Expressive Writing Difficulties in Children Described as Exhibiting ADHD Symptoms

Anna Maria Re, Martina Pedron, and Cesare Cornoldi

Abstract

Three groups of children of different ages who were considered by their teachers as showing symptoms of attention-deficit/hyperactivity disorder (ADHD) and matched controls were tested in a series of expressive writing tasks, derived from a standardized writing test. In the first study, 24 sixth- and seventh-grade children with ADHD symptoms wrote a description of an image. The ADHD group’s expressive writing was worse than that of the control group and associated with a higher number of errors, mainly concerning accents and geminates. The second study showed the generality of the effect by testing younger groups of children with ADHD symptoms and controls with another description task where a verbal description was substituted for the picture stimulus. The third study extended the previous observations with another type of writing task, the request of writing a narrative text. In all the three studies, children with ADHD symptoms scored lower than controls on four qualitative parameters (adequacy, structure, grammar, and lexicon), produced shorter texts, and made more errors. These studies show that children with ADHD symptoms have school difficulties also in writing—both in spelling and expression—and that these difficulties are extended to different tasks and ages.

Numerous studies have shown that children described by their teachers as showing attention-deficit/hyperactivity disorder (ADHD) symptoms also present academic difficulties in a variety of fields. Until recently, the emphasis has been on the more basic skills, such as reading (Bonaffia, Newcorn, McKay, Koda, & Halperin, 2000; Johnson, Altmair, & Richman, 1999; Pisecco, Baker, Silva, & Brooke, 2001; Swanson, Mink, & Bocian, 1999; Willcutt & Pennington, 2000) and arithmetic (Benedetto-Nasho & Tannock, 1999; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999). Given the planning and organizational difficulties shown by children with ADHD, one would expect them to have equal if not greater difficulties in skills requiring greater organization and control, for example when having to compose a short essay.

Nonetheless, and in contrast with the large literature on the writing problems of children with learning disabilities (LD; Englert & Raphael, 1988; Graham & Harris, 1989; Graham, Harris, MacArthur, & Schwartz, 1991; Montague, Graves, & Leavell, 1991; Newcomer & Barenbaum, 1991), much less is known about the writing skills of children with ADHD. We found only two studies that specifically examined writing skills in children with ADHD. One study focused on general writing skills, the other on speed of writing. In the first study, as part of a writing test, Resta and Eliot (1994) examined the performance of 32 students between 8 and 13 years old (Grill & Kirwin, 1989). The study included 21 boys with ADHD and 11 matched controls, who were required to write three essays about an expressive (about hands), a creative (in response to a picture of a cat), and an instructive (the danger of fire) topic. The results showed that children with ADHD performed worse and were less productive, in that they wrote fewer words than control children.

In the second study, Ross, Poidevant, and Miner (1995) assessed the writing speed of 48 children with ADHD, from first to fifth grades, and 48 controls matched for gender and schooling. The task consisted of writing, as rapidly as possible, the numbers from 0 to 9 and the student’s first name for 1 min. The results showed no difference between the two groups. The pattern of these results suggests that children with ADHD write less because they have difficulties in the text production process and not because of fluency or writing speed problems. However, these data, coming from different populations and different studies, do not allow clear conclusions and generalizations to be drawn. Furthermore, these studies did not systematically examine different aspects of expressive writing or spelling errors. Yet the study of different performance parameters in expressive writing may be important, because it could reveal specific peculiarities of children with...
ADHD, like those that have emerged in other learning areas (e.g., problem solving; Marzocchi, Lucangeli, De Meo, Fini, & Cornoldi, 2002). Writing is not a simple transcription of thoughts and concepts; it requires the involvement of a high degree of complex cognitive procedures. For example, classical views of expressive writing (Burnett & Kastman, 1997; Hayes & Flower, 1980) showed the importance of several processes, and in particular the planning phase of an essay, the production of ideas, their organization, the transcription, and the final revision. The planning problems of children with ADHD have been documented in the literature (Barkley, 1995; Cornoldi, Barbieri, Gaiani, & Zocchi, 1999; Seidman, Biederman, Montetaux, Doyle, & Faracane, 2001); it is thus highly probable that these children also have difficulties in expressive writing. For example, one could predict that children with ADHD can produce many ideas, but—given their organizational and planning difficulties—they do poorly at writing a text that is adequate and well organized (i.e., adequately matching the writing requests both in terms of the quantity of expressed ideas and their organization). Thus, despite the fact that their expression difficulty should mainly concern the organization of ideas, the poorer text organization and planning of children with ADHD could also have the consequence of limiting the number of ideas actually being expressed.

