

Written narrative of students with and without difficulty in syntactic awareness

Ana Claudia Constant Soares¹, Patrícia Aparecida Zuanetti², Kelly da Silva³, Raphaela Barroso Guedes-Granzotti⁴, Marisa Tomoe Hebihara Fukuda¹



¹Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (FMRP-USP). Ribeirão Preto (SP) - Brasil.

²Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (HCFMRP-USP) - Ribeirão Preto (SP) - Brasil.

³Universidade Federal de Sergipe (UFS). Campus Profº Antônio Garcia Filho - Lagarto (SE) - Brasil.

⁴Universidade Federal de Sergipe (UFS). Campus São Cristóvão - São Cristóvão/SE (SE) - Brasil

Corresponding author
pati_zua@yahoo.com.br

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Abstract

Introduction: Syntactic awareness is a metalinguistic ability defined as the child's ability to reflect on formal processes relating to the organization of words in sentences and to manipulate them. This skill is still little explored in the context of school learning, and its importance in the school learning process of Portuguese-speaking children is poorly described.

Objective: To compare written narrative between children with and without difficulty in syntactic awareness.

Methods: The study was conducted on 60 children (mean age 9.4 years; SD: 0.9) enrolled in the 4th and 5th years of elementary school in a municipal school. The subjects were divided into two groups according to their performance in the task of syntactic awareness - G1 (children with medium/high performance in syntactic awareness) and G2 (lower performance). After the assessment of syntactic awareness each child elaborated a written narrative text based on a stimulus figure. This text was analyzed by judges in terms of spelling, grammatical errors, use of grammatical classes, and content. The Student t-test ($\alpha = 0.05$) was used to compare the groups.

Results: G2 children showed altered handwriting; greater occurrence of spelling mistakes, mainly of irregular phonographic relation type; oral support and difficulty with nasal markers; short texts with preference for the use of nouns and verbs, as well as difficulties with text structuring, use of punctuation and vocabulary, while G1 used more verbs and pronouns instead of nouns.

Conclusions: Children with adequate syntactic awareness were able to elaborate written narratives with greater competence, demonstrating acquisition of orthographic aspects and development of textual coherence.

Keywords: child language, language development, narration, handwriting, learning, syntactic awareness.

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Authors summary

Why was this study done?

Several cognitive skills are evaluated within the context of school learning. Within the metalinguistic skills, syntactic awareness has been little explored, with its role in school learning being ignored until recently. The objective of the present study was to demonstrate that this metalinguistic skill is also an important variable for the development of written language and should be stimulated within the school context.

What did the researchers do and find?

The children's sample was evaluated and then divided into a group with appropriate performance in syntactic awareness and a group with inferior performance. Written narrative was later compared between these two groups.

We observed that children with reduced syntactic awareness had difficulty in elaborating a text both in terms of spelling, suggesting a lag in the development of written language, and in terms of poor text coherence.

What do these findings mean?

The findings demonstrate that this metalinguistic skill is as important for the development of written language as all the other metalinguistic skills (e.g.: phonological awareness), supporting the importance of exploring the relationship between syntactic awareness and text elaboration.

INTRODUCTION

The metalinguistic skills involve reflection about verbal production and are defined as skills with a secondary function in language, with properties that can be examined by intentional and deliberate monitoring¹. Syntactic awareness is one of these metalinguistic skills.

Syntactic awareness (SA) is defined as the ability to reflect and manipulate the syntactic structure of language and to control its application, i.e., it refers to reflection and intentional control of the formal processes related to the organization of words into sentences². SA differs from comprehension because it concerns an ability more related to the structure more than to the meaning of a sentence³.

There is a reciprocal and close relationship between written language and SA which has been analyzed in studies conducted on populations of different languages such as Portuguese³⁻⁷, Chinese⁸⁻¹¹, English^{12,13}, and Spanish¹⁴. The instruments usually employed for SA evaluation consider the child's ability to judge whether the words are properly ordered in the sentence, whether there is nominal and verbal concordance between the words², or using word categorization^{6,15}.

