verbal prompt).** This writing task (Berninger et al., 1992) required children to write about the most beautiful day they had ever spent at school—specifically, when it happened, its most significant events, and what they liked most. The assignment was therefore more informative than that of Berninger et al. (1992). The prompt here was not pictorial but rather asked participants to focus on a particular event. However, unlike in the study of Cain and Oakhill (1996), children had direct experience of the event to be narrated, and rather than generating novel ideas, they simply had to retrieve familiar episodes from their long-term memory.

**Descriptive task (pictorial prompt).** As with the narrative task, the descriptive task was taken from the standardized Italian battery for the assessment of writing skills (Tressoldi & Cornoldi, 2000). Differently from the narrative task,

however, the descriptive task involved presentation of a single colored picture showing people at the zoo, plus various animals in their allocated areas. In this case, the request was to describe the scene represented in the cartoon to allow a friend to imagine what the participant had seen. The precise instruction was as follows: "Imagine that you have been at the zoo and you have to describe the scene you see in the picture to some friends who were not there."

Performance on the three writing tasks was evaluated both qualitatively and quantitatively. Using established assessment measures (Re, Cazzaniga, Pedron, & Cornoldi, 2009; Tressoldi & Cornoldi, 2000), two blind raters were asked to evaluate the texts based on five qualitative parameters:

- General impression: the coherence and richness of the ideas presented;
- Adequacy: the ability of participants to meet task requests; therefore, a higher score was assigned to written texts addressed to a fictional friend in describing what happened or what they had seen (narrative and descriptive pictorial prompt tasks) or describing the characteristics of the events that defined the most beautiful day spent at school (narrative verbal prompt task);
- Global structure: the organization of the text; for the narrative condition, the text was evaluated as satisfying when it was organized into a three-part structure—that is, with a beginning (introducing the event), a middle (explaining what happened), and an end (reporting the conclusion); for the descriptive condition, the text was considered well structured when it contained the salient details of the picture, giving information about the relationship between such details and a personal evaluation of the situation;
- Lexicon: the appropriateness and the variety of the words used;
- Syntactic structure: the sentence construction (use of direct or indirect discourse) and the coordination/subordination between sentences—that is, the use of connectives, the correct use of verb tenses, and correct agreement between gender and number of nouns, verbs, and adjectives.

In accordance with the standardized procedure, for each parameter, the evaluation followed a 5-point scale in which 1 corresponded to *considerably below grade level*, 2 to *somewhat below grade level*, 3 to *grade appropriate*, 4 to *somewhat above grade level*, and 5 to *considerably above grade level*. The interrater reliability ranged between .65 and .80 (Pearson correlation; see the Appendix for specific values); because of this variability, the evaluations of the two raters were averaged and then used as dependent variables.

In addition to qualitative measures, the number of words produced and number of spelling mistakes as a percentage of the total number of words were computed and considered as quantitative measures.

## Procedure

Children were assessed in small groups (four to five students per group). In the case of expressive writing tasks, each participant received a copy of the picture or instructions for topic writing and a response sheet (the same type of paper they use at school for writing). They had 30 min to write each text. The tasks were administered in three different sessions, with a time lag of about 2 days. To minimize error due to order interaction, the order was fixed: (1) narrative task–pictorial prompt, (2) descriptive task, and (3) narrative task–verbal prompt.

The working memory updating task was administered in the third session after the writing task; it took about 15 min. In the working memory updating task, participants listened to each list. Then, they wrote down in a small booklet the three smallest objects in the list. The test was preceded by a warm-up session with two lists of words, but it could be repeated in the event of a misunderstanding of the task. Before starting the actual trial, the experimenter commented on the performance of each child, providing feedback.

