

Eötvös Loránd University
Faculty of Humanities

THESES OF DOCTORAL DISSERTATION

ANNA SZÁNTÓ

THE CHANGES OF SPEECH PROCESSING IN FUNCTION
OF SPEECH DEVELOPMENT

Doctoral School of Linguistics

Head of School: Prof. Dr. Tolcsvai Nagy Gábor, Member of the Academy

Applied Linguistics

Head of School: Prof. Dr. Gósy Mária DSc

Members of the Assessment Committee

Chairperson of the Committee:

Prof. Dr. Adamikné Jászó Anna DSc

Officially appointed assessors:

Dr. Bóna Judit PhD

Dr. Neuberger Tilda PhD

Secretary of the Committee

Dr. Raátz Judit PhD

Further members:

Dr. Dér Csilla PhD

Dr. Antalné Szabó Ágnes PhD

Dr. Gyarmathy Dorottya PhD

Supervisors:

Prof. Dr. Gósy Mária DSc

Budapest, 2016

1. Introduction

Children's mother tongue processing is considered to be a natural process and is usually paid attention to when a problem occurs during the course of processing (Lengyel 1981). The errors of speech production and their inadequate functioning are easier to detect (e.g. delay in speech initiation, flawed articulation), while the latent disorders in perception strategies come to light at a later stage thanks to the application of compensational strategies (Gósy 1994).

During a child's speech acquisition the so-called articulation and perception bases develop in an interconnected fashion. The former ensures a child's ability to pronounce the sounds and sound connections of one's mother tongue without error, whereas the latter enables a child to comprehend the speech sounds, words and sentences, recognize the sound connections of others. The cooperation of the two bases facilitates the development of age-adequate functioning of mother tongue-based speech production and speech comprehension (Gósy 1995/2006).

Research in the field of speech perception aims at understanding how an individual is able to create a discrete linguistic unit out of a stream of acoustic signs in the course of articulation. Today, as far as speech perception processes are concerned, most researchers accept a hierarchical model. The structure of the hierarchical model does not exclude serial and/or parallel, as well as modular and/or interactive ways of information processing, hence a hierarchy does not (necessarily) mean a serial order or an exclusive "from bottom to top" approach. The partial processes coincide in time and the result of superior processes influences the functioning of inferior ones (Gósy 2005).

According to which linguistic units are processed, the functioning of individual partial processes becomes more emphatic in the course of the whole perception process (Markó 2007).

"One of the foundations of literacy at school age is that a child should be linguistically conscious as to sound perception and production, optical and visual processing and production, as well as segmentation" (Adamikné Jászó 1996: 228). School-based education accelerates the process of literacy only if a child's speech processes upon entering the school system show age-based adequacy (e.g. Stackhouse–Weels 1997; Boets et al. 2006; Csépe 2006; Imre 2006; Gósy 2008).

Speech perception and comprehension are studied from various aspects. The results of research call attention to types of default in speech recognition and perception, the importance of prevention and development regardless of a child being mono-/bilingual, typically developing or a risk child (e.g. Gósy 2000; Bombolya 2002; Gósy–Horváth 2006; Horváth 2007; Rosta–Schuchné Rumppli 2007; Horváth–Gósy 2012; Bartha 2013).

Present thesis examines the speech processing patterns of preschool- and elementary school children with typical development and describes the changes taking place in speech processing due to targeted development.

2. Research Objectives and Hypotheses

The purpose of this research, on the one hand, is to examine speech perception and comprehension among senior kindergarten- and first-year elementary school pupils, on the other hand, to introduce an alternative speech perception development model and to study what changes occur due to targeted development in the speech perception performance of control groups.

The underlying hypothesis was that an elementary school pupil's speech perception performance, due to spontaneous development, must be significantly better than that of a preschool pupil. The second supposition was that the development of most children in both age groups would show signs of delayed development compared to standard values. In case of kindergarten children we presumed to find greater individual differences. In accord with our hypotheses, due to development, the performance of the studied group should significantly improve, the individual differences should decrease, moreover, they would have better results in speech perception and comprehension tests than their peers in the age-adjusted control group. Fourthly, it was surmised that the speech perception performance of the school children not exposed to development should be significantly lower in every examined process than that of the preschool children who participated in the development program.

3. Materials, Methods, Groups Examined

The speech perception and comprehension processes of the examined children were assessed with GMP testing (Gósy 1995/2006). The diagnostics of the tests were developed by Dr. Mária Gósy between 1984-1988. With the help of this method the mother tongue acquisition processes of Hungarian children are possible to examine in terms of the functioning of speech comprehension processes. The diagnostics study the interrelated fields of speech decoding processes, namely speech perception and speech comprehension, with a standardized method between ages 3 and 13. On the basis of the output data, the functioning patterns of adequate speech comprehension are easily describable, thus healthy development level is securely separable from a default or disturbed process. Despite their relative brevity, the GMP diagnostics study the entire speech perception process including the sub-processes necessary to acquire the auditory and written forms of one's mother tongue (Gósy 1995/2006).

The background of the GMP test series is provided by the hierarchical, interactive model. The test series originally consists of 20 sub-tests, out of which 14 tests have been used in the study. To understand perception processes, the sub-tests GMP2, GMP3, GMP4, GMP5, whereas to reveal the functioning of underlying partial processes GMP7, GMP10, GMP14, GMP17, GMP18 have been applied. To map short-term verbal and visual memories GMP8, GMP9; to assess speech comprehension processes sub-tests GMP12, GMP16; to activate vocabulary GMP11 has been used. (for additional information on sub-tests and the examination process see Gósy 1995/2006.)

