REVISTA CEFAC
SPEECH, LANGUAGE, HEARING SCIENCES AND EDUCATION JOURNAL
Rev. CEFAC. 2016 Jul-Ago; 18(4):843-853 doi: 10.1590/1982-021620161843116

Original articles

# Main changes found in written narratives productions of children with reading/writing difficulties

## *Principais alterações encontradas nas narrativas escritas de crianças com dificuldades em leitura/escrita*

Patrícia Aparecida Zuanetti[1]
Carolina Bernardi de Novaes[1]
Kelly Silva[2]
Fabíola Mishima-Nascimento[3]
Marisa Tomoe Hebihara Fukuda[3]

[1] Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da Universidade de São Paulo, Universidade de São Paulo, USP, Ribeirão Preto, São Paulo, Brasil.
[2] Universidade Federal de Sergipe, UFS, Lagarto, Sergipe, Brasil.
[3] Faculdade de Medicina de Ribeirão Preto - Universidade de São Paulo, USP, Ribeirão Preto, São Paulo, Brasil.

Conflict of interest: non-existent

Received on: March 31, 2016
Accepted on: May 09, 2016

**Mailing address:**
Patricia Aparecida Zuanetti
Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto - USP
Av Bandeirantes, 3900,
Campus Universitário – Monte Alegre,
Ribeirão Preto (SP), Brasil
CEP: 14048-900
E-mail: pati_zua@yahoo.com.br
mafukuda@fmrp.usp.br

## ABSTRACT

**Purpose:** to analyze the writing productions of children with reading/writing difficulties.

**Methods:** this study analyzes 171 children of the 4th or 5th year of elementary school. They are divided into two groups: G1 consists of children without difficulties in reading/writing and G2 consists of children with difficulties in these tasks. Each child, after observing a figure stimulus, should write a text. This text is analyzed using a protocol and evaluate the spelling, spelling mistakes, the linguistic variables and contents.

**Results:** in the G2 we observed changes to the spelling (disorganization of the text on the sheet and lyrics with irregular size ); the highest percentage of occurrence of misspellings and others types of mistakes; same proportion in the use of nouns, adjectives and pronouns, but difficulty in verbal conjugation and use of temporal adverbs. Regarding content, the G2 children just described the scene and demonstrated limited vocabulary and poor creativity.

**Conclusion:** the writing abilities of children with difficulty in reading/writing showed several failures including: changes in spelling, presence of misspellings and limitation in building text restricting itself to simple description of the stimulus, with little articulation of ideas and no creation of characters, time and place for your story. This set of failures compromise the intelligibility of the text by the reader and demonstrates that writing development is a complex task for these children.

**Keywords:** Child Language; Language Development Disorders; Language Tests; Reading; Learning Disorders

## RESUMO

**Objetivo:** analisar as produções escritas de crianças com dificuldades em leitura/escrita.

**Métodos:** 171 crianças, matriculadas no 4º/5º do ensino fundamental constituíram dois grupos: G1 (n=50) - crianças sem dificuldades em leitura/escrita, G2 (n=121) - crianças com dificuldades nessas tarefas. Cada criança, após observar uma figura estímulo, deveria escrever um texto. Foi analisado a grafia, os erros ortográficos, as variáveis linguísticas e o conteúdo deste.

**Resultados:** em G2 observou-se alterações em relação à grafia; maior percentual de ocorrência de erros ortográficos e de diversos tipos; mesma proporção no uso de substantivos, adjetivos e pronomes, porém dificuldade na conjugação verbal e no uso de advérbios temporais. Em relação ao conteúdo, apenas descreveram a cena e demonstraram vocabulário restrito e pouca criatividade.

**Conclusão:** a produção escrita de crianças com dificuldade em leitura/escrita apresentou diversas falhas entre as quais: alterações na grafia, presença de erros ortográficos e limitação na construção de texto, restringindo-se a simples descrição do desenho estímulo, com pouca articulação de idéias e sem criação de personagens, local e tempo para a sua história. Este conjunto de falhas compromete a inteligibilidade do texto pelo leitor e demonstra que a elaboração escrita é uma tarefa complexa para essas crianças.

**Descritores:** Linguagem Infantil; Transtornos do Desenvolvimento da Linguagem; Testes de Linguagem; Leitura; Transtornos de Aprendizagem

## INTRODUCTION

Learning to read and write is a new instrument of communication and a new manner of expression[1] that permits the child to achieve new knowledge. Writing is a factor that permits the cognitive development of a person and his/her social insertion in literate societies[2].

The development of written language starts when the child, by being inserted in a literate world, comes into contact with books and stories through his parents or the school. This contact stimulates various cognitive skills which will then be improved upon achieving literacy. These skills include phonologic, lexical, morphologic, syntactic, semantic and spelling aspects of written language[2].

