COMPONENTS AFFECTING EXPRESSIVE WRITING IN TYPICAL AND DISABLED WRITERS

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ABSTRACT

This paper examines the role of some basic variables that may be critical in children with difficulties in expressive writing. Preliminary data demonstrating the role of a series of variables are presented. In particular, based on these data, a model was derived using structural equations showing how orthography, neuropsychological functions (idea generation and planning), and revision affect the performance of tasks requiring children to describe the content of pictures. These variables appeared to significantly discriminate between children with good and poor expressive writing skills.

Writing is a frequent cause of concern in schools worldwide. Teachers frequently report that over half their students do not meet classroom writing requirements, at all grade levels, including higher education (Rogers & Graham, 2008). However, not enough attention has been devoted to the characteristics of children who present severe difficulties in producing

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adequate texts, or to intervention techniques. This is still true even in our technological society, where writing can be the gateway to success at school and work alike, since people are expected to produce written documents of many different types. Moreover, writing can give support to emotions and reasoning.

This paper examines how expressive writing (EW) – used here as roughly synonymous with production of written texts or composition – can be studied, and the role of some basic variables that may be critical for children with writing difficulties. An overview of the literature is given, along with preliminary data demonstrating the role of these variables collected as part of the Padua Expressive Writing Disabilities Project.

MODELS OF EXPRESSIVE WRITING

The 'modal' model in the field was proposed by Hayes and Flower (1980), who described EW as a problem-solving task involving a series of operations, in particular retrieval of knowledge from memory, planning, translation of ideas into written form, self-monitoring, and revision. Berninger and Swanson (1994) developed the model, observing that distinction should be made between text generation and text transcription, the latter being the main source of problems for 'young' writers. They also stressed that general linguistic factors, such as discourse, syntax, morphology, lexicon, and phonology are critical for writers to succeed. Berninger (1999) stressed how working memory may affect a child's writing. Specifically, if a child has not mastered the rapid process of transcription, working memory capacity is devoted to the acts of handwriting and spelling rather than higher-level composition skills.

Subsequently, Berninger, Abbott, Abbott, Graham, and Richards (2002) considered the relationship between reading and writing based on a series of different approaches and models. In particular, one of their approaches considered the case of a learning disability in reading and writing; 23 psychometric measures were collected from a group of children with learning disabilities (LD) and their relatives. The authors found that, for the children, only the orthographic and phonological factors had direct paths to reading accuracy, spelling and composition factors. In the case of affected adults, only the orthographic factor (and IQ) had a direct path.

Focusing on the basic deficits in children with severe LD and young children with LD, however, may overlook the importance of cognitive–neuropsychological processes underlying EW. A model describing how different factors

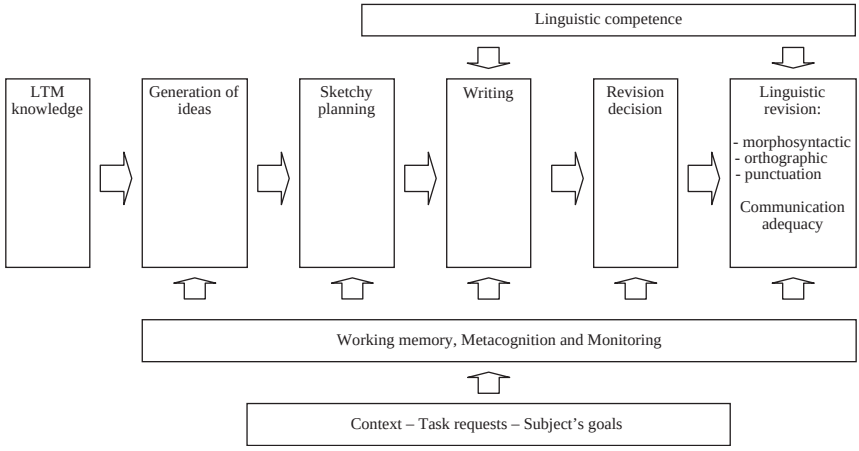

Fig. 1. A Model Describing the Main Variables Affecting Success in Expressive Writing.

may contribute to successful writing is presented in Fig. 1. EW is considered the result of a series of general factors (e.g., knowledge, language, working memory, and metacognition) that affect the specific processes involved in writing, within the contextual constraints. The specific processes involved in writing are: (a) basic cognitive–neuropsychological processes (idea generation, sketchy planning); (b) transposition (largely affected by linguistic competence and spelling); and (c) revision.

