DOI: 10.1590/2317-1782/201420130068

Original Article

Artigo Original

School children with low birth weight inserted in system of Embu's education: construction of sentences

Escolares nascidos com baixo peso inseridos no sistema de educação do Embu: formação de sentenças

Rebeca Rodrigues Pessoa[1,2]
Selma Mie Isotani[2]
Jacy Perissinoto[2]
Rosana Fiorini Puccini[3]

Keywords

Child Language
Infant, Low Birth Weight
Speech, Language and Hearing Sciences
Child
Language Tests
School Health

ABSTRACT

Purpose: To characterize the construction of sentences in schoolchildren born with low weight. **Methods:** We selected 413 students from Embu das Artes (SP), Brazil. Application of Recreating Speech Acts of Test of Language Competence sub-test. We analyzed the number of words and the holistic score. Age group of 6–10 years old, female/male, with low birth weight (<2,500 g) in Study Group (SG; n=238), and birth weight above or equal to 2,500 g composing the Control Group (CG; n=175). Children with anomalies were excluded. The both groups' responses were considered as well as the association of the responses with variables birth weight, gender, age of child and maternal age and education, through Student's t-test, χ^2test and linear regression. **Results:** The SG scored less on the total number of words and had worst performance in items that involved prepositions with a sense of temporality and place, with adverb functions. There was no difference between groups regarding the holistic score. It was found positive impact of the variables birth weight (p=0.002), age of child, age of mother and maternal education on standard test scores in both groups. **Conclusion:** The SG had fewer words compared to CG. The higher the birth weight, the higher the score test pattern. It was evident the age-related changes in morpho-syntactic skills addressed in the study, and protection factors mother's schooling and age had a positive impact on language performance.

Descritores

Linguagem Infantil
Recém-nascido de Baixo Peso
Fonoaudiologia
Criança
Testes de Linguagem
Saúde Escolar

RESUMO

Objetivo: Caracterizar a construção frasal de escolares nascidos com baixo peso. **Métodos:** Selecionados 413 escolares de Embu das Artes (SP). Aplicação do subteste Recriando Atos de Fala do *Test of Language Competence*. Analisou-se o número de palavras e o escore holístico. Faixa etária de 6 a 10 anos, ambos os sexos, baixo peso ao nascimento (<2.500 g) compondo Grupo Pesquisa (GP; n=238) e peso ao nascimento acima ou igual a 2.500 g compondo o Grupo Controle (GC; n=175). Excluídas as crianças com anomalias. Consideraram-se as respostas dos grupos e a associação das respostas com as variáveis peso ao nascimento, sexo, idade da criança e idade e escolaridade maternas, por meio dos testes *t* de Student, do χ^2 e regressão linear. **Resultados:** O GP obteve menor pontuação quanto ao número de palavras utilizadas e pior desempenho em itens que envolveram preposições com sentido de temporalidade e de local, com funções de advérbios. Não houve diferença entre os grupos quanto ao escore holístico. Constatou-se impacto positivo das variáveis peso ao nascimento (p=0,002), idade da criança, idade da mãe e escolaridade materna sobre a pontuação padrão do teste em ambos os grupos. **Conclusão:** O GP apresentou número menor de palavras quando comparado ao GC. Quanto mais alto o peso ao nascimento, maior a pontuação obtida. Evidenciou-se evolução relativa à idade nas habilidades morfossintáticas abordadas no estudo, e os fatores de proteção escolaridade e idade da mãe tiveram impacto positivo no desempenho da linguagem.

Correspondence address:
Rebeca Rodrigues Pessoa
Rua Botucatu, 802, Vila Clementino, São Paulo (SP), Brasil, CEP: 04023-900.
E-mail: rebecapessoa@uol.com.br

Received: 11/27/2013

Accepted: 06/30/2014

Study carried out at the Department of Speech-Language Pathology and Audiology, Escola Paulista de Medicina, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
(1) Graduate Program in Language and Speech with emphasis in Human Communication, Escola Paulista de Medicina, Universidade Federal São Paulo – UNIFESP – São Paulo (SP), Brazil.
(2) Department of Speech-Language Pathology and Audiology, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
(3) Pediatrics Department, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
Conflict of interests: nothing to declare.