In research, the ability to read and write is first assessed with instruments such as dictation and the reading of words and pseudowords and later with tests that analyze sentence and text comprehension. The analysis of written narratives is little used in Brazil, with a gap existing in the national literature[3]. However, it is an instrument that provides various data about the development of written and oral language and cognitive development in children since, in order to produce texts, it is necessary to select content (semantic and pragmatic aspect) and to use a form of message transmission (written words as well as motor planning) [4].

The elaboration of written narratives demonstrates how a child articulates his ideas and how he dominates spelling. To elaborate a text, a child must know that each event has a temporal sequence, that the story must contain characters, a place and a time where it occurs, the actions occurring, as well as other aspects[5]. This demonstrates the complexity of the act of elaborating a text.

Visual support (the use of stimulus figures in order to elicit the narrative) is a strategy used for the production of written narrative texts since it facilitates the production of more coherent texts by children[6-9].

Few studies have used the elaboration of written narratives as a tool for assessment, and when they do, they only focus on the question of textual coherence[6-8,10]; or on spelling[10,11] or which condition (free theme, retelling of stories or others) leads to better text production[6,7,9,12].

The objective of the present study was to analyze handwriting, misspelling, the use of grammatical classes and the content of written narratives produced by already literate children who, however, have reading/writing difficultes.

## METHODS

### Ethical considerations and sample selection

This was a cohort study approved by the Research Ethics Committee of our institution (protocol no. 2893/2011).

The study was conducted on 171 children (95 girls and 76 boys) enrolled in the 4th or 5th grade of elementary school of the municipal network in the interior of the State of São Paulo. The participants, aged on average nine years and six months (standard deviation: 1.4), regularly attended school and were divided into two groups:

- G1 (n=50): 31 girls and 19 boys with no reading/writing difficulties as demonstrated by appropriate performance in the reading/writing tests of the School Performance Test (SPT)[13], and by a teacher's statement declaring the absence of difficulties on the part of the child regarding school activities.
- G2 (n=121): 64 girls and 57 boys with difficulties in reading/writing tasks as demonstrated by unsatisfactory performance in the reading and writing tasks of the SPT[13] and also by a report of the teacher.

Exclusion criteria were lack of consent for data collection on the part of the person responsible, age of less than nine years or more than 11 years, lack of regular school attendance, presence of syndromes impairing cognitive functions, failed hearing screening on the date of assessment, complaint of upper airway infection on the date of hearing screening, a history of speech therapy, presence of phonologic disorders, and lack of literacy.

The criteria for inclusion in G1 were: regular reading/writing performance reported by the teacher and adequate performance for age in the reading/writing subtests of the SPT[13]. The inclusion criteria for G2 were: complaint of the teacher regarding reading/writing difficulties and inadequate performance for age in the two SPT[13] test applied.

### Materials and procedures

All children were assessed individually, with the tests being applied at a single time. The children took the time they considered necessary to perform the tests.

The following procedures were performed:

- - Questionnaire answered by the teacher: the teacher of each classroom responded to the questionnaire by describing the reading/writing performance of each student and stating if the child had achieved literacy or not.

- Analysis of spontaneous conversation: used to determine the presence of phonologic dsorders, only for the purpose of exclusion.
- Hearing screening: hearing screening consisted of the examination of airway hearing thresholds at the frequencies of 500, 1000, 2000 and 4000 Hz. For this screening we used a pediatric audiometer (Interacoustics), model Pa5) with a coupled phone for the separate study of each ear. The descending method was used for this test, i.e., a sound of a given intensity was presented to the child and if the child detected it (the child raised his hand in the presence of the sound), the next sound presented was 10 dB lower. The exam was conclded when the child detected a sound at the intensity of 15 dB in two of three presentations.
- School Performance Test – SPT[13]: only the writing and reading subtests of this instrument were applied**.** the writing subtest consisted of writing one's own name and separate words presented in the form of dictation (a mximum of 35 points). The reading test consisted of the recognition of words separate from a context that ranged from disyllabic words with a simple syllabic structure to polysyllabic words with a complex syllabic structure (a maximum of 70 points). In both tests, the child scored one point for each word correctly read or written. The performance of the child in each subtask was compared to the normal standard of the test itself considering the standard of normality for age. This instrument was used to divide the chilren into G1 and G2.
- Development of a written narrative: a sheet of white paper, a pencil and an eraser were offered to the child. A plate consisting of four figures was presented as a stimulus for the development of a written narrative. The figures portrayed a person performing domestic activities (ironing clothes, washing dishes, sweeping the floor, and sewing clothes) and did not have a logical-temporal relationship with one another. The child was instructed to observe the figures and to write a story without worrying about the time it would take for this activity or about the number of words/lines. The figure was explained verbally to the child and no model for a possible narrative was proposed.