## Results

### Working Memory Updating Task

Poor and good comprehenders were compared on the number of correctly recalled words and the number of intrusion errors. The univariate analysis of variance showed a difference in performance between the two groups in both correct recall,  $F(1, 75) = 9.52$ ,  $MSE = 4.96$ ,  $\eta_p^2 = .11$ ,  $p < .01$ , and the percentage of intrusions,  $F(1, 75) = 5.27$ ,  $MSE = .18$ ,  $\eta_p^2 = .07$ ,  $p < .05$ , with poor comprehenders recalling fewer correct words and committing a larger number of intrusion errors (see Table 1). Table 1 presents the magnitude of effect sizes, using the  $d$  index proposed by Cohen (1988), which is computed by subtracting the mean scores of the good comprehenders from those of the poor comprehenders and dividing by the pooled (average) standard deviation. The score distances between the group means are expressed in units of variability. According to Cohen's guidelines, values corresponding to  $d = .20$  are small,  $d = .50$  are medium, and  $d = .80$  are large. In other words, a  $d$  value of .50, equivalent to a medium effect size, indicates that the means differed by half a standard deviation. Consistent with previous studies (see, e.g., the meta-analysis by Carretti et al., 2009), the performance of poor comprehenders was below that of good comprehenders in terms of correct recall and the percentage of intrusion errors.

### Expressive Writing Tasks<sup>1</sup>

**Narrative text: Effect of prompt (pictorial vs. verbal).** All of the analyses were run using a repeated measures ANOVA with Group (good vs. poor comprehenders) as the between factor, and Kind of Prompt (pictorial vs. verbal) as the within factor; significant interactions were decomposed using the Tukey method, corrected with Bonferroni's adjustment for multiple comparisons. Descriptive statistics are reported in Table 2.

### Quantitative Measures

The analysis of the length of text, expressed in number of words, showed only a main effect of Kind of Prompt,  $F(1, 74) = 13.82$ ,  $MSE = 794.59$ ,  $\eta_p^2 = .16$ ,  $p < .001$ . In the verbal prompt condition ( $M = 88.09$ ,  $SD = 49.08$ ), the texts were, on average, longer than in the pictorial prompt condition ( $M = 71.09$ ,  $SD = 37.21$ ). The same analysis on the percentage of spelling errors yielded a main effect of Kind of Prompt,  $F(1, 74) = 4.03$ ,  $MSE = 9.21$ ,  $\eta_p^2 = .05$ ,  $p < .05$ , with a higher number of spelling errors in the pictorial prompt text ( $M = 4.07$ ,  $SD = 4.24$ ) than in the verbal prompt text ( $M = 3.08$ ,  $SD = 3.39$ ). The main effect of the Group,  $F(1, 74) = 3.61$ ,  $MSE = 3.61$ ,  $\eta_p^2 = .05$ ,  $p = .061$ , and the interaction,  $F(1, 74) = 3.22$ ,  $MSE = 9.21$ ,  $\eta_p^2 = .04$ ,  $p = .077$ , were both marginally significant, indicating a higher number of spelling errors committed by poor comprehenders, particularly in the pictorial prompt condition ( $M = 5.19$ ,  $SD = 4.86$ ), than by good comprehenders ( $M = 3.32$ ,  $SD = 3.35$ ) ( $p < .01$ ).

### Qualitative Measures

**General impression.** The ANOVA showed only a main effect of the Group,  $F(1, 74) = 11.35$ ,  $MSE = 1.39$ ,  $\eta_p^2 = .13$ ,  $p < .01$ , with poor comprehenders' texts evaluated as less rich and coherent than those written by good comprehenders ( $d = .77$ ).

**Adequacy.** No differences were found between groups and the kind of prompt.

**Global structure.** The ANOVA showed only a main effect of the Group,  $F(1, 74) = 8.49$ ,  $MSE = 1.27$ ,  $\eta_p^2 = .10$ ,  $p < .01$ . The texts written by poor comprehenders respected to a lesser extent the typical structure of narrative text ( $d = .66$ ).