Another problem in text production concerns spelling: Children with ADHD could be less capable of simultaneously paying attention to their ideas and to spelling and, therefore, make more mistakes. In fact, the presence of a larger number of spelling errors in the written text of children with ADHD can also be predicted on the basis of their frequently observed reading and phonological difficulties (e.g., Kroese, Hynd, Knight, Hiemenz, & Hall, 2000). Nevertheless, it is not clear whether a hypothesized spelling difficulty in children with ADHD equally extends to any type of error or mainly concerns a particular error type. A successful classification of writing errors is based on a basic model for learning to read and write (Frith, 1985) that proposes a series of learning stages, some of which are associated with specific types of spelling errors. In the first stage, called logographic, a child can only associate a particular graphic configuration with a certain concept. In the second stage, called alphabetic, a child discovers the concept of phonemes and learns to associate every phoneme with its peculiar graphic sign pattern. In this stage, errors are of the phonological type; due to the incorrect association between a grapheme and the corresponding phoneme. In the third stage, called orthographic, a child learns that writing is governed by syntactic and orthographic rules and no longer works with phonemes but with syllables or other sublexical units, so that the writing process becomes more rapid and correct. In the fourth stage, children learn specific lexical entries and are able to read and write words that do not follow the phonological rules (e.g., typical writing errors in Italian are represented by illegal fusions and separations). Finally, Tressoldi and Cornoldi (1991) described a fifth stage, requiring a lexicon-based refinement of lexical and phonological analysis, in which the main difficulties are represented by the correct use of last syllable accents and geminates. Evidence for a specific writing disorder and a consequent autonomous representation of geminates in Italian has also been reported by Miceli, Benvegnu, Capasso, and Caramazza (1995). At this stage, the selection of phonemes and graphemes may be appropriate, but may miss the details regarding longer phoneme duration (which in Italian requires the writing of double letters: e.g., correrere, to run) or of an accent (which in the Italian writing system is required only when the accent is on the last syllable).

The present research examined the performance of children who were described by their teachers as showing ADHD symptoms (see Note 1) on writing tasks derived from the Batteria per la Valutazione della Scrittura e della Competenza Ortografica nella Scuola dell’Obbligo (BVSCO; Battery for the Assessment of Writing Skills in 7- to 13-Year-Old Children), devised by Tressoldi and Cornoldi (1991), which is the only standardized writing test available in Italy. Because the BVSCO offers an overall view of expressive writing competencies, the first goal of the present research was to obtain a general description of the writing skills of children with ADHD symptoms. Concerning the children’s writing abilities we focused on the four main aspects considered in the BVSCO (adequacy, structure, lexicon, and grammar) and on some other indices as recommended by the BVSCO’s authors. Furthermore, the BVSCO also offered the opportunity of measuring writing speed and accuracy. Concerning writing speed, we predicted that, as Ross et al. (1995) already found, children with ADHD symptoms would be as rapid as controls. Concerning accuracy, on the contrary, we predicted that children with ADHD symptoms would show a poorer performance due to their spelling difficulties (Kroese et al., 2000).

The second goal of the study concerned spelling accuracy in expressive writing. In particular, and following the indication of the BVSCO manual, we considered three types of errors: phonological, nonphonological, and a third type (geminates and accents; see Note 2). Because these types of errors reflect different stages in learning to write correctly, we expected that the lower competence of older children would show itself in the form of third-type errors, whereas for younger children who were still involved in the preceding learning stages, the differences would be found at earlier levels (Tressoldi & Cornoldi, 1991).
they had to describe an image, and in a speed writing task, in which they had to write as many numbers in letters as possible in one minute. The second study investigated the generality of the effect and its developmental pattern by testing younger groups of children with ADHD symptoms and controls, using the same task as in Study 1 and another task in which the picture was replaced by a verbal description. In fact, it has been suggested that not only images, but also verbal prompts can improve the quality of expressive writing (Marchian & Alber, 2001). Finally, the third study examined the general writing skills with respect to another type of writing request, by asking children to write a narrative text.

STUDY 1

Study 1 examined the expressive writing, spelling, and writing speed abilities of a group of children described by their teachers as exhibiting ADHD symptoms and of a matched control group.

Method

Participants

Two groups of sixth- and seventh-grade children were selected: 24 children (17 boys and 7 girls) described by their teachers as exhibiting ADHD symptoms, and a comparison group of 24 children (17 boys and 7 girls; control children) of the same age and schooling. Participants were selected from public schools in the Catania area of Sicily, Italy, on the basis of the teacher’s rating scale, Scala per i Disturbi di Attenzione/Iperattività per Insegnanti (SDAI; ADHD Rating Scale for Teachers; Marzocchi & Cornoldi, 2000), which was used to assess 817 children. The schools were located in the environs of the city of Catania, which are predominantly inhabited by White families working in the public sector or engaged in agricultural activities. All children came from families with Italian as their first language.

The SDAI includes 18 items, based on the 18 ADHD symptoms listed in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994), and has been validated and standardized for the Italian population, showing very high validity, reliability (r = .81), and interrater agreement (r = .78; Marzocchi & Cornoldi, 2000). The scale includes two subscales, one for Inattention and the other for Hyperactivity/Impulsivity. Teachers have to observe the children’s behavior and report the frequency of symptomatic behaviors described for each item. Scores range from 0 (when the problematic behavior is never present) to 3 (for very frequent behavior). Children whose mean score was above 1.5 per item on one of the two subscales were considered for inclusion in the group of children with ADHD symptoms (selected children were mainly of the inattentive or combined DSM-IV subtypes), and those who did not meet this criterion were considered for inclusion in the control group.

Teachers were also asked to rate socioeconomic status (SES) and oppositional and aggressive behavior. In the group with children showing ADHD symptoms, we included only children who did not manifest oppositional and aggressive behavior. Control children were selected from the same classes as the children with ADHD symptoms, so as to be matched for gender, age, schooling, estimated IQ, rated ability, and SES. The IQ estimation was obtained by administering part of the Primary Mental Abilities Battery 11–17 (PMA) test. The PMA Reasoning subscale is part of the classical battery devised by Thurstone and Thurstone (1963/1981) on the basic components of intelligence, which is still in use in Italy, and requires finding, within 6 minutes, the logical criterion in a sequence of letters (30 items). For example, the first item presents the letter series a a b c c d e e f g g, and requires that the child select between the following possible choices to continue the series: a b c e f g h. The Italian norms of the test include a transformation table, which permits the translation of the raw scores into IQ scores. All children included in the study scored above the 40th percentile on the PMA Reasoning task, roughly corresponding to an IQ higher than the 95th percentile. Finally, children with ADHD symptoms scored below the 30th percentile in an attentional visual search task, the Continuo Performance (CP) task (Cornoldi, Gardinale, Masi, & Pettenò, 1996), which requires finding a sequence of three letters (F Z B) presented 54 times within three random arrays of letters.