For analysis we used the Protocol for the Analysis of Written Narratives (PAES in the Portuguese acronym), a protocol proposed in the present study and described below, based on articles and texts of the Brazilian and international literature[1,2,14-16]. The protocol was divided into four parts (Appendix 1):

The first part concerned the analysis of spelling (force applied to the graphic layout, letter size, spacing between letters, inclination of the sentences and difficulty in using the spacing of the sheet). The child scored one point when there were no changes and zero when there were changes. The maximum score for this item was 6 points (the higher the scorem the better the spelling);

The second part analyzed the frequency of the various types of spelling mistakes, whch were divided into 15 categories. We initially computed how many mistakes the child made within each category (type of misspelling) and the total number of words written by the child (both correctly and incorrectly spelled words and unintelligible words). In order to compare the data between groups, the crude data were converted into percentage of occurrence. This procedure was adopted because each child was free to write narratives of any length.

The third part analyzed the presence of linguistic variables (number of nouns, adjectives, pronouns, correct and incorrect verb conjugations, temporal markers, and others). The percentage of words in each category was also used in this part.

The fourth and last part analyzed the content of the written text. This part consisted of eight items: structure of the text (presence of beginning/mddle/end), coherence of the theme (creation and outcome of the problem situation, maintenance of the characters along the narrative), adequacy of the vocabulary, presence of details of the story, creativity, intelligibility of the message of the text, use of punctuation, and title. One, half or zero point was attributed to each item. The child scored one point when he demonstrated dominance of the topic, half point when he showed partial dominance, and zero when he did not present the topic. The score for the analysis was the sum of the points obtained for all items. The maximum possible score was eight points.

In order to test the reliability of the PAES we used the strategy of analysis by various raters (a judging board consisting of three speech therapists, all of them language specialists) followed by the calculation of the Kappa index. The decision about whether the Kappa index represented weak, moderate, substantial or perfect agreement was based on the method of Landis and Koch[17].

Inter-rater assessment (test/retest) showed the following respective Kappa index values for spelling, percentage of spelling mistakes, linguistic variables and contents: **Rater 1**: 0.4 (moderate agreement); 0.4 (moderate agreement); 0.5 (moderate agreement); 0.5 (moderate agreement). **Rater 2**: 0.4 (moderate agreement); 0.8 (practically perfect agreement; 0.9 (practically perfect agreement). **Rater 3:** 0.6 (substantial agreement); 0.6 (substantial agreement); 0.6 (substantial agreement); 0.8 (practically perfect agreement).

The Kappa values detected in the inter-rater assessment were 0.4 (moderate agreement) for spelling; 0.6 (substantial agreement) for percentage of spelling mistakes; 0.6 (substantial agreement) for the linguistic variables, and 0.7 (substantial agreement) for content.

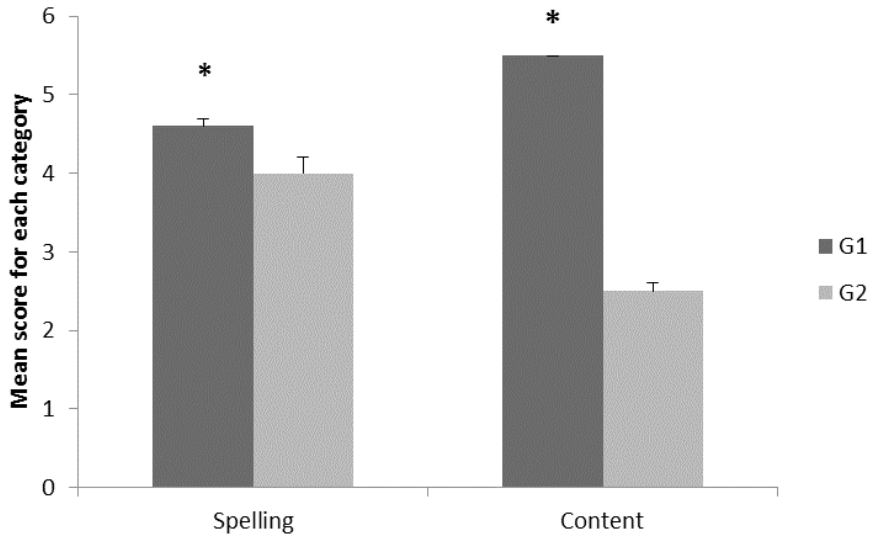
## Statistical analysis

Descriptive statistics methods were used to characterize the sample.. The Student t-test was used for statistical inference for unpaired samples with similar variance, with the level of significance set at 0.05 (α = 5%). The Kappa index was used to calculate agreement between the inter- and intra-rater assessments.

