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Metalinguistic awareness of homonymy in children with cleft lip and palate: a pilot study

ABSTRACT: Celem niniejszego badania jest ocena metajęzykowej świadomości homonimii wśród dzieci z rozszczepem wargi i podniebienia. Dokonano zestawienia wyników z ich zdolnościami ekspresji i odbioru mowy. Badanie objęło 13 osób z rozszczepem wargi i podniebienia, w średnim wieku 10,9 (w przedziale od 9,5 do 12 lat). Wszyscy pacjenci poddani byli identycznemu protokołowi chirurgicznemu. Adekwatna do wieku językowa świadomość homonimii została zaobserwowana u większości dzieci. U niektórych spośród badanych z rozszczepem wargi i podniebienia pojawiły się specyficzne problemy z metajęzykowym uczeniem się – mające związek bądź nie z problemami z rozumowaniem przez wnioskowanie i zdolnością do rozumienia na poziomie zdania. Te odkrycia poświadczają, że wczesna ocena i leczenie specyficznej metajęzykowej świadomości dzieci z rozszczepem wargi i podniebienia sprzyjają zapobieganiu opóźnień lub problemów w nauce drugiego języka w ostatniej klasie szkoły podstawowej.

KEY WORDS: świadomość metajęzykowa, homonimia, rozszczep wargi i podniebienia, bierny język, odbiór i nadawanie mowy

Introduction

The ability to not just use language as a tool, but rather to internally reflect on it and to treat it as an object of study is known as the metalinguistic dimension of language development¹. The capacity to deal with language on a metalinguistic level emerges very gradually and relatively late in the course child language development. Metalinguistic skills are related to several other aspects of develop-

¹ P. CORTHALS: *Nine-to twelve year olds' metalinguistic awareness of homonymy*. "Journal Lang Commun Disord" 2010, No. 45, p. 121–128.

ment such as learning to read and write², dealing with idiom³, figurative language, metaphors, humour⁴, grammaticality judgments⁵ and polysemy and homonymy⁶. The metalinguistic abilities that are brought to bear in coping with homonyms (i.e., words having multiple unrelated meanings) are interesting because they relate to academic achievement and second language learning. Corthals⁷ assessed the acquisition of metalinguistic abilities associated with homonym processing in 801 typically developing children in the fourth, the fifth and the sixth or final grade of regular elementary school (mean age of 10.5 years). It was found that the ability to define a word correctly as homonymous clearly develops rather late in the course of language development and that significant progress is still being made during the final years of elementary school. However, children were very accurate in identifying pseudowords as meaningless items. The measurement protocol for homonym processing used by Corthals⁸ has some potential as a tool to identify low achievers in need of therapy, like children with cleft lip and palate.

Several studies have demonstrated a relatively high occurrence of language impairments throughout the preschool years⁹ in children with cleft lip and palate. These language impairments include delays in onset and progression of vocabulary, syntax and morphological skills¹⁰. However, contradictory findings are reported regarding the course of these language delays. Whereas some studies suggest that early delays disappear by the time children reach school age¹¹, others reported persisting delays that affect social and academic performance¹². To the

² H. CATTS: *The relationship between speech-language impairments and reading disabilities*. "Journal Speech Hearing Res" 1993, No. 36, p. 948–958; P. MENYUK, M. CHESNIK, L. WEIS, B. KORNGOLD, R. D'AGOSTINO, A. BELANGER: *Predicting reading problems in at risk children*. "Journal Speech Hearing Res" 1991, No. 34, p. 893–903.

³ M. NIPPOLD, C. TAYLOR: *Idiom understanding in youth: further examination of familiarity and transparency*. "Journal Speech Hearing Res" 1995, No. 38, p. 426–433.

⁴ C. SPECTOR: *Linguistic humour comprehension of normal and language-impaired adolescents*. "Journal Speech Hearing Disord" 1990, No. 55, p. 533–541.

⁵ J. SUTTER, C. JOHNSON: *School-age children's metalinguistic awareness of grammaticality in verb form*. "Journal Speech Hearing Res" 1990, No. 33, p. 84–95.

⁶ C. JOHNSON, M. IONSON, S. TORREITER: *Assessing children's knowledge of multiple meaning words*. "Am Journal Speech Lang Pathol" 1997, No. 1, p. 77–86.

⁷ P. CORTHALS: *Nine-to twelve year olds...*, p. 121–128.

⁸ *Ibidem*.

