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Source / Izvornik: **Collegium antropologicum, 2015, 39, 653 - 661**

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:257:149603>

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Download date / Datum preuzimanja: **2025-02-22**



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Understanding Basic Temporal Relations in Primary School Pupils with Hearing Impairments

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ABSTRACT

Time can be observed as a subjective, as well as an objective phenomenon which is a component of our life, and due to its communicational needs, it is standardized by temporal signs and symbols. The aim of this study was to determine the understanding of basic temporal relations of pupils with hearing impairments. We assumed that the knowledge of basic time relations is a precondition for the acquisition of knowledge that is connected with the understanding of the syllabus in regular school programs. Three groups of pupils have been examined: pupils with hearing impairments who attend the primary school of SUVAG Polyclinic under special condition, integrated hearing impaired pupils with minor additional difficulties who attend regular primary schools in Zagreb with a prolonged expert procedure and pupils of the control group. The subjects have been examined with a measuring instrument constructed by the expert team of the Polyclinic SUVAG. Twenty nine subjects have been questioned, chronologically aged between 10 and 12.

Key words: *pupils with hearing impairments, temporal relations*

Introduction

Time is part of our everyday life, but also a phenomenon dealt by physicists, historians, philosophers and artists.

The idea of time is connected with the idea of causality, cause – effect linkage can only be observed if we are mobile in the temporal and spatial coordination system, and if we have acquired signs and symbols as means of communication.

Speech enables the child to expand temporal and spatial perceptions, it enables it to talk about its actions, to reconstruct the past and to predict future activities. Difficulties in hearing and understanding of speech can slow down some cognitive processes. Wood explains that the failure to understand and explain can be caused by language conventions which have not been acquired, and not by the absence of logic¹. In this context it is clear how important the understanding of temporal relations as a part of the communicational system is.

Past researches

It is known that between the sixth and the eighth month of a child's life, as early as the senso-motoric stage

of development, conditions are achieved which enable coping with spatial-temporal relations².

During the first two years of life categories of objects, space, causality and time are being created. This is the period of the development of the sense of time, which a child spontaneously acquires by moving in space, noticing other persons' movements and shifting of objects. Along with the development of macro and micro motorics, a perception of time, space and speed is developed as well.

The development of hearing and speech passes through spatial processors and crosses the way from grammar of space to grammar of speech. In this way it has simply been determined that grammatical relations correspond with spatial relations, as well as the fact that a verbal event is a spatial event³.

Simultaneously with managing spatial-temporal relations, memorizing the very same relations is being developed as well. We recollect the past and remember it exactly by key events which are landmarks in our temporal-spatial system of recollection^{4,5}.

Researches about memorizing time relations have shown that several basic cognitive processes, which contribute to the observation and recollection of chronological correlation, are interwoven. A study entitled »Children's

comparisons of the recency of two events from the past year⁶ used the developmental approach and singled out one of these processes.

Testing was carried out on a big pattern of subjects. Children aged between 3 and 12 had to estimate what was before, their birthday or Christmas (in another study, Halloween and Thanksgiving). Even children under the age of 6 were able to distinguish events in the past when the events were quite separated. Distinguishing temporal dimensions of events in their relative time could be correctly interpreted only by children older than 9 years of age.

Four studies were carried out on a bigger number of subjects (261 children aged between 4 and 10) with the objective of observing their abilities of differentiating distances of future events⁷. Distances were graded from the same day to almost a year ahead in the future. Methods of forming a judgment included pointing to parts on the spatial scale which represented future distances and answering unfinished questions. Although 4-year-olds did not manage to distinguish between future distances, 5-year-olds were able to distinguish events which were to happen in the upcoming weeks and months from those which were not going to happen in many months, in other words time distance was an important factor. However, just like little children in earlier studies of recollection of time, they also confused near future and recent past. Children aged between 6 and 8 made more precise estimates, but were not successful in estimating events that were to happen more than a few months ahead in the future. Children aged between 8 and 10 estimated distances correctly, using mental presentations of time of an event in a year cycle.