## RESULTS

The results demonstrated that G2 used a smaller number of words than G1 (G1 mean = 70 words, standard deviation 6; G2 mean = 47 words, standard deviation 27; p value = 0.0001).

There were differences between groups both in spelling and in the content of the written narratives. The scores for spelling and content are illustrated in Figure 1. G1 children obtained high contet scores, inferring feelings and events in the story, without simply describing the stimuls drawing. In addition, their texts contained various elements that permitted better intelligibility on the part of the reader. Regarding handwriting, G2 children showed problems, with difficulties mainly related to the space used on the sheet and the format of letters.




* Presence of a difference between groups (p≤0.05) – Student t-test for unpaired samples

**Figure 1.** Mean score for each group in the spelling and content categories

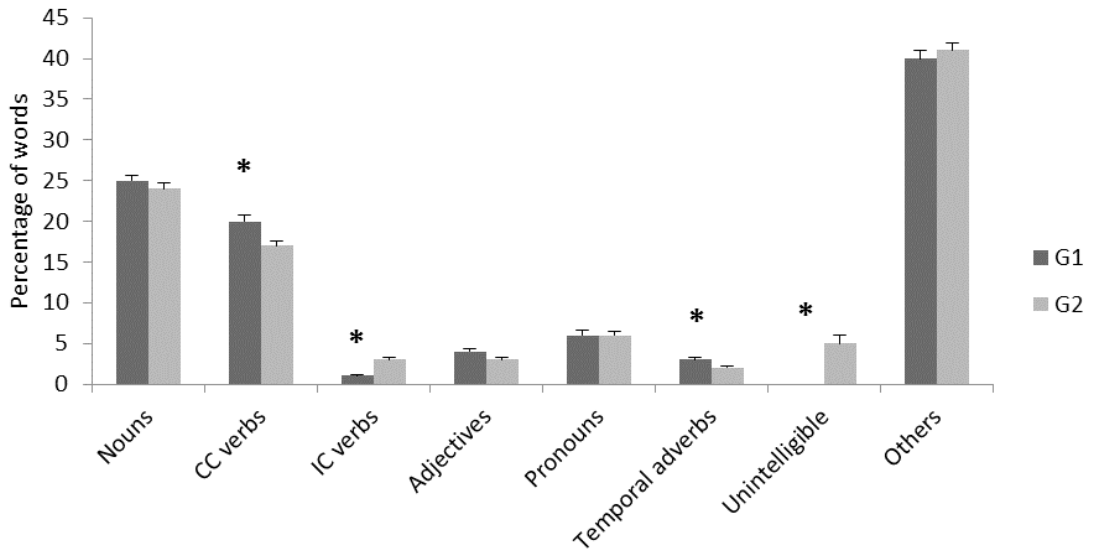
Analysis of spelling mistakes (Table 1) revealed a greater variability in the types of mistakes made in G2, as well a higher percentage of occurrence in all categories.

Linguistic variables (Figure 2) differed between groups, with G2 children showing more difficulties in verb conjugation, in the use of temporal adverbs and in the quantity of unintelligible words. There was no difference between groups regarding the percentage of nouns, pronouns or the use of other grammatical classes.

**Table 1.** Percentage of spelling mistakes detected in the written narratives of each group

| Spelling mistake | mean G1 | SD - G1 | mean G2 | SD - G2 | p value |
|---|---|---|---|---|---|
| Irregular phonographemic relation | 1.5 | 2.2 | 4 | 4.1 | 0.0001* |
| Support on orality | 1.5 | 2.1 | 3.5 | 3.8 | 0.0001* |
| Hypercorrection | 0 | 0.7 | 0.5 | 1.1 | 0.03* |
| Difficulties with markers of nasalization | 0.4 | 1 | 1.3 | 2.8 | 0.002* |
| Difficulties with accents | 2.6 | 3.3 | 4 | 5 | 0.02* |
| Omission/addition of letters in complex syllables | 0.6 | 1.4 | 5 | 5.3 | 0.0001* |
| Omission of letters in simple syllables | 0 | 0.2 | 0.2 | 1.1 | 0.05 |
| Omission of syllables | 0 | 0.3 | 0.5 | 1.9 | 0.01* |
| Errors of segmentation | 0.5 | 1.1 | 2.5 | 3.5 | 0.0001* |
| Exchange of letters according to sonority trait | 0.2 | 0.7 | 1 | 2.4 | 0.0001* |
| Confusion between am/ão | 0.3 | 1.1 | 0.3 | 1 | 0.9 |
| Inversion on the axis itself | 0 | 0 | 0 | 0 | ND |
| Inversion of position within the word | 0 | 0 | 0.1 | 1.6 | 0.9 |
| Others | 0.4 | 0 | 2 | 14.5 | 0.0001* |
| Total | 9 | 6 | 29 | 19 | 0.0001* |