Procedure

Children were administered the Description test from the BVSCO (Tresoldi & Cornoldi, 1991) in their classroom. This task is based on the presentation of a colored figure showing people at the zoo, with a variety of animals in their surroundings. Children receive a copy of the figure and a response sheet corresponding to the type of paper on which they are used to writing. They have 10 min to write a text on the basis of the following instruction: “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.” As a control, children were administered a writing speed subtest taken from the same BVSCO. This test requires writing, in letters, as many numbers as possible in 1 min, starting from uno (one) and proceeding with the subsequent numbers of the number series. There was no significant difference between the two groups’ performance on this task.

Results

Children were able to understand the instructions and meet task requests. The available time of 10 min was sufficient for all children, and many children in both groups finished with a
few minutes to spare. Because children were instructed to keep the response sheet until the end of the available time, so they could check over their answers, it was not possible to record the actual time used by each child to complete the task. The protocols were analyzed for the properties of expressive writing, following the procedure described in the test manual. First, two independent raters, blind with respect to the goals of the study, rated the protocols for the following four qualitative parameters:

1. **adequacy**, defined as the adequacy of the written text with respect to the task request;
2. **structure**, based on the organization of the text;
3. **grammar**, concerning the correct use of punctuation, subdivision in paragraphs, correct use of verb tenses, and correct concordance between gender and number of nouns, verbs, and adjectives (very important in Italian); and
4. **lexicon**, defined as the quantity of different words used.

The agreement of the two raters was high for each of the four parameters (i.e., adequacy, \( r = .89 \); structure, \( r = .84 \); lexicon, \( r = .83 \); and grammar, \( r = .78 \)). Therefore, in the subsequent analyses, we only considered the ratings given by the first rater.

Children with ADHD symptoms obtained significantly lower scores than controls on adequacy (ADHD, \( M = 2.62, SD = 0.78 \); controls, \( M = 3.92, SD = 0.87 \); \( t(46) = 5.41, p < .01 \)), structure (ADHD, \( M = 2.25, SD = 0.99 \); controls, \( M = 3.04, SD = 0.99 \); \( t(46) = 2.76, p < .01 \)), lexicon (ADHD, \( M = 1.92, SD = 0.93 \); controls, \( M = 3.29, SD = 1.30 \); \( t(46) = 4.21, p < .01 \)), and grammar (ADHD, \( M = 1.83, SD = 0.82 \); controls, \( M = 3.12, SD = 1.11 \); \( t(46) = 4.58, p < .01 \)).

In other words, children with ADHD symptoms obtained lower scores than controls on all qualitative parameters.

We also computed the quantity of words written by every child, and we found that children with ADHD symptoms wrote significantly less, on average, than controls. In the group with children showing ADHD symptoms, the mean length of the text was 51.79 words (\( SD = 21; 95\% CI = 42.92–60.66 \)), with a range between 20 and 90. In the control group, the mean length of the text was 68.21 words (\( SD = 32.96; 95\% CI = 54.29–82.12 \)), with a range between 32 and 143. A \( t \)-test comparison between group means showed a significant difference, \( t(46) = 2.06, p < .05 \).

Furthermore, we computed the percentage of errors distinguished according to the manual classification: phonological errors (PhE), where the reading of the written word would have a different phonology than the real word; nonphonological errors (NPhE), with the same sound for the written word and the real word; and third-type errors. In the last category, the test manual includes errors where the sequence of written letters corresponds to the correct sequence, but some subtle phonological markers of the Italian writing system are lost (i.e., geminates and accents; e.g., giraffa for giraffen, città for città).

Because the length of the essay was different for each participant, we computed the percentages of the three types of errors with respect to the total number of written words. We found that large groups of children had a very low percentage of errors, suggesting that a control for the normality of the distribution and the use of non-parametric tests would be appropriate. In fact, the Kolmogorov-Smirnov test, a statistical test for the evaluation of distribution normality, showed that the distributions deviated significantly from the normal distribution for all types of error \( (p < .05) \), so we used non-parametric tests. First, we compared the two groups on the overall percentage of errors with the nonparametric Mann-Whitney \( U \) test and found a significant difference between groups, \( U = 97.50, p < .001 \). In fact, the group with children showing ADHD symptoms made more than four times more errors than the control group, with a mean percentage of errors higher than 7% (ADHD, \( M = 7.88, SD = 6.48, range = 0–24.24 \); control, \( M = 1.66, SD = 2.45, range = 0–9.38 \)).

When we considered the three different types of errors separately, we could see that many children were perfectly accurate in one or more categories. For this reason, we decided to divide children into two categories according to whether they had made one or more errors of a particular type or no such errors. We made this division for the three types of error. The results showed that the two groups were significantly different only for the third type of error (see Figure 1), whereas the differences between groups were slight both for PhE (62.5% of ADHD and 41.7% of controls made errors), \( \chi^2(1, N = 48) = 2.09, p > .05 \), and for NPhE (29.2% ADHD vs. 12.5% control), \( \chi^2(1, N = 48) = 2.02, p > .05 \). In contrast, there was a highly significant difference in the third error type, which was present for 87.5% of children with ADHD and only 29.2% of controls, \( \chi^2(1, N = 48) = 16.8, p < .001 \).