These testings are of interest to us, because we know that in the educational cycle children have to acquire numerous concepts and understand social processes which took place in the past, they also have to develop the skill of moving in space through various time periods. In order to be successful they need to have different previous knowledge so that they can learn science, later on history and geography with understanding, but also many other educational units. Understanding concepts, with their concrete and general characteristics essentially depends on the functioning of speech, language and speech-language thought.

The process of thinking based notably on visual perception assumes a concrete-visual character. The range of such thinking is limited. One of the basic problems in the development of a child with hearing impairment is the difficulty of understanding complex concepts⁸.

In order to understand school subjects it is not enough to possess concrete thinking, but for the comprehension of social events and processes a developed abstract thinking is also required.

Children with hearing impairments may have difficulties in the educational process because reduced vocabulary and the fact that they are not familiar with the concepts may result in the inability of following the above mentioned educational programmes.

Signs are visual forms of expression on the level of imaginative or intellectual cognition. A symbol represents far more than a sign, it is filled with affectivity and dynamics and as such resuscitates big periods, models, myths and structures. By adopting signs and symbols we enter the world of abstract thinking and speech. The understanding of temporal signs and symbols and their integration into spontaneous speech develop wider spatial-temporal cognitions about oneself and the world we live in.

Objective of the Research

The objective of the research is to determine the knowledge and abilities of pupils with hearing impairments according to the following problem groups:

1. determine the ability of recognizing the chronological age of a person (ARC)
2. determine the knowledge of the arithmetic dimension of time and temporal relations in a sentence (ADTT)
3. determine the understanding of symbols that represent wider temporal and civilizational periods (US).

The objective of this research was to determine if statistically significant differences exist in the understanding of basic temporal relations with pupils with hearing impairments of the primary school of the Polyclinic Suvag, pupils with hearing impairments who are integrated into a regular educational institution and pupils of the control group.

The research was carried out in order to accomplish a successful rehabilitation and education based on the most realistic foundations, and as a final outcome, achieve the best possible integration of pupils with hearing impairments.

Hypotheses

According to the determined objectives of the research and according to the results of past similar researches, in this study it seemed most justified to start the hypothesis:

- H1 – subjects with hearing impairments recognize the chronological age of a person without bigger deviations
- H2 – subjects with hearing impairments use arithmetic dimensions of time and understand temporal relations in a sentence without bigger deviations
- H3 – subjects with hearing impairments understand symbols which represent wider temporal and civilizational periods without bigger deviations

Methods of Research

The pattern of subjects

SUVAG Polyclinic is the health institution providing health care for persons with difficulties in speech communication. Children and adults are rehabilitated accord-

TABLE 1
PATTERN OF SUBJECTS ACCORDING TO THE FORM OF EDUCATION

The form the pupil attends	Primary school of polyclinic Suvag	Regular primary school »Davorin Trstenjak« with extended expert procedure	Regular primary school	Total
4.	1	1	3	5
5.	6	2	4	12
6.	7	3	2	12
Total	14	6	9	29

ing to the verbotonal method that is used in diagnostics and auditory and speech rehabilitation. The most often and wide-spread application of the verbotonal method is to the programs of rehabilitation of hearing and speech impaired children, in other words, stimulation of listening and speech development. The primary school of the SUVAG Polyclinic, which is the part of the SUVAG Polyclinic, is attended by hearing and speech impaired children and children with difficulties in speech and language development. Because of delayed rehabilitation, additional difficulties in development or inadequate level of speech and language development these children cannot attend regular primary schools.

All subjects in this study are hearing impaired pupils rehabilitated in the SUVAG Polyclinic by use of the verbotonal method.

All pupils are of the chronological age between 9 and 12. The average age of a pupil was 11 years and two months.

In this research three groups of pupils were included:

1. pupils with hearing impairments of the primary school of SUVAG Polyclinic from the fourth to sixth form
2. pupils with hearing impairments who are integrated into regular schools and attend extended expert procedure from the fourth to the sixth forms.