* Presence of a difference between groups ($p \leq 0.05$) – Student t-test for unpaired samples
SD = standard deviation




* Presence of a difference between groups ($p \leq 0.05$) – Student t-test for unpaired samples
CC = correctly conjugated/ IC = incorrectly conjugated

**Figure 2.** Percentage of words used in the text in each grammatical class (Linguistic variables)

## DISCUSSION

The task of elaborating written narratives is a complex activity that represents the level of linguistic development in children. Narrating events in writing involves the organization of ideas, revision of the material read, and domain of the alphabetic code and of the spelling and grammatical rules. Creating stories is different from acquiring literacy, since these narrative skills derive from experience with texts and their manipulation and not simply from the ability to decode the letters. After acquiring literacy, the child still has a long path to follow[18].

Studies have stated that it is common to find children older than nine years who do not have an appropriately developed ability to create texts[9,11,16,19,20], and researchers point out that the creation of written narratives should be better explored in children with difficulties in order to provide better intervention to this population. Thus, the objective of the presnet study was to analyze various characteristics of the written narratives of these children.

The first point to be discussed is handwriting. In contrast to spelling mistakes, handwriting performance does not vary acording to progression in school[21], suggesting that changes in handwriting are not expected in children enrolled in elementary school. The present study, however, revealed different results: children with reading/writing difficulties showed changes in the tracing of letters, in how they held the pencil and in the spatial arrangement of the text on the sheet. This difficulty resulted in a lower G2 score in the "spelling" item compared to G1 (control).

Some studies have already demonstrated that children with school difficulties also show changes in spelling. A study[22] conducted on children with dyslexia and attention deficit and hyperactivity disorder demonstrated delayed in fine motor coordination in 100% of the sample, a fact that generated difficulties in tasks requiring dexterity such as spelling or tying one's shoes. Another study[14] observed signs of dysgraphia in pupils attending 6th grade of elementary school associated with various changes in learning.

The act of writing involves different skills such as fine motor control, visuomotor integration and motor planning in the dominant hand[23]. If one of these skills is impaired, the child will have difficulties with the spatial orientation of the text on the sheet (lack of margin conservation and writing in a desceding or ascending manner – "crooked line"), with general disorganization on the sheet and disorganization of the text itself[14], characterizing changes in handwriting.

Although spelling mistakes are expected to occur during the acquisition of written language, the spelling performace of the child should improve over each subsequent school year, demonstrating that the child acquired more knowledge about the use of spelling rules[24]. The permanence of these mistakes or the presence of infrequent misspellings such as letter inversion may reflect deficits that the child possesses, impairing the creation of elementary hypotheses by the child[25].

In the present study, G2 children showed wide variability of the types of misspellings and a higher percentage of their occurrence compared to G1. The types occurred in the following sequence: writing complex syllables, irregular phonographemic relationship, accents, support on orality, and segmentation. Errors due to sonority traits, difficulties in the markers of nasalization and others also occurred in the written narratives of G2 children, but in a small proportion.

These same mistakes were also the most frequent ones observed in other studies that analyzed written narratives[11,12].

Difficulty with complex syllables, the item most frequently observed in G2, and errors of support on orality indicate that there was no development of sufficient phonologic slills to guarantee the complete spelling of the words and that the child did not yet sufficiently understand that writing is not limited to phonetic transcription[25].

Errors of irregular phonographemic relation, frequently detected in G1 and G2, are among the major errors detected since the child first works with the hypothesis of absolute regularity between phoneme and grapheme and later starts to understand little by little that graphophonemic relations are not simply of a unique nature[1,26]. These errors decrease with the advance of schooling and with experience with written material.

Errors due to difficulty with accents present in both groups and those of improper word segmentation are usually detected in samples of written narratives and are less frequent in samples of word dictation[27]. The difficulty with accents appears with the increasing number of words in the text and with the advance of school grade[27] and decreases when the children master the spelling rules.

Errors of segmentation are common at the beginning of the acquisition of literacy and therefore they were only detected in G2, indicating that the children are mastering the written system of Portuguese[24].

Finally, errors of inversion in relation to the axis, inversion within the word and difficulties with simple syllabic structure did not occur in either group. These errors are considered to be of visual origin (errors of inverson or of exchange of visually similar letters). Thus, the present results agree with literature data suggesting that visual and spatial abililities are not the major factors linked to learning difficulties[26,28].