INTRODUCTION

The term "developmental difficulty" can describe conditions that lead the children to the risk of developing less than expected, or situations that will cause the children to have some sort of developmental impairment, delay, disorder, or inability. The term is related to children who show limitations with regard to functioning or development to achieve their full potential, for instance, those born with low weight[1].

Low weight is characterized as a major determinant of mortality, morbidity, and inabilities during childhood, and, in the long term, it also has an impact on health during adulthood.

Low birth weight is considered when the first weight measurement of the fetus or newborn is lower than 2,500 g[2].

Low birth weight is related to numberless biological, psychosocial, and demographic factors, such as inadequate intrauterine growth, shorter gestation period or prematurity, pregnancy among women aged less than 20 years or more than 35 years, multiple pregnancies, mothers who smoke, malnourishment during pregnancy, reduced number of prenatal appointments, absence of or inadequate follow-up during pregnancy, maternal schooling, and families living with poor social conditions or in developing countries[1,3].

Many studies and discussions show that low birth weight is a risk factor for development, and it is one of the most important determinants of neonatal, perinatal, and child mortality. Studies about child development have related gestational age to weight at birth as predictive factor for the outcomes in the first years of life[4–10]. Besides, we should consider its implications on language acquisition[8,11–14], because children who live with biological risks in the early years of life are more prone to developing problems that may affect their development.

One meta-analysis considering 4,125 premature individuals (with 33 weeks of gestation or less) and/or those with very low weight (≤1,500 g) and 3,197 individuals who were born at term, from 5 to 22 years old, showed that premature individuals and/or those with very low birth weight could present with difficulties to retain information, to understand changes between mindsets, and to generate solutions to a particular problem. They can also present with severe deficit for mathematics and reading skills, as well as spelling and executive functions. According to the study, they are faced with behavioral sequels, such as symptoms of lack of attention and internalized behavioral issues. There has been significant tendency in the association between weight at birth and the scores of parents for internalized behavioral issues, as well as attention-related problems[15].

An evaluation study involving language and cognition was conducted at Hospital de Cabueñes, Gijón (2010), and at the Central University of Hospital de Asturias, Oviedo, Spain, which comprised 141 children (63 premature children and 78 children at term), with mean age of 8 years. It was observed from the study that preterm children and those with very low weight (≤1,500 g) presented significant differences concerning tests of verbal fluency when compared to those who were born at term, that is, they scored less than expected. Their scores in total intelligence quotient (IQ) tests were within normality rates, however, lower in relation to those for children born at term. These data show that prematurity associated with very low weight may cause difficulties in verbal fluency, one of the aspects of language[16].

Another study compared language skills of preterm children or those with very low weight (≤1,500 g) with 7-year-olds who were born at term, at the same age. The preterm or very low weight group had significantly worse scores than the control group in all of the subdomains of language that were tested: phonological awareness, semantics, grammar, speech, and pragmatics[17].

Stolt et al.[18] analyzed initial vocalizations and their effect on the language of children who were born with very low weight, who were assessed at the age of 2 and compared to children who were born at term (control group). The authors emphasized that initial vocalizations are significantly correlated with late language performance among children with very low weight.

Because of the risks involved in the development of children with low birth weight, especially concerning language, the hypothesis for this study is that children with low birth weight may present changes in language development, especially with regard to morphosyntactic aspects.

This study aimed mainly at characterizing sentence formation among schoolchildren with low birth weight, who were part of a municipal educational network in the city of Embu das Artes (SP). Therefore, the specific objectives were to compare language performance among students with low birth weight with that of students with adequate birth weight, and to verify the association between language performance and the following variables: birth weight, sex of the child, age of the child, and maternal age and schooling.