**Discussion**

Study 1 confirmed that children with ADHD symptoms, despite showing an adequate standard of general abilities, presented expressive writing difficulties. Their problems were rather general, as they concerned all the measured aspects. Children with ADHD symptoms were rated as less proficient writers on all four basic parameters (adequacy, structure, lexicon, and grammar). They produced shorter texts and made a higher percentage of errors. These difficulties were not related to writing speed, because the two groups did not differ on this measure. However, in some aspects of expressive writing, the differences appeared stronger. In particular, the difference in the adequacy parameter was very conspicuous. Furthermore, the pattern of errors mainly involved errors that require a sophisticated use of both phonological and nonphonological indices.

One problem in this study was related to the fact that we did not have a
measure of the linguistic (including reading) ability of the participants, and a particularly low linguistic ability of children with ADHD symptoms could have affected their writing performance. Another problem concerned the generalizability of the results obtained. In particular, evidence concerning children in primary school was also needed to examine the presence of difficulties at earlier phases of the writing skill acquisition process. Furthermore, the difficulties of children with ADHD symptoms could be strictly related to the procedure adopted in the task, which was based on the presentation of a picture (see the procedure also adopted by Grill & Kirwin, 1989). Effects could be different if a verbal scaffold rather than a picture were presented and children were given verbal cues to start their description. In fact, it has been suggested that expressive writing can be improved on the basis of a prompt represented by a sufficiently large quantity of verbal material (Marchisan & Alber, 2001). An advantage of the verbal scaffold could be especially present in children with ADHD symptoms who have difficulties in autonomously initiating and controlling cognitive activities. In fact, the availability of a short text could facilitate the production process. For these reasons, in a second study, we tested children of different grades and compared the standard procedure used in Study 1 with a different procedure in which the picture was substituted with a verbal scaffolding description. Children were presented with the same description request used in Study 1, but one of the tasks was based on the standard presentation of the picture, whereas the other task was based on a verbal description.

**STUDY 2**

Study 2 examined whether children with ADHD symptoms who attended different grades of primary school scored lower in expressive writing and spelling, and whether this was the case also when their productions were prompted by a detailed verbal prompt.

**Method**

**Participants**

Two groups consisting of a total of 163 children participated in the study. One group comprised children described by their teachers as exhibiting ADHD symptoms, and a control group was matched for gender, age, and schooling. In total, groups consisted of 46 second graders (33 boys and 13 girls), 40 third graders (32 boys and 8 girls), 44 fourth graders (36 boys and 8 girls) and 33 fifth graders (29 boys and 4 girls). Participants were selected from public schools located in northeastern Italy and mainly came from White families working in agriculture, public employment, and industry. The teacher rating scale (SDAI), already described in the preceding study, was used for assessing 1,468 children. Also in this case, children whose mean score was above 1.5 per item on one of the two subscales were considered for inclusion in the group with children showing ADHD symptoms, and those who did not meet this criterion were considered for inclusion in the control group. Teachers were interviewed to have confirmation concerning the presence of ADHD symptoms and were also asked to rate on a 0 to 3 rating scale the presence of general cognitive difficulties, linguistic and mathematics learning difficulties, problems in the social skills domain, oppositional and aggressive behavior, anxiety problems, and depressive behavior (children with these kinds of problems were excluded from both control and experimental groups). Control children were also matched for estimated IQ, rated ability, and SES. The IQ estimation was obtained by administering part of the PMA 2–4 and 4–6 Spatial Reasoning subscale (Thurstone & Thurstone, 1963/1981), which requires finding, in 6 minutes, among four different alternatives, the figure that—combined with the given model—can produce a square. The control group and the group with children showing ADHD symptoms were not significantly different in their estimated cognitive abilities ($M = .30$ for both groups), language abilities ($M = .53$ for the ADHD group and $M = .40$ for the control group), and IQ, which, due to the overestimation in the Italian PMA norms, was particularly high in both

![Figure 1. Study 1: Percentages of children with attention-deficit/hyperactivity disorder (ADHD) and control children who made errors on the Description test. *p < .001. PhE = phonological errors; NPhE = nonphonological errors; 3rd Type = errors on geminates and last syllable accents.](image-url)
groups: 118.35 (SD = 16.35) in the group of children with ADHD symptoms and 119.30 (SD = 13.50) in the control group. On the other hand, the two groups were significantly different (p < .01) on estimated mathematical abilities (.80 vs. .45)

**Tasks**

All children were administered two expressive writing tasks (i.e., two Description tasks) in their classroom. All the tasks were derived from the standardized writing battery devised by Tressoldi and Cornoldi (1991). The writing tasks were based on the presentation of one of two colored figures appropriate for the child’s grade and one of the corresponding verbal illustrations. Figures and verbal illustrations concerned the zoo scenario already proposed in the preceding study, and the picture task was also the same as in Study 1, but all children were also presented with another description task using another stimulus modality, namely, a verbal scaffold rather than a picture. The verbal scaffold included the main elements present in the picture; for example, for one of the pictures, it included the following: “Try to imagine that you and another child have been to visit the zoo, where there were a lot of people and animals. At one point you stopped in front of a cage in which there were many parrots of different colors.”