**Lexicon.** Only the main effect of the Group was significant,  $F(1, 74) = 12.28$ ,  $MSE = .58$ ,  $\eta_p^2 = .14$ ,  $p < .001$ , with a better use of vocabulary by good comprehenders than by poor comprehenders ( $d = .63$ ).

**Syntactic structure.** The ANOVA showed a main effect of the Group,  $F(1, 74) = 13.15$ ,  $MSE = .90$ ,  $\eta_p^2 = .15$ ,  $p < .01$ . The lower evaluation depended in part on the fact that the texts produced by poor comprehenders appeared as a sequence

**Table 2.** Descriptive Statistics of the Qualitative Evaluations and Effect Size for the Narrative Text (Pictorial and Verbal Prompt) and Descriptive Text

Writing Tasks	Good comprehenders		Poor comprehenders		<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Narrative text (pictorial prompt)					
Global impression	3.43	1.07	2.66	0.86	0.79
Adequacy	3.71	0.82	3.50	0.96	0.23
Global structure	3.54	1.01	3.03	0.71	0.58
Lexicon	3.34	0.67	2.80	0.43	0.95
Syntactic structure	3.24	0.85	2.36	0.73	1.10
Narrative text (verbal prompt)					
Global impression	3.22	0.95	2.71	0.93	0.54
Adequacy	3.70	0.86	3.37	1.03	0.34
Global structure	3.45	0.98	2.89	1.06	0.54
Lexicon	3.22	0.73	2.89	0.68	0.46
Syntactic structure	2.88	0.87	2.64	0.83	0.28
Descriptive text (pictorial prompt)					
Global impression	2.68	1.00	2.49	0.77	0.21
Adequacy	2.75	1.13	2.92	0.96	-0.16
Global structure	2.42	1.15	2.37	0.83	0.05
Lexicon	3.14	0.81	2.80	0.51	0.50
Syntactic structure	2.72	0.87	2.57	0.68	0.19

of sentences without a causal or explicit temporal connection. In addition, some grammatical errors were present, particularly the incorrect use of verb tenses and some mistakes in the agreement between gender and number of nouns, verbs, and adjectives ( $d = .83$ ). The interaction Group  $\times$  Kind of Prompt was significant,  $F(1, 74) = 8.68$ ,  $MSE = .46$ ,  $\eta_p^2 = .11$ ,  $p < .01$ ; post hoc comparisons highlighted a difference between the two groups, favoring condition good comprehenders, only in the verbal prompt ( $p < .001$ ).

**Effect of text genre: Narrative versus descriptive text (pictorial prompt).** All of the analyses were run using a repeated measures ANOVA with the Group (good vs. poor comprehenders) as the between factor and Kind of Prompt (pictorial vs. verbal) as the within factor; significant interactions were decomposed using the Tukey method, which was corrected with Bonferroni's adjustment for multiple comparisons. Descriptive statistics are reported in Table 2.

### Quantitative Measures

The analysis of the length of text, expressed in number of words, did not reveal any effects. The same analysis on the percentage of spelling errors yielded a main effect of Text Genre,  $F(1, 74) = 7.46$ ,  $MSE = 9.06$ ,  $\eta_p^2 = .09$ ,  $p < .01$ , with a larger number of spelling errors in the narrative text ( $M = 4.07$ ,  $SD = 4.24$ ) than in the descriptive one ( $M = 2.74$ ,  $SD = 3.64$ ). The main effect of the Group,  $F(1, 74) = 3.47$ ,  $MSE = 9.06$ ,  $\eta_p^2 = .05$ ,  $p = .066$ , and the interaction,  $F(1, 74) = 3.47$ ,

$MSE = 9.06$ ,  $\eta_p^2 = .05$ ,  $p = .066$ , were both marginally significant, indicating a larger number of spelling errors committed by poor comprehenders, particularly in the narrative text condition ( $M = 5.19$ ,  $SD = 4.86$ ), than by good comprehenders ( $M = 2.95$ ,  $SD = 3.20$ ).

