Original Research Article

QUANTITATIVE UNDERSTANDING OF DEAF CHILDREN WRITTEN FORM OF COMMUNICATION THROUGH THE USE OF WORD TYPES

ABSTRACT

Deaf children, due to the impossibility of transforming the internal speech scheme into expressive speech in mutual written communication, make maximum use of abbreviated speech schemes that determine the ability to communicate. The aim of the study is to examine the content comprehensibility and semantic level of written communication of deaf children through the number of used types oaf words in written communication, and to determine the existence of statistical significaance of differences between deaf and hearing respondents in the use of word types at the level of statistical significance p=0.001. The study was conducted on a sample of 140 respondents. The first subsample of respondents, the experimental group consisted of 70 deaf students, and the second subsample, a control group of 70 hearing students, of the same chronological age and gender. The measurement instrument "Test of understanding the written form of expression" was applied. The frequencies and percentages of responses to each of the variables used were calculated. The t-test and the F (Fisher) test were used to determine the statistical significance of the differences between deaf and hearing subjects. The results of the study showed that deaf students do not have contextual understanding and recognition of word types through testing of linguistic competence in relation to the hearing population, because 67.10% do not understand, and 10.00% of deaf students partially understand the contextual application of word types in writing textual task. Deaf students in the written form of communication use nouns (65.70%), pronouns (34.30%), verbs (45.7%), adjectives (28.60%), adverbs (22.90), prepositions (54.30%), exclamations (15.70%), particles (12.90%) and numbers (32.90%). There is a statistically significant difference between hearing and deaf respondents, in favor of hearing, in all applied types of words, except the use of verbs.

Key words: deaf students, word types, communication, linguistic competence.

1. INTRODUCTION

Language competence or language knowledge implies knowledge of language system units at all levels: phonological, morphological, lexical, syntactic, semantic, and textual level, and knowledge of rules for combining language units and their organization into higher order units (1). Language competences are linguistic and communication competence. Linguistic competence includes theoretical knowledge of language, and is primarily realized through the subject mother tongue, but partly through other subjects because the child reads, write and speaks, that is, realizes language activities through these subjects. Communication competence includes practical knowledge of the language, or the practical use of theoretical knowledge (2).

Deaf children, due to the impossibility of transforming the internal speech scheme

into an expressive speech expression in mutual written communication, make maximum use of abbreviated speech schemes that determine the ability to communicate. Most deaf children (82.14%) have written communication competence, understand messages and respond adequately to written content in accordance with the topic, but most deaf children (75.58%) do not have linguistic competence. Agrammatic sentence structures, the presence of omissions, substitutions, and lexical inversions, diminish the linguistic competence of the written form of communication of deaf children. About 24.42% of deaf children have linguistic competence in written communication. In written correspondence there is an intelligibility of short sentences composed of two or three words. Deaf children use language ideologies in their written communication, which they learn and use without any problems. Well-placed lexemes are present in the content of sentences (3).

Deaf children can use dialogue in written communication, but in most cases, they use sentences that are not linguistically correct. They are less skilled in writing complex sentences but there is a possibility of using complex sentences. Over 17% of deaf children can use syntactically correctly written complex sentences in written communication. Deaf children understand messages in written form, they have communication but not linguistic competence (4).

To explore new possibilities for improving language competence in the deaf students, neurolinguistic dynamic approaches in the field of language can play a major role. With the aim of introducing more efficient, for deaf and hard of hearing students, easier ways of acquiring language knowledge and skills, the need to introduce programmed content for computer language learning is emphasized, which in addition to educational rehabilitation enables language self-education (5).

„The population of deaf persons is characteristic and homogeneous in the way, style of writing and content understanding of written text observed through linguistic discourse in written dialogue, which is confirmed by the coefficients of statistical significance of intragroup and intergroup variance of applied variables. In the written form of exchange of communication content, a significant degree of communication competence has been achieved, or the comprehensibility of the written form of expression in terms of content understanding. Deaf persons achieve very modest linguistic competence. The reduced ability of deaf children to achieve linguistic competence is reflected through the simplicity of statements in the substantive sense of preferring statements, as one of the characteristics of the linguistic competence of the deaf population. In deaf persons, there is a negative correlation between the use of complex sentences and adequate answers to questions. A statistically significant correlation was found, which indicates that there is communication competence in deaf children. In deaf children, there is a connection between the linguistic constructions of the number of written expressions used in the content understanding of the written form of communication“ (6).

