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## CORRELATION OF AGE WITH RECEPTIVE AND EXPRESSIVE SEMANTIC SKILLS IN HEARING IMPAIRED CHILDREN

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Language and speech are hallmarks that differentiate a human being from other species. It is well established that receptive and expressive semantic skills improve with age, hence all the components of language improve with age, which is as a result of maturation of many centers that are responsible for language acquisition and production, for instance center for production language and speech (Broca center), comprehending speech and language (Wernicke), visual center, spatial center and so on. However, if one of these centers are interrupted somehow to process the work that are responsible, like hearing loss, then receptive and expressive semantic skills as well as other speech and language skills, may not develop properly. The objective of our research was to assess whether or not receptive and expressive semantic skills improve with age in children with hearing impairments, in order to evaluate if hearing loss has impact on this natural process. For this reason, we tested N=50 subjects, aged 8-15, divided as 8-11(younger) and 12-15 (elder), using signed or oral mode of communication, all visiting residential school for children with hearing loss in Kosovo and Albania, by using Toss-p test primary for receptive and expressive semantic skills, including five areas, labels, categories, functions, attributes and definitions, translated and adapted in Albanian language. The results showed that there is a strong association of subjects' receptive total tasks and their age, respectively as age increases the ability to comprehend and identify increases as well. To be more precise, two areas of receptive skills tasks, identifying labels and identifying functions showed statistical differences in favour of elder group. In expressive semantic tasks, the results showed even higher significance of association with subjects' expressive skills, respectively as the subjects' age increases, their performance in expressive total tasks increases as well. More precisely, there was a statistical significance of difference in favour of elder group if four of five areas, stating labels, stating categories, stating attributes and stating functions. These differences confirmed that the maturation of language and speech canters might be interfered from an outside factor (like hearing loss), however if a child uses any other mode of communication besides speech, the process of development of receptive and expressive semantic skills might be slowed down, but still will be in a line of improvement with age. Our suggestions were based on constant stimulation of communication, regardless signed or oral mode of communication, by using different educational techniques with children with hearing impairments.

**Keywords:** hearing impairment, receptive and expressive semantic skills, age, language.

### 1. INTRODUCTION

Every language contains thousands of vocabulary items that refer to concepts ranging from the concrete and frequent (bottle, ball) to the abstract and unusual (ponder, perplex), and the primary challenge for acquiring word meanings is the reference, or how symbolic elements such as word forms are linked to specific-concepts (Wagner, 2010). Saksida (2014) has divided the literature into four broad areas that correspond to the infants' words learning: 1) the development of native language categorization, 2) the development of categorization of the visual input and its possible interaction with language, 3) segmentation of words from fluent speech, and 4) acquiring the meaning of words – conceptual mapping between the word form and the concept for which it stands. Semantic development expands from the concrete nouns of infancy to complex, abstract, and relational concepts, such as words for actions, emotions, and colours; and deictic terms, such as, *this*, and *that* that point to the time, places or situation (Brandone, Salkind, Golinkoff, & Pasek, 2006) According to Gabriela et al. (Vigliocco, Meteyard, Andrews, & Kousta, 2009) representation of abstract concepts in the mind/brain is grounded in the representation of concrete knowledge, which in turn is grounded in our sensory and motor experience of the world. This is why it is important that the child be in discourse with a competent adult speaker or signer (it doesn't matter) to link the *signifie'* with *significant* (de Saussure, 1959), so the child will understand their meaning, and be able to reproduce them. However, when we refer to children with hearing loss, the input is not the same as in typically hearing children, because according to

Koulidobrova and Davidson (in press), they have shown that those children are limited only on linguistic closed answers, without giving them space to understand or express the meaning in terms of utterance of words or signs. Even though there are many factors that influence the variability of language acquisition between hearing impaired children (Ekmekci, 1991; Brandone, Salkind, Golinkoff, & Pasek, 2006), that result with a variability of different stages of language development, among the first is the lack of hearing.

Receptive language skills involve receiving and decoding or interpreting language, while expressive language skills encompass encoding or production of language (Mcintyre, Hellsten, Didonde, Boden, & Doi, 2017). By measuring their receptive (comprehension) and expressive (production) skills of the word, sentence meaning in everyday context, we can evaluate the level of the child's language development (Rahimpur, 2004). Children with hearing impairments use different mode of communication in order to compensate the lack of auditory input, sign mode of communication, oral mode, total mode etc. regardless the mode of communication they use, there are studies that have presented results which show that receptive and expressive semantic skills are age related, as a matter of fact, the older a child becomes, the more aware he becomes of the meaning of a word or a phrase, like in the study of Beal-Alvarez (2014), where the researcher presents receptive and expressive American Sign Language skills of 85 students, from 6 to 22 years of age at a residential school for the deaf using the American Sign Language Receptive Skills Test and the Ozcaliskan Motion Stimuli and came to the conclusion that students' receptive skills increased with age and were still developing across this age range. Students' expressive skills, specifically classifier production, increased with age but did not approach adult-like performance. In other research (Schick, de Villiers, de Villiers, & Hoffmeister, 2007) this assessment was administered to 96 children between 4 and 7 years of age, half with deaf parents (DoDP) and half with hearing parents (deaf of hearing parent [DoHP]). On average, students' scores increased with age, ranging from 60% to 77% correct.