⁹ *Ibidem*; L. RICHMAN, M. ELIASON: *Disorders of communication: developmental language disorders and cleft palate*. In: *Handbook of clinical child psychology*. Eds. E. WALKER, M. ROBERTS. New York, Wiley 1995.

¹⁰ P. CORTHALS: *Nine-to twelve year olds...*

¹¹ N. SCHERER, L. D'ANTONIO: *Language and play development in toddlers with cleft lip and/or palate*. "Am Journal Speech Lang Pathol" 1997, Vol. 6, p. 48–54.

¹² C. SPECTOR: *Linguistic humour comprehension of normal and language-impaired adolescents*. "Journal Speech Hearing Disord" 1990, Vol. 55, p. 533–541; L. SNYDER, N. SCHERER: *The development of symbolic play and language in toddlers with cleft palate*. "Am Journal Speech Lang Pathol" 2004, Vol. 13, p. 66–80; S. STOTHARD, M. SNOWLING, D. BISHOP, B. CHIPCHASE,

best of our knowledge, metalinguistic skills in children with cleft lip and palate have not been documented yet. Assessment of metalinguistic skills in children with cleft lip and palate is critical to proper patient care since these skills are related to academic achievement and second language learning.

The main purpose of this study is to assess the specific metalinguistic awareness of homonymy in children with cleft lip and palate at the age when children start to learn a second language, as well as their overall expressive and receptive language abilities. The second purpose is to compare these metalinguistic abilities of children with cleft lip and palate with the normative data for Dutch-speaking children and an age- and gender-matched control group as suggested by Broen et al.¹³. Based on the available literature regarding language development in cleft lip and palate children, decreased metalinguistic abilities in coping with homonyms are hypothesized.

Methods and materials

This study was approved by the human subject committee of the University Hospital of Ghent, Belgium (PA 2010/012).

Subjects

Fifteen subjects responded positively to participate in this study. The subjects were all between 10 and 12 years. They had isolated cleft lip and palate, no secondary pharyngeal surgery, no cognitive deficiency, no neuromotor dysfunction or residual hard palate fistula, and hearing thresholds better than 20 decibels hearing level in the poorer ear. Two subjects were excluded: one was outside the age bracket of the Corthals¹⁴ norms and the other one was not a native speaker of Dutch. The remaining 13 subjects (9 boys and 4 girls) had a mean age of 10.9 years (range 9.5–12 years) and were attending the 4th, 5th or 6th grade of the six grades in the Belgian elementary school system. Four children had a bilateral cleft lip and palate and 9 had a unilateral cleft lip and palate. All patients consulted

C. KAPLAN: *Language-impaired preschoolers: a follow-up into adolescents*. "Journal Speech Hearing Res" 1998, Vol. 41, p. 407–418.

¹³ P. BROEN, K. MOLLER, J. CARLSSTROM, S. DOYLE, M. DEVERS, K. KEENAN: *A comparison of the hearing histories of children with and without cleft palate*. "Cleft Palate Craniofac Journal" 1996, Vol. 33, p. 127–133.

¹⁴ P. CORTHALS: *Nine-to twelve year olds...*

the same craniofacial team¹⁵ and had undergone an identical surgical protocol. Surgical closure of the lip was performed using a modified Millard technique without primary nose correction at an average age of 5.4 months (range 3–5.11 months). The cleft palate had been closed using one-stage Wardill-Kilnerpalatoplasty at an average age of 13 months (range 11.8–23.8 months). All patients had been operated by the same surgeon and with the same surgical technique in the same conditions. At an average age of 8.01 years (range 7.12–11.3 years), bone grafting (preceded by orthodontic treatment) was performed. Six children had speech therapy for a minimum of 9 months, twice a week. The goals of speech therapy were to establish correct phonetic placement and to eliminate compensatory articulations or developmental errors.

Methods

The original homonym mastery test used by Corthals¹⁶ was used to assess metalinguistic skills. The instructions and actual tests items were incorporated in a computer presentation. All items were presented simultaneously in writing and as a spoken word. There were 60 items (21 words having only one literal meaning, 19 homonyms and 20 pseudowords) and four example items (Appendix 1). The task was to assign each word to one of three possible categories: a “no literal meaning” category (for words like “flons”), a category of words having just one literal meaning (like the word “hart”; meaning “heart”; only tangible, visible, or audible referents were relevant) and, finally, a category of words having more than one literal meaning (like the word “bloem”; meaning “flower” or “flour”). The final score was determined on the basis of 20 specific items that were chosen from the original set of 60 after an item analysis, using their item-total correlation and their discriminating power as criteria. As a result, the final score reflected the underlying ability that is tested. However, in order not to change the equal proportion of each of the three categories during the test, all 60 items are presented. Instructions were given by means of four example items. During the presentation of the four example items, the child was allowed to ask questions and to finish each of the four assignments completely before the next item was presented, but the child was notified when the actual test time limit was reached (10 seconds per item). After the instruction phase, blank response sheets were distributed and