Writing is a complex brain activity that includes visual, speech, auditory and semantic processes, and successful writing can only be achieved if the function of these processes is satisfactory. Hearing impairment leaves direct consequences on writing, that is, written speech. Hearing impairment leads to a misperception of words in an auditory way, and a misheard word is mispronounced and misspelled.

The aim of the study is to examine the content comprehensibility and semantic level of written communication of deaf children through the number of used word types in written communication, and to determine the existence of statistical

significance of differences between deaf and hearing respondents in the use of word types at the level of statistical significance p=0.001.

2. METHODOLOGY

2.1. Sample

The study was conducted on a sample of 140 respondents. The total sample consisted of two subsamples. The first subsample of respondents (N=70), the experimental group consisted of deaf children aged 10 to 18, who attend primary and high school in educational and rehabilitation centers in Sarajevo, Tuzla and Banja Luka. The second subsample of respondents (N=70), the control group, consisted of hearing students of the same chronological age and gender, selected by random selection from the population of hearing students.

2.2. Measurement instrument and method of conducting study

Vocabulary used by deaf children in their letters was used to construct a measurement instrument for assessing the language competence of written communication of deaf children (3). Content analysis of the written communication from deaf children). The constructed test *"Test of understanding the written form of expression"* was modulated in such a way that pictures were not described as suggested by Vladisavljević (1993) but based on the frequency of vocabulary as deaf children, a "text" was constructed, not a "comic book" story for assessment of semantic levels of written form of communication in deaf children. The study was conducted in such a way that the respondents did not know that they were in an experimental situation, which was organized in such a way as to simulate regular school knowledge testing to achieve students' interest and motivation in the study process.

The variables of the measurement instrument used were: Number of correctly used nouns; Number of correctly used pronouns; Number of verbs used correctly; Number of correctly used adjectives; Number of correctly used attachments; Number of suggestions used correctly; Number of correctly used exclamations; Number of correctly used words and Number of correctly used numbers.

Testing of conjunctions as word types was not done in this study, because the textual task was constructed in such a way that conjunctions in the task were a guide for recognizing other types of words and their correspondence on blank lines to make it easier for both subsamples.

2.3. Data processing methods

The collected study data were processed by the method of parametric and nonparametric statistics. The frequencies and percentages of the respondents' responses on each of the used variables of the measurement instrument were calculated. The t-test and the F (Fisher) test were used to determine the statistical significance of the differences between deaf and hearing subjects.

3. RESULTS AND DISCUSSION

3.1. Basic characteristics of the examined sample of respondents

Table 1. Frequency characteristics of deaf and hearing respondents according to chronological age

Class	Deaf respondents		Hearing respondents	
	f	%	*f*	%
Fourth grade of primary school	2	2.90	2	2.90
Fifth grade of primary school	2	2.90	2	2.90
Sixth grade of primary school	5	7.10	5	7.10
Seventh grade of primary school	11	15.79	11	5.79
Eighth grade of primary school	12	17.10	12	17.10
Ninth grade of primary school	5	7.10	5	7.10
First grade of high school	6	8.60	6	8.60
Second grade of high school	5	7.10	5	7.10
Third grade of high school	18	25.70	18	25.70
Fourth grade of high school	4	5.70	4	5.70
Total N=140	70	100.00	70	100.00

Table 2. Frequency characteristics of deaf and hearing respondents in relation to gender

Gender	Deaf respondents		Hearing respondents	
	f	%	*f*	%
Male	39	55.70	39	55.70
Female	31	44.30	31	44.30
Total N=140	70	100.00	70	100.00

Tables 1 and 2 show the basic characteristics of the examined sample in relation to the chronological age and gender structure of the applied subsamples of respondents. Based on the sample of the experimental group, an identical and subsample of the control group of respondents was selected by number and gender, so that equality was achieved in relation to the chronological age and gender of the applied sample of respondents.