The literature review intrigued us to assess mentioned skills in hearing impaired children in correlation to age, respectively the **objective** of our research was to analyse whether there is a difference in performance of receptive and expressive semantic skills among hearing impaired children, from which we derived two research question:

1. Do children with hearing loss, being in a different age differ in their receptive semantic skills?
2. Do children with hearing loss, being in a different age differ in their expressive semantic skills?

## 2. MATERIALS AND METHODS

Based on our research objective and research questions, we carefully framed the methodology since it required a convenient sample, only children with hearing loss. For that reason, we chose N=50 children with hearing impairments, aged 8- 15, grouped in two groups, younger group 8-11 and elder group 12-15, all pupils of residential school for children with hearing impairments from Prizren, Kosovo and Tirana, Albania. They were all assessed by using a standardized test of semantic skills, respectively Toss- p test for receptive and expressive semantic skills (Bowers, Logiudice, Huisingh, & Orman, 2002), translated and adapted in Albanian language, which includes five areas of semantic skills, labels, categories, attributes, functions and definitions. It consists of twenty realistic line-illustrations depicting natural, real life scenes, based on six common themes: learning and playing, shopping, around the house, working at school, eating and health and fitness, hence the authors considered these scenes and themes so as to represent aspects of everyday life that are familiar and important to preschool children, however when it comes to hearing impaired children, based on a literature review for a delayed semantic skills in hearing impaired children, these themes are appropriate for older children as well (Bowers, Logiudice, Huisingh, & Orman, 2002).

## 3. RESULTS

Our data was calculated by using different statistical analysis, starting with descriptive statistic for demographic variables, continuing with inferential statistic for calculating difference of means. In the following table is presented descriptive statistic for the main variable age, and as can be seen the younger group consisted of 12 deaf children and 7 children hard of hearing, while the elder group consisted of 25 deaf children and 6 children hard of hearing.

*Table 1 Descriptive statistic of main variable age*

Degree of hearing loss		Deaf N	f	HH N	f	Total f
Age	8-11	12	24	7	6	100
	12-15	25	50	6	12	

Since we had nonparametric distribution of the score, we used nonparametric tests to calculate the difference of means between two groups of main criterion variable, age. In order to confirm these assumptions for the current

study, we will present a Mann-Whitney analysis to see if there is a difference between age and semantic skills which is presented in table number 2.

*Table 2 Differences in performance among age of subjects and receptive tasks of semantic skills*

	Age	N	Mean Rank	Z scores	Mann-Whitney	Sig
<b>A-identifying labels</b>	1 8-11	19	19.55	-2.352	181.500	.019*
	2 11-15	31	29.15			
<b>B-identifying categories</b>	1 8-11	19	22.74	-1.503	242.000	.133
	2 11-15	31	27.19			
<b>C-identifying attributes</b>	1 8-11	19	21.74	-1.514	223.000	.130
	2 11-15	31	27.81			
<b>D-identifying functions</b>	1 8-11	19	20.29	-2.097	195.500	.036*
	2 11-15	31	28.69			
<b>E-identifying definitions</b>	1 8-11	19	23.89	-.632	264.000	.527
	2 11-15	31	26.48			
<b>Receptive total</b>	1 8-11	19	17.55	-3.034	143.500	<b>0.002**</b>
	2 11-15	31	30.37			

As can be seen on table number 2, there is a strong difference between the receptive semantic skills of the subjects and their age, since the significance of Mann-Whitney score for total receptive skills 175.000 is lower than  $p < 0.01$ , respectively subjects tend to increase their comprehension skills of the language with age. The table also presents the exact areas where this difference is due, and **A-identifying labels** with a Mann-Whitney score of 181.500 and a significance  $p < 0.50$ , shows that as the age increases the skills for identifying labels increases as well, and another significance of difference  $p < 0.50$  appeared in **D-identifying functions** with Mann-Whitney score 195.500 indicates that as the age increases, increases his ability to identify functions of objects. However, three areas of receptive tasks are not age related, since the significance is higher than  $p < 0.50$ , and this indicates with age the ability to identify a category, attribute or a definition do not improve in the case of this present study.