Idea generation seems to be dependent on the degree of pertinent elements stored in long-term memory (knowledge) and on the ease with which this information is accessed (semantic fluency). Van den Bergh and Rijlaarsdam (2007) suggested that idea generation may be present throughout the whole writing process, though with different characteristics and implications. However, a main phase of idea generation is represented by the initial retrieval from long-term memory and its combination with contextual cues in order for the writer to make a sketchy plan of the text and start writing. This phase is particularly amenable to treatment as it can be treated in a specific way. That is, teaching the child that knowledge should be used in the most effective way, where all possible elements that might be included in a text are considered.

As with idea generation, text planning and organization are also processes developed throughout the whole writing process. However, when starting to write, children must have made a sketch plan of what and how they want to write and must create the basis for organization of the text.

Transposition is the process most strongly affected by the child's linguistic competence, and includes lexical, syntactic, and paragraph-producing expertise.

Revision is a complex process that involves checking the linguistic properties of the text (''Editing'' or ''Linguistic revision'') and checking the general adequacy of the text produced (''Is it really meeting the required goals?''). Linguistic revision is also affected by the child's linguistic competence, including grammar knowledge. In fact, Hayes, Flower, Schriver, Stratman, and Carey (1987) observed that only good writers focus their attention, while revising, on both local problems (at sentence level or below) and global problems. To pay attention at this level, the writer has to use comprehension processes that rely strongly on working memory while reading for revising (see also Hayes & Chenoweth, 2007). Wallace and Hayes (1991) demonstrated that a very short instructional session was sufficient to change the attitudes of a group of freshmen, improving global revision and quality of text.

LEARNING DISABILITIES IN WRITING

As in the similar case of persistent difficulties in mathematics, a distinction should be made between more general difficulties (partly modifiable, and also due to motivational and instructional factors) and severe disabilities (which, in the case of EW, may be associated with other forms of reading and writing disorders).

Berninger and Hart (1992) distinguished between different types of writing difficulties, concluding that, in a group of 300 primary grade children, around 2% had problems in written narrative. Obviously, the estimate of the percentage of children with EW problems can vary according to age and school demands, ranging from this relatively low value to high values (6–22%) for middle school students, as suggested by Hooper, Montgomery, and Brown (1993).

Students with EW disability can be considered as a group, and their general characteristics can be studied. For example, Gregg, Coleman, Stennett, and Davis (2002) examined the discourse complexity (in an expository text produced in a 30-min period) of college students with a diagnosis of LD and/or ADHD. These groups had similar performance on both general (e.g., holistic rating and length, two highly correlated variables) and specific (based on a classification system developed by Biber, 1995) for examining output related with different types of text writing ability

measures. Additionally, both groups performed lower than a control group on these measures. Text length was approximately 290 words for the students with disabilities and about 340 (SD = 89.08) for the controls. Gregg et al. (2002) found that all writers emphasized some basic functions, such as verb tense, reference through use of relative pronouns, reduction of the text by using pronouns and "do" instead of a richer verb, and frame elaboration through use of attributive adjectives and adverbs. Examination of the specific features of the output of the different groups showed that, in general, the clinical groups were poorer than the controls. Interesting findings from Biber's study concern the greater use of first-person pronouns and hedges, and the less frequent use of time adverbials in the LD group than in the pure ADHD group and controls.