Studies involving SA and literacy have indicated that the syntactic-semantic skills developed are good predictors of performance in reading comprehension tasks^{3,4,8-14,16,17}. These studies have analyzed the relationship between SA and reading comprehension, but the SA and written narrative dyad (in which it is possible to observe more in depth the development of writing by analyzing the production of sentences, the use of different grammatical classes and spelling mistakes) has not yet been explored.

In view of the scarcity of studies analyzing the relationship between SA and written narrative and of the cultural importance of writing in our society, it is necessary to understand which cognitive skills are of help for this linguistic appropriation. On the basis of literature studies showing that SA is related to reading and writing performance, in the present study we started from the premise that individuals with difficulties in SA tasks will have more difficulty in constructing a written narrative. The task of elaboration of a written narrative is a complex activity¹⁸ involving aspects of oral language such as vocabulary and adequate comprehension, cognitive skills, and adequate fine motor development. Text elaboration

permits us to analyze how a child articulates his ideas and what kind of orthographic mastering he possesses¹⁹.

Thus, our objective was to analyze the written narrative of elementary schoolchildren with and without fine SA difficulties.

METHODS

This was an observational case-control study conducted on 60 schoolchildren enrolled in the 4th and 5th s of public elementary schools in a municipality of the State of São Paulo, Brazil. The children were divided into two groups according to their performance in the SA test, as follows:

- Group 1 (G1): children with SA performance appropriate for school year (n = 41; mean age: 9.4 years, standard deviation 0.7 – 53.6% girls and 63.4% enrolled in the 4th year);

- Group 2 (G2): children with altered SA performance for school year (n=19; mean age: 9.5 years, standard deviation 0.6 - 52.6% girls and 57.9% enrolled in the 4th year);

Exclusion criteria were: children with a diagnosis of intellectual deficiency or of some syndrome (children on the program of school inclusion, for example); hearing complaints; a history of therapeutic intervention for changes in oral/written language (e.g.: phonotherapy, psychopedagogy or cognitive rehabilitation); non-literate children, and children who did not cooperate with the application of the tests.

It should be pointed out that children with insatisfactory school performance or with behavioral complaints were not excluded from the study. If they were literate and if they did not have a diagnosis of intellectual deficiency/syndrome, they did participate in the study.

Data were collected during three phases. The first consisted of a survey of data regarding the children by means of a questionnaire filled out by the persons responsible. The questionnaire contained questions about gestation and birth (APGAR score, time of hospitalization, term or preterm birth, and others), neuropsychomotor and speech/language development, and a history of diseases and their respective treatments. The questionnaire was used only to verify the exclusion criteria.

The second phase consisted of the individual application of the SA test Capovilla and Capovilla¹⁵, in a quiet location, and the third included the written narrative test collectively applied in a classroom.

The Syntactic Awareness Test¹⁵ consists of four tasks assessing different categories:

I. Grammaticality Judgment: correct and incorrect sentences are presented orally. The child must indicate which sentences are correct and which are not. Three sentences are first provided as examples, with an explanation of why the sentence is correct or incorrect.

II. Grammatical Correction: incorrect sentences are presented orally and the child will have to correct them, also orally (e.g.: the examiner says “The pencil sharpened I” and the child must correct by saying: “I sharpened the pencil”). Three sentences are first provided as examples, with an explanation of why and how they would be if corrected.

III. Grammatical Correction of Sentences with Grammatical and Semantic Errors: sentences with semantic and grammatical changes are presented to the child, who should correct only the grammatical error (e.g.: the examiner says “The soil are black” and the child should respond: “The soil is black”). The child should perceive what type of grammatical error exists and correct the sentence by repeating it to the examiner in the correct manner, but without correcting the semantic error. Again, three sentences are first provided as examples, with an explanation of why the sentence is correct or incorrect and how it should be corrected.

IV. Word Categorization: 15 words are presented orally. The words correspond to a grammatical class (adjective, noun and verb) and the child must judge to which grammatical class the word belongs. Three words are first provided as examples and the category of each one is explained.

For the scoring of this test, 1 point is attributed to each item with a correct response. The maximum score is 20 points for grammatical judgment, 10 points for grammatical correction, 10 points for the grammatical correction of sentences with grammatical and semantic errors, and 15 points for word categorization, with the general score of the test being 55 points.

The criteria for the division into groups (G1 and G2) followed the reference patterns of test normality for school year according to the score obtained by each child. It should be emphasized that the pattern of normality of the test is based on school year; thus, if the child is enrolled in the 5th year of elementary school, the standard pattern to be compared refers to the 4th grade and if the child is enrolled in the 4th year, the standard table to be compared refers to the 3rd grade.

In the Written Narrative Test each child was given a standard blank sheet of paper and was asked to write a text after the presentation of four images representing a woman doing “housework” (ironing, washing dishes, sweeping, and sewing). It should be pointed out that there was no logical temporal relationship between images and that no oral elaboration was requested before the writing of the text. No time limit was imposed on this task.

The Guide for Written Narratives (PAES)²⁰ was

used for the analysis of written narratives. This instrument evaluates four aspects:

- The first part analyzes graphics on the basis of six items (force applied to the graphic tracing, letter size, letter inclination, spacing between letters, sentence inclination, and difficulty in using spacing on the sheet). According to the criteria of the protocol, the highest score is 6 points; the higher the score, the better the graphics.

- This part analyzes how many times the various types of spelling mistakes possible for the Portuguese language are made. The mistakes were divided into 15 categories. We first calculated how many mistakes the child made within each category (type of spelling mistake) and the total number of words written by the child (words written correctly or incorrectly and unintelligible words). Crude data were converted to percentage of occurrence in order to permit comparison between groups. This procedure was adopted in view of the fact that each child was free to write a narrative of any size.

- Regarding the linguistic variables (nouns, adjectives, correctly and incorrectly conjugated verbs, pronouns, temporal markers and other grammatical classes), we calculated the total number of words in the narrative (extension of the text) and the percentage of the use of each grammatical class in the text. The percentage of each category was also determined in this item.

- The fourth and last part analyzes the content of the text elaborated, which consists of eight items: text structure (presence of beginning/middle/end), coherence with the theme (creation and outcome of the problem situation, maintenance of the characters along the narrative), adequacy of vocabulary, presence of story details, creativity, intelligibility of the message of the text, use of punctuation, and title. The score attributed to each item was one, half or zero points. A full point was scored when the child demonstrated mastery of the matter, a half point when the child showed partial mastery, and zero when the child did not approach the matter. The score for the analysis was the sum of the points obtained for each item, with a maximum score of eight points.

The written narratives were analyzed by two judges, speech therapists with specialization in children’s language, who were blind to the group to which each child belonged. The Kappa index was used to assess concordance between judges, showing that agreement between them was practically perfect.

Data were analyzed for normality and a possible statistical difference in written narrative between groups with and without SA was determined by the Student t-test for unpaired samples, with the level of significance set at 0.05.

The study was approved by the Research Ethics Committee of the Institution (protocol n° 602/2014) and by the Office of the Municipal Secretary of Education of the municipality where data were collected.

■ RESULTS

Table 1 presents the results of the Syntactic Awareness Test used to form the groups, i.e., the mean performance of each group in the different subtasks of the Test.

Table 1: Mean performance of each group in each part of the Syntactic Awareness Test (SAT) (Student t-test for unpaired samples; $\alpha = 0.05$)

	Maximum score	G1		G2		p-value
		Mean	SD	Mean	SD	
P1	20 points	19.3	0.85	17.9	1.07	0.001*
P2	10 points	8.6	1.01	6.8	1.04	0.001*
P3	10 points	8.4	1.14	6.6	0.68	0.001*
P4	15 points	10.1	2.17	5.8	1.11	0.001*
Total	55 points	46.5	3.47	37.3	1.7	0.001*

P1 – grammatical judgment; P2 – grammatical correction; P3 – grammatical correction of sentences with grammatical and semantic inaccuracies; P4 – word categorization / SD = standard deviation/ * = statistically significant difference.

In G1, “low rating” was attributed to 2% of the children in the judgment test – test 1 (t1), to 4% in the grammatical correctness test (t2), to 4% in the grammatical correctness test with semantic and syntactic changes (t3), and to 2% in the categorization test. In G2, the percentage of errors in these tests was: t1 = 36%, t2 = 74%, t3 = 10%, and t4 = 63%. As described in Methods, children who obtained results within normal limits (medium and/or high performance) in this test as a whole were assigned to G1 and those classified as having “low rating” were assigned to G2 (Table 1).