### Qualitative Measures

**General impression.** The ANOVA showed a main effect of Text Genre,  $F(1, 74) = 21.11$ ,  $MSE = .38$ ,  $\eta_p^2 = .22$ ,  $p < .001$ . In the narrative text condition ( $M = 3.04$ ,  $SD = 1.04$ ), the texts were on average richer and more coherent than in the descriptive condition ( $M = 2.59$ ,  $SD = .88$ ). The main effect of the Group was also significant,  $F(1, 74) = 6.68$ ,  $MSE = 1.35$ ,  $\eta_p^2 = .08$ ,  $p < .05$ , with poor comprehenders' texts evaluated as less rich and coherent than those written by good comprehenders ( $d = .59$ ). These differences were qualified by a significant interaction Group  $\times$  Text Genre,  $F(1, 74) = 8.34$ ,  $MSE = .38$ ,  $\eta_p^2 = .10$ ,  $p < .01$ ; post hoc comparisons highlighted a difference between the two groups, favoring good comprehenders, only in the narrative text ( $p < .01$ ).

**Adequacy.** The analysis revealed only a main effect of Text Genre,  $F(1, 74) = 34.54$ ,  $MSE = .65$ ,  $\eta_p^2 = .32$ ,  $p < .001$ . In the narrative text condition ( $M = 3.60$ ,  $SD = .89$ ), participants were able to follow the instruction better than in the descriptive condition ( $M = 2.83$ ,  $SD = 1.88$ ).

**Global structure.** Also in the case of text structure, the analysis showed only a main effect of Text Genre,

$F(1, 74) = 56.68, MSE = .53, \eta_p^2 = .43, p < .001$ . In the narrative text condition ( $M = 3.04, SD = 1.04$ ), the texts were better structured than in the descriptive condition ( $M = 2.59, SD = .88$ ). The main effect of the Group was not significant. The interaction Group  $\times$  Text Genre was marginally significant,  $F(1, 74) = 3.81, MSE = .53, \eta_p^2 = .05, p = .055$ ; post hoc comparisons highlighted a difference between the two groups, favoring good comprehenders, only in the narrative text ( $p < .01$ ) (see Table 2).

**Lexicon.** Only the main effect of the Group was significant,  $F(1, 74) = 15.32, MSE = .48, \eta_p^2 = .17, p < .001$ , with a better use of vocabulary by good comprehenders than by poor comprehenders ( $d = .89$ ).

**Syntactic structure.** The ANOVA showed a main effect of the Group,  $F(1, 74) = 13.51, MSE = .76, \eta_p^2 = .15, p < .001$ , with worse performance exhibited by poor comprehenders ( $d = .77$ ). This difference was qualified by the interaction Group  $\times$  Text Genre,  $F(1, 74) = 10.36, MSE = .48, \eta_p^2 = .12, p < .01$ , which highlighted that the differences emerged only in the narrative condition; in fact, post hoc comparisons showed a difference between the two groups, favoring good comprehenders, only in the narrative text ( $p < .001$ ).

Table 2 also gives the effect sizes, describing the mean standardized difference in the expressive writing tasks between poor and good comprehenders.

## Discussion and Conclusion

The goal of the present study was to explore written language production in a group of children identified as having poor reading comprehension, relative to a group of control children matched for age, decoding skill, and verbal abilities. The few studies that analyzed this relationship have found a specific difficulty in narrative production in the poor comprehenders group compared to children with adequate reading comprehension. However, previous studies did not indicate whether the difficulty in expressive writing encountered by poor comprehenders was general or specific to narrative tasks or whether their poorer performance depended on the type and complexity of the prompt, which usually requires the understanding of a series of picture.