The presence of misspellings does not preclude a good text production in terms of content, a name assigned in the present study to text coherence, since even in the presence of various misspellings, the child's narrative can have characters, creation and outcome of a problem situation and description of the place/time where the story takes place. Thus, the analysis of written narrative should involve both the spelling question and text processing/metatextual consciousness[19]. Despite this dissociation in the assessment of written narratives (spelling and text processing), several studies have stated that there is a correlation between these items, with texts of better quality having fewer spelling mistakes[10], and that intervention based on story telling or on the teaching of strategies that improve written narratives indirectly help to prevent spelling mistakes[5]. This relationship between spelling performance and text processing was also detected in the present study.

Regarding content, G2 children obtained a significantly lower score than G1 children. In general, children with reading/writing difficulties simply describe the scene instead of creating a story, prepare a text with poor coherence, without creating/revealing a problem situation, have difficulty with the logical/temporal sequence, and are unable to articulate ideas or to associate moments of their daily life with the scene, thus being unable to infer feelings or actions for the characters or telling details..This causes a text produced by the child to be difficult to understand on the part of the reader by being a "poor" text with no organization of the ideas.

The main objective of studies that analyzed written narratives from the viewpoint of textual coherence was not to compare children with and without learning difficulties, although many of these investigations detected children with the ability to produce a text below the expected level. Some studies intended to compare performance between public and private school children[10,18], others investigated in which situation a text of better quality was produced (with visual support, with story telling, with a free theme and others)[7,8,9,12,18] and others only investigated children with no school difficulties[8,10,29] in order to better understand the development of this skill.

Finally, regarding the linguistic variables, there was a difference between groups in the use of temporal adverbs, difficulties in verb conjugation and percentage of unintelligible words. Studies assessing the oral narrative of children [30] or their written narrative in different school years [(10)] have also detected differences only in the use of adverbs and not in the use of nouns, adjectives or others.

Temporal adverbs are connectors rather than markers of time, i.e., they are organizers of the narrative sequence[30]. They usually appear in more elaborate written narratives or during more advanced school years[10]. Thus, it is the presence of adverbs of time associated with correct verb conjugation that differentiates the written elaboration of children with and without difficulties regarding grammatical classes. However, a doubt arises about whether there is only a difference in the percentage of presence of time adverbs and of verb conjugation because the texts of children with reading/writing difficulties are poorly intelligible.

This fact suggests that children with school difficulties are able to use most of the grammatical classes, but have difficulties in organizing the text. They produce a text with words of various grammaitcal classes but wiith little organization, with difficulties in relating the elements to one another and in using the various flexions and with erros of word position within the sentence. This suggests difficulties in morphosyntactic awareness in cases of difficulties of verb and gender flexion, or difficulties in metatextual awareness in cases of incoherent texts.

Brazilian studies analyzing the elaboration of written narratives by children are quite scarce. This emphasizes the need for new studies on the development of written narrative skills in children during the first years of elementary school and on related skills, since it is not enough to write and read words, but che child is expected to be able to understand texts and to write intelligible stories with a wealth of details that can trasmit information in a clear and objective manner.

## CONCLUSION

Children with reading/writing difficulties show various changes in writing elaboration such as:

- Handwriting characterized by faults in the spatial orientation of the text on the sheet and general disorganization of the written text;
- High occurrence of spelling mistakes of various types, the most frequent being difficulty with complex syllables, irregular phonographemic relation, difficulties with accents, and support on orality;
- Lower utilization of time adverbs, difficulty in verb conjugation and a larger number of unintelligible words compared to children with no difficulties;
- Presentation of a limited content, with only the description of the drawing offered as a stimulus. The child does not create characters and does not infer feelings/actions for them, and has difficulty in maintaining the logical-temporal sequence of the facts. They present texts with a low level of coherence;

The combination of these changes compromises the intelligibility of the text, causing considerable impairment of written communication and school performance.