In order to determine the scope of communicative and linguistic competence of deaf respondents in written communication, comprehension testing was performed by the method of a textual task in the form of a story, in which a cut or unfinished sentence had to be supplemented, it was necessary to establish the quantity of the types of words used and on that basis to determine whether the respondents understood the textual story, on the basis of which the communicative and linguistic competence was assessed. In order to gain a better insight into the quantity of word types used, the study compared the results with the control group of hearing respondents, in order to gain insight into the differences in the achievements of word types in the text task between deaf and hearing students.

Table 3. Variability of correctly used nouns on the applied sample of respondents

Variable	Deaf respondents		Hearing respondents	
	f	%	*f*	%
One used noun	7	10.00	0	0.00
Two used nouns	16	22.90	0	0.00
Three used nouns	2	2.90	1	1.40
Four used nouns	3	4.30	1	1.40
Five used nouns	9	12.90	1	1.40
Six used nouns	5	7.10	11	15.70
Seven used nouns	4	5.70	56	80.00
No used nouns	24	34.30	0	0.00
Total N=140	70	100.00	70	100.00

Significance of differences	*F=152.376*	*p=0.000*	*t=-5.050*	*p=0.000*

The results in Table 3 indicate that 65.70% of respondents can recognize in the written text the place where the noun should be added, thus showing communicative competence. Looking at the results of hearing students, it can be stated that hearing students in 80% of cases used seven nouns in the task, which is a significant difference in the population characteristics of linguistic competence. Also, it should be noted that there are no hearing respondents who did not have a single unfinished noun, unlike deaf respondents who in 34.30% of cases failed to find adequate places in the text to correspond to omitted nouns. Insight into the testing of the significance of differences, it can be concluded that deaf and hearing respondents differ significantly in the variable "Number of correctly used nouns", at the level of statistical significance p=0.000.

Table 4. Variability of correctly used pronouns

Variable	***Deaf respondents***		***Hearing respondents***	
	f	*%*	*f*	*%*
One used pronoun	19	27.10	9	12.90
Two used pronouns	4	5.70	29	41.40
Three used pronouns	1	1.40	32	45.70
No used pronouns	46	65.70	0	0.00
Total N=140	70	100.00	70	100.00
Significance of differences	*F=74.515*	*p=0.000*	*t=-4.013*	*p=0.000*

Inspecting Table 4, it can be stated that 65.70% of respondents do not use pronouns in written communication, and about 34% of respondents use, which indicates that deaf children can use this type of word, especially because they recognize it as necessary in contextual understanding the text. The highest percentage, about 27% of respondents, managed to insert one pronoun in the text task where it is omitted in the text. Unlike deaf students, who in 65.70% of cases do not use pronouns, all hearing students used pronouns in a text task. Most hearing students (45.7%) used three pronouns where necessary, in contrast to deaf students, who used three pronouns in only one case. Insight into the testing of the significance of differences, it can be concluded that deaf and hearing respondents differ significantly in the variable "Number of correctly used pronouns" at the level of statistical significance p=0.000.

Table 5. Variability of correctly used verbs

Variable	***Deaf respondents***		***Hearing respondents***	
	f	*%*	*f*	*%*
One used verb	6	8.60	0	0.00
Two used verbs	4	5.70	0	0.00
Three used verbs	1	1.40	0	0.00
Four used verbs	3	4.30	0	0.00
Five used verbs	2	2.90	1	1.40
Six used verbs	2	2.90	0	0.00
Seven used verbs	3	4.30	2	2.90
Eight used verbs	3	4.30	1	1.40
Nine used verbs	1	1.40	7	10.00
Ten used verbs	3	4.30	11	15.70
Eleven used verbs	1	1.40	9	12.90
Twelve used verbs	0	0.00	16	22.90
Thirteen used verbs	1	1.40	18	25.70