*Table 3 Difference of performance among age of subjects and expressive tasks of semantic skills*

	Age	N	Mean Rank	Z scores	Mann-Whitney	Sig
<b>F-stating labels</b>	1 8-11	19	31.03	-2.125	189.500	.034*
	2 11-15	31	27.11			
<b>G-stating categories</b>	1 8-11	19	19.97	-2.132	180.500	.033*
	2 11-15	31	28.89			
<b>H-stating attributes</b>	1 8-11	19	17.53	-3.156	143.000	.002**
	2 11-15	31	30.39			
<b>I-stating functions</b>	1 8-11	19	14.13	-4.409	78.500	.000**
	2 11-15	31	32.47			
<b>J-stating definitions</b>	1 8-11	19	21.47	-1.577	218.000	.115
	2 11-15	31	27.97			
<b>Expressive total</b>	1 8-11	19	18.24	-2.773	156.500	<b>0.006**</b>
	2 11-15	31	29.95			

The expressive tasks, also show a strong difference with age, respectively according to table number 4.1-12, only one area of expressive skills didn't show a difference to age, J-stating definition, and just one area showed a difference to age in favour of the youngest group **F-stating labels**, with a Mann-Whitney score 189.500, and mean rank for younger group 31.03, compared to older group 27.11. Even though the difference is slight, the fact that the younger group performed better in stating labels indicates that this skill in hearing impaired children for this current study, did not increase with age. In addition, there are two areas that performed difference with age, **H-stating**

**attributes** and **I-stating functions** with the older group, hence the significance of difference is lower than  $p < 0.01$ , which means that with age it was easier for children to state an attribute of an object or a function. The last area with significance of difference performed **G-stating categories** at the level of significance  $p < 0.05$ , which is not as strong as the previous two, but however the mean rank of the older group 28.89 compared to the younger group does not show that stating a category is an expressive skill that can advance with age.

#### 4. DISCUSSIONS

The results indicate that there is a strong association of subjects' receptive total tasks and their age, respectively as age increases the ability to comprehend and identify increases as well. To be more precise, two areas of receptive skills, identifying labels and identifying functions have performed strong association with age in favour of elder group, which means that probably the elder group have responded correctly on identifying labels in comparison with the younger group. In addition, the same explanation can be referred to identifying function, the elder group can more easily identify a function of an object than the younger group. However, there are three areas that didn't performed a statistical significance of association with age, identifying category, identifying attributes and identifying definitions, which indicates that probably these are higher level of receptive semantic processes that didn't not improve with age due to hearing loss.

In addition, the predictor variable age has shown even higher significance of association with subjects' expressive skills, respectively as the subjects' age increases, their performance in expressive total tasks increases as well. The results of association have shown a strong association for each area of expressive tasks, moreover stating labels, stating categories, stating attributes, stating function performance increase as subjects' age increased, which indicates that the elder group of subjects have stated a label, for instance when they were asked to state the name of an object that was pointed by the researcher correctly compared to the younger group. Furthermore, the same results go for stating category, respectively the elder group answered correctly when they were asked for instance to state the category to which chalk, pencil, pen belong to compared to the younger group, which is probably due to the abstract meaning of the superordinate category of a certain label. The elder group again performed better than the younger group in the area of stating attribute, moreover they answered correctly when asked to name a category based on some attributes named by the researcher compared to the younger group, which requires higher level of language development. For instance, both groups might have found it easy to point to an object based on certain attributes given by the researcher, like show me something made of wood, however as age increases the elder group performed with higher success when stating the attributes of an object given by the researcher compared to the younger group. The last area with significant difference in favour of the elder group is stating functions, which indicates that the elder group performed with higher success when asked to state the functions of an object given by the researcher compared to the younger group, which means that probably the subject needed a higher level of language experience. However, only the last area, stating definition didn't show difference associated to age, which means that explanation or giving a definition what a certain object is, did not increase with age. These results correspond with an investigation conducted by Choubaz and Gheitury (2017) who explored the knowledge of a group of Iranian deaf individuals, who due to auditory deprivation did not acquire the language normally in the early years of their life., and they were tested to assess their knowledge of vocabulary, collocation, semantic categorization, semantic features and proverbs.

#### 5. CONCLUSIONS

The results indicated that language deprivation in early childhood does not have the same effect on different components of our linguistic knowledge and that the acquisition of semantics may well continue beyond puberty (Choubaz & Gheitury, 2017). Thus, we recommend that therapist and different professionals that work with hearing impaired children, to assess regularly every area of semantic skills of their children, in order to be updated with their language progress, because only then they will be able to prompt and reinforce the development of those areas. For instance in our study, for receptive semantic skills in these children, we recommend that the therapist to be more attentive in developing three areas, identifying categories, identifying attributes and identifying definitions, since it has shown that these areas do not improve spontaneously with age, whilst for expressive semantic skills, the therapist and educator be more attentive to the area of stating definitions, which is probably very difficult for children with hearing impairments to produce definitions even with age.

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