For pupils with sensory and motoric impairments (sight and hearing; physical impairments with cerebral palsy) who are integrated into regular schools an extended expert procedure is organized.

After regular school programs, an extended expert procedure is organized in special educational groups. Therapists of appropriate specialty achieve rehabilitative educational programs.

3. pupils without impairments from the fourth to the sixth form of regular primary schools in Zagreb (control group).

The first and second group consist of children with hearing impairments (Anacusis bilateralis, loss of hearing bigger than 92 dB), and the third group consists of children without hearing impairments. Pupils of the primary school of the SUVAG Polyclinic, unlike integrated pupils with hearing impairments, do not have a sufficient level of speech-language development so they can not be educated in regular primary schools.

Pupils of the primary school of the SUVAG Polyclinic have additional difficulties:

- in motor functioning scoliosis, dystonia
- epilepsy, limited EEG, VEP not in accordance with age
- concentration and emotional disorders
- limited intelligence

Average time of rehabilitation of hearing impaired pupils who attend the primary school of the SUVAG Polyclinic is 6 years and 7 months, while the average time of rehabilitation of hearing impaired pupils integrated into extended expert procedure of a regular primary school is 7 years and 8 months.

In the second group of subjects, pupils of the primary school Davorin Trstenjak, beside hearing impairment, have some minor difficulties and they are included into organized extended expert procedure with everyday support in learning and with auditory and speech rehabilitation (Table 1). These pupils have additional difficulties such as concentration and emotional disorders and they need everyday auditory and speech rehabilitation because speech and language development is not in accordance with chronological age of children. Numerous hearing impaired pupils with cochlear implant, rehabilitants of the SUVAG Polyclinic, who do not have additional difficulties and successfully attend regular schools throughout Republic of Croatia, are not included in this study (Table 2). These are pupils who have created conditions for full integration by early rehabilitation and implantation.

Measuring instrument

In order to test the understanding of temporal relations a measuring instrument was used designed especially for the purposes of this research. It was constructed by the

TABLE 2
PATTERN OF SUBJECTS ACCORDING TO HEARING STATUS

Form	Pupils with the diagnosis of anacusis bilateralis	Control group – pupils without impairments
4.	2	3
5.	8	4
6.	10	2
Total	20	9

expert team of SUVAG Polyclinic. The knowledge of temporal relations was tested through a series of testing tasks. Testing tasks were distributed in sets, and each set contained 10 tasks. The series of testing tasks has a total of 30 questions.

The highest possible score which could be achieved in every series of tasks was 10, and a total possible score was 30.

The first set of testing tasks is related to testing the ability of recognizing the chronological age of a person. Pupils had to recognize in a picture what age the person is and out of three given choices choose one.

The second set of testing tasks is related to testing the knowledge of arithmetic dimensions of time in everyday life and temporal relations in a sentence. Pupils had to choose among three given choices.

The third set of testing tasks is related to testing of understanding symbols which represent wider temporal and civilizational periods. Pupils had to recognize in a picture which historical period is in question and choose one answer among three offered choices.

Modes of research

Testing was carried out in a written form. It was conducted in the primary school of SUVAG Polyclinic, primary school of »Davorin Trstenjak« from Zagreb and in one randomly chosen regular primary school. The testing was carried out under the supervision of the expert team of SUVAG Polyclinic during February 2009.

Methods of data processings

The analysis of results was carried out through the statistical programme SPSS for Windows. The basic statistical analysis was carried out (frequencies, percentages, arithmetic mean, standard deviations, minimal and maximum result) for the whole pattern of subjects. Through a one-way analysis of the variance, differences were determined among groups of subjects in relation to some items.

Results and Discussion

The ability of recognition of the chronological age of persons

The perception of time and space starts with »here and now«. From these points cognition about temporal rela-

tions broadens and gradually enables us to understand not only the concrete, but also the abstract nature of time.

We set off with the presumption that recognizing chronological age of a person is a starting point for the understanding of complex relations in coping with time and space (Table 3).