A diagnosis of EW disability is related to the assessment procedures and identification of both the main aspects of EW and the aspects that can be dissociated when considering learning disabled individuals. If the different aspects of writing are considered, rather than using an overall holistic assessment, then different subtypes can be observed. For example, Roid (1994) assessed six traits (ideas, organization, word choice, sentence fluency, etc.) and found 11 cluster solutions. Focusing on children with difficulties, Sandler et al. (1992) found a large group of children with fine motor and linguistic deficits, another group with spatial deficits, and two small groups, one with attention/memory deficits, and the other with sequencing deficits.

A major study regarding differentiation between the various subtypes of EW difficulties was carried out by Wakely, Hooper, de Kruif, and Swartz (2006). Taking a sample of 276 fourth- and fifth-graders, these authors asked them to write two stories prompted by an initial sentence. They collected one holistic score and one series of analytical and metacognitive scores. These showed six clusters, based on five main scores (of understandability, grammar, semantics, spelling, and reading): children who were (a) average, (b) skilled, or (c) poor in grammar, (d) poor in semantics, (e) poor in text quality, and (f) poor in spelling–reading. Children poor in grammar (7% of the sample) were mainly characterized by morphosyntactic errors. Children with poor text quality (23% of the sample) did not make a particularly high number of errors, but received a low holistic rating, due to the paucity of offered information and lack of communicative power. It is possible that these children, by paying attention to the syntactic and orthographic aspects of their output, did not save working memory space for activating and organizing relevant content. Children in the Low Semantics subtype (12% of the sample) made a considerable number of understandability errors, owing to missing words, words in the wrong order

or misused, ambiguous references. Finally, the Low Spelling–Reading subtype (5% of children) was characterized by poor reading comprehension and a high percentage of spelling errors (with an average around 20%).

TREATMENT

Determining which variables are of particular relevance to EW requires care, especially when considering provision of treatment to children with disabilities. Educational approaches in writing instruction can clearly strike a variety of different chords (as illustrated in the book edited by Graham, MacArthur, & Fitzgerald, 2007), including motivation, thinking, communication, awareness of goals, contexts, genre familiarity, and so on. Cutler and Graham (2008) surveyed the classroom instructional practices in writing of 178 primary school teachers in the United States. Most teachers reported eclectic use of process writing (emphasizing the communicative role of writing) and skills instruction (based on systematic teaching of handwriting, spelling, sentence construction, grammar, punctuation, capitalization, and so on). However, the teachers also reported specific instructional practices. The authors concluded with some general recommendations, including a higher integration between school and home, increasing motivation for writing, and the use of computers.

If we consider specific treatment that goes beyond typical classroom work, studies in the literature put forward various approaches and criteria for measuring the outcomes, typically focusing on improvement in the holistic impression offered by the written text. However, some research has focused on specific dependent variables, which are targets of the intervention and considered particularly relevant. For example, McCurdy, Skinner, Watson, and Shriver (2008) used a specific Comprehensive Writing Program (CWP), including a series of behavioral techniques, which focused on three target skills regarding production of: (1) complete sentences, (2) compound sentences, and (3) sentences containing adjectives.

An implication of the influential model of Hayes and Flower (1980) is that some writing programs have addressed the underlying neuropsychological processes (e.g., planning). This approach has been criticized (e.g., Berninger, 1994) because it brings the risk of underestimating the importance of language functions necessary for writing. However, a large body of evidence (Graham & Perin, 2007) has confirmed its efficacy. Furthermore, the approach has the advantage of identifying some basic mechanisms that could be targeted by specific, relatively short programs designed to enhance

children's EW abilities, used in association with the classical linguistic experience children gather over time. In this respect, one approach of particular relevance is the Self-Regulated Strategy Development (SRSD) model, proposed by Graham and Harris (1997) and focused on metacognitive abilities. Page-Voth and Graham (1999) showed that a strategy facilitating goal attainment (for enhancing the production of arguments and counterarguments supporting a premise) increased the quality of the texts produced by seventh- and eighth-graders with writing problems. Hooper, Wakely, de Kruif, and Swartz (2006) treated 73 fourth- and fifth-graders in a 20-lesson program aimed at neuropsychological and metacognitive components, and found positive effects and some initial evidence of specific effects related to subtypes of EW disability. Re, Caeran, and Cornoldi (2008) showed that a procedural facilitation, supporting organization of planning, increases the quality of texts produced by ADHD children.