Stimulus modality (verbal scaffold vs. picture) and order of presentation of the situation (zoo with monkeys vs. zoo with parrots) were counterbalanced across participants. In all other respects, the procedure was the same as in Study 1.

**Results**

A preliminary analysis examined whether grade level affected the two groups in different ways. However, no significant interaction was found between grades and groups. Therefore, we will present the overall pattern of results, distinguishing only between groups (children with ADHD symptoms and controls) and types of tasks.

For the analysis of the children’s production, we followed the procedure described in the BVSCO manual. The qualitative judgment was made by two blind and independent raters. The interrater agreement was high for each parameter in both tasks (i.e., for the Description task with the picture: adequacy, r = .96; structure, r = .92; lexicon, r = .88, and grammar, r = .91; and for the Description task with verbal scaffold: adequacy, r = .96; structure, r = .90; lexicon, r = .90; and grammar, r = .94). Therefore, in successive analyses, we only considered the ratings given by the first rater.

Four 2 × 2 (Group × Task) ANOVAs were run for the different parameters. We did not find a significant difference between the two tasks, but we found differences between the two groups on all aspects: adequacy: F(1, 324) = 261.50, MSE = 307.10, p < .001, partial η² = .447; structure: F(1324) = 213.18, MSE = 290.47, p < .001, partial η² = .397; lexicon: F(1324) = 239.52, MSE = 220.48, p < .001, partial η² = .245; and grammar: F(1324) = 249.17, MSE = 209.35, p < .001, partial η² = .435. Means and standard deviations of Description task scores with an image and with verbal scaffolding for both ADHD and groups are detailed in Table 1.

We also carried out a 2 × 2 (Group × Task) ANOVA to compare the length of the descriptions and found a significant difference between groups (ADHD: M = 52.13, SD = 1.55, 95% CI = 49.09–55.18; control: M = 67.97, SD = 1.55, 95% CI = 64.92–71.01; F(1, 324) = 52.33, MSE = 780.88, p < .001, partial η² = .139, but no significant difference between the two conditions. As can be seen from Table 2, there was no difference in the number of words used to write the description of an image alone or with the aid of a verbal scaffold. That is, children with ADHD symptoms and controls wrote on average a similar number of words in the two tasks, but in general, as in Study 1, the children with ADHD symptoms wrote fewer words than the control group.

Following the suggestion of Tressoldi and Cornoldi (1991), we carried out further analyses on the protocols,

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**TABLE 1**

Study 2: Means and Standard Deviations on Four Basic Parameters of Expressive Writing in Two Conditions for ADHD and Control Groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ADHD group</th>
<th></th>
<th></th>
<th></th>
<th>Control group</th>
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<tbody>
<tr>
<td></td>
<td>Image condition</td>
<td>Scaffold condition</td>
<td>Image condition</td>
<td>Scaffold condition</td>
<td></td>
<td></td>
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<tr>
<td>Adequacy</td>
<td>M</td>
<td>SD</td>
<td>95% CI</td>
<td>M</td>
<td>SD</td>
<td>95% CI</td>
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<td>SD</td>
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<tr>
<td>Structure</td>
<td>2.87</td>
<td>0.84</td>
<td>2.73–3.00</td>
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<td>0.91</td>
<td>2.84–3.12</td>
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<td>Lexicon</td>
<td>2.77</td>
<td>0.70</td>
<td>2.67–2.88</td>
<td>2.82</td>
<td>0.68</td>
<td>2.72–2.93</td>
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<td>Grammar</td>
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<td>0.66</td>
<td>2.29–2.49</td>
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<td>0.58</td>
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<td>3.40</td>
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<td></td>
<td>2.34</td>
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<td>2.25–2.43</td>
<td>2.31</td>
<td>0.60</td>
<td>2.22–2.40</td>
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<td>0.71</td>
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Note. ADHD = attention-deficit/hyperactivity disorder.

* n = 163.
concerning not only the text length, but also the percentage of qualitative adjectives, the percentage of repetition (both calculated on the first 50 words), and the percentage of subordinate clauses present. These indexes have been suggested (Tressoldi and Cornoldi, 1991) to be associated with good production, mainly reflecting the richness of the ideational process (in the case of text length), their organization in the text (in the case of a high percentage of subordinate clauses), a satisfactory use of the lexicon (in the case of a low percentage of word repetitions), and an articulated and sophisticated transcription (in the case of a high percentage of qualifying adjectives).

In this case (see Table 3), the two description tasks produced different outcomes. Wilcoxon tests—a nonparametric test that enables the comparison of within-subject measures—showed that the children with ADHD symptoms showed a significantly lower performance on all parameters. Furthermore, they wrote significantly more qualitative adjectives in the condition with verbal scaffolding than in the condition with the picture, Wilcoxon $z = 3.54, p < .001$; they made more repetitions in the condition with the image than in the other condition, $z = 2.4, p < .05$; but the difference in the number of subordinate clauses only approached significance, $z = 1.9, p = .05$. In contrast, for the control group, there was no difference between the two conditions in the percentages of qualitative adjectives, $z = 0.99, p > .05$, and repetitions, $z = 0.17, p > .05$, but there was a significantly higher percentage of subordinate clauses in the picture task than in the verbal scaffolding task, $z = 2.11, p < .05$. These results are shown in Table 3.