Results of the robust discriminant analysis show that no statistically significant difference exists in recognizing the chronological age of a person between pupils with hearing impairments of SUVAG Polyclinic, integrated pupils with hearing impairments –primary school »Davorin Trstenjak« and pupils of a regular primary school, or the control group.

Subjects when recognizing start with themselves, and without difficulty recognize the age of their peers, whereas when recognizing the age of younger or older persons a few irregularities appear (Table 4). We can see that the biggest deviations are present in recognizing the age of an older male person who belongs to the historic period of renaissance (ARC item 6). Furthermore, somewhat bigger deviations occur in recognizing a middle-aged woman (ARC item 9).

Arithmetic dimensions of time and temporal relations in a sentence

The seventh year of the life of a child is the time when a rational space and time is created. This is the time of the first and the second form of primary school when elementary time signs are acquired: an hour (minute, second), day – time of day, week, month, year, and a bit later a century and a millennium.

Acquiring concepts of time, space and speed can not be done without the knowledge of the meaning of number. With a number one can logically connect the sequence of events, with it time intervals are presented.

The concept of year and month is learned by pupils, as we have pointed out, from the beginning of the educational process, they revise this almost every day when putting dates, and often repeat during individual speech and hearing exercises.

In this set of testing tasks, along with the arithmetic dimension of time we were also testing the understanding of words which signify temporal dimension (Table 5). Linguistic tools for expressing time references differ from those expressing space reference, although we use numerous universal spatial- linguistic tools of expression on a daily basis⁹. Expressing time in grammar is most fre-

TABLE 3
RECOGNIZING THE CHRONOLOGICAL AGE OF A PERSON – RESULTS OF A ROBUST DISCRIMINANT ANALYSIS

Discriminant functions	Discriminant values	\bar{X}			Standard deviations			F	Significance p
		Pupils PS	Pupils DT	Pupils RS	Pupils PS	Pupils DT	Pupils RS		
1	0.9958	0.06	0.78	-0.62	0.99	1.37	0.67	2.88	0.073
2	0.6835	0.05	-0.43	-0.49	1.06	1.53	0.37	2.23	0.126

PS – pupils with hearing impairments of Primary school SUVAG Polyclinic

DT – integrated pupils with hearing impairments of the primary school „Davorin Trstenjak“, RS – Control group – pupils of a regular primary school

TABLE 4
THE DISTRIBUTION OF RELATIVE FREQUENCIES IN PERCENTAGES – ARC

	PS – correct answers	PS – incorrect answers	DT – correct answers	DT –incorrect answers	RS – correct answers	RS – incorrect answers
ARC – item 1 Female age about 20	100	0	100	0	100	0
ARC – item 2 Girl age 12 – 13	100	0	100	0	100	0
ARC – item 3 Female age over 70	100	0	83	17	100	0
ARC – item 4 Male age about 20	100	0	100	0	100	0
ARC – item 5 Boy age 4 – 5	86	14	100	0	83	17
ARC – item 6 Male age over 70	64	36	67	33	100	0
ARC – item 7 Child age up to a year	93	7	100	0	100	0
ARC – item 8 Male age over 70	93	7	100	0	89	11
ARC – item 9 Male age between 40 and 50	71	29	83	17	100	0

ARC – The ability of recognition of the chronological age of persons

PS – Primary school SUVAG Polyclinic,

DT – regular school with prolonged expert procedure,

RS – Control group – regular primary school

TABLE 5
KNOWLEDGE AND USAGE OF ARITHMETIC DIMENSIONS OF TIME AND TEMPORAL RELATIONS IN A SENTENCE – RESULTS OF THE ROBUST DISCRIMINANT ANALYSIS

Discriminant functions	Discriminant values	\bar{X}		Standard deviations		F	Significance p
		Pupils PS	Pupils DT	Pupils PS	Pupils DT		
1	1.5850	0.50	-1.16	1.16	0.48	20.34	0.000

PS – pupils with hearing impairments of Primary school SUVAG Polyclinic

DT – integrated pupils with hearing impairments of the primary school »Davorin Trstenjak«

quently expressed with verbs, in other words verb forms. Besides verbs we can also use various linguistic tools, adverbials of time, temporal noun phrases and conditional clauses to express time.