According to Rogers and Graham (2008), very few studies have examined group effects of writing programs. The authors found positive effects from 12 different procedures, the most effective being as follows (ranked according to impact): teaching strategies for planning, revising, and editing; teaching written summarization; using peer tutoring for specific components; establishing specific goals; teaching the requisite writing skills (handwriting, spelling, and typing); using word processors; teaching students to write complex sentences; and establishing a process approach to writing (see also Graham & Perin, 2007). In their meta-analysis of single-subject treatments, Rogers and Graham (2008) examined which intervention methods produced a PND (percentage of non-overlapping data) with mean and median values above the recommended level of 50% (Scruggs, Mastropieri, Cook, & Escobar, 1986). Data confirmed the efficacy of teaching strategies for planning and drafting both narrative and expository texts, followed by grammar teaching, setting specific goals, and teaching strategies for editing. Based on this evidence and a model of EW, Re, Cazzaniga, Pedron, and Cornoldi (2009) developed a program designed to enhance EW abilities of children with difficulties. The program, entitled "*Io scrivo*" ("I write") targets four of the main EW components – idea generation, planning, revision, and working memory.

THE PRESENT STUDY

The main goal of the present study was to examine the role of some of the critical variables in producing a successful written text (see Fig. 1).

In particular, we concentrated on variables that might be easiest to treat in a program for children with disabilities (Re et al., 2009). In the first phase we examined how these variables might affect the performance of a random sample of children. In the second phase we focused on a subset group of children who had low performance on the writing tasks. The data were collected using a series of new tasks or adaptations that are currently undergoing psychometric analysis within the Padova Expressive Writing Project.

The Tasks

Expressive Writing Measures

The measures were derived from the Tressoldi and Cornoldi (1990) Writing Battery, which requires the subject to produce one descriptive text and one narrative text based on given illustrations (see also Re, Pedron, & Cornoldi, 2007). Two scores were obtained:

(1) Holistic ratings. Two raters gave holistic ratings of both texts. The high correlations (always above 0.85) found between the two raters showed that the ratings were reliable; and
(2) Productivity. The text length in number of words (segmented elements) was computed. The index has proven to be strongly related, in primary grades, to the other indices of text quality.

Spelling

The percentage of words incorrectly written were computed for both of the passages produced.

Cognitive–Neuropsychological Processes

Two tasks were administered to measure cognitive–neuropsychological processes (see the appendix for a descriptions of the tasks). First, for the idea generation task, the child was asked to make a list of all the elements s/he could include in a description of his/her home. Second, for the sketch planning task (Butterflies), the child was given a scrambled series of elements that could be included in a text describing butterflies' wings (butterflies = "farfalle" in Italian) and asked to put them in order to give a reasonable structure for a text on the topic. The number of correctly reordered elements was determined.

Linguistic Revision
Three different texts were given to the child, containing morphosyntactic (e.g., inappropriate plural), spelling, and punctuation errors, respectively. For each passage the child was asked to underline the errors. We determined the omissions made in detecting errors for the morphosyntactic task (i.e., number of non-omissions in morphosyntactic task) and the orthographic task (i.e., number of non-omissions in orthographic task). For the punctuation text, we determined the punctuations that had been correctly eliminated (i.e., number of punctuations correctly eliminated) and those correctly added (i.e., number of punctuations correctly added).