Fourteen used verbs	2	2.90	5	7.10
No used verbs	38	54.30	0	0.00
Total N=140	70	100.00	70	100.00
Significance of differences	*F=118.829*	*p=0.000*	*t=-0.803*	*p=0.423*

Inspecting Table 5, it can be stated that 54.30% of deaf respondents failed to recognize the place in the text where the verb should be added, but 45.70% of respondents use verbs as a necessary type of word in written communication. The largest percentage of respondents used one (8.60%) and two verbs (5.70%), and other respondents distributed a percentage of one to three verbs in the text task, so that individuals used five to fourteen verbs, which indicates the fact that deaf children in 45.70% of cases can use verbs in the form of letters. Unlike deaf respondents, all hearing respondents recognized the place and added a verb. The frequency distribution of hearing respondents goes in the direction of 10% who typed nine verbs to 25.7% who typed thirteen verbs. The distribution of deaf respondents in this quantity ranges from one to three cases of respondents who managed to achieve this result. Insight into testing the significance of differences, it can be concluded that deaf and hearing respondents differ significantly in the variable "Number of correctly used verbs", according to stricter criteria of significance calculated F (Fisher), at the level of statistical significance of p=0.000, and t-test shows that there is no statistical significance at the level of the set significance of p=0.005.

Table 6. Variability of correctly used adjectives

Variable	***Deaf respondents***		***Hearing respondents***	
	f	*%*	*f*	*%*
One used adjective	18	25.70	49	70.00
Two used adjectives	2	2.90	18	25.70
No used adjectives	50	71.40	3	4.30
Total N=140	70	100.00	70	100.00
Significance of differences	*F=24.935*	*p=0.000*	*t=8.934*	*p=0.000*

Adjectives are more complex types of words, and a special teaching methodology is needed to master them for deaf children, as shown by the results in Table 6, which shows that in 71.40% of cases deaf children could not recognize places in the text task where an adjective should be added. However, 28.60% of children succeeded, in 25.70% of cases the respondents recognized one place where an adjective had to be added, and two respondents (2.90%) recognized two places where an adjective had to be added in a text task. On this variable, 4.30% of hearing respondents could not identify places in the text where an adjective should have been added, but 70% of respondents used one adjective and 25.70% two adjectives. Based on the global insight into the frequency dispersion of the experimental and control groups, a lag of the deaf population in relation to the hearing population is observed when it comes to this linguistic variable. Insight into the testing of the significance of differences, it can be concluded that deaf and hearing respondents differ significantly in the variable "Number of correctly used adjectives", at the level of statistical significance p=0.000.

Table 7. Variability of correctly used adverb

	Deaf respondents	***Hearing respondents***

Variable	*f*	*%*	*f*	*%*
One used adverb	13	18.60	30	42.90
Two used adverbs	3	4.30	36	51.40
No used adverbs	54	77.10	4	5.70
Total N=140	70	100.00	70	100.00
Significance of differences	*F=2.645*	*p=0.106*	*t= 8.107*	*p=0.000*

Inspecting Table 7, it can be stated that the use of adverbs in the text task for deaf children ranged from zero (77.10%) to the use of two adverbs (4.30%). Three students (4.30%) used two contributions correctly, and thirteen students (18.60%) used one contribution correctly. The control group of respondents used two contributions in 51.40% of cases, which is 47.10% more than deaf respondents, and 42.90% of respondents used one contribution, which is 24.30% more than used by deaf respondents. That the use of adverbs in the text is a demanding linguistic task is also shown by the fact that four hearing respondents failed to identify places in the textual task where the adjective had to be added. Insight into the testing of the significance of differences, it can be concluded that deaf and hearing respondents on the t-test differ significantly in the variable "Number of correctly used adverbs", at the level of statistical significance p=0.000.