METHODS

Sample

This is a retrospective, case–control study, whose sample comprised 415 students aged from 6 to 10 years, both male and female students of municipal schools in Embu das Artes (SP). They were submitted to a speech language pathology and audiology evaluation and interview with the mother and/or people in charge (anamnesis), for the collection of information about the development of the children. The research ethics committee of Universidade Federal de São Paulo approved the study (CEP/UNIFESP no. 184.779).

The information analyzed in this study was obtained from the project "Morbidity, growth and development of students aged 6 to 10 years old with low birth weight — integrity and intersectoriality in child care in the local health system. Embu (SP)," conducted between 2010 and 2012 by an interdepartment team of UNIFESP, supported by the São Paulo Research Foundation (FAPESP) — Research Program for SUS: Shared Health Management (PPSUS), approved by the research ethics committee of Universidade Federal de São Paulo (CEP/UNIFESP no. 1142/09).

At that time, data were collected by a multidisciplinary team involving speech language pathologists. Parents and/or people

in charge of the participants previously authorized the use of the obtained data by signing the informed consent form. Besides, for the analysis of data in this study, the previous project conceived previous authorization so the information could be used in this study, with the Authorization Letter for Data Base Research.

Children aged between 6 and 10 years, including both genders, who presented with normal weight at birth (≥2,500 g) and those in the same age group with low birth weight (<2,500 g) were included in this study. In this study, there were 175 children with normal weight at birth, who constituted the control group (CG), and 238 children with low birth weight, who formed the research group (RG).

The sample (CG and RG) counted on 182 female and 231 male children.

With regard to age, the sample was well distributed in both groups (11.6%, <7 years old; 13.3%, from 7 to <8 years old; 25.4%, from 8 to <9 years old; 28.1%, from 9 to <10 years old; 21.5%, 10 years old or more).

The RG presented mean of 2,078 g and standard deviation of 437 g of weight at birth, with minimum of 620 g and maximum of 2,495 g. The minimum age of the mother when pregnant was 11 years, and the maximum age was 45 years, with standard deviation of 24.04 years. In the CG, the minimum age of the mother when pregnant was 15 years, and the maximum age was 40 years, with standard deviation of 17.67 years.

Both groups presented mean maternal age of 25 years. Maternal schooling in both groups was homogeneous. The schooling years of the sample were distributed as follows: 0.9%, 1 year; 12%, 2 years; 39.4%, 3 years; 33.5%, 4 years; 8.6%, 5 years; 2.2%, 6 years; 3.4%, 9 years.

Children with anomalies or morbidities were excluded. As to hearing, all of the participants in this study underwent hearing screening tests.

Procedures

The language performance of children assessed by the Test of Language Competence — Extended Edition (TLC-E) was analyzed[19]. The test was translated and adapted to Portuguese (level 1)[20]. In this study, we aimed at analyzing the performance of children in TLC-E, level 1, subtest 3: Recreating Speech Acts.

TLC-E is divided into two parts: level 1, for children aged from 5.0 to 9.11 years; and level 2, for the age group 9.11 years and more. Both levels are divided into four subtests, which are in charge of assessing each of these linguistic competence skills. At the end of each subtest, there is a qualitative analysis of the evaluator as to the behavioral observation of the child during the application of the test[19].

Subtest 3 from level 1 in TLC-E, named "Recreating Speech Acts," has the goal of assessing oral expression by the skill to plan and formulate speech acts, based on grammar, information processing, and models of speech acts, from target words related to a context established by a figure. It analyzes the organization of sentence structure as to morphosyntax, semantics, and pragmatics, besides auditory memory. It can also measure the mean length of utterance (MLU) and conduct a qualitative analysis of the speech[19].

Subtest 3 has 16 items, of which holistic scores and number of words are analyzed and separated by columns. At the end, both variables are added to obtain a raw score. This score should be converted into a standard score, weighted for the age group of the assessed child, which enables the classification of the performance in relation to the population at the same age group[19,20].