Results of the robust discriminant analysis show that there is a statistically significant difference in the usage of the arithmetic dimension of time and words which represent temporal relations in a sentence between pupils of the SUVAG Polyclinic and integrated pupils with hearing impairments of the primary school »Davorin Trstenjak« (Table 6).

Results of the robust discriminant analysis show that there is a statistically significant difference in the usage of the arithmetic dimension of time and temporal relations in a sentence between pupils of the SUVAG Polyclinic and pupils of a regular school/control group (Table 7).

Results of the robust discriminant analysis show that there is statistically significant difference in the usage of the arithmetic dimension of time and temporal relations in a sentence between integrated hearing impaired pupils of the primary school »Davorin Trstenjak« and pupils of a regular school/control group.

From Table 8 it can be seen that there are differences in certain items among subjects. They are especially visible with items which are related to the knowledge of temporal relations in a sentence. By the analysis of the variance it has been determined that statistically significant differences exist with the fourth, eighth and ninth item which examines the knowledge of arithmetic dimensions of time, adverbs, and adjectives which point to temporal relations. In all stated features, a somewhat bigger number of statistically significant differences is

TABLE 6
KNOWLEDGE AND USAGE OF THE ARITHMETIC DIMENSION OF TIME AND TEMPORAL RELATIONS IN A SENTENCE – RESULTS OF A ROBUST DISCRIMINANT ANALYSIS

Discriminant functions	Discriminant values	\bar{X}		Standard deviations		F	Significance p
		Pupils PS	Pupils RS	Pupils PS	Pupils RS		
1	2.8007	0.90	-1.41	1.46	0.00	32.26	0.000

PS – pupils with hearing impairments of Primary school SUVAG Polyclinic
RS – pupils of a regular primary school

TABLE 7
KNOWLEDGE AND USAGE OF THE ARITHMETIC DIMENSION OF TIME AND TEMPORAL RELATIONS IN A SENTENCE – RESULTS OF A ROBUST TEMPORAL ANALYSIS

Discriminant functions	Discriminant values	\bar{X}		Standard deviations		F	Significance p
		Pupils DT	Pupils RS	Pupils DT	Pupils RS		
1	1.2768	0.94	-0.63	1.28	0.00	8.24	0.013

DT – integrated pupils with hearing impairments of the primary school »Davorin Trstenjak«, RS – Control group – pupils of a regular primary school

TABLE 8
THE DISTRIBUTION OF RELATIVE FREQUENCIES IN PERCENTAGES – ADTT

	PS – correct answers	PS – incorrect answers	DT – correct answers	DT – incorrect answers	RS – correct answers	RS – incorrect answers
ADTT – item 1 Days in a week	100	0	100	0	100	0
ADTT – item 2 Months in a year	57	63	100	0	100	0
ADTT – item 3 Seasons (of the year)	100	0	100	0	100	0
ADTT – item 4 Recognition of time adverbs	50	50	83	17	100	0
ADTT – item 5 Recognition of time adverbs	93	7	100	0	100	0
ADTT – item 6 Recognition of time adverbs	100	0	100	0	100	0
ADTT – item 7 Recognition of adjectives related to temporal dimension	79	21	100	0	100	0
ADTT – item 8 Recognition of adjectives related to temporal dimension	57	43	50	50	100	0
ADTT – item 9 Recognition of time adverbs	36	64	83	17	100	0

ADTT – Arithmetic dimensions of time and temporal relations in a sentence
PS – Primary school Polyclinic Suvag, DT – regular school with extended expert procedure, RS – Control group – regular primary school

related to pupils with hearing impairments from the SUVAG Polyclinic.