Phase 1: Relationship between the Variables Affecting EW in a Group of 150 Third- to Fifth-Graders

The first phase tested the model described in Fig. 1, assessing the role of some of the variables assumed to be critical in EW. In order to include the role of spelling competence, which can affect how fluent the child is and is not overloaded during transposition (see Berninger, 1994), spelling measures were also considered. With respect to the model described in Fig. 1, we distinguished between text productivity, often considered a measure of text quality, and a more comprehensive estimation of the quality of the text. Therefore, performance in EW was considered on the basis of the holistic ratings given by expert judges to the texts written by children. It was assumed that these overall ratings were affected by productivity and that the latter one is influenced by the basic cognitive processes of idea generation and organization in planning.

Subjects
Participants were 161 children attending a primary school in the suburbs of a medium-sized town in north-east Italy. They were mainly Italian in origin, and from medium sociocultural-level families. Participants fell in roughly equal numbers of third-, fourth-, and fifth-graders (nine classes were involved, three per grade), and of males and females.

Procedure
Children were administered all tasks in their own classroom in a single session lasting 70–90 min during school hours.

Results

The pattern of relationships between variables was investigated using structural equations based on the model described in Fig. 1 and computed via LISREL. The derived model is based on the covariance matrix between the observed variables.

Two preliminary steps were: (a) change of the sign of variables describing errors, in the direction of positive performance, in order to have only positive links in the model; and (b) standardization of all the measured variables introduced in the model, in order to have a unique unit of measure.

Productivity for the descriptive and narrative texts produced the endogenous observed variables (*Number of written words in descriptive text* and *Number of written words in narrative text*) measuring the first endogenous latent "*Productivity*." *Descriptive text global impression* and *Narrative text global impression* were the endogenous observed variables measuring the first endogenous latent variable "*Holistic ratings*."

The other exogenous observed variables measured the three latent exogenous variables. In particular, percentages of correctly written words for the two texts (*Percentage of correct words in narrative text* and *Percentage of correct words in descriptive text*) measured spelling competence; idea generation (*Number of ideas*, and *Number of categories in idea production*) and sketchy planning (*Butterflies*) measured the basic cognitive–neuropsychological processes; the other variables measured the child's linguistic revision ability. The basic cognitive–neuropsychological processes measured the latent endogenous variable describing Productivity, where Spelling and Linguistic Revision Ability measured the latent endogenous variable describing Holistic ratings.

The fitness indices were good, as the RMSEA (0.016) was much lower than the usual critical value of 0.08 and the relationship between χ^2 and degrees of freedom was less than 1 (i.e., lower than the typical critical value of 2.5). The Normed Fit Index (NFI) and the Non-Normed Fit Index (NNFI) were also good (NFI = 0.93 and NNFI = 0.96) (see Fig. 2).

The goodness of the model was also supported by the residuals, which were uniformly low. Thus the model confirmed our assumption that three different main latent variables – basic cognitive abilities (via productivity), spelling competence, and linguistic revision – affect EW performance.

Phase 2: Study of a Group of Children with Difficulties in EW

The second step was to examine how far the variables thus defined actually discriminated between a specific subgroup of children who, according to

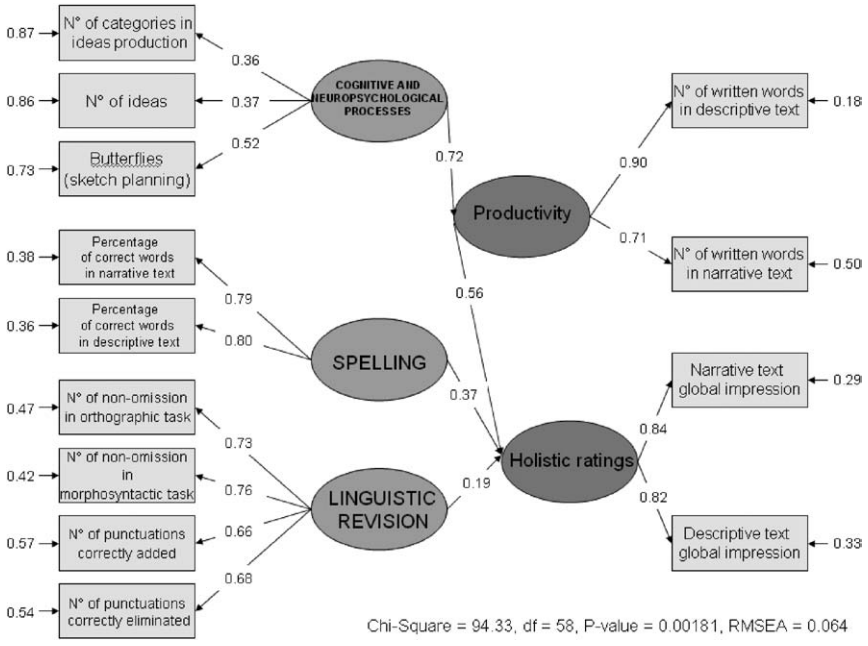

Fig. 2. Relationships between Variables Affecting Expressive Writing as Emerging from the Structural Equations Derived from the Performances of a Group of Third- to Fifth-Graders (See Text for Description of the Variables). *Note:* N°, number.

expert ratings, had severe difficulties in writing and a subgroup of children with good writing skills. For this reason we used holistic ratings (on a 5-point scale) for both passages from the two experts.

The two groups were compared on all the above-mentioned variables as well as in writing speed. According to Berninger (1994), writing speed can affect the difficulties encountered by poor writers.

Subjects

The experts' ratings, which were highly correlated based on interrater reliability, and the similarity of the mean scores for the two texts (Pearson's $r = 0.87$) were used to identify a subgroup of children considered to be "poor writers" (summed rating for the two texts ≤ 4). The 32 children belonging to this category were approximately 20% of the sample, with unequal split between males ($n = 25$) and females ($n = 7$). This disproportionality provides further support to the presence of a gender effect in learning outcomes associated with language. These children were compared

to the group of children with good writing skills. A cut-off summarized rating score of ≥ 7 was used to define good writers in order to have comparable numbers of children in each group. Further supporting the presence of a gender effect, in this case the proportion of males and females was exactly the opposite. The group of good writers was comprised of 7 males and 25 females.

Tasks

The tasks were as described above. In addition, the children carried out a speed-writing task, which required them to write the highest possible number of numbers words (one, two, etc.) in 1 min.

Results

Fig. 3 (see also Table 1) presents the mean scores obtained by the two groups. Student's *t*-test comparisons showed all differences to be highly significant.

CONCLUSIONS

Despite the impact of EW difficulties on academics and success in life, as well as their potential influence on psychological development, writing has not received the same attention as decoding and spelling. The present study revisits models of writing based on identification of a series of distinct components. On the basis of a revised model of EW, we have identified a series of critical components and devised procedures for their assessment (see Figs. 1 and 2).

Administration of these procedures to a group of primary school children showed that the predicted variables did indeed affect success on two writing tasks, as measured by the children's productivity. In particular, a structural equation analysis found that an empirical model derived from our general model had a good fit. The model showed how basic cognitive functions of idea generation and planning affect productivity. Moreover, the latter, together with revision and spelling, affect the overall quality of the text. Furthermore, analysis of a group of children rated by experts as poor text-producers confirmed that all the procedures identified had successfully distinguished between children with good and poor written output.

The fact that many different trainable variables appear to affect failure in EW implies that children with EW difficulties might benefit from an intervention focused on one or more of these variables. Given the role of the cognitive–neuropsychological variables we have identified, targeted