The score is considered as follows: Column 1 — holistic score (qualitative analysis of the sentence) — if the child did not make any sentence, score 0; if there is one syntactic error in the pronounced sentence, score 1; and if the child gave one correct answer, score 3. Column 2 — number of words (quantitative analysis of the sentence) — if the child did not use any given word or did not produce one sentence, score 0; if the child used one word to form a sentence, score 1; and if the child used two target words to form the sentence, score 3[19,20].

This study considered the performance in subtest 3, and the mean scores of the test were analyzed in each of the groups, by comparing the performance between them. The mean ages and gender of the children were related to the score, and intra- and intergroup data were compared. The following variables were considered: age of the mother when pregnant or age of the person in charge, maternal schooling or that of the person in charge as external factors. Data were compared to the response variables of the study.

Statistical analysis

For the sample characterization, the descriptive statistical analysis was conducted. In the analysis of qualitative variables, the absolute (n) and relative frequencies (%) were presented. For the quantitative analysis, mean and median were calculated as summarized measures. To indicate variability, standard deviation, minimum and maximum values, and means were presented.

To compare the results of each item in the holistic score, the score of the number of words, and the standard score between both groups, χ^2-test was used. To compare the total scores of the holistic score, the score of number of words, the raw score, and the standard score between both groups, Student's *t*-test was used. For all the tests, a 5% significance level was considered. Therefore, differences were considered between groups if $p<0.05$.

Also, it was important to conduct an analysis by linear and logistic regression to verify the variables with most impact on language performance, obtained in subtest 3 of TLC-E — level 1. For this analysis, the following variables were introduced in the model: gender, age, maternal age and schooling, and, concerning weight, both weight at birth and as a group (normal weight and low weight as a single group) were used. It was possible to observe there was no multicollinearity between the variables used in this study; therefore, all the variables were used in the models.

This analysis considered a 5% significance level. R^2 points out the quality adjustment of the model, and, the closer to 1, the better the adjustment. The value of $p<0.05$ shows whether the model was significant or not, and p-value for each variable shows if there are coefficients (β) in the model with values

different from 0. The software used in the analysis was the Statistical Package for the Social Sciences (SPSS), version 12.0.

RESULTS

Comparison of variables in relation to both groups of interest: normal weight and low weight

Comparison of total scores

By the results (Table 1), it was possible to observe that the only significant difference observed between groups was related to the total number of words (p<0.05), showing that children in the CG present, in average, higher scores in relation to the total number of words.

Comparison of items in the holistic score and items related to the number of words

There were no significant differences between groups in relation to any of the items (p>0.05), for the holistic score.

For the results related to the score of number of words (Table 2), it was possible to observe there were significant differences between groups in relation to the item "in the playground," in which target words were "house" and "before" (item 3), and to the item "playing hide and seek," in which target words were "behind" and "hide" (item 6) (p<0.05), showing that:

- Concerning the item "in the playground," there is higher percentage of children with score 3, that is, with maximum score in the CG than in the RG.
- With regard to the item "playing hide and seek," there is a higher percentage of children with score 3, that is, with maximum score in the CG than in the RG.

Multiple regression analysis

Significant coefficients are shown with asterisks in the tables. Afterward, the adjusted models will be shown, which presented high R^2, indicating good adjustment quality for the models in each situation.

Analysis considering weight-related information in the model

The final model was well adjusted (p<0.05), with high R^2, being interpreted as follows (Table 3):

- Every extra year in the mother's age, fixating the other variables in the model (individuals with the other characteristics being identical), increases the standard score of the test in 0.072.
- Every extra year in the mother's schooling, fixating the other variables in the model (individuals with the other characteristics being identical), increases the standard score of the test in 0.439.
- Every extra kilogram in the weight of the child at birth, fixating the other variables in the model (individuals with the other characteristics being identical), increases the standard score of the test in 0.795.