Results indicate that pupils from the primary school of the SUVAG Polyclinic have difficulties with understand-

ing temporal relations in a sentence. Acquiring a language is a complex process which demands developmental pre-conditions: cognitive, sensory, motoric, a developed work memory and other. A big number of authors emphasized

TABLE 9
UNDERSTANDING SYMBOLS WHICH REPRESENT EXTENDED TIME AND CIVILIZATIONAL PERIODS – RESULTS OF A ROBUST
DISCRIMINANT ANALYSIS

Discriminant functions	Discriminant values	\bar{X}			Standard deviations			F	Significance p
		Pupils PS	Pupils DT	Pupils RS	Pupils PS	Pupils DT	Pupils RS		
1	2.2927	0.68	0.37	-1.30	1.07	0.73	0.73	17.48	0.000
2	0.9990	0.42	-0.91	-0.04	1.05	0.58	0.67	9.16	0.001

PS – pupils with hearing impairments of Primary school SUVAG Polyclinic

DT – integrated pupils with hearing impairments of the primary school »Davorin Trstenjak«, RS – Control group – pupils of a regular primary school

that a large number of factors influences difficulties when acquiring lexical units: previous knowledge, the ability of conceptualization, the ability of using context, pronunciation, context that surrounds a word, the variability of meanings^{10,11}.

Past researches have shown that certain deviations exist in the linguistic expression of children with hearing impairments as opposed to children without impairments, but that the differences become smaller with children who have been exposed to a longer period of rehabilitation¹²⁻¹⁸.

Researches have shown that children with hearing impairments have the least problems with mastering nouns and verbs and that in the process of acquisition they remain with the content and neglect form endings. The easiest to adopt are words that represent concrete concepts. Time adverbs such as for example: before, after, while and similar, can be the cause of the incomprehension of a text that is read. Pupils of the SUVAG Polyclinic who had the worst results, are educated under special conditions because they, along with hearing impairments, usually have additional difficulties because of which they are not capable of attending a regular primary school. It is obvious that the difference in the results is more connected with additional impairments or an untimely beginning of rehabilitation, since there is no statistically significant difference in results between integrated pupils with hearing impairments and pupils from the control group.

Similar examinations of an active and passive vocabulary in children with hearing impairments who are integrated into regular schools and children with hearing impairments who are educated under special conditions have shown that integrated pupils show significantly better results when it comes to active and passive vocabulary than subjects from special schools. Reason for this is the fact that deaf children who are chosen to be integrated into regular schools, among other things, possess a wider lexical knowledge as one of the indicators of language development¹⁹.

Understanding symbols which represent extended time and civilizational periods

Results of the robust discriminant analysis have shown that there is a statistically significant difference in under-

standing symbols which represent time and civilizational periods between pupils of the primary school of the Polyclinic Suvag, integrated pupils and pupils from a regular school/control group (Table 9).

By the analysis of the variance it has been determined that there is a statistically significant difference with items which are related to the recognition of picture which symbolizes the Ancient World and the Middle Ages. In all stated features a somewhat bigger statistically significant difference is shown in pupils with hearing impairments of the primary school of SUVAG Polyclinic. However, from Table 10 it is notable that the results of pupils are not entirely correct neither with the control group. Integrated pupils with hearing impairments and pupils of the control group in the 5 item did not answer the asked questions. From the three series of tasks this series was the most difficult one for all pupils.

The development of abstract thinking, as well as acquired temporal signs and concepts are a precondition for the understanding of time symbols.

Education and becoming literate change the nature of a child's linguistic knowledge and lead to an analytical way of thinking. Children get acquainted with time symbols, traits of a culture and past civilizations through various media, but this is not a conscious knowledge which includes cause- effect conclusions, and does not leave more permanent and deeper traces. Education enables a systematic encounter with a culture, cultural concepts and symbols.

Symbols which have traits of a culture or bigger time units can be acquired by examining rich pictorial-didactic material. Many school subjects (history, literature, history of art) enable the acquisition of time symbols, but the synthesis which is required to enhance the acquired knowledge and recognize time symbols, is a very demanding task.