In the first phase of the research 30 senior preschool pupils, 30 first-year elementary school pupils, altogether 60 children from Budapest were evaluated with GMP sub-tests in the fall term of 2011/2012. The preschool children are from a Budapest district but from two kindergartens, while the school group consisted of different classes in the same year of the same school. The two groups were further divided into two sub-groups, thus an **examined** group and a **control** group were created. All parents agreed to a recording at the end of the school year.

In the second phase of the research, at the end of the spring term of 2011/2012, the fall-term examination was repeated and the children were assessed again. This time a mother of a child from the kindergarten control group did not consent to the test after the child in question was diagnosed with a mild case of mental disability and the mother decided not to expose the child to further tests. As the diagnosis came to light seven months after the first test recording, the number of all groups was randomly reduced by one and the results from the beginning and the end of the school year are demonstrated with the participation of 56 children, whose performance was recorded on 112 test

sheets defined by the diagnostics. According to the teachers involved, the 56 children show adequate intellectual and hearing abilities, come from monolingual Budapest families and study in kindergartens and schools in a traditional educational system. The groups participating in the research are heterogeneous from a sociological point of view.

Two weeks after the diagnostics, the **examined** kindergarten- and elementary school groups participated in development for seven months. As no development plans had been made for this particular number of individuals, all plans were newly drafted based on the book “Beszédpercepció fejlesztő modulok” (Speech Perception Developmental Moduls), under the supervision of Dr. Mária Gósy (Gósy–Imre 2007). The book contains diverse development materials from five disciplines (5 moduls). Each modul chapter outlines different difficulty ranges, which were considered when making the development plan. The plans were drafted for 27 weeks, separately for preschool and school pupils. The plans were made in the most versatile ways possible in order to consider individual differences among the children. The kindergarten groups worked with different moduls every day. As the school children had four mother tongue lessons, there were sessions when they learned with two different moduls. The development plans of the two age groups differed in a way that in the kindergarten groups the exercises were annotated with possible execution modes. The teachers received the monthly plans broken down into weekly sub-plans at the end of every month. Upon receiving the plans the experiences, notes, possible modifications were discussed. The development plan, after introducing and discussing the plans, was carried out by the teachers. In the school it took place at the beginning or end of mother tongue lessons, four times a week (5 min), in the kindergartens the plan was carried out during the day, five times a week (15-20 min). According to the feedback the teachers and, most importantly, the children enjoyed “playing”, the exercises were implemented into the everyday routine of lessons unnoticed.

As to one kindergarten pupil we received 233 data, with one school pupil 276 data. The total amount of data is nearly 14252; the test sheets show detailed qualitative assessments (e.g. types of error, wrong answers). The statistical analysis of the data was conducted with the software SPSS 22.0. As the data did not indicate normal distribution, non-parametric tests were used in the statistical data processing.

4. Introducing the Results

4.1 The Functioning of Speech Processing Patterns among Preschool- and Elementary School Children

The results show that not even the integration of acoustic, phonetic and phonological levels in speech processing is perfect. Studying phonetic and phonological perception, it is seen that regardless of age groups, phonetic perception and speech sound identification work best. It is typical of both age groups that the average performance in phonological perception is significantly lower than that of phonetic perception. Compared with preschool children, the school children’ performance showed a decrease in the difference within the adequate functioning range of both processes, that is, as children age, phonological perception increasingly reaches the level of phonetic perception, at the same time, in terms of average performance, the time of delay in phonological development was three years in both the preschool- and the school groups. Based on the perception curves, the individual age groups showed different perception defaults, which further indicates significant individual differences.

The sub-processes measuring speech perception demonstrate that the average performance of all participants is close to an expected standard value in both visual and rhythm perceptions. In serial perception tests the default experienced is two with the kindergarten children and three with the school children. The participants, on average, made 4,5 mistakes in speech sound differentiation, which proves that speech sound differentiation is still insecure among school children. The majority of school children (78,5%) scored a 100% in transformational perception, which is in accord with the age-based standard. The minority of participants scored between 25–75%, which shows that their default individually varied (4-2 years).

Speech comprehension requires more complex functions than speech perception; accurate decoding activates a greater range of cognitive processes. Text comprehension functioned on a low level in both groups, which might be due to perception disorder; lexical, morphological, syntactic insecurity; memory problems; association disorders or delayed perception. The test on sentence comprehension showed better results than that on text comprehension. The level of sentence comprehension indicated a significantly better result among school children, which might refer to the fact that sentence processing becomes more secure upon entering the school system.

During the analysis of the one-sample t-test it was deduced that upon testing the verbal and visual memories of participants, neither group showed significant differences in the expected 5 words relevant to the age groups studied. This result means that both preschool- and school children could recall an average 5 words, typical of their age group. During word activation the words activated did not show differences in the two age groups. The average performance of preschool pupils showed a score close to the standard, unlike with the school children, whose performance stayed a year behind the expected average.

In the studied age groups, within the twelve tests, five showed a mathematically measurable difference, where the school children had better results, which is clearly explicable with a relatively great deviation. