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# Specific Language Impairment in School Age children: literature review

## Distúrbio Específico de Linguagem em Idade Escolar: revisão de literatura

## Trastorno Específico del Lenguaje en Edad Escolar: revisión de la literatura

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### Abstract

**Introduction:** There is significant damage in school learning processes resulting from specific language impairment not detected and treated in due time. Difficulties caused by this disorder may lead to persistence into adolescence and adulthood and depending on its severity, there is a probability of not being overcome. **Objective:** To conduct a systematic review of studies on the specific language impairment in children 6-14 years. **Method:** A literature review was carried out on the following databases: SciELO Chile, SciELO Brazil, ProQuest and EBSCO. The information search was undertaken from March to August 2014, taking into account the period from 2004 to 2014. Databases were searched for the following key terms: Child Language, Language Disorders and Language Development, including publications in Spanish, English and Portuguese. **Results:** After applying inclusion and exclusion criteria, the 22 articles selected showed a higher number of publications from 2011, in English, with focus on childhood and covering both cognitive and linguistic aspects. **Conclusion:** Studies with school-age subjects between 10 and 14 years old are less numerous. The review highlights the limited literature in Latin American Spanish.

**Keywords:** Child Language; Language Disorders; Language Development; Speech, Language and Hearing Sciences.

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**Authors' contributions:** APMGMK: method, organization of the article objectives, supervision of filtration and collection of descriptors in the databases, assistance in drafting the article and final review of the article text, formatting data for the journal. CFAA: data collection in the databases, analysis of the material according to the descriptors, writing the final version of the article. ADG: filtering of descriptors, collecting data in the databases, analysis of the material according to the descriptors, the final frame organization, writing the final version of the article.

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## Resumo

**Introdução:** Verifica-se importante prejuízo na aprendizagem escolar decorrente de um transtorno específico de linguagem não detectado e não tratado em tempo hábil. As dificuldades decorrentes podem persistir na adolescência e idade adulta, com maior probabilidade de não serem superadas, segundo o grau de gravidade. **Objetivo:** Realizar uma revisão sistemática de estudos sobre o distúrbio específico de linguagem em crianças de 6 a 14 anos. **Método:** A revisão de literatura efetuou-se nas seguintes bases de dados: Scielo Chile, Scielo Brasil, ProQuest e EBSCO. A busca de informações abrangeu o período entre março e agosto de 2014 e os arquivos de dados de 2004 a 2014. Os descritores utilizados foram: Linguagem Infantil, Transtornos da Linguagem e Desenvolvimento da Linguagem. Foram incluídos na pesquisa artigos em Espanhol, Inglês e Português. **Resultados:** Após a aplicação dos critérios de inclusão e exclusão, 22 artigos foram selecionados e neles se constata maior número de publicações a partir de 2011, em Inglês, infância como fase privilegiada e estudos com enfoque tanto cognitivo como linguístico. **Conclusão:** Observa-se um número reduzido de estudos com sujeitos em idade escolar entre 10 e 14 anos. Destaca-se a limitada literatura disponível em espanhol da América Latina.

**Palavras-chave:** Linguagem Infantil; Transtornos da Linguagem; Desenvolvimento da Linguagem; Fonoaudiologia.

## Resumen

**Introducción:** Se verifican daños significativos en el proceso de aprendizaje escolar si un trastorno específico del lenguaje no se detecta y se trata a tiempo. Las dificultades generadas por este trastorno pueden derivar en persistencia hasta la adolescencia y la adultez y presentar mayor riesgo de no superación según el grado de severidad. **Objetivo:** Realizar una revisión sistemática de estudios sobre el trastorno específico del lenguaje en niños de 6-14 años. **Método:** Una revisión de la literatura se llevó a cabo en las siguientes bases de datos: SciELO Chile, SciELO Brasil, ProQuest y EBSCO. Se efectuó la búsqueda de información entre marzo y agosto de 2014, teniendo en cuenta archivos de 2004 a 2014. Los descriptores adoptados fueron: Lenguaje Infantil, Trastorno del Lenguaje y Desarrollo del Lenguaje. Se incluyeron publicaciones en español, inglés y portugués. **Resultados:** Tras un análisis, posterior a la aplicación de los criterios de inclusión y exclusión, se escogieron 22 artículos en los cuales se verificó mayor número de publicaciones a partir del año 2011, en inglés, la niñez como rango etario privilegiado y estudios sobre aspectos tanto cognitivos como lingüísticos. **Conclusión:** Se observa un número reducido de estudios con sujetos en edad escolar entre los 10 y 14 años. Se destaca la limitada literatura que hay en español de Latinoamérica.

**Palabras claves:** Lenguaje Infantil; Transtornos del Lenguaje; Desarrollo del Lenguaje; Fonoaudiología.

## Introduction

The specific language impairment (SLI) is a heterogeneous diagnostic category defined as an abnormal acquisition, comprehension or expression of spoken or written language. This condition occurs in the absence of history of hearing impairment, comprehensive development disorders, neurosensory disorders, intelligence deficit, motor disorders, neurological damage or socio and family disorders, considering diagnostic procedures in different disciplines.<sup>1,2,3,4</sup>

The problem may involve all, some or one of the language system components, namely phonological, morphological, semantic, syntactic or pragmatic. Individuals with this disorder often have problems with language processing or meaningful information abstraction for storage and short and long-term memory retrieval<sup>1</sup>. Moreover, the SLI can be understood as an impairment that evidences deterioration in language skills even when environmental conditions are appropriate for normal development<sup>3</sup>, which means that difficulties may arise even in suitable environment stimulation. It is possible to deduce that this definition focuses on

the specificity of the disorder, which occurs in the absence of other difficulties.

Depending on SLI severity degree, linguistic manifestations may vary and change during language development<sup>5</sup>. Difficulties arise at different levels of spoken and written language (phonological, semantic, morphosyntactic and pragmatic)<sup>3</sup>. Multiple psycholinguistic markers are in deficit in SLI, specifically: verbal memory, auditory-phonetic recognition, phonological short-term memory, linguistic representations, phonological awareness, phonological programming, execution of articulatory praxis, knowledge and use of connective elements and morphemes, syntactic comprehension, sentence formation, access to mental lexicon and meaning, categorical organization meanings, and assertive communication and efficacy<sup>6,7</sup>.

SLI difficulties and severity may result in persistence of the disorder in adolescence and adulthood<sup>3</sup>. If not detected and treated early, it can affect the process of learning of language reading and writing skills, the adequate school stages progress and global school achievement<sup>8,9,10</sup>.

To successfully develop literacy metalinguistic skills are required, including phonological awareness, most studied in children with SLI for its importance in school years. In this regard, there has been a lower performance in tasks involving this ability. It is likely that the high incidence of this deficit specifically may be due to the fact that it has been demonstrated that phonological awareness is one of the best predictors, because it requires a decoding process, since when a grapheme represents a phoneme it facilitates word identification<sup>8</sup>. Therefore, decoding and phonological awareness are mutually required processes and for this reason learning to read should involve satisfactory oral language development since phonological awareness is manifested in orality. Other possible difficulties presented by SLI subjects involve receptive language and narrative discourse aspects, as it has been established data indicating low discursive consistency, that there is in this kind of discourse little consistency, presence of cohesion errors and deficits in text structure<sup>3,5,9</sup>.

Considering that language mediates learning, language problems clearly have negative consequences in almost all academic subjects, more specifically in mathematics. Some calculation facets depend on the use of language and therefore it can be predicted that mathematics could be complex for

children with poor language skills. Limitations in information processing, such as the ones deriving from short-term phonological memory, associate with specific language impairment. Thus, it is expected that those problems will reflect on the numeric skills development<sup>10</sup>.

The importance of SLI study at school age relies on curriculum demands at this stage. Children need a good command of oral and written language which acts as an instrument to develop thinking and a learning mediator<sup>6</sup>. That is why those subjects who have difficulties in language development present a diminished school performance, given that linguistic skills are the basis for its advancement.

A significant amount of Specific Language Impairment literature focuses on the early stages of language development and, under an educational perspective, it covers the preschool stage. The number of studies decreases as age ranges between 8 to 14 years. In addition, each year a considerable number of scientific studies are published, which may make it difficult to keep abreast of all available information. Thus, accessing major databases may expedite a literature review that comprises this period and may aid the updater information search. Synthesized data from numerous studies may be a benefit and an important support for future research on the subject.

Given the above, the present study aimed to conduct a review of literature on the specific language impairment in children from 6 to 14 years old.

## Method

A descriptive study was carried out to establish the state of art of SLI scientific research focusing on children from 6 to 14 years.

A systematic review accessed the following databases: SciELO Chile, SciELO Brazil, ProQuest and EBSCO. Searching terms as child language, language disorders, language development as well as combination and association of these terms were used for retrieving articles. The search was limited to original articles that described characteristics of cognitive and/or language skill levels in subjects aged between 6 to 14 years with SLI, published from 2004 to 2014 (considered as a relevant period after a general screen), in Spanish, English and Portuguese. Database search was conducted in the

period between March and August 2014. Exclusion criteria covered articles referring to subjects outside defined age range, studies conducted in preschool children, comparative studies without SLI language development characteristics description, articles which objectives were measuring effectiveness of assessment instruments and literature reviews

Search results were organized by author, year and journal, article objective, methods and instruments.

## Results

This review objective was to verify SLI school age children from 6 to 14 years state of art literature. After the database search, 83 articles were considered for probable inclusion and 22 of them matched inclusion and exclusion criteria as described in Table 1.

Related to year of publication, the findings showed that in the period from 2004 to 2006 none of the studies was in accordance with adopted criteria. A gradual growth in the number of publications could be verified after this period: one publication in 2007<sup>11</sup>, three in 2008<sup>5,10,12</sup>, two in 2009<sup>13,14</sup>, one in 2010<sup>15</sup>, three in 2011<sup>16,17,18</sup>, five in 2012<sup>19-23</sup>, four in 2013<sup>24-27</sup> and three in 2014<sup>28,29,30</sup>.

The search was conducted in three different languages, resulting in a total of two articles in Spanish<sup>23,28</sup>, seven in Portuguese<sup>5,10,15,18,22,24,25</sup> and thirteen in English<sup>11-14,16,17,19,20,21,26,27,29,30</sup>.

Based on the age topic, most articles mentioned information on age range. Childhood is the period covered by most studies<sup>5,10,12,14-19,21-30</sup> while adolescence was referred by three<sup>11,13,20</sup>.

As mentioned, the specific language disorder presents a wide heterogeneity of symptoms, so publications present different points of analysis thus the studies selected topics were cognitive and language abilities and / or levels of language. Studies involving cognitive approach focused more on memory<sup>15,16,19,26,27,29,30</sup>, and less on executive function<sup>13</sup> and reasoning<sup>17</sup>. Among the studies centered in the levels of language, the review presents those who favored semantic level<sup>5,14,23</sup>, pragmatic level<sup>12,25</sup>, syntactic/morph-syntactic level<sup>19,24</sup> and phonetic /phonological level<sup>10,15,18</sup>.

In addition to those studies that highlighted a particular aspect, research results demonstrated a number of them that were related to more than one as: morph-syntax and semantic<sup>22,28</sup>, cognitive skills and language levels<sup>19,21</sup>. Some authors incorporated more specific procedures related to narrative<sup>5,11,14,22,23,28</sup>, reading and writing<sup>10,18,29</sup> or verbal and nonverbal skills<sup>20</sup>.

Those results are summarized in Table 1.

**Table 1.** Articles characteristics by author, year, journal, study objective, sample, methodology / instruments and results.

<b>Wetherell D, Booting N, Conti-Ramsden G</b>	
Year /Journal	2007 International Journal of Language & Communication Disorders
Objective	To compare the two narrative genres in SLI adolescents and normal language development subjects in 4 aspects: productivity, syntactic complexity, syntax errors and factors related to performance.
Sample	118 subjects, from 13 to 15 years, a group of 19 subjects with SLI and another group of 99 subjects with typical language development.
Methodology / instruments	Subjects were evaluated through two narrative tasks: a narrative story of a given picture and a spontaneous narrative elicited by questions. Four narratives areas (productivity, syntactic complexity, syntax errors and performance) were evaluated.
Results	The SLI group with specific language impairment performed more poorly in most of narratives what is in accord with recent research that confirms that this is a long term disorder. It was also observed that a narrative story is a task significantly more difficult to perform by children with SLI than by children with typical language development. Through error analysis, it showed that the SLI group made qualitatively different types of errors compared to the group with typical language development, even within the same narrative task.
<b>Befi-Lopes DMaria, Paiva ACB, Perissinoto J</b>	
Year /Journal	2008 Pró-Fono Revista de Atualização Científica
Objective	To characterize story narrative in children with SLI regarding the narrative type and content and compare the performance with normal language development children I.
Sample	32 subjects, from 7.2 to 10.10 years; experimental group composed of 12 SLI subjects and control group composed of 12 subjects with normal language development.
Methodology / instruments	To obtain the narrative stories, children were assessed through 4 sequential scenes, in a total of 15 pictures with the objective to obtain narrative stories and to verify intentional behavior relating the characters.
Results	Children with disorders were distinguished from those with typical development, however, there were relatively few distinct patterns between children with SLI, children with specific disorder in working memory, and those with mixed disorders. Subjects with memory problems may have some difficulties with the language, and children with language disorders, had difficulties with memory.
<b>Nicolielo A, Fernandes G, Garcia, V, Hage S</b>	
Year /Journal	2008 Revista Sociedade Brasileira de Fonoaudiologia
Objective	To describe SLI subjects performance in reading, writing, arithmetic, phonological awareness and auditory sequential memory tasks. To verify positive association between school learning tasks and information processing tasks.
Sample	20 participants, from 7 to 12 years, 14 males and 5 females subjects..
Methodology / instruments	Reading, writing and arithmetic skill were evaluated with the School Performance Test. Afterward information processing was assessed with the Phonological Skills Profile (for phonological awareness), the sub-test of Sequential Hearing Memory of the Illinois Test of Psycholinguistic Abilities.
Results	Most subjects presented Disorders in all tests. The association of group performance with different tests revealed that metaphonologic skills presented a significant association with literacy; auditory sequential memory skill presented significant association with arithmetic skills.
<b>Ryder N, Leinonen E, Schulz L</b>	
Year /Journal	2008 International Journal of Language & Communication Disorders
Objective	To develop a cognitive paradigm to pragmatic assessment based on relevance theory, and to develop an instrument to identify subjects with pragmatic disorders among a SLI subjects.
Sample	99 participants, from 5.2 to 11.3 years divided in three groups: SLI group, two typical language development groups with age from 5 to 6 years and 7 to 11 years.
Methodology / instruments	The role of context was evaluated in pragmatic language comprehension questions using increasingly pragmatic verbal complexity in different contexts (sceneries with and without images and a story with supporting images).
Results	SLI group demonstrated similar performance by using context inferences and references, semantic meaning inferences and general implications only when answers were provided by the picture context. None of the three groups resulted competent in using verbal context to answer more complex pragmatic questions and children with pragmatic difficulties performed worse than other SLI subjects. Implications questions scores were used to identify with precision those who had pragmatic difficulties.

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<b>Hughes DM, Turkstra LS, Wulfeck B</b>	
Year /Journal	2009 International Journal of Language & Communication Disorders
Objective	To compare SLI adolescents qualifications in executive functions to their parents perception, and to peers with typical language development.
Sample	42 participants with age range between 11 and 18 years A group consisting of 21 SLI subjects and a group of 21 subjects with typical language development.
Methodology / instruments	Parents were assessed through BRIEF test, which indicated their perception of their SLI adolescents, by assessing cognitive, emotional and behavioral capacity. Teens with and without SLI were evaluated by the BRIEF-SR, which presents their own vision of executive performance.
Results	Adolescents of both groups rated themselves more positively than parents did. The presence of SLI was associated with more scores that are negative by all subjects. Fifty-seven percent of SLI adolescent's parents perceived executive function skills in clinically impaired range, compared with 10% of the group of subjects with typical language development.

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<b>Ukrainetz TA, Gillam RB</b>	
Year /Journal	2009 Journal of Speech, Language and Hearing Research
Objective	To investigate the elaboration of narratives in children with Specific Language Impairment.
Sample	96 participants with age range between 6 and 8 years. Experimental group consisted of 48 subjects with SLI and control consisted of 48 subjects with typical language development group.
Methodology / instruments	It was evaluated through two imaginative stories, which should contain 14 elements of expressive development (introduction, summary, topic, names etc.) into three categories (Appendix, guidance and evaluation). The children were instructed to tell the best possible story, with a beginning, development and end.
Results	Children with SLI and younger children with typical language development produced stories with a significantly smaller number of attachments, guidance, and evaluations than older children with typical language development did. Children with SLI and younger children showed a significantly lower performance even in simple elements. Children with SLI, although with a lower performance than children with typical language development, showed improvements from the first to the second story of fiction.

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<b>Befi-Lopes DM, Spinardi Pereira, AC, Paiva ACB</b>	
Year /Journal	2010
Objective	Pró-Fono Revista de Atualização Científica
Sample	To assess children with normal language development skill and with SLI to distinguish between words and non-words in a lexical decision task.
Methodology / instruments	54 participants with age range between 4.0 and 8.9 years; 29 male subjects and 21 female subjects: experimental group consisting of 18 subjects and a control group consisting of 36 subjects. Members of both groups were divided into three groups according to their receptive vocabulary.
Results	There were selected 48 tri-syllabic words, being 24 and 24 of these actual manipulated for pseudo. Three variables were considered: a) Extent of modification, b) position change, c) type of modification,. The subjects had to decide whether a phonological sequence consisted of a spoken word or not.

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<b>Archibald, LMD , Joanisse M, Edmunds A</b>	
Year /Journal	2011 Child Language Teaching and Therapy
Objective	To describe the behavior in school of SLI, specific disorder of working memory, or mixed disorder children.
Sample	12 participants with age range between 7.11 and 9.7 years; 7 subjects male and five female subjects.
Methodology / instruments	Participants were evaluated by observation in the classroom and through questionnaires on communication, working memory and attention for teachers (the Children's Communication Checklist, the working memory rating scale, the Conners Teacher Rating Scale).
Results	Children with disorders are distinguished from those with typical development; however, there are relatively few distinct patterns between children with SLI, children with specific disorder in working memory, and those with mixed disorders. The conclusions suggested that subjects with memory problems may have some difficulties with the language, and children with language disorders have difficulties with memory.

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<b>Leroy S, Parisse C, Maillart C</b>	
Year /Journal	2011 Clinical Linguistics & Phonetics
Objective	To investigate the ability of children with SLI for analogical reasoning tasks, by aligning several sequences and deduction of its relational similarity.
Sample	30 participants with age range between 9 and 13 years; 16 male subjects and 16 female subjects. Children were homogeneously distributed in two groups. A group of children with SLI and a typically developing one.
Methodology / instruments	Subjects were evaluated by various tests: measurement of IQ by WISC IV, two sub-tests of "Evaluation of oral language," the "Echelle vocabulaire en Corporel" and "Epreuve de Compréhension Syntaxico-Sémantique".
Results	All children with SLI may have problems in building more abstract schemes related to the difficulties of analogical reasoning. It was also observed that children with SLI have independent cognitive difficulties of language development
<b>Nicolielo A, Hage S</b>	
Year /Journal	2011 Revista CEFAC
Objective	To determine the incidence of alterations in written language skills and in phonological processing (PF) skills in children with SLI; to compare performance between children with SLI and children with typical language development, in terms of the different PF skills ; to check if there is an association between PF skills and written language in subjects with SLI.
Sample	40 participants with age range between 7 and 10 years; experimental group consisting of 20 subjects with SLI and control group (CG) consisted of 20 subjects with typical language development.
Methodology / instruments	Words test repetition was used to assess working memory phonological skills; Rapid Naming Automated Test to assess lexical access and phonological skills profile to assess phonological awareness. Writing and reading were evaluated by sub-tests Reading Analysis (dictation, and spontaneous writing, reading text and reading comprehension, respectively).
Results	Statistical analysis showed that the EG presented significantly lower performance in PF skills compared with Control Group. It was also noted that subjects of the CG did not show alterations in reading and writing, as well as in PF testing. It was concluded that the presence of alterations in language and writing skills and in PF skills, in patients with SLI was confirmed, with a significantly worse performance of SLI subjects than those with typical language development. The study verified an association between performance on tests of reading and writing tests and PF.
<b>Conti-Ramsden G et al</b>	
Year /Journal	2012 Journal of Speech, Language, and Hearing Research
Objective	To examine developmental trajectories of verbal and Nonverbal skills in SLI subjects
Sample	242 participants 7, 8, 11, 14, 16, and 17 years old.
Methodology / instruments	An overtime-modified discrete factor was used to examine the development path for the whole group and to identify subgroups, based on a novel development multidimensional approach.
Results	When expressive language, receptive language and non-verbal skills widened to a common indicator, the group of people with a history of SLI had a stable growth of skills throughout the period of 10 years. Seven linguistic subgroups were identified, but they differed only in severity and showed mutually different growth pattern. In contrast, 6 nonverbal skills subgroups were identified, and their trajectories differed significantly, with evidence of a slowdown in about a third of the sample. In general, people with a SLI history showed a steady language growth at age 7. However, different growth patterns of nonverbal skills are observed from childhood through adolescence.
<b>Duinmeijer I, De Jong J, Scheper A,</b>	
Year /Journal	2012 International Journal of Language & Communication Disorders
Objective	To compare the narrative skills, sustained auditory attention and verbal working memory, between children with SLI and typical language development children.
Sample	72 participants with age range between 6.1 and 9.9 years; 42 male subjects and 30 female subjects. Experimental group consisted of 34 subjects with SLI and control group consisted of 48 subjects with normal language development.
Methodology / instruments	A comparison between a task of storytelling ("The Bus Story") and a story generation task (The Frog Story) was performed. Furthermore, the sustained auditory attention (TEA-Ch) and verbal working memory (WISC digit span and the Dutch version of the CVLT-C list of words) were measured and correlations were calculated between the narrative, memory and attention scores.
Results	The comparison between groups showed that children with SLI scored significantly worse than children with typical development in the various indicators of narration, sustained auditory attention and verbal working memory. A comparison in narrative tasks scores showed a contrast between them in various narrative aspects. In addition, a correlation analysis demonstrated that, at structure level, generation in history is correlated with sustained auditory attention, while the re-telling a story is related to the list of words to remember. Average length of sentences is correlated with the sequence of digits but not to auditory sustained attention..

<b>Fortunato-Tavares T et al</b>	
Year /Journal	2012 Journal of Speech, Language, and Hearing Research
Objective	To examine the understanding of predicate and reflexive phrases understanding attached to non-adjacent words, and to evaluate if there are more memory demands on phrases containing reflexive structures and if they affect the SLI children incorrect sentences construction.
Sample	32 participants with age range between 8.4 and 10.6 years; 19 male subjects and 13 female subjects. Subjects were divided into two groups: SLI Group, consisting of 16 individuals and typical language development group, consisting of 16 subjects..
Methodology / instruments	Se realizaron dos experimentos para esta evaluación: en el experimento 1, se evaluó la comprensión de la relación entre el predicado y el sintagma nominal. En el Two experiments were conducted: in experiment 1, understanding of the relationship between the predicate and the noun phrase was evaluated; in experiment 2 understanding of reflexive and nouns that precede them were evaluated; It also examined whether the demands of working memory affected how children understand sentences incorrectly SLI.
Results	Children with SLI were significantly less accurate in all conditions. Both groups made more syntactic construction errors in condition of the long working memory than in short working memory..
<b>González D, Cáceres A, Paiva AC, Befi-Lopes DM</b>	
Year /Journal	2012 Jornal da Sociedade Brasileira de Fonoaudiologia
Objective	Check the use of conjunctions in sentences and investigate the influence of stimuli complexity on the type of combination used in both SLI and typical language development subjects..
Sample	40 participants with age range between 7 and 10.11 years; experimental group consisting of 20 subjects with SLI and control group of 20 subjects with typical language development.
Methodology / instruments	15 logical-temporal sequences were classified according to the interactions between the characters and to increasing complexity. They were classified in mechanical, behavioral (I and II) and intentional, represented by four scenes each. The narratives were analyzed in relation to the occurrence and classification of conjunctions.
Results	The analysis of the average use of conjunctions between groups revealed that both used more coordinated than subordinate conjunctions with a significant reduction of use in SLI group. A comparison between the kind of narrative and conjunctions complexity indicated that the use of conjunctions varied in the type of narrative. The performance of both groups in coordinating conjunctions hardly differed between intentional and behavioral, with a higher occurrence in the behavioral. In the case of subordinate conjunctions, the performance of children with normal development did not differ between the narratives, while in the SLI group there was a difference between mechanical and intentional, and also between behavioral and intentional, with lower occurrence of intentional.
<b>Soriano-Ferrer M, Contreras-González M</b>	
Year /Journal	2012 Universitas Psychologica
Objective	To examine differences in narrative written skills in Spanish school children with SLI and children with normal language development.
Sample	50 participants with age range between 7 and 9 years; 36 male subjects and 14 female subjects. A group consisting of 25 subjects with SLI and a group consisting of 25 subjects with typical language development.
Methodology / instruments	The subjects were evaluated using a narrative written task of the story "The rabbit and the puma." The evaluator read them twice and the subject wrote posteriorly. The texts were evaluated based on two set of measures: grammar measures and production errors.
Results	The results indicated that the two groups differed in the production of narratives. Children with SLI not only wrote more short stories, but also with less organization and coherence and with more spelling and syntax errors.
<b>Befi-Lopes DM, Pedott P, Bacchin L, Cáceres AM</b>	
Year /Journal	2013 CoDAS
Objective	To verify if there are influences of grammatical classes in average silent pauses during production of narratives in children with typical language development in children with SLI.
Sample	20 participants with age range between 7 and 10 years; subjects divided into two groups, 20 with SLI and 40 with typical language development
Methodology / instruments	Each subject developed 15 stories based on a sequence of four scenes each, with gradually increasing complexity. Following, the analysis of nouns, adjectives, verbs, conjunctions, prepositions and pronouns in the samples were identified. In a second step, the samples were subjected to a silent pauses analysis program (software /in milliseconds).
Results	Both groups presented silent pause lower duration preceding substantive and higher preceding conjunctions. Statistical analysis showed that the groups differed in all kinds of words, with an average of silent pauses higher in children with SLI.



<b>Carlino F, Da Costa MP, Marques D</b>	
Year /Journal	2013 Revista CEFAC
Objective	To assess social and pragmatic communication skills in children with SLI.
Sample	18 participants with age range between 7 and 9.11 years; experimental group consisting of 9 subjects with SLI and control group consisting of 9 subjects with typical language development.
Methodology / instruments	Pragmatic skills were evaluated in a structures interaction with an unfamiliar female adult. The interactions were videotaped. The answers were classified in categories and grouped into appropriate and inadequate responses, always according to the established communicative context. Social Communication skills were assessed through games, analyzing components of verbal content, verbal and nonverbal forms of social communication skills presence or absence.
Results	It was observed that as more limiting pragmatic skills were, worse was the initiative and interpersonal relationship performance. There was a significant difference between both groups, indicating that the experimental group has a lower performance compared to control group in pragmatic and social skills.
<b>Hesketh A, Conti-Ramsden G</b>	
Year /Journal	2013 PLOS ONE
Objective	To examine the sensitivity of repeating phrases for different subgroups of children with a history of SLI and to investigate the role of short-term memory phonological skills and morphological knowledge of repeating phrases in children with and without a history of SLI.
Sample	274 participants with age range between 7 and 11 years; the sample was divided into two subgroups: children with a history of SLI and children with typical language development
Methodology / instruments	Subjects were evaluated with the following tests: "Test of Nonword Repetition", "Past Tense morphology elicitation task" and "CELF-R, Recalling Sentences subtest"
Results	The repetition of prayers performance was significantly worse in patients with a history of SLI, when compared with their peers. A retrospective analysis revealed that learning was a predictor in the performance of typically developing children and children with a history of SLI. Memory skills performance was significantly predictive in the repetition of prayers only for children with a history of SLI.
<b>Coady JA, Mainela-Arnold E, Evans JL</b>	
Year /Journal	2013 International Journal of Language & Communication Disorders
Objective	To examine how memory affects SLI children phonological awareness and vocabulary.
Sample	32 participants with age range between 8.5 and 12.3 years; 15 male subjects and 17 female subjects, divided into two groups: subjects diagnosed with SLI and subjects with typical language development.
Methodology / instruments	The evaluation was performed with the repetition of word lists with phonological similarity, word frequency, and frequency of phonotactic pattern.
Results	SLI subjects were less affected by the similarity of words than its peers when comparing with frequency of words and frequency of phonotactic pattern.
<b>Coloma J</b>	
Year /Journal	2014 Revista Signos
Objective	To describe both the structure and causal and temporal relationships of oral narratives produced by first grade students with SLI.
Sample	39 participants with age range 6 to 8 years, 26 male and 13 female subjects divide in an experimental group consisting of 20 subjects with SLI and control group consisting of 19 subjects with typical language development.
Methodology / instruments	Narration production was evaluated through elicitation and structural analysis of children's stories as directed by Narrative Test Evaluation and then, through the test procedures for evaluating speech plus temporal and causal relationships, children's stories were analyzed.
Results	The results indicated that students with SLI, when compared with control group had significantly lower performances in structuring their stories and less causal relationships those children with typical language development. However, the amount of temporal relationships produced by the two groups was similar. Finally, it was established that there was correlation between the narrative structural aspects and content.

<b>Hage S, Nicolielo A, Guerreiro MM</b>	
Year /Journal	2014 Psychology
Objective	To compare the performance of children with SLI and children with typical language development, analyzing whether there was an association between phonological working memory (PWM) and performance in reading and writing.
Sample	44 participants with age range between 7 and 10 years; study group consisting of 22 subjects with SLI and control consisting of 22 subjects with typical language development group.
Methodology / instruments	Subjects were evaluated with phonological working memory test, to assess the number of items that each child was able to retain and retrieve from memory, immediately after the oral presentation of a list of words and digits. Subsequently reading and writing tests were used to identify the evolutionary characteristics of reading and writing at different levels.
Results	It was noted that the study group performed worse than control in all tests. Significant WMT data indicated that children with SLI had greater difficulty, thus justifying the oral language difficulties. In addition, an association between phonological memory with reading and writing was observed suggesting that literacy difficulties encountered in children with SLI may be connected, even in part, to difficulties in the PWM.
<b>Marton K, Eichorn N</b>	
Year /Journal	2014 American Psychological Association or one of its allied publishers
Objective	To study the interaction between working memory and long term memory (LTM) in children with SLI and subjects with typical language development.
Sample	45 participants were divided into three groups: the first consisting of subjects with SLI with an age range between 7.8 and 10.1 years; a second, consisting of with typical language development, matched for age corresponding to 7.9 and 10.3 years and the third group consisted of typical language development children matched for language, aged between 6.8 and 9.11 years.
Methodology / instruments	Subjects were assessed repeating words and numerical series tasks, comparing subjects with SLI with typical language development groups in order to establish control over the potential effects on the performance of vocabulary in working memory.
Results	The results suggested a strong interaction between age, the state of the language and complexity of the task. Children with specific language impairment showed a deficit in the performance of tasks and it was identified a weakness in the use of knowledge to support long-term performance of working memory. The results also showed that these children did not benefit from various strategies designed to improve performance through working memory as a support for LTM. The results show that these children do not benefit from various manipulations designed to improve performance through working memory support LTM due to a combination of inefficiencies in maintaining and updating working memory elements and LTM information retrieval, partly because of its poor interference resistance.