Table 1. Total score (holistic and number of words) and general total in the Test of Language Competence

	Group		p-value
	Normal weight	Low weight	
Total (holistic)			
n	175	238	
Mean	33.61	32.59	
Median	38.00	38.00	0.470
Standard deviation	13.42	14.54	
Minimum	0.00	0.00	
Maximum	48.00	48.00	
Total (number of words)			
n	175	238	
Mean	27.97	24.80	
Median	34.00	28.00	0.030*
Standard deviation	14.48	14.80	
Minimum	0.00	0.00	
Maximum	48.00	48.00	
General total			
n	175	238	
Mean	61.58	57.39	
Median	70.00	64.00	0.098
Standard deviation	24.84	25.77	
Minimum	0.00	0.00	
Maximum	94.00	92.00	
Total standard score			
n	175	238	
Mean	6.27	6.00	
Median	6.00	6.00	0.386
Standard deviation	3.00	3.11	
Minimum	0.00	0.00	
Maximum	13.00	13.00	

*Statistically significant data

Table 2. Test of Language Competence of subtest 3: items related to the number of words

	Group				p-value
	Normal weight		Low weight		
	n	%	n	%	
Item 3 (number of words)					
0	29	17.2	44	19.2	
1	24	14.2	57	24.9	0.016*
3	116	68.6	128	55.9	
Item 6 (number of words)					
0	14	8.4	48	21.4	
1	63	38.0	88	39.3	0.001*
3	89	53.6	88	39.3	

*Statistically significant data

Analysis considering the group information in the model

The final model was well adjusted (p<0.05) and with high R^2, with the following interpretation (Table 4):

- Every extra year in the age of the child, fixating the other variables in the model (individuals with the other characteristics being identical), increases the standard score of the test in 0.196.
- Every extra year in the age of the mother, fixating the other variables in the model (individuals with the other characteristics being identical), increases the standard score of the test in 0.086.
- Every extra year in maternal schooling, fixating the other variables in the model (individual with the other characteristics being identical), increases the standard score of the test in 0.503.

Table 3. Analysis considering weight information in the model

	β	p-value
Sex (male)	0.154	0.662
Age of the child (years)	0.063	0.496
Maternal age (years)	0.072	0.001*
Maternal schooling	0.439	<0.001*
Birth weight	0.795	0.002*

*Statistically significant data; p-value of the model <0.001; R^2=0.792

Table 4. Analysis considering group information in the model

	β	p-value
Sex (male)	0.195	0.584
Age of the child (years)	0.196	0.017*
Maternal age (years)	0.086	<0.001*
Maternal schooling	0.503	<0.001*
Group (normal weight)	0.368	0.333

*Statistically significant data; p-value of the model <0.001; R^2=0.789

DISCUSSION

There were no differences in the comparison of the holistic score between groups, that is, no differences with regard to the qualitative analysis of the sentence, which classifies if the child forms a sentence or not, and also if the sentence is correct in terms of syntax. This points to a similar production of the RG in relation to the CG, according to the criteria proposed by the Wiig et al.[19]. However, when the score with relation to the number of words was considered (Table 2), a higher percentage of children with maximum score in the CG was observed.

Literature has demonstrated the relationship between the number of words in the vocabulary, verbal fluency, lexical access, and morphosyntax, which is related to semantic aspects[21-25], leading to the idea that lexical competence is related with the ability of the speaker to decide on the grammar aspect of the words, as well as their proper usage in a specific context[21].

In the items that had differences ("in the playground" and "playing hide and seek"), the target words were "before" and "behind," respectively, which are prepositions that indicate time and place and work as adverbs. Adverbs should be more complex for being open and more heterogeneous, providing more mobility in the sentence. Prepositions are more closed, however, not less complex[22,26,27]. Therefore, morphosyntax would be strongly interconnected to semantic aspects, and the order of adverbs in a given sentence would be influenced by syntactic, semantic, and discursive factors[23].