In summary, the performance of children with ADHD symptoms was poorer (used less adjectives and made more repetitions) on the task with the picture than on the task with the verbal scaffolding. In contrast, control children scored higher (used more subordinate clauses) in the condition with images than in the verbal scaffolding condition. Furthermore, comparing the two groups on these parameters, we found that children with ADHD symptoms used less qualitative adjectives, made more repetitions, and wrote less subordinate clauses than control children, both in the task with an image and in the task with verbal scaffolding (see Table 3).

The lower performance of the group with children showing ADHD symptoms was also evident from the total number of spelling errors; here there was no significant difference between the two tasks. Also in this study, when we considered the three different

### TABLE 2

<table>
<thead>
<tr>
<th>Condition</th>
<th>ADHD group$^a$</th>
<th>Control group$^a$</th>
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</thead>
<tbody>
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<td></td>
<td>$M$</td>
<td>Range</td>
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<tr>
<td>Description with image</td>
<td>51.89</td>
<td>18–104</td>
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<tr>
<td>Description with verbal scaffolding</td>
<td>52.38</td>
<td>18–121</td>
</tr>
</tbody>
</table>

Note. ADHD = attention-deficit/hyperactivity disorder.

$^a n = 163$.

### TABLE 3

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjectives</th>
<th>Repetitions</th>
<th>Subordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>Range</td>
<td>$SD$</td>
</tr>
<tr>
<td>Image condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD$^a$</td>
<td>2.9</td>
<td>0–9</td>
<td>2.3</td>
</tr>
<tr>
<td>Control$^b$</td>
<td>6.6</td>
<td>1–18</td>
<td>3.5</td>
</tr>
<tr>
<td>Mann-Whitney $U$</td>
<td>5248.5*</td>
<td>3754.5*</td>
<td></td>
</tr>
<tr>
<td>Verbal scaffolding condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD$^a$</td>
<td>3.4</td>
<td>0–13</td>
<td>2.7</td>
</tr>
<tr>
<td>Control$^b$</td>
<td>6.7</td>
<td>0–16</td>
<td>3.7</td>
</tr>
<tr>
<td>Mann-Whitney $U$</td>
<td>6529.5*</td>
<td>4139.0*</td>
<td></td>
</tr>
</tbody>
</table>

Note. ADHD = attention-deficit/hyperactivity disorder.

$^a n = 163$.

$^* p < .001$. 
types of errors separately, we could see that many children’s performances were accurate in one or more categories. For this reason, we again divided children into two categories according to whether they had made one or more errors or none.

As can be seen in Figure 2, children with ADHD symptoms made more errors than control children both in the condition with images (ADHD: $M = 3.6$, $SD = 2.6$, range = 0–13; controls: $M = 1.6$, $SD = 1.5$, range = 0–7; Mann-Whitney $U = 6,800$, $p < .001$) and in the condition with verbal scaffolding (ADHD: $M = 3.7$, $SD = 2.5$, range = 0–14; controls: $M = 1.7$, $SD = 1.6$, range = 0–9; Mann-Whitney $U = 6,178$, $p < .001$).

In particular, in the condition with images, 22.7% of children with ADHD symptoms versus 13.5% of control children made PhE, $\chi^2(1, N = 326) = 11.95$, $p = .001$; 36.2% of children with ADHD symptoms versus 23.9% of control children made NPhE, $\chi^2(1, N = 326) = 20.47$, $p < .001$; and 39.9% of children with ADHD symptoms versus 30.1% of controls made third-type errors, $\chi^2(1, N = 326) = 14.94$, $p < .001$. A similar result could be observed in the verbal scaffolding condition: 22.2% of children with ADHD symptoms versus 11.4% of controls made PhE, $\chi^2(1, N = 326) = 17.24$, $p < .001$; 35.0% of children with ADHD symptoms versus 24.8% of controls made NPhE, $\chi^2(1, N = 326) = 13.90$, $p < .001$; and 43.4% of children with ADHD symptoms versus 32.3% of controls made third-type errors, $\chi^2(1, N = 326) = 20.77$, $p < .001$.

**Discussion**

Study 2 confirms the results of the preceding one: Children with ADHD symptoms present writing difficulties. In particular, children with ADHD symptoms are rated as less proficient writers, make more errors, and write shorter texts than controls. These errors cannot be due to a general linguistic disability in the children with ADHD symptoms because the two groups were matched on this aspect. However, their impaired writing proficiency could be affected by a more specific linguistic deficit. The deficit could also be related to a more general scholastic difficulty, as suggested by their lack of high performance in math (as reported by their teachers). The finding that—in contrast to the preceding study—control children also made a considerable number of errors of the third type can be explained by considering the young age of the children in this study, at a stage in which they are still involved in learning to manage subtle spelling skills.

This study examined the writing difficulties encountered by children with ADHD symptoms and tested whether producing a written description of a scene aided by a verbal scaffold could be simpler than with the aid of an image alone, by offering a verbal structure to be used for planning and producing a verbal text. In general, children showed a similar pattern of difficulties on both tasks. Results showed that the availability of a verbal scaffold during a writing task does not represent a strong help for a child engaged in a writing task, and this result is valid both for children with ADHD symptoms and for controls. Children with ADHD symptoms performed lower than controls on all parameters, they made a higher percentage of errors, and they produced shorter texts. However, the presence of a very simple verbal scaffold slightly reduced their performance difficulties, improving the quality of their texts by increasing the number of adjectives and reducing the number of repetitions. It is also important to note that the only difference between the two conditions (with picture or with verbal instructions) for controls was a very slight improvement in the percentage of subordinate clauses in the picture condition.