To tackle these issues, the current study compared the performance of poor and good comprehenders in three expressive writing task in which the modality of the prompt (pictorial vs. verbal) and genre of the text to be produced (narrative vs. descriptive) were varied.

The performance on the writing expressive tasks was analyzed both quantitatively (length, spelling errors) and qualitatively (richness of ideas and vocabulary, story structure, and syntactic structure).

The analyses of quantitative measures demonstrated that poor comprehenders produced stories of a similar length to that of the stories of control children. However, some differences emerged in the percentage of spelling errors in narrative conditions, particularly when the pictorial

prompt condition was considered, with poor comprehenders making a larger number of spelling errors. This result was unexpected, as the two groups were paired on a measure related to reading decoding. However, comparing the percentage of errors of poor comprehenders with norms provided by the manual (Re et al., 2009), their performance fell within the normal range according to age and grade. It should be also noted that in this study, decoding was assessed through a single word recognition task; conversely, spelling errors were assessed in a more complex task: text production. In this situation, spelling errors may come from the difficulty in retrieving and producing orthographic forms while producing other words and sentences (Arfé, De Bernardi, Pasini, & Poeta, 2011; Berninger, 1999). This second condition is cognitively more demanding than the first, and children who succeed in single-word recognition may make errors when they have to retrieve and use orthographic forms in a more complex task.

With reference to qualitative indexes, results showed that the texts produced by poor comprehenders were less effective than those of good comprehenders when narrative writing was considered. This did not depend on difficulty in understanding the task request. In fact, both groups were able to understand the instructions and meet task requests. Differences in narrative writing emerged at various levels. Poor comprehenders' narratives were less coherent and informative than those of good comprehenders, as the analysis on global impression suggested. In addition, the texts of poor comprehenders obtained a low evaluation score in terms of structure. According to our criteria, story structure refers to the ability to organize the text with respect to temporal and causal relations in the narrative. Therefore, low story structure scores reflect narratives that simply describe the content of each picture (in the pictorial prompt condition) or list the events (in the verbal prompt condition), rather than reporting causal connections between the events depicted across the pictures or the events that occurred during the most beautiful day spent at school. Interestingly, this happened both when children had to organize a narrative based on a given set of pictures (i.e., had to first understand a picture sequence) and when they had to write about a familiar event, as in the verbal prompt condition of this study. These results suggest that narrative writing per se represents a specific challenge for poor comprehenders. Indeed, narratives may be more cognitively demanding than descriptions in that they require writers to linguistically relate events in the text according to both local and global relations (Arfé & Boscolo, 2006). This could overload the child's working memory, especially when his or her working memory capacity is low, thereby diminishing the overall linguistic quality of the text. Indeed, in our study, poor comprehenders also made more spelling errors than good comprehenders in the narrative condition and produced stories at a poorer syntactic level than good comprehenders. Interestingly, this did not happen in the descriptive condition.

Poor comprehenders demonstrated difficulty in organizing and communicating a narrative, regardless of the prompt provided. These results are consistent with those reported by Cain (2003) in an oral production task. In fact, the author reported that when the verbal prompt was informative, guiding the specific topic of the narrative to be produced, poor comprehenders performed as they did in the pictorial prompt condition. However, unlike in Cain's results, in the current study, the performance of poor comprehenders remained lower than that of good comprehenders even when a direct structure was given through a pictorial or verbal prompt. The request of producing a narrative in written form, being more demanding in terms of cognitive and metacognitive resources than oral production, is probably more sensitive to poor comprehenders' difficulties. Our results therefore confirmed the results obtained by Cragg and Nation (2006), although we used a pictorial prompt less complex in terms of quantity of information to be processed.

Although the two groups were matched on a measure of vocabulary knowledge, the use of words while writing appeared less various and appropriate than those used by the good comprehenders. Retrieving the appropriate word in the context of a sentence or a text is determined by not only the child's vocabulary knowledge but also other cognitive factors, including the ability to encode and process alternative formulations of an idea in his or her memory buffer (Arfé et al., 2011). This would explain why poor comprehenders scored lower than good comprehenders did in this measure.