Table 8. Variability of correctly used prepositions

Variable	***Deaf respondents***		***Hearing respondents***	
	f	*%*	*f*	*%*
One used preposition	12	17.10	0	0.00
Two used prepositions	14	20.00	1	1.40
Three used prepositions	3	4.30	1	1.40
Four used prepositions	6	8.60	17	24.30
Five used prepositions	3	4.30	45	64.30
No used prepositions	32	45.70	6	8.60
Total N=140	70	100.00	70	100.00
Significance of differences	*F=171,385*	*p=0,000*	*t=-2,950*	*p=0,004*

Like the use of adverbs, the use of prepositions requires a certain degree of linguistic knowledge. This statement is confirmed by the fact from Table 8 that six respondents from the control group (8.60%) failed to identify places in the text task where it was necessary to add an appropriate proposal. However, 64.30% of hearing respondents correctly used five suggestions in the text task, in contrast to deaf respondents who in 4.30% of cases managed to use five suggestions correctly. Differences are noticed among the respondents and in the correct use of one to four suggestions in the text task. The frequency between deaf and hearing respondents was particularly pronounced in the use of two suggestions, where one hearing respondent correctly used only two suggestions, while fourteen deaf respondents correctly used two suggestions, which is the highest frequency and best success of deaf respondents in this variable. Insight into testing the significance of differences, it can be concluded that deaf and hearing respondents on the variable "Number of correctly used prepositions" on the F-test differ statistically significantly at the level of statistical significance of p=0.000, and on the t-test differ significantly at the level of statistical significance p=0.004.

Table 9. Variability of correctly used exclamations

	Deaf respondents		***Hearing respondents***	
Variable	*f*	*%*	*f*	*%*

One used exclamation	10	14.30	43	61.40
Two used exclamations	1	1.40	11	15.70
No used exclamations	59	84.30	16	22.90
Total N=140	70	100.00	70	100.00
Significance of differences	*F=11.735*	*p=0.001*	*t=8.268*	*p=0.000*

Exclamations are easy to recognize in hearing communication, so it was to be expected that hearing respondents would achieve maximum results, but since exclamations are not carriers of important information, it was expected that deaf children would not even recognize them in a text task. Solving the task is further complicated by the fact that exclamations are less processed in language teaching than other types of words, as shown by the results in Table 9. However, out of 70 deaf respondents, ten (14.30%) recognized one place in the text task where it was necessary to use this type of word correctly, but 84.30% of deaf respondents failed to solve this task. Also, 22.90% of hearing respondents failed to identify the place where it was necessary to add an exclamation, but 15.70% of respondents correctly used two exclamations, and 61.4% of respondents used one exclamation. Insight into testing the significance of differences, it can be concluded that deaf and hearing respondents on the variable "Number of correctly used exclamations" on the F-test differ statistically significantly at the level of statistical significance of p=0.001, and on the t-test differ significantly at the level of statistical significance p=0.000.

Table 10. Variability of correctly used particles

	Deaf respondents		***Hearing respondents***	
Variable	*f*	*%*	*f*	*%*
One used particle	8	11.40	32	45.70
Two used particles	1	1.40	35	50.00
No used particles	61	87.10	3	4.30
Total N=140	70	100.00	70	100.00
Significance of differences	*F=3.162*	*p=0.078*	*t=11.305*	*p=0.000*

Particles are rarely used in communication, and in writing even less often, so it was difficult for deaf children to recognize them in a text task where they were missing. This is also shown by the results in Table 10, where it can be noticed that in 87.10% of cases deaf students could not recognize the places where they should have corresponded. Also, 4.30% of hearing students could not use this type of word correctly, but 50% of hearing respondents used two words correctly, while only one of the deaf respondents achieved such a result. Of the hearing respondents, 45.7% used one word each, while 11.4% of the deaf respondents used one word each. Insight into testing the significance of differences, it can be concluded that deaf and hearing respondents in the variable "Number of correctly used particles" on the F-test differ statistically significantly at the level of statistical significance of p=0.078, and on the t-test differ significantly at the level of statistical significance p=0.000.