## REFERENCES


1. Zorzi JL. Desvios na ortografia. In: Ferreira LP, Befi-Lopes DM, Limongi SCO (org) Tratado de fonoaudiologia. São Paulo: Roca; 2005. p. 878-91.
2. Maluf MR, Zanella MS, Pagnez KSMM. Habilidades metalinguísticas e linguagem escrita nas pesquisas brasileiras. Bol Psicol. 2006;56(124):67-92.
3. Zaboroski AP,Oliveira JP. Written narratives productions: a review of litterature emphasizing pedagogical practice. Distúrbios Comun. 2015;27(3):569-88.
4. Belinchón M, Igoa JM, Rivière A. Psicología del lenguaje. Investigación y teoría. Madrid: Trotta; 2000.
5. Costa ER, Boruchovitchb. As Estratégias de Aprendizagem e a Produção de Textos Narrativos. Psicol. Refl. Crít. 2009;22(2):173-80.
6. Lins e Silva ME, Spinillo AG. A Influência de Diferentes Situações de Produção na Escrita de Histórias. Psicol. Refl. Crít. 2000;13(3):337-50.
7. Pessoa APP, Correa J, Spinillo AG. Contexto de Produção e o Estabelecimento da Coerência na Escrita de Histórias por Crianças. Psicol. Refl. Crít. 2010;23(2):253-60.
8. Bonki E, Oliveira JP. Rural students' performance in written narratives and possible relations with profile variables. Distúrb Comum.2014;26(1):144-55.
9. Santos MJ, Barrera SD. Escrita de textos narrativos sob diferentes condições de produção. Psicol. Esc. Educ. 2015;19(2):253-60.
10. Bigarelli JFP, Ávila CRB. Habilidades ortográficas e de narrativa escrita no ensino fundamental: características e correlações. J Soc Bras Fonoaudiol. 2011;23(3):237-44.
11. Ferreira AA, Silva ACF, Queiroga BAM. Written learning and maternal education. Rev. CEFAC. 2014;16(2):446-56.
12. Carvalho e Souza ACF, Correa J. Reprodução escrita de histórias e a escrita ortográfica de crianças. Psicol. pesq. 2007;1(02):32-40.
13. Stein LM. TDE - Teste de desempenho escolar; manual para aplicação e interpretação. 1ª ed. São Paulo: Casa do Psicólogo; 1994.
14. Martinsa MRI, Bastosb JA, Cecatoc AT, Araujod MLS, Magroe RR, Alaminose V. Screening for motor dysgraphia in public schools. J Pediatr. 2013;89:70-74.
15. Silva MF. A ortografia lusofônica: breve histórico. Inf Soc Est.1994;4(1):85-9.
16. Spinillo AG, Pinto G. Children's narratives under different conditions: A comparative study. Brit J Clin Psychol. 2014;12:177-93.
17. Landis JR, Koch GG. The measurement of observer agrément for categorical data. Biometrics. 1977;33:159-74.
18. Lins e Silva ME, Spinillo AG. Uma análise comparativa da escrita de histórias pelos alunos de escolas públicas e particulares. R. bras. Est. pedag. 1998;73(193):5-16.
19. Salles JF, Corres J. A produção escrita de histórias por crianças e sua relação com as habilidades de leitura e escrita de palavras/pseudopalavras Psicol. USP. 2014;25(2):189-200.
20. Zaboroski AP, Antozczyszen S, Michelon LJ,Oliveira JP. Students' performance in written productions before and after a motion for interdisciplinar intervention. Distúrbios Comun. 2015;27(3):544-57.
21. Damasceno ESS, Avila CLB, Arnaut MA. Correlations between handwriting and spelling in Elementary School children. Distúrbios Comun.2015; 7(4):819-30.
22. Okuda PMM, Lourencetti MD, Santos LCA, Padula NAMR, Capellini SA. Coordenação motora fina de escolares com dislexia e transtorno do déficit de atenção e hiperatividade. Rev. CEFAC. 2011;13(5):876-85.

23. Adi-Japha E, Landau YE, Frenkel L, Teicher M, Gross-Tsur V, Shalev RS. ADHD and dysgraphia: underlying mechanisms. Cortex. 2007;43:700-9.
24. Ygual-Fernández A, Cervera-Mérida JF, Cunha VLO, Batista AO, Capellini AS. Avaliação e intervenção da disortografia baseada na semiologia dos erros: revisão da literatura. Rev. CEFAC. 2010;12(3):499-504.
25. Zorzi JL, Ciasca SM. Análise de erros ortográficos em diferentes problemas de aprendizagem. Rev. CEFAC. 2009;11(3):406-16.
26. Zorzi JL, Ciasca SM. Caracterização dos erros ortográficos em crianças com transtornos de aprendizagem. Rev CEFAC. 2008;10(3):321-31.
27. Capellini SA, Amaral AC, Oliveira AB, Sampaio MN, Fusco N, Cervera-Mérida JF, Ygual-Fernández A. Desempenho ortográfico de escolares do 2º ao 5º ano do ensino público. J Soc Bras Fonoaudiol. 2011;23(3):227-36.
28. Zuanetti PA, Corrêa-Schnek AP, Manfredi AKS. Comparação dos erros ortográficos de alunos com desempenho inferior em escrita e alunos com desempenho médio nesta habilidade. Rev Soc Bras Fonoaudiol. 2008;13(3):240-5.
29. Santos MAG, Hage SRV. Textual production of children without learning difficulties. CoDAS. 2015;27(4):350-8.
30. Miilher LP, Ávila CR. Variáveis linguísticas e de narrativas no distúrbio de linguagem oral e escrita. Pró-Fono. 2006;18(2):177-88.

