Vocabulary skills in Down Syndrome and typical development

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Abstract

Down Syndrome is the most common developmental disorder characterized by mild to moderate intellectual disability. Several studies have reported poor language and prosodic skills, phonological problems due to their deficits caused by intellectual disabilities. This research aims to study over time the expressive use of language in 10 children with Down Syndrome and in 10 children with typical development matched on their chronological age and nonverbal intelligence. We used t tests analyses and the results showed statistically significant development of the oral vocabulary skills in the children with typical development, but not in the children with Down Syndrome, with the typically developing children showing faster and better development in the oral vocabulary skills than the children with Down Syndrome.

Keywords: Down Syndrome, toddlers, expressive language, longitudinal study, Greek language

Introduction

Down syndrome is the most common developmental disorder characterized by mild to moderate intellectual disability. Several studies have reported poor language and prosodic skills, phonological problems due to their deficits caused by intellectual disabilities, mouth and tongue abnormalities and dental issues (eg Abbeduto, Warren & Conners, 2007; Levy & Eilam 2013). Older children with Down Syndrome show expressive vocabulary deficits relative to nonverbal cognitive levels. Expressive vocabulary levels on standardized tests and during language samples for children and adolescents with Down Syndrome were delayed to comparison groups of younger typically developing children at similar mental age or to chronological age matched groups. These deficits extend across the domain of vocabulary and phonology production (eg Griego et al 2015).

Few longitudinal linguistic studies have been conducted so far, mainly in the past decades, due to many mental and body health issues these children face. Most of these studies found that vocabulary skills in children with Down syndrome appear to lag behind their cognitive development (eg Zampini & D'Odorico 2013). Given the paucity in Greek language this research aims to study over time the oral vocabulary skills in 10 children with Down Syndrome

and 10 children with typical development matched on their chronological age and nonverbal intelligence.

Methodology

Our hypotheses are a) children with typical development would present better oral vocabulary skills over time than children with Down Syndrome and b) children with typical development would increase their oral vocabulary skills over time more than children with Down Syndrome. For the purpose of this study 10 children with Down Syndrome and 10 children with typical development were tested. All children were matched on their chronological age and on nonverbal intelligence with a standardized test (Tzouriadou, Anagnostopoulou, Toutountzi, & Psoinou, 2008- Detroit Test of Learning Aptitude). Children with Down Syndrome had their mental intelligence measured by WISC III, three months before the study by a certified psychologist, and all of them had moderate intellectual disability. Moreover, children with Down Syndrome were tested by karyotype test, had a typical trisomy 21 and all of them were born and raised in Greece and Greek was their native language. Neither of the children had any previous hearing or any other clinical problems that could affect the results. Parents gave their consent and all necessary ethics were taken into consideration.

Children were firstly tested at the age of 4 to 6 years and again at the age of 12 to 14 years with a standardized Language Test, and more specifically with the subscale of oral vocabulary (Tzouriadou, Singolitou, Anagnostopoulou, & Vakola, 2008- L-a-t-o). The first oral vocabulary task, suitable for ages 4 to 6 years old, consists of two parts. The first part has 14 items and measures the child's ability to find the correct described word. For example, the researcher says /thelo na mu pis mia leksi pu arhizi apo "pa" ke simeni to ptino pu kani "papapa"/ (I want you to tell me a word that starts with "pa" and means a bird that sounds like "papapa") the child has to say /papja/ (duck). Each correct answer is awarded with one point and each wrong with 0 points. Maximum possible score for this part is 14 points.

The second part consists of 15 items and measures the child' s ability to describe well known words. For example, the researcher says as an example /ti ine skilos- ine ena zoo, yavyizi, fora luri/ (What is a dog? An animal, barks, has a leash). And then asks the child another well known word and the child has to give an accepted description that matches this word. Each correct answer gives one point and each wrong 0 points. Maximum possible score for this part is 15 points. Maximum score for the whole task is 29 points.

The second oral vocabulary task, suitable for ages 12 to 14 years old, has 13 items and measures the child's ability to find the correct described word with similar methodology as the previous task. Maximum possible score for this part is 13 points. The second part consists of 13 items and measures the child' s ability to describe well known words with similar methodology as the previous

task. Maximum possible score for this part is 13 points. Maximum score for the whole task is 26 points.