Table 11. Variability of correctly used numbers

Variable	*Deaf respondents*		*Hearing respondents*	
	f	*%*	*f*	*%*
One used number	22	31.40	1	1.40
Two used numbers	20	28.60	8	11.40
Three used numbers	5	7.10	60	85.70
No used numbers	23	32.90	1	1.40
Total N=140	70	100.00	70	100.00
Significance of differences	*F=143.510*	*p=0.000*	*t=-2.915*	*p=0.004*

Inspecting Table 11, it can be stated that 32.90% of deaf respondents were not able to use numbers in the text task, but 31.40% of respondents identified one place where they had to add a number in the text task, 28.60% the respondent identified two places in the task where a number needed to be added. Five respondents (7.10%) identified three places in the text task where a number had to be added. The highest percentage of hearing respondents (85.70%) recognized all three places in the text task where a number needed to be added and thus completed the task completely, and 11.4% recognized two places where a number needed to be added. Insight into testing the significance of differences, it can be concluded that deaf and hearing respondents on the variable "Number of correctly used numbers" on the F-test differ statistically significantly at the level of statistical significance of p=0.000, and on the t-test differ significantly at the level of statistical significance p=0.004.

Table 12. Contextual understanding and recognition of word types in a written text task

Variable	*Deaf respondents*		*Hearing respondents*	
	f	*%*	*f*	*%*
Understands the contextual application of word types in a written text task	7	10.00	69	98.60
Does not understand the contextual application of word types in a written text task	47	67.10	0	0.00
Partially understands the contextual application of word types in a written text task	16	22.90	1	1.40
Total N=140	70	100	70	100

Table 12 shows the contextual understanding and recognition of word types in a written text task. A comparison of the results in comprehensibility and recognition of word types in the written form of expression between the experimental and control groups of respondents was performed. It was found that out of a total of 70 deaf respondents, 10% of deaf respondents understand and recognize the written form of expression in relation to the observed types of words, and 98.60% of hearing respondents understand and recognize the observed types of words in the text task in relation to contextual characteristics . It was also found that 67.10% of deaf respondents were not able to recognize and understand the contextual use of the observed word types in the written text task, unlike those who read, where there are no respondents who do not understand the contextual use of word types in the written text task. Deaf respondents in 22.90% partially understand and recognize the contextual use of word types in a written text task, in contrast to hearing respondents who in 1.40% of cases partially understand the contextual application of word types in a written text task.

3.2.Similar studies

Deaf children have difficulty using pronouns, determinants, conjunctions, passives, and conditional verbs such as “maybe”, “might” and “should” (7).

When writing independently, respondents with impaired hearing, given the type of word, mostly use nouns (51.61%), then verbs (23.32%), prepositions (8.10%), then adjectives (4.70%), pronouns (4.18%), and conjunctions (3.22%), numbers (1.91%), adverbs (1.65%) and words (1.31%) (8).

The four main omissions in the written expression of deaf and hard of hearing children are: prepositions, objects, verbs (especially auxiliary) and the strength of connections between words. In practice, deaf children who have mastered the phonological-morphological structure of language can say and repeat a given sentence without understanding the meaning of the sentence and the message it carries, and have difficulty writing that sentence (9).

A deaf child usually uses only nouns and verbs in speech, while omitting prepositions, pronouns and conjunctions. For him, significant parts of the sentence are words that denote things, people and actions that are related to them (10).

Starting from previous and syntactic knowledge, the greatest importance in approaches to teaching reading to prelingually deaf people should be given to building syntactic and semantic abilities, regardless of the communication system and language used by the child as primary (11).

To understand the text read by deaf people, their ability to develop knowledge about the structure of the story and to use it correctly is very important (12).

4. CONCLUSION

Deaf students do not have contextual understanding and recognition of word types through testing of linguistic competence in relation to the hearing population, because 67.10% do not understand and 10.00% of deaf students partially understand the contextual application of word types in a written text task. Deaf students in the written form of communication use nouns (65.70%), pronouns (34.30%), verbs (45.7%), adjectives (28.60%), adverbs (22.90%), prepositions (54.30) %), exclamations (15.70%), words (12.90%) and numbers (32.90%). There is a statistically significant difference between hearing and deaf students, in favor of hearing, in all types of words used, except the use of verbs. To improve linguistic competence and contextual understanding and recognition of word types in deaf students, it is necessary to intensify work on the acquisition and understanding of word types through mother tongue teaching and individual rehabilitation.

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