It is important to consider the difficulty that these children might have to associate words and form sentences. The word "house" is usually associated with words like "bed," "family," "bedroom," and "TV"[24], at least by speakers of Portuguese. Experience with words could create a dynamic structure in the memory that would involve representations of words and their connections with other words[24], unlike the proposal presented to the children in our study, in which the target word "house" would be associated to the word "before."

Table 1 shows that children who were born with low weight used fewer words in sentences than those with normal weight at birth, that is, they used the two requested words less often. Studies show that children who were born with low weight present with changes in verbal fluency, work memory, changes in expressive language, verbal and nonverbal communication, learning problems, poor executive function, and attention-related problems[4,8,13,15,16,18,28]. These skills have impact on sentence formation. The executive functions would be strongly related to academic accomplishments and/or behavioral functioning, and may be they could explain the problems that premature children and/or those with very low weight at birth present in these domains[15].

According to literature, by assessing vocabulary and the MLU of children aged between 4 years and 6 years and 11 months, with language impairment, it was possible to observe that the expansion of expressive vocabulary has been related to the increasing use of longer sentences and to the use of closed word classes, which confirmed that the process of word acquisition is essential for syntactic development[25]. This could explain the difficulty related to the closed words "before" and "behind," which is also observed for children who were born with low weight in our study (Table 2); such difficulty could be associated to vocabulary, which would influence sentence formation and the fewer words used in sentences when compared to children with normal weight at birth (Table 1).

Studies showed that there is a relationship between auditory memory and vocabulary with reading and morphological consciousness, with strong, positive, and significant correlations between morphological consciousness and auditory memory[29]. Since children with low weight at birth could present changes in work memory[15,30] and in auditory skills[30], this could explain the reason for their inabilities to form sentences and memorize and use the target words pronounced by the evaluator, besides the reduced number of words in their sentences, emphasized in Tables 1 and 2.

In none of the regression models (Tables 3 and 4), the sex variable presented an impact on the standard score of the language test, which is in accordance with literature. It has shown differences between genders in score tests that measure total and internal problems, in attention-related symptoms, in measures of mental and language performance[9,13,14].

Table 3 shows that, when considering birth weight as the main variable in the regression model, the variables maternal age and maternal schooling years had a positive impact on sentence formation, showing that the higher the age and level of schooling of the mother, the better the performance of the child in the standard score of the test. Besides, it was observed that the heavier the weight at birth, the better the performance in sentence formation. All of these data corroborate information from literature. A study considering premature children with low birth weight showed that family income and birth conditions, as well as gestational age and weight at birth, were related to phrase extension (number of produced words), and the group with low weight had worse performance. The authors of the study observed that maternal schooling and family income had differences between the term group and the preterm low-weight group; the latter had lower family income and maternal schooling[12]. Studies comparing children with low birth weight and those with regular weight showed a slower language process among the former, and weight at birth was a critical variable for the performance in the applied language tests[10].

Still concerning the results of Table 3, our study is in accordance with literature when it comes to maternal schooling years related to the size of the fetus (including weight). This factor can also be predictive of the IQ of the child with normal and low birth weight, which is related to measures of language and cognition[11]. The socioeconomic condition can be predictive of learning problems among children who are extremely premature and with less than 1,000 g at birth[30]. Maternal schooling, family model, and socioeconomic level mostly influence children with moderately low weight at birth in relation to children with adequate weight at birth, because children with low weight would be more prone to risk for cognitive and language changes, such as attention-related problems, autism, and attention deficit disorder/hyperactivity[13].

After considering both groups (low weight and normal weight) as a single group in the linear regression model (Table 4), it was observed that the higher the age of the children, the age of the mother, and the level of maternal schooling, the better the performance in sentence formation, which is also in accordance with literature. Literature shows that the higher the age of the child and the level of maternal schooling, the better the language performance and attention-related skills[14]. Studies have shown that maternal schooling can influence the IQ and verbal intelligence quotient[11].