Four aspects were analyzed in the written narrative based on a stimulus figure: spelling, percentage of spelling mistakes, linguistic variables, and content. The mean value for spelling was 4.3 points (standard deviation: 0.9) for G1 and 3.2 (standard deviation: 0.9) for G2. The difference between groups was significant ($p = 0.001$), with G1 showing a better performance.

The “Spelling Mistakes” in the written narratives occurred in a more significant manner in G2. The frequency of mistakes in each typology is presented in Table 2. It should be pointed out that, in this case, the higher the percentage, the worse the performance of the child (Table 2).

Table 2: Percent occurrence of spelling mistakes in writing (%) – (Student t-test for unpaired samples; $\alpha = 0.05$)

Types of spelling mistakes	G1		G2		p-value
	Mean	SD	Mean	SD	
Irregular phonographic relation	2.9	4	7.8	6	0.001*
Oral support	1.7	2	5.2	6.6	0.004*
Hypercorrection	0.2	0.6	0.7	1.2	0.04*
Confusion with nasality markers	1.2	2.1	2.7	2.9	0.04*
Failure in word accent use	1.1	1.5	2.2	3.1	0.08
Omission/addition of letters in complex syllables	0.4	1.6	1.7	3	0.03*
Omission/addition of letters in simple syllables	0.1	0.7	0.3	1	0.4
Omission of syllables	0.1	0.5	0.1	0.4	0.8
Improper segmentation	0.4	1.1	2.6	6.4	0.04*
Deaf/sound exchange	0.4	1.6	0.4	1.1	0.9
Other exchanges	0.7	1.7	1.4	2	0.1
Confusion between am/ão	0	0	0.2	1	0.1
Inversion in relation to the axis itself	0	0	0.06	0.2	0.1
Inversion of position within the word	0	0	0	0	###
Unintelligible words	0.1	1.1	0.3	1.3	0.6
Total	9.9	1.2	25.8	2.4	0.001*

SD = standard deviation/ * = statistically significant difference

Regarding performance in the item “Linguistic variables” (Table 3), significant differences were observed between groups in the use of nouns and pronouns, as well as in text extension (based on the total number of words). G1 children elaborated more extensive texts with a greater use of pronouns than G2 children, who, in turn, used a larger number of nouns. Regarding the percentage of use of each word category in the text productions, both groups

showed a lower use of adjectives, with a predominance of verbs in G1 and of the use of verbs and nouns in G2 (Table 3).

Table 4 presents the results of the “Content” item of PAES. G1 performance was characterized by significantly higher mean scores compared to G2, indicating that G1 showed better adequacy of the items analyzed in terms of content than G2 according to the protocol used (Table 4).

Table 3: Percent occurrence of linguistic variables in writing (%) – (Student t-test for unpaired samples; $\alpha = 0.05$)

Linguistic variables	G1		G2		p-value
	Mean	SD	Mean	SD	
Nouns	23.9	4.9	29.4	8.9	0.02*
Correct verbs	26.2	6	28.1	7.8	0.3
Incorrect verbs	1.3	2.4	1.4	2.9	0.9
Adjectives	2.3	2.8	2.2	1.9	0.8
Pronouns	8.6	4.5	5.5	5.3	0.03*
Time marker	9.1	5.2	7.7	5.1	0.3
Others	28.2	5.6	25.3	8.5	0.1
Unintelligible words	0	1	1	1	0.3
Total no. of words	71.2	4.6	43.7	5.2	0.009 *

SD = standard deviation/ * = statistically significant difference

Table 4: Mean score for the “content” item obtained after analysis of the written narrative (%) – (Student t-test for unpaired samples; $\alpha = 0.05$)

"Content"	G1		G2		p-value
	Mean	SD	Mean	SD	
Text structure	0.82	0.28	0.52	0.38	0.001 *
Coherence with the Theme	0.97	0.15	0.92	0.18	0.24
Adequacy of the Vocabulary	0.75	0.25	0.5	0.33	0.001 *
Use of details	0.5	0.4	0.31	0.34	0.09
Creativity	0.67	0.38	0.39	0.31	0.008 *
Intelligibility of the Text	1	0	0.89	0.26	0.04 *
Use of punctuation	0.35	0.33	0.13	0.22	0.01 *
Title	0.21	0.41	0.1	0.31	0.29
Total	5.2	0.3	3.8	0.3	0.001 *

SD = standard deviation/ * = statistically significant difference

DISCUSSION

The written narrative is an important instrument of evaluation since it provides data about the linguistic and cognitive development of children^{20,21}. It involves the selection of content (the pragmatic and semantic aspect of language), as well as the form of transmission of the message²⁰. When the transmission of the message is in writing, it is necessary for the child to be aware of the phoneme/grapheme (letter/sound) relationship, to know how to organize words by constructing sentences and, later, the text (syntactic and morphological aspects) and to master handwriting and spelling aspects.

We observed that children with SA difficulties (G2) elaborated a narrative text of reduced extension, with a higher percentage of spelling mistakes, the use of words of different grammatical classes and a poorer text in terms of “content”.

Thus, the present study demonstrates not only that SA is predictive of the ability to understand texts as confirmed by some studies^{2,4,6,8-14}, but also that children with altered SA elaborate deficient written texts, a fact suggesting that there may be a direct relationship between these items.

Analysis of the subtests assessing SA revealed that both groups had more facility (a higher mean score) in

the first task, *i.e.*, grammatical judgment. The literature considers this task to be of easy execution, with the authors pointing out that this task should not be the only one used for SA assessment since some children may only “detect a global dissonance” in the statement without actually identifying the syntactic change present in the sentence². Particularly important among the more complex tasks for G2 is word categorization. Greater difficulties with this task have also been reported in another study⁶.

G2 had a lower score in spelling, the first aspect assessed in the written narrative and exhibited more difficulty in using the space on the sheet, excessive force in writing, and disorganization of the lines, among others. So far there are no studies relating spelling ability to SA skill, although studies assessing this aspect in children with learning difficulties^{20,22}, with dyslexia or with attention deficit hyperactivity disorder (ADHD)²³ have detected altered spelling in these populations. The objective of the present study was not to determine whether G2 or G1 children had specific reading/writing difficulties, ADHD or behavioral changes, but whether the misspelling question may have been associated with the presence of comorbidities in the study population.

The children with changes in SA were also those with the higher percentage of spelling mistakes in their

written texts, demonstrating that their lack of mastery of syntax was also reflected on a lower mastery of spelling rules. Regarding the typology of the mistakes, the most frequent ones in both groups were: irregular phonographemic relationship (possibility of multiple representations), followed by support on orality and confusion in the use of nasal markers, although with a higher rate of occurrence in G2.

When the percentage and typology of the spelling mistakes of the children of the present study were compared to those of children with learning difficulties previously investigated by Zuanetti *et al.*²⁰, similar findings were observed regarding words with spelling mistakes (25%); however, with respect to typology, children with learning difficulties showed more difficulties regarding the omission/addition of letters in complex syllables, while children with syntactic difficulties showed a higher percentage of mistakes in the irregular phonographemic relation. This difference between the two populations may suggest that children with learning difficulties may show a greater delay in the development of written language than children only having SA difficulties, with the latter population consisting of children who have already mastered the idea that a syllable can show complex structures, but have not mastered the fact that our graphic system has irregularities.

The only Brazilian study that related writing to SA6 observed more frequently the error of the “improper segmentation” type and the fact that children with alteration of this skill make more hypersegmentation mistakes than children with adequate development of this skill.

Regarding the use of linguistic variables in text elaboration, it has been reported that children with no difficulty in written language preferentially use verbs and nouns, while they least use affectives^{20,24}. On the other hand, children with language disorders use adjectives more than temporal markers²⁴. Regarding the use of verbs, the same was observed in the present study, this being one of the grammatical classes more frequently used by both G1 and G2.