## APPENDIX 1. (PAES) – Protocol for the Analysis of Written Narratives

1. SPELLING (a score of 0 indicates the presence of the aspect and a score of 1 indicates its absence. The higher the score, the better the performance of the child in this level)

| | ABSENT (1) | PRESENT (0) |
|---|---|---|
| **Excessively thick or too soft traces** (e.g.: when the child erases his mistake the mark of the pencil continues to be present on the sheet; excessive force when holding the pencil, or it is almost impossible to see the written word) | | |
| Excessively large or small letters | | |
| Slanted letters | | |
| **Excessive spacing of the letters** (it is not considered to be undue segmentation) | | |
| **Poor use of space on the sheet** (when writing the words of the sentence the child does not respect horizontality, showing slanting on the sheet) | | |
| **Poor use of space on the sheet** (the child does not know how to use space on the sheet, does not respect the margins and their spaces, does not use paragraphs) | | |
| Total | | |

2. PERCENTAGE OF OCCURRENCE OF SPELLING MISTAKES (divide de number of spelling mistakes by the total number of correctly and incorrectly spelled words of the text and multiply by 100; e.g.: (10/100) * 100 = 10%. NOTE: the same word may contain various spelling mistakes; compute each mistake).

| TYPE OF MISTAKE | Nº OF OCCURRENCES | % MISTAKES MADE |
|---|---|---|
| **Irregular phonographemic relationship** (a sound may be represented by different graphemes) | | |
| **Support on orality** (words are written as they are pronounced) | | |
| **Hypercorrection** (by increasingly understanding the difference between the spoken and written language the child starts to autocorrect. In this case, the child may make inappropriate generalizations to contexts where a certain rule should not be used). E.g. *resistio (resistiu)* | | |
| **Difficulty with the use of nasalization markers** (use of M at the end of words and before the graphemes *p* and *b*, use of N at the end of syllables in the middle of words) | | |
| **Difficulty with the marking of graphic accents** (the childs omits the accent or places an accent on the word in an inappropriate manner) | | |
| Omissions or additions of letters in syllables of complex structure (CVC – CCV) | | |
| Addition of letters to syllables of simple structure (CV) | | |
| **Omission of syllables** (absence of syllables that should be part of the words) | | |
| **Inappropriate segmentation** (joining or separation of words) | | |
| **Exchange of letters by sonority trait** (deaf/sonorous) | | |
| Other types of letter exchange | | |
| Confusion between “am” and “ão” | | |
| **Inversions in relation to the proper axis** (there is mirroring or rotation of letters) | | |
| **Inversions in relation to the place that should be occupied within the word** (change of position within the syllable or the word) | | |
| Unintelligible words | | |
| Total number of misspellings | | |

3. LINGUISTIC VARIABLES (divide the total number of words in each category by the total number of words of the text and multiply by 100. We will find the % of use of each category in the text)

| CATEGORY | TOTAL Nº OF WORDS | % OF THIS CATEGORY IN THE TEXT |
|---|---|---|
| **Total number of words of the text** (spelled correctly or incorrectly or repeated) | | - - - - - - - - - |
| Total number of nouns | | |
| Total number of correctly conjugated verbs | | |
| Total number of incorrectly conjugated verbs | | |
| Total number of adjectives | | |
| **Total number of pronouns** (personal, demonstrative, possessive, undefined, interrogative, relative) | | |
| **Total number and discrimination of temporal markers** (after, before, soon, today, always, sometimes, suddenly, in the morning,...) | | |
| **Others** (prepositions, other types of adverbs..) | | |
| Unintelligible words/passages | | |

4. CONTENT (when present, the item will receive a score of 1, when the student presents it sometimes it will receive a score of 0.5, when absent it will receive a score of 0. The higher the score, the better the performance of the child).

| | ABSENT (0) | ÀT TIMES (0.5) | PRESENT (1) |
|---|---|---|---|
| **Appropriate structure** (the child's story has a beginning/middle/end) | | | |
| **The story is coherent** with the visual stimulus presented (maintenance of the characters, outcome of the problem situation, description of place and time, etc) | | | |
| **Diversified vocabulary (**observe if the child uses different words or simply repeats the same words) | | | |
| The story has various details | | | |
| **Creativity** (the child infers facts/explanations/feelings that are not explicit in the figure instead of simply describing the figure) | | | |
| **The prepared text is intelligible,** i.e., even if some elements are missing, the child is able to transmit his message | | | |
| Use of punctuation | | | |
| Use of a title of the written text | | | |
| Total | | | |