CONCLUSION

Children with low birth weight in this study used fewer words when compared to those with adequate weight at birth when it comes to sentence formation using presented figures and words. Children with low birth weight showed morphosyntatic difficulties in items that presented abstract and more complex target words.

Maternal schooling and age had an impact on both groups, as well as the age of the child, which were related to the performance in the test. Besides, birth weight influenced the language performance, showing that the higher the weight at birth, the better the language performance.

**RRP was in charge of data collection and tabulation, literature research for discussion, and manuscript writing; SMI collaborated with data collection and tabulation, supervised data collection, and was in charge of the project, study design and general orientation of the steps of execution, and elaboration of the manuscript; JP followed up data collection and tabulation, supervised and collaborated with data analysis, and was responsible for the project and study design, as well as the general orientation of the stages of execution and elaboration of the manuscript; RFP followed up data collection, collaborated with data analysis, and was responsible for the project and study design.*

REFERENCES

1. World Health Organization [Internet]. Developmental difficulties in early childhood: prevention, early identification, assessment and intervention in low- and middle-income countries: a review [book on the Internet]. WHO Library Cataloguing-in-Publication Data; 2012 [cited 2014 Jul 3]. Available from: http://whqlibdoc.who.int/publications/2012/9789241503549_eng.pdf
2. Organización Mundial de la Salud. Necessidades de salud de los adolescentes. Informe de um comitê Expertos de La OMS. Ginebra: OMS; 1997.
3. Muntaner C, Rocha KB, Borrell C, Vallebuona C, Ibáñez C, Benach J, et al. Clase social y salud en América Latina. Rev Panam Salud Publica. 2012; 31(2):166-75.
4. Bühler KEB, Limongi SCO, Diniz EMA. Language and cognition in very low birth weight preterm infants with PELCDO application. Arq Neuropsiquiatr. 2009;67(2-A):242-9.
5. Flabiano FC, Bühler KECB, Limongi SCO. Desenvolvimento cognitivo e de linguagem expressiva em um par de gêmeos dizigóticos: influência da síndrome de Down e da prematuridade associada ao muito baixo peso. Rev Soc Bras Fonoaudiol. 2009;14(2):267-74.
6. Lamônica DAC, Picolini MM. Habilidades do desenvolvimento de prematuros. Rev CEFAC. 2009;11(Supl 2):145-53.
7. Carlino FC, Lamônica DAC, Alvarenga KF. Assessment of receptive and expressive auditory and visual functions in ré-term children. Pró-Fono R Atual Cient. 2010;22(1):19-24.
8. Silva CA, Brusamarello S, Cardoso FGC, Adamczyk NF, Rosa Neto F. Development of low birth weight preterm infants during the first two years of life. Rev Paul Pediatr. 2011;29(3):328-35.
9. Reis ABR, Mello RR, Morsh DS, Meio MDBB, Silva KS. Desempenho mental de bebês pré-termo de muito baixo peso ao nascer: avaliação da estabilidade nos dois primeiros anos de vida e fatores associados ao desempenho mental. Rev Bras Epidemiol. 2012;15(1):13-24.
10. Ramon-Casas M, Bosch L, Iriondo M, Krauel X. Word recognition and phonological representation in very low birth weight preterms. Early Human Development. 2013;89(1):55-63.
11. Ehrenstein OS, Mikolajczyk RT, Zhang J. Timing and trajectories of fetal growth related to cognitive development in childhood. Am J Epidemiol. 2009;171:1388-95.
12. Isotani SM, Azevedo MF, Chiari BM, Perissinoto J. Expressive language of two year-old pré-term and full-term children. Pró-Fono R Atual Cient. 2009;21(2):155-60.
13. Hack M, Taylor HG, Schluchter M, Andreias L, Drotar D, Klein N. Behavioral outcomes of extremely low birth weight children at age 8 years. J Dev Behav Pediatr. 2011;30(2):122-30.
14. Ribeiro LA, Zachrisson HD, Schjolberg S, Aase H, Rohrer-Baumgartner N, Magnus P. Attention problems and language development in preterm low-birth-weight children: Cross-lagged relations from 18 to 36 months. BMC Pediatrics. 2011;11:59.