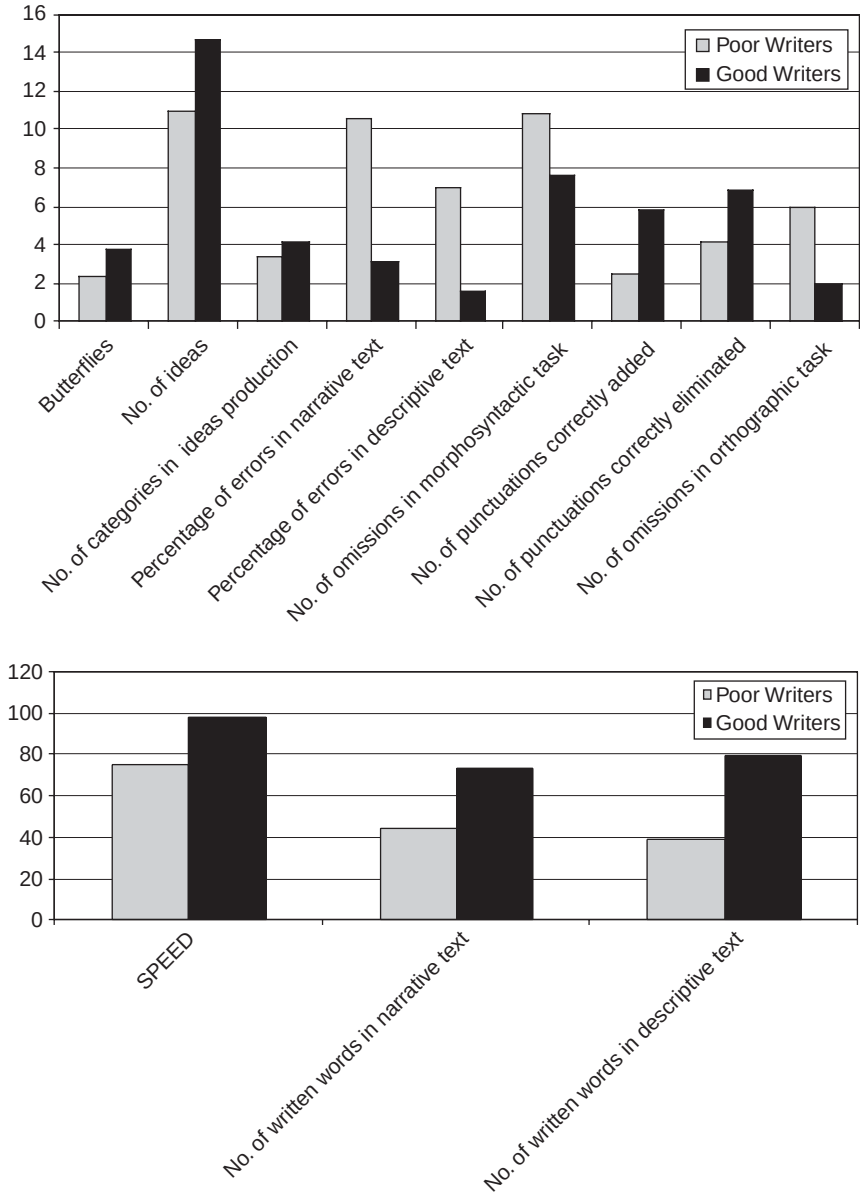

Fig. 3. Differences in Performance between a Group of Good (Black) and Poor (Gray) Writers (Speed = Numbers Words Written in 1 min). The Scores for Speed and Productivity are Reported Below as the Scale of the Measures was Different. *Note:* No, number.

Table 1. Mean Scores Obtained by the Two Groups in the EW Battery.