In the present study, comparison of the linguistic variables used by each group revealed differences in the use of nouns and pronouns, with the group without SA alteration (G1) showing a lower percentage of the use of nouns and a higher percentage of the use of pronouns, whereas the contrary (a greater use of nouns and a small percentage of pronouns) was observed in G2. This result suggests greater knowledge and mastery of the morphosyntactic rules by G1, which uses other grammatical classes to avoid the need to use or repeat some nouns.

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G1 also elaborated more extensive narratives, and studies on the Portuguese language have observed that, the larger the total number of words used in text production, the greater the possibility of the appearance of different linguistic variables^{20,25}.

The present schoolchildren who elaborated more extensive texts (children with adequate SA), were also those who showed greater adequacy in terms of content. This result suggests that more extensive texts tend to show a more developed narrative structure with a beginning, middle and end and tend to be richer in details, including characters and inferring facts and feelings. G1 children had a more diversified vocabulary, with greater creativity and the correct use of punctuation.

Regarding content, the aspect showing greater difficulty, after the use of the title, was the correct use of punctuation. A possible justification of this fact is that the remaining items evaluated (vocabulary, details, creativity and coherence) may be favored by visual clues present in the image and also by the previous experience of the subjects with the reading and writing of stories, in contrast to punctuation, which mainly depends on learned rules.

The present study, one of the few conducted on children whose main language is Portuguese, demonstrated that children with SA changes have deficits in written narrative. This result demonstrates that the writing versus SA dyad should be better investigated among our children. We suggest future studies that would evaluate how the training of SA skills would be of benefit for writing ability and if children with various conditions (e.g.: dyslexia, ADHD, emotional disorders and others) have a more developed SA skill compared to another group.

■ CONCLUSION

The present findings demonstrate that schoolchildren with an adequate development of this metalinguistic skill also showed a better text production, with a more elaborate written narrative ranging from spelling aspects to the development of text coherence.

We observed that children with SA difficulties showed a high percentage of spelling mistakes, with a typology similar to that observed in studies assessing writing in children with learning difficulties (more frequent mistakes: irregular phonographemic relationship, support on orality and confusion of nasal markers) and had difficulties with the use of pronouns, preferentially using “noun repetition” during text elaboration. They also produced short texts usually of a more descriptive nature.

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Resumo

Introdução: A consciência sintática é uma habilidade metalinguística e é definida como a capacidade da criança em refletir sobre os processos formais relativos à organização das palavras em frases e manipulá-los. Esta é uma habilidade ainda pouco explorada no contexto de aprendizagem escolar, sendo pouco descrito a sua importância no processo de aprendizagem escolar de crianças falantes do português.

Objetivo: Comparar a narrativa escrita entre crianças com e sem dificuldade em consciência sintática.

Método: Participaram 60 crianças (idade média 9,4 anos; DP: 0,9) matriculadas no 4º e 5º ano do ensino fundamental de uma escola municipal, divididas em dois grupos, de acordo com seu desempenho na tarefa de consciência sintática – G1 (crianças com desempenho médio/elevado em consciência sintática) e G2 (desempenho rebaixado). Após a avaliação da habilidade de consciência sintática, cada criança elaborou um texto narrativo escrito baseado em uma figura estímulo que foi analisado nos aspectos grafia, erros ortográficos, uso das classes gramaticais e o conteúdo. Para comparação entre os grupos usou-se o teste T – student ($\alpha = 0,05$).

Resultados: As crianças do G2 apresentaram grafia alterada; maior ocorrência de erros ortográficos, sendo estes principalmente do tipo relação fonografêmica irregular; apoio na oralidade e dificuldade com marcadores de nasalização; textos curtos com preferência do uso de substantivos e verbos, além de dificuldades com a estruturação do texto, uso de pontuação e vocabulário, enquanto que o G1 utilizou mais verbos e pronomes no lugar dos substantivos.

Conclusão: Crianças que apresentam adequada habilidade de consciência sintática conseguiram elaborar narrativas escritas com maior competência, demonstrando aquisição de aspectos ortográficos e desenvolvimento da coerência textual.

Palavras-chave: linguagem infantil, desenvolvimento da linguagem, narrativa, escrita manual, aprendizagem, consciência sintática.

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