15. Aarnoudse-Moens CSH, Weisglas-Kuperus N, Goudoever JB, Oosterlaan J. Meta-analysis of neurobehavioral outcomes in very preterm and/or very low birth weight children. Pediatrics. 2009;124(2):717-28.
16. Begega A, Méndez-López M, Iscar MJ, Cuesta-Izquierdo M, Solís G, Fernández-Colomer B, et al. Assessment of the global intelligence and selective cognitive capacities in preterm 8-year-old children. Psicothema. 2010;22(4):648-53.
17. Reidy N, Morgan A, Thompson DK, Inder TE, Doyle LW, Anderson PJ. Impaired language abilities and white matter abnormalities in children born very preterm and/or very low birth weight. J Pediatr. 2013;162(4):719-24.
18. Stolt S, Lehtonen L, Haataja L, Lapinleimu H. Development and predictive value of early vocalizations in very-low-birth-weight children: a longitudinal study. Clin Linguist Phon. 2012;26(5):414-27.
19. Wiig EH, Secord W. Test of language competence – Expanded Edition. San Antonio: The Psychological Corporation; 1989.
20. Mantovani J, Perissinoto J. Caracterização da competência de linguagem e habilidades linguísticas de crianças recém-alfabetizadas [monografia]. São Paulo: Universidade Federal de São Paulo; 2004.
21. Araújo CB. O lugar das palavras na aula de língua materna. Eduser: revista de educação. 2011;3(2):60-81.
22. Secco AF. Um estudo acerca da classe de palavras conjunção no português brasileiro [tese]. Rio Grande do Sul: Universidade Federal do Rio Grande do Sul; 2011.
23. Bandoli GMD, Luquetti ECF. A ordenação dos adverbiais de tempo e o ensino de gramática sob a ótica funcionalista. In: Simpósio Internacional de Ensino de Língua Portuguesa (SIELP); 2012; Uberlândia. Anais. Uberlândia: EDUFU; 2012; 2(1).
24. Sousa LB, Gabriel R. Palavras no cérebro: o léxico mental. Letrônica. 2012;5(3):3-20.
25. Befi-Lopes DM, Nuñes CO, Cáceres AM. Correlação entre vocabulário expressivo e extensão média do enunciado em crianças com alteração específica de linguagem. Rev CEFAC. 2013;15(1):51-7.
26. Passos APS, Costa IO, Salgado OFA, Haddad VC. Adquirindo as primeiras palavras: categorias abertas e fechadas e as primeiras combinações. In: Bernardo S, Augusto MRA, Vasconcellos Z, organizadores. Linguagem: teoria, análise e aplicações, volume 6. Rio de Janeiro: UERJ; 2011. p. 228-38.
27. Rauber AL, Defendi CL. A categoria advérbio e a interface gramática e gramaticalização na aula de Língua Portuguesa. In: Simpósio Internacional de Ensino de Língua Portuguesa (SIELP); 2012; Uberlândia. Anais. Uberlândia: EDUFU; 2011; 1(1):131-41.
28. Georgsdottir I, Erlingsdottir G, Hrafnkelsson B, Haraldsson A, Dagbjartsson A. Disabilities and health of extremely low-birthweight teenagers: a population-based study. Acta Pædiatrica. 2012;101:518-23.
29. Mota MMPE. Consciência morfológica, aspectos cognitivos da linguagem e reconhecimento de palavras. Interação Psicol. 2010;15(1):21-6.
30. Taylor HG, Klein N, Anselmo MG, Minich N, Espy KA, Hack M. Learning problems in kindergarten students with extremely preterm birth. Arch Pediatr Adolesc Med. 2011;165(9):819-25.