¹⁵ K. VAN LIERDE, S. MONSTREY, K. BONTE, P. VAN CAUWENBERGE, B. VINCK: *The long-term speech outcome in Flemish young adults after two different types of palatoplasty*. “Journal Pediatr Otorhinolaryngol” 2004, Vol. 68, p. 865–875; K. VAN LIERDE, A. LUYTEN, J. VAN BORSEL, N. BAUDONCK, T. DEBUSSCHERE, H. VERMEERSCH, K. BONTE: *Speech intelligibility of children with unilateral cleft lip and palate following a one-stage Wardill-Kilnerpalatoplasty, as judged by their parents*. “Journal oral maxillofac” 2010, Vol. 39, p. 641–646.

¹⁶ P. CORTHALS: *Nine-to twelve year olds...*

actual testing began. All 60 items were presented at a constant pace of one per 10 seconds. The final scores were transformed to percentile ranks, using data from typically developing children with the appropriate age and gender in the Corthals¹⁷.

Overall expressive and receptive language development level was tested using the Taaltestvoor Kinderen¹⁸, a Dutch language battery designed for children between 4 and 10 years of age that assesses sentence comprehension, sentence expression, word comprehension, word expression and inferential understanding.

Statistical analysis

Descriptive statistics were used to describe the language results regarding metalinguistics, word and sentence expression/comprehension and inferential understanding. A Chi-square test was used to compare the cleft palate children and the children without a cleft palate. Statistical analysis was performed using SPSS 14.0 windows. Significance level was set at $\alpha = 0.05$. The Corthals¹⁹ data set, derived from 966 typically developing children, was used to establish control data for homonym mastery. For each child with cleft palate, an age- and gender-matched subgroup of control subjects attending the same grade in elementary school was identified, and this subgroups' average score was used for comparison. Mann-Whitney U tests were performed to evaluate differences in homonym mastery results.

Results

Homonym mastery in children with cleft palate

The results of the test for homonymy are presented in table I. The mean total score on the test for homonymy was 13/20 corresponding with a percentile rank of 60. The majority (8 out of 13) had a percentile rank above 50. Among the five children scoring below percentile rank 50, the lowest percentile rank found was 30 (for two children). According to the Mann-Whitney U test, there was no significant difference between scores of the cleft palate children and those of the matched control group.

¹⁷ Ibidem.

¹⁸ W. VAN BON, J. HOEKSTRA: *Taaltests voor Kinderen*. Lisse, Swets & Zeitlinger 1982.

¹⁹ P. CORTHALS: *Nine-to twelve year olds...*

Expressive and receptive language skills

The results regarding the expressive and receptive language skills are provided in table II. The mean total scores on the sentence comprehension/expression subtests were 36/37, and 24/30 respectively, corresponding with percentile ranks 73, and 60 respectively. All subjects (10/10) had a percentile rank above 50 on the subtest sentence comprehension. A clear majority (7 out of 10) had a percentile rank above 50 on the subtest sentence expression.

The mean total scores on the word comprehension/expression were 35/40 for both subtests, corresponding with percentile ranks 60 for word comprehension and 66 for word expression. A majority of 7 out of 10 had a percentile rank above 50 on the subtest word comprehension and expression.

The mean total score for the inferential understanding subtest was 30/33, corresponding with percentile rank 70. Almost all children (13 out of 15) had a percentile above 50.

Performance levels for expressive and receptive language skills did not seem to be related to homonym mastery scores, except for sentence comprehension, in that children scoring above percentile rank 50 for homonym mastery scored significantly better (Mann-Whitney U test, $p < 0.05$) for this subtest than those scoring below that level.

Discussion

The present study investigated metalinguistic awareness of homonymy in 13 children with isolated cleft lip and palate. All children attended either the fourth, fifth or the sixth grade of regular elementary school, i.e. the years during which major progress in metalinguistic skills is expected to happen²⁰. All children consulted the same craniofacial team, had undergone an identical surgical protocol, had no residual hard palate fistula, and had hearing thresholds better than 20 decibels hearing level in the poorer ear.