Verification of the hypotheses

According to the achieved results of the hypothesis:

H1 we confirm and conclude: subjects with hearing impairments without bigger deviations recognize the chronological age of a person

TABLE 10
DISTRIBUTION OF RELATIVE FREQUENCIES IN PERCENTAGES – US

	PS – correct answers	PS – incorrect answers	DT – correct answers	DT – incorrect answers	RS – Correct answers	RS – incorrect answers
US – item 1 Ancient art	86	14	100	0	89	11
US – item 2 The Ancient World	79	21	100	0	100	0
US – item 3 The Middle Ages	50	50	67	83	100	0
US – item 4 The Ancient World	64	36	50	50	89	11
US – item 5 Prehistory	86	14	83	17	100	0
US – item 6 Future	64	36	83	17	100	0
US – item 7 Ancient art	50	50	83	17	78	22
US – item 8 Future	86	14	100	0	67	33
US – item 9 The Middle Ages	93	7	100	0	67	33

US – Understanding symbols which represent extended time and civilizational periods

PS – Primary school SUVAG Polyclinic, DT – regular school with extended expert procedure, RS – Control group – regular primary school

H2 we reject and conclude: subjects with hearing impairments use the arithmetic dimension of time and understand temporal relations in a sentence, but their knowledge is not equal to the knowledge of control group subjects. The biggest deviations are noticed with pupils of the primary school of the Polyclinic Suvag who attend the school under special conditions.

H3 we reject and conclude: there are statistically significant deviations in results of subjects with hearing impairments and the control group in the understanding of symbols which represent wider time and civilizational periods. Statistically, a significant difference is the biggest with pupils of the primary school of SUVAG Polyclinic. We must point out that pupils of a regular school also have minor difficulties in distinguishing bigger historical periods.

Conclusion

Time is, due to communicational needs, standardized by temporal signs and symbols. When it comes to time and spatial relations, all languages of the world have a whole span of possibilities for expressing them. In this study we have examined the acquisition of time relations on a lexical, syntactic and pragmatic level. The study relates only

to hearing impaired pupils who have some of additional difficulties.

The study shows that there is no statistically significant difference in results of subjects when we speak about basic temporal relations.

The more demanding are the tasks, the bigger differences are among the subjects. The study shows that there is statistically significant difference between normal hearing and deaf pupils. Bigger deviations in results are shown in pupils of the primary school of the SUVAG Polyclinic who attend the school under special conditions. The study shows that hearing and speech impaired children have certain deviations in relation to unimpaired children but these differences become minor in children who beside hearing impairments do not have additional difficulties, in children who have been included in rehabilitation for a long time and in children who attend school in the environment well prepared for educational integration.

Familiarity with words and their usage in the context is very important for hearing impaired pupils. The study shows that some hearing impaired children have difficulties with the usage of words related to understanding of temporal relations. The implication is that the auditory and speech rehabilitation in later chronological age should be based on practicing complex language structures which show temporal-spatial relations.

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RAZUMIJEVANJE OSNOVNIH VREMENSKIH ODNOSA UČENIKA OŠTEĆENA SLUHA OSNOVNOŠKOLSKE DOBI

SAŽETAK

Vrijeme možemo promatrati kao subjektivni i kao objektivan fenomen koji je sastavni dio našeg života, pa je iz komunikacijskih potreba standardizirano vremenskim znakovima i simbolima. Cilj ispitivanja bio je odrediti razumijevanje osnovnih vremenskih odnosa od strane učenika oštećena sluha. Pošli smo od pretpostavke da je poznavanje temeljnih vremenskih odnosa preduvjet za usvajanje znanja koja se odnose na razumijevanje nastavnih sadržaja u redovnom školskom programu. Ispitane su tri skupine učenika: učenici oštećena sluha koji se školuju u Osnovnoj školi Poliklinike SUVAG pod posebnim uvjetima, integrirani učenici oštećena sluha koji se školuju u redovnoj zagrebačkoj osnovnoj uz produženi stručni postupak i učenici kontrolne skupine. Ispitanici su ispitani mjernim instrumentom kojeg je sastavio stručni tim Poliklinike Suvag. Ispitano je 29 učenika kronološke dobi od 10 do 12 godina.