A different pattern of results emerged when descriptive and narrative productions were compared. The two groups performed at a similar level in the descriptive condition, and both performed better in narrative than in descriptive writing. However, the lack of differences depends primarily on the fact that the quality of good comprehenders' text diminished in the descriptive condition. This is likely because 9- and 10-year-olds are less familiar with the structure of descriptive texts, as much more work is done on narratives in the Italian school curriculum. Contrary to narrative texts, which have a standard/prototypic structure, descriptions have a more variable structure, and teachers tend to give less explicit instructions on how to structure descriptive texts. Moreover, as readers, elementary school children are generally more familiar with narratives than with descriptions because literature addressed to children of this age consists mostly of stories.

As the literature would suggest, good comprehenders outperformed poor comprehenders in the working memory updating task (see, e.g., the meta-analysis by Carretti et al., 2009), remembering a larger number of correct words and with the intrusion of fewer irrelevant items. However, these differences did not affect the pattern of differences between the two groups writing tasks. In fact, when working memory measures were inserted as covariate, poor comprehenders' performance remained lower.

In conclusion, the findings of the present study demonstrate that poor comprehenders are particularly disadvantaged when they are required to write a narrative text. In contrast, no differences between the two groups emerged in the descriptive writing task. These results highlight the fact that the difficulty encountered by poor comprehenders in expressive writing tasks are not general but specific to narrative text, suggesting that their difficulty is related to temporally and causally organizing the relation between events, which is a critical feature of narratives and that their lower performance is not biased by the type of prompt used to elicit production. However, some limitations should be highlighted, especially concerning the characteristics of the participants. As our results demonstrated a difference in spelling errors between poor and good comprehenders, future research should consider other variables related to writing skills, such as spelling and handwriting. It has been demonstrated that these two skills influence expressive writing (e.g., Edwards, 2003). Therefore, it would be useful to add a fine graded evaluation of writing skills of less skilled comprehenders before affirming that their difficulty is specifically related to their level of reading comprehension and not to other possible sources of difficulty. It is worth mentioning that the higher number of spelling errors made by poor comprehenders can be considered within the normal level expected of their age and education, but future researchers should take this issue into account.

Despite this limitation, from the theoretical point of view, our results indicate that there may be a common basis for the underlying causes of poor comprehension and poor written narrative production skills, probably related to the ability to look for coherence and cohesion in a text, whether it is already written or to be written. In fact, our findings, in agreement with previous studies, showed that poor comprehenders' narrative production is less structured, in terms of coherence, than that of good comprehenders. However, further analysis is needed to clarify the poorer performance in the narrative writing task. From a practical point of view, a simple way to improve poor comprehenders' written production would be to facilitate the promotion of metacognitive reflection on the phases of text production. Based on the difficulties that emerged in the current study, these activities should pay particular attention to the importance of the organization of ideas from a provided prompt (title, series of pictures) and of planning written production based on an organized structure with respect to the causal and temporal relationships between the events.

For example, in a previous study on children with ADHD, Re et al. (2008), the authors found that giving a facilitation (a guide-scheme) in the planning phase of the written process to children with ADHD improved their performance in terms of production, generation of ideas, organization, and spelling errors.

## Appendix

### Interrater Reliability for the Three Expressive Writing Tasks

Qualitative parameters	Narrative		Descriptive
	Pictorial prompt	Verbal prompt	Pictorial prompt
Global impression	.82**	.68**	.72**
Adequacy	.69**	.79**	.68**
Global structure	.76**	.76**	.70**
Lexicon	.61**	.60**	.63**
Syntactic structure	.71**	.73**	.75**

\*\* $p < .01$ .

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### Note

1. The results remained substantially the same using both correct recall and intrusion errors as covariates in the analyses.

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