The metalinguistic awareness of homonymy in this group of 13 children with cleft lip and palate was age appropriate (mean percentile rank 60) with more than half of the group having a percentile rank above 50. Both word and sentence comprehension and expression abilities as well as inferential understanding were assessed and more than age appropriate levels were found.

Taken as a group, this cohort of cleft palate children do not significantly differ from their typically developing peers when it comes to the language development

²⁰ Ibidem.

indices that were investigated. Nevertheless, some individual children do seem to have problems with this specific language skill. Two children scoring at the lowest percentile rank (i.e. rank 30) for metalinguistic awareness of homonyms also had the lowest sentence comprehension scores and one of them had quite a low score (percentile rank 36) for inferential understanding. It is not surprising that poor levels of homonym mastery are associated with low scores for inferential understanding comprehension at the sentence level, since the latter abilities also imply some metalinguistic skill, i.e. reflecting internally on all connotations of what is being said as a step towards interpretation. Further investigation involving larger samples is needed to verify the prevalence of this problem.

To the best of the authors' knowledge, this is the first in-depth analysis of specific metalinguistic awareness of homonymy in children with isolated cleft lip and palate. The findings suggest that it is important for speech language pathologists to assess and follow the metalinguistic development in cleft palate children. Given the association with academic achievement, early identification and treatment of delays or problems in specific metalinguistic abilities may be a tool to prevent learning difficulties in the final grades of elementary school, for instance in the realms of second language learning and reading comprehension.

The reader should be aware of some limitations of this study. All children were attending a regular elementary school, which suggests normal cognitive functioning. Knowledge of the pure verbal and performance intellectual scores together with the social status of the subjects and the capacities of second language learning in each child could have provided valuable background information, but these data were not available due to practical reasons. To what extent the provided speech therapy in some subjects can influence the metalinguistic awareness is subject for further research. Cleft palate patients typically receive speech therapy from an early age on. The continuous and deliberate focus on speech and language issues and the meta-language that is used in instructions and feedback may in some cases result in either an advantage or a delay in the realm of metalinguistic abilities, depending on the individual patients' profile. The present study did not allow to evaluate the impact of former speech pathology interventions and the age from which they started. In future research, frequency and starting age of interventions could be incorporated as an independent variable. Detailed analysis of a greater number of subjects with incorporation of these above-mentioned aspects may help further specify the ramifications of metalinguistic awareness of children with cleft palate.

This pilot study revealed age appropriate metalinguistic awareness of homonymy in a cohort of children with isolated cleft lip and palate. However, in some children with isolated cleft palate specific problems with metalinguistic learning (whether or not associated with problems in inferential understanding and sentence comprehension) can occur. Since metalinguistic skills underpin crucial aspects of academic achievement such as second language learning and read-

ing comprehension, monitoring them is worthwhile. In summary, the findings suggest that early assessment and treatment of specific metalinguistic awareness (together with word and sentence expression and reception and interferential skills) in children with cleft palate may help to prevent delays or learning difficulties in some children during the final grades of regular elementary school. Unfortunately, larger studies of metalinguistic awareness, particularly in relation to second language learning, are needed.

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Declaration of interests

The authors report no declaration of interests.

Appendix 1

Words used as test items. Numbers indicate the order of presentation. Marked items (*) were used to calculate the final score with.

Non-homonymous words	Homonymous words (homographic and homophonous)	Pseudowords
1. Neger	3. Aarde	2. Balkoos
4. Slogan	5. Tand	8. Prijl
6. Emmer	7. Baan	9. Loen
11. Dorp	10. Veld	12. Schaag
14. Geschenk	15. Koper *	13. Gamant
17. Raadsel	18. Kruk	16. Spogger
21. Stoorinis *	20. Klinker	19. Kampil
22. Plot	24. Lijst	23. Almak
25. Fobie *	26. Kraan *	27. Glommer
28. Spijker	29. Pasta	31. Pregel
32. Poos *	30. Munt *	34. Velmis
35. Implosie	33. Stroom *	37. Zarf
36. Obstakel *	41. Trap *	39. Menotaaf
38. Veranda	44. Monitor *	40. Bimiek

42. Opinie *	47. Prijs *	43. Zommel
48. Pilaar *	49. Slot *	45. Spraak
50. Bezem	53. Staat *	46. Godor
52. Dozijn *	58. Ezel *	51. Bilk
54. Vete	59. Toets *	55. Ritter
57. Folder *		56. Breef
60. Welvaart *		