**STUDY 3**

The difficulties encountered by children with ADHD symptoms could have been emphasized by the particular type of expressive task set. In fact, it has been shown (e.g., Ellis, Taylor, & Drury, 2005; Graham, Harris, & Mason, 2005; Segev-Miller, 2004) that express...
sive writing is largely dependent on the type of writing task required. As the BVSCO standardized test battery for Italy includes another writing task (i.e., a narrative one), we further tested children with ADHD symptoms on their expressive writing skills by presenting this task. Thus, the same children examined in the preceding study were invited to write a narrative text based on the presentation of a series of images describing a short story.

Method

Participants were the same as in Study 2, and the procedure was the same as in Study 1, with the presentation of pictorial material and the request to produce a written text. However, rather than being presented with a single image, children were presented with a series of pictures forming a short story. The pictorial material for the writing test (Tressoldi & Cornoldi, 1991) for second and third graders consisted of three cartoons depicting the story of a child and his dog. For fourth and fifth graders, it included five cartoons depicting the story of a child falling off a tree. To give a more complete example, the cartoons for younger children showed the story of a child who first plays with his dog (Cartoon 1), then goes to school with the dog (Cartoon 2) and leaves the dog waiting for him outside while he stays in school (Cartoon 3). All children had 10 min to write their text.

Results

As for the other studies, we followed the BVSCO manual’s procedure. First, two independent and blind raters evaluated the protocols. The correlations between the two raters’ assessments of the qualitative parameters for the narrative task were very high for adequacy ($r = .95, p < .001$), structure ($r = .91, p < .01$), lexicon ($r = .85, p < .001$), and grammar ($r = .81, p < .001$). For this reason, we decided also in this case to consider the evaluations of the first rater only.

The performance of children showing ADHD symptoms was significantly lower on all qualitative parameters compared to the control group, as shown in Table 4. We compared the two groups on the number of words written, and we found, again, that the children with ADHD symptoms wrote fewer words than the control group. In fact, the children with ADHD symptoms wrote on average 50.77 words ($SD = 14.75$, range $= 21–99$), whereas the control group wrote 64.32 words ($SD = 17.78$, range $= 27–118$), a difference found to be significant, $t(324) = 7.49, p < .01$.

When we considered the first 50 text words for all children, we found that children with ADHD symptoms used less qualitative adjectives (ADHD: $M = 3.2, SD = 2.8$, range $= 0–11$; controls: $M = 6.3, SD = 4$, range $= 0–15$, Mann-Whitney $U = 7,300.5, p < .001$), made more repetitions (ADHD: $M = 9.8, SD = 4.6$, range $= 0–22$; controls: $M = 3.9, SD = 3.6$, range $= 0–16$, Mann-Whitney $U = 4,193.5, p < .001$), and wrote fewer subordinate clauses (ADHD: $M = 26.28, SD = 25.11$, range $= 0–133$; controls: $M = 44.7, SD = 23.84$, range $= 0–150$, Mann-Whitney $U = 7,510.5, p < .001$) than control children (see Figure 3). Furthermore, children with ADHD made significantly more errors than controls (ADHD: $M = 3.4, SD = 2.01$, range $= 0–11$; controls: $M = 1.7$, $SD = 1.3$, range $= 0–7$, Mann-Whitney $U = 6,177, p < .001$). Comparing the two groups on the different types of errors, we divided children into two groups according to whether they had made one or more errors or none. The results showed that 19.3% of children with ADHD symptoms made phonological errors versus 12.6% of controls, $\chi^2(1, N = 326) = 6.83, p = .009$; that 36.4% of children with ADHD symptoms made nonphonological errors versus 24.4% of controls, $\chi^2(1, N = 326) = 18.49, p < .001$; and that 40.6% of children with ADHD symptoms made third-type errors versus 36.3% of controls, $\chi^2(1, N = 326) = 3.03, p > .05$.

As can be seen in Figure 4, children with ADHD symptoms always made more errors than controls, but there was no relevant difference between the two groups on third-type errors. A final analysis comparing the different types of errors showed that in both groups, phonological errors were less frequent than nonphonological errors (ADHD: PhE = 38.7% vs. NPhE = 72.4%, McNemar’s $p < .001$; control: PhE = 24.8% vs. NPhE = 49.1%, McNemar’s $p < .001$) and nonphonological errors were less frequent than third-type errors for the control group (NPhE = 49.1% vs. 3rd type = 73.3%, McNemar’s $p < .001$) but not for children with ADHD symptoms; in fact, for ADHD, NPhE were not significantly less frequent than third-type errors (NPhE = 72.4% vs. 3rd type = 81%,

### TABLE 4

Study 3: Means and Standard Deviations on Four Basic Parameters of Narrative Writing for ADHD and Control Groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ADHD groupa</th>
<th>Control groupa</th>
<th>t(324)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequacy</td>
<td>3.23</td>
<td>4.36</td>
<td>11.67*</td>
</tr>
<tr>
<td>Structure</td>
<td>2.34</td>
<td>3.24</td>
<td>13.05*</td>
</tr>
<tr>
<td>Grammar</td>
<td>2.42</td>
<td>3.38</td>
<td>12.86*</td>
</tr>
<tr>
<td>Lexicon</td>
<td>2.92</td>
<td>4.01</td>
<td>13.59*</td>
</tr>
</tbody>
</table>

Note. ADHD = attention-deficit/hyperactivity disorder.