Tasks	Groups	*N*	Mean	SD	*t*-Value	df	*p*
Butterflies	Poor Writers	30	2.43	1.71	−3.515	60	<0.001
	Good Writers	32	3.84	1.43			
Speed	Poor Writers	32	75.72	18.98	−5.158	62	<0.001
	Good Writers	32	98.56	16.34			
No. of ideas	Poor Writers	32	11.03	5.05	−2.801	62	0.007
	Good Writers	32	14.72	5.46			
No. of categories in ideas production	Poor Writers	32	3.47	1.24	−2.512	62	0.015
	Good Writers	32	4.25	1.24			
No. of written words in narrative text	Poor Writers	32	44.31	18.97	−5.214	62	<0.001
	Good Writers	32	73.97	25.98			
Percentage of errors in narrative text	Poor Writers	32	10.65	6.83	5.687	62	<0.001
	Good Writers	32	3.14	3.00			
No. of written words in descriptive text	Poor Writers	32	39.50	20.25	−6.786	62	<0.001
	Good Writers	32	79.84	26.84			
Percentage of errors in descriptive text	Poor Writers	32	7.00	5.40	5.313	62	<0.001
	Good Writers	32	1.67	1.71			
No. of omissions in morphosyntactic task	Poor Writers	32	10.94	2.79	5.326	62	<0.001
	Good Writers	32	7.72	1.97			
No. of punctuations correctly added	Poor Writers	32	2.50	2.07	−7.157	62	<0.001
	Good Writers	32	5.91	1.71			
No. of punctuations correctly eliminated	Poor Writers	32	4.16	2.93	−4.881	62	<0.001
	Good Writers	32	6.94	1.34			
No. of omissions in orthographic task	Poor Writers	32	5.96	2.38	7.768	62	<0.001
	Good Writers	32	2.00	1.62			

interventions can be devised that can greatly improve the EW of children with EW difficulties (Re et al., 2009; see also Graham & Perin, 2007).

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APPENDIX. THE IDEA GENERATION TASK

Instructions:

- List all the elements you could include in a description of your home.

Scoring:

(a) number of reproduced ideas
(b) number of categories represented out of the 11 predefined

Predefined categories and examples of responses classified within each category:

1. **THE PLACE** (indirizzo, punti di riferimento…) "*vicino alla mia casa c'è un pista ciclabile*,"
2. **OUTDOORS** (giardino, tetto, terrazza, colore) "…*circondata da alberi che fanno molta ombra*,"
3. **INDOORS** (numero e tipologia delle stanze…) "*la mia casa è composta dalla cucina, dalla taverna, dal salotto, dal garage, le camere da letto e la sauna*"
4. **FURNITURE** "*ho anche un pianoforte e due tavolini di cristallo*"
5. **ESTHETIC JUDGEMENT** "*la mia casa è molto bella*"

6. **SPECIFIC EMOTIONS** "*… e quando devo fare la nanna mi sento al sicuro, e quindi dormo tranquilla*"
7. **PETS** *"ho una tartaruga che si chiama Scorza e ha 4 anni. Ho anche un pesce che si chiama Oliver e ha 6 anni".*
8. **HISTORY** "*abbiamo appena finito di ristrutturare la casa perché era molto vecchia…è stata costruita da mio nonno*"
9. **RELEVANT DETAILS** "*c'è perfino un ripostiglio dove c'è sempre freddo perché c'è sempre la finestra aperta*"
10. **ACTIONS** "*io a casa gioco a nascondino*"
11. **WISHES** "*vorrei una mia stanza da letto perché fino adesso la sto condividendo con mia sorella Alice*"

THE PLANNING TASK

Correct Structure

1. *Introduction*: Butterflies' wings, etc.
2. *Specification of the introduction*: The color of the wings
3. *Specific feature*: The colored powder is easily lost
4. *Example*: The powder remains on your hands if you touch them
5. *Introduction to the explanation*: There are many explanations
6. *Specific explanation*: It is a defence against a spider's web
7. *Conclusion*: The instance of the powder loss reveals how

Order of Sentence Presentation

1. Specific feature
2. Example
3. Specific explanation
4. Conclusion
5. Introduction
6. Introduction to the explanation
7. Specification of the introduction

Instructions:

- Imagine that you have to write a composition on "Butterflies' wings."
- Reorder the following sentences to give the best structure to your composition.

- Note: The seven sentences (not syntactically connected) refer to the different parts of a well-organized text.

Scoring: 1 point for each sentence following a sentence that precedes it in the correct order (1 point is always awarded for the first sentence given).

LINGUISTIC REVISION TASKS

(1) Morphosyntactic
(2) Orthographic
(3) Punctuation

Instructions: Imagine you are your teacher. Correct the text(s), which contain a series of errors.

Scoring: Number of correctly detected errors (for ''Punctuation'' include the number of appropriately added or deleted punctuations).