    At the end of all meetings, data were collected and analysed by SPSS version 20.

Results

Descriptive statistics indicators for the total of the correct answers for all participants in the two measurements are presented below. The highest mean of correct answers is presented in the oral vocabulary task for the age group of 12 to 14 years old and the lowest mean of correct answers in the oral vocabulary task of children aged 4 to 6 years. Low values for Skewness and Kurtosis were observed in all parts, indicating normal distribution (Table 1).

Table 1. Descriptive Statistics of correct answers in both groups.

Test	N	Mean Age	SD age	Min	Max	Skewness	Kurtosis
Oral Vocabulary 1	20	5.5	0.9	1	22	0.7	0.9
Oral Vocabulary 2	20	13.5	0.9	3	23	0.6	0.8

    The 10 toddlers with typical development ($M = 480$, $SD = 34.5$) compared to 10 toddlers with Down Syndrome ($M = 425$, $SD = 31$) in their oral vocabulary skills demonstrated significantly better performance, $t(18) = 2.1$, $p < .05$. After eight years the 10 children with typical development ($M = 536$, $SD = 2.5$) compared to the same 10 same children with Down Syndrome ($M = 137$, $SD = 2.9$) again demonstrated better oral vocabulary skills, $t(18) = 4.9$, $p < .05$. Additionally, two paired-samples t-tests were conducted to compare performance in oral vocabulary skills between two different time periods. The first one when children were 4 to 6 years old and the second when children were 12 to 14 years old. There was a significant difference in the scores for children with typical development in the first measurement (M=9.4, SD=1.14) and in the second measurement (M=17.4, SD=0.9); t(9)=-8.00, p < 0.005. As for children with Down Syndrome no significant differences were observed between the first measurement (M=1, SD=1.89) and the second measurement (M=4.3, SD=1.67), t(9)=-3.3, p > 0.005.

Discussion

These results suggest that children with typical development performed better in both time periods than children with Down Syndrome. Moreover, our findings show that oral vocabulary skills increase as children with typical

development grow older, whereas oral vocabulary skills of children with Down Syndrome increase but in a slower rate than their typical developing counterparts. Our findings come in line with previous research conducted in this field that show that children with typical development exceed in their performance over children with Down Syndrome (eg Zampini & D'Odorico 2013). Since this is the first time a longitudinal study in greek language is performed, we can assume that deficits in oral vocabulary in children with Down Syndrome may be caused, in addition with the above mention difficulties, by the peculiarity of Greek language in morphology and in complexity of consonants and vowels, although further studies need to be done in this fruitful field. However, our findings must be treated with caution since the sample is small and should not be generalized to the total of children with Down Syndrome.

References

Abbeduto, L., Warren, S., Conners F. 2007. Language development in Down Syndrome: From the prelinguistic period to the acquisition of literacy. Mental Retardation and Developmental Disabilities Research 13, 247-261.

Grieco, J., Pulsifer, M., Seligson, K., Skotko, B., Schwartz, A. 2015. Down Syndrome: cognitive and behavioral functioning across the lifespan. American Journal of Human Genetics 169, 135-149.

Tzouriadou, M., Anagnostopoulou, E., Toutountzi, E, Psoinou, M. 2008. Detroit Test of Learning Aptitude. Thessaloniki, Aristotle University of Thessaloniki and Ministry of Education.

Levy, Y., Eilam, A. 2013. Pathways to language: A naturalistic study of children with Williams Syndrome and children with Down Syndrome. Journal of Child Language 40, 106-138.

Tzouriadou, M., Singolitou, E., Anagnostopoulou, E., Vakola, I. 2008. Psychometric criterion of Language Adequacy (L-a-T-o). Thessaloniki, Aristotle University of Thessaloniki and Ministry of Education.

Zampini, L., D'Odorico, L. 2013. Vocabulary development in children with Down Syndrome: Longitudinal and cross sectional data. Journal of Intellectual and Developmental Disability 38, 310-317.