## Discussion

This review analyzed some aspects of current knowledge on specific language impairment in school age children, between 6 and 14 years. The number of investigations growth in the last decade was observed and most of them were conducted in English-speaking countries. In the Spanish language, there was a small quantity of studies, especially in Latin American Spanish. The number of articles in Portuguese, with emphasis on Brazilian Portuguese should be highlighted.

It is noteworthy that researchers privileged studies focused on pre I school/childhood phase. However, there was limited information on children aged 6-10 years and even less from 11 to 14 years. Authors referred to early years of schooling and in adolescence (after 15 years), leaving an information gap between these two phases, hindering

the study of the school process development and children with SLI and the proper understanding of the subject itself.

As this condition presents a wide diversity of signs, different studies show different points of analysis. In a study of working memory and SLI<sup>16</sup>, the conclusion indicated that those subjects who had language problems had difficulties with memory and vice versa. In the same context, but in relation to long-term memory and working memory, an investigation found that children with SLI had more long-term memory difficulties, specifically in phonological representation recovery through working memory<sup>30</sup>.

The revised literature presented studies that performed complex associations in relation to impaired cognitive abilities in patients with TEL, as it is the case study<sup>21</sup> in which an analysis of working memory and sustained attention was made in

a narrative task. Regarding executive function<sup>13</sup> in adolescents with SLI, authors suggested that findings, coupled with language disorders, revealed difficulties in different aspects, such as the ability to plan, to sequence, to control or to adapt to new tasks, which affected not only the subject's social sphere but also their academic performance.

From a linguistic point of view, references provided information about what happens at different levels of language during the school years and how the difficulties interacted with other cognitive skills, allowing the observation of SLI evolution and its influence on development process<sup>10,12,15,19,20,24,29</sup>.

Expanding into the pragmatic component discussion, studies showed that subjects with pragmatic deficits often have difficulty in social relationship, considering that interpersonal relationships during schooling are more varied and require more ability to adapt to distinct contexts<sup>25</sup>. The pragmatic inferences and story context comprehension were the object of one<sup>12</sup>, indicating an evident lack of investigation in the area.

The interest in narrative evaluation involves language skills that should be integrated with cognitive and social skills, so it is suggested that an alteration in narrative discourse would predict long term difficulties as described in a study<sup>11</sup> that evaluated narrative in adolescents. This research supported the theory that SLI prevails in time and therefore problems may persist throughout life. The articles centered in comprehensive and expressive narrative deficits covered narrative development assessed by discourse stimulation through images<sup>5,14,23</sup> and the conclusions led coherence disorders with tendency to short texts which could disregard important information. Research on morphosyntax and discourse were more punctual, applying specific tests, such as the use of conjunctions and temporal markers<sup>22,28</sup>. Findings did not differ from previous studies but added more strength to the knowledge that SLI subjects present poverty of language and discourse.

A research suggested<sup>13</sup> that subjects with language disorders have phonological deficits associated with working memory, condition that could affect the development of arithmetic. The metaphonologic skill is a highly studied aspect in SLI, due to its importance in literacy acquisition. A study on school performance confirmed the positive association between literacy difficulties and phonological consciousness<sup>29</sup>. Some authors<sup>18</sup>

established the relationship between difficulties in phonological processing and literacy problems since phonological awareness is one of the basis for reading and writing development and it is impaired in SLI children.

## Conclusion

Specific Language Impairment is a highly studied topic, although a small number of investigations with school-age subjects between 10 and 14 years are documented. It may be suggested that at this stage the child undergoes a transitional period, between childhood and adolescence, which generates a series of cognitive changes.

Literature indicates that childhood language difficulties affect language and cognitive development, which share a close relationship. Nowadays, it is accepted that there is continuity between SLI and learning disorders so that early language difficulties affect school performance as a whole. Literacy is one of the most influenced processes by SLI and when one recognizes its major role in school education it can be suggested that problems arising from this disorder can predict other learning processes.

A limited literature in Latin American Spanish emerged from the review. This evidence highlights a failure in specificity since the information search is accomplished in other languages, resulting in an adaptation to the Spanish of this region. Given the significance of speech pathology investigation in language disorders during different school ages, studies conducted with subjects who speak Latin American Spanish would gather relevant language data deriving in more suitable therapeutic actions.

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