*a $n = 163$.

*p < .001.
McNemar’s $p > .05$). Finally, children in both groups made numerous errors of the third type.

**Discussion**

The same patterns of performance observed in the preceding studies with the Description tasks were also found in the Narrative task: Children with ADHD symptoms always made more errors than control children, wrote shorter texts, and were judged to be poorer writers than controls. This result shows that the writing difficulties of children with ADHD symptoms do not depend on the type of writing task or on the type of instructions given. In all the present studies, and in all conditions, children with ADHD symptoms always wrote less proficiently and produced shorter texts than the control children.

In this third study, we found the same pattern of specific problems for the children with ADHD symptoms that were found in the previous studies. The only difference was that on this task, children with ADHD symptoms and controls did not differ in the number of third-type errors made. In fact, a relevant proportion of control children also made this type of errors. It is thus possible that the narrative task was more difficult for both groups, subtracting critical resources from paying attention to spelling, so that all children made third-type errors.

**GENERAL CONCLUSION**

The three studies presented here shed light on the expressive writing skills of children with ADHD symptoms—an aspect of this disorder that has been rather understudied so far. The results showed that the expressive writing performance of children described by their teachers as exhibiting ADHD symptoms was always lower than the control group’s performance under all the considered aspects (number of errors made, qualitative and objective parameters of the production). Thus, our results show that the difficulties that children with ADHD symptoms face at school are not limited to the traditionally considered areas of reading (e.g., Pisecco et al., 2001) and mathematics (e.g., Marzocchi et al., 2002), but also concern different aspects of writing. If an increase in spelling errors in children with ADHD symptoms may be associated with a reading difficulty (see Frith, 1985), the relevant difficulties faced by children with ADHD symptoms in producing an adequate, well-organized text could be due to their well-known planning and organizational difficulties (e.g., Barkley, 1995).

Concerning spelling errors, despite following the same developmen-
tential path described by the stage model (Frith, 1985; Tressoldi & Cornoldi, 1991), children with ADHD symptoms presented more of the three types of errors analyzed here (i.e., phonological, nonphonological, and third type, the latter involving last-syllable accents, which in Italian must be reported, and geminates). This type of error later disappears in all children, but is still present in children with ADHD symptoms who are attending secondary school. This evidence is consistent with a model that outlines a number of stages in learning to write, starting from the acquisition of the ability to transcribe simple words (phonological errors), then more complex ones (nonphonological errors), and finally acquiring the rules regulating accents and geminates (third-type errors). The present article focused on writing skills and, unfortunately, no information was collected on the children’s reading abilities—an issue that should be considered in future research in the area. For the children tested in Studies 2 and 3, we only had the teachers’ general rating on language abilities, which did not produce significant differences between the group of children with ADHD symptoms and the control group. However, due to the typical difficulties that children with ADHD symptoms encounter in reading (e.g., Bonafia et al., 2000) and the interaction between reading and spelling (Frith, 1985), one could predict that the children examined in the present studies should also present with reading difficulties, and the latter should have an influence on the observed spelling difficulties to produce in the child some hesitations also in the expressive writing context. In a similar vein, one could have predicted that the reading difficulties observed in preceding studies with children with ADHD symptoms could be at least partially affected by their spelling difficulties. The fact that both spelling and reading difficulties can be found leaves open the question of the nature of their frequent comorbidity with ADHD and of the potential causal links—an issue that cannot be resolved on the basis of the present data.

However, in the case of expressive writing, a negative influence of ADHD on academic performance seems clear. In fact, for children with ADHD symptoms, producing ideas, organizing concepts, and writing them down is hard work. For this reason, probably, the children with ADHD symptoms in the present studies wrote less, organized the text poorly, used a limited vocabulary, and made more errors. Usually, their text was very simple and not well articulated—more similar to a list of elements than to an organized text. The adequacy and structure of the writing of children with ADHD symptoms was particularly poor, but also for lexicon and grammar, the differences between children with ADHD symptoms and controls were dramatically evident (Studies 1, 2, and 3). The poorer lexicon of the children with ADHD symptoms was also confirmed by the greater number of repetitions and the lower number of adjectives used (Studies 2 and 3). In this respect, the present research confirms that the inclusion of adjectives in a text is associated with higher writing proficiency. The poor grammatical and syntactic qualities of the texts produced by children with ADHD symptoms are also confirmed by the less complex syntactic structure demonstrated by the lower number of subordinate clauses (Studies 2 and 3).

There are a number of issues that remain to be investigated and clarified. In particular, our observations should be replicated in contexts using more standardized procedures for the diagnosis of ADHD and its comorbid symptoms. However, we believe that a priority in future research should be given to the study of how to facilitate the writing process of children with ADHD. Thus, we think that researchers in the field should investigate ways to train and help children with ADHD to write more proficiently and in accordance with their age. Developments in this field could also take advantage of some of the results of these studies, for example the fact that ADHD children prefer verbal to pictorial prompts.

ABOUT THE AUTHORS

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NOTES

1. In these studies, we used only the teachers’ ratings. It must be noted that in Italy, no standard procedures are used for ADHD assessment and diagnosis, and medication was not permitted at the time of these studies. However, teachers had a long-term familiarity with the children and knowledge about their behavior in different contexts. Moreover, the identification of children with ADHD symptoms was checked through successive informal interviews.

2. The manual presents validation studies. Concerning the test’s psychometric properties, the manual only reports a mean test–retest reliability of .57 for the classification system of the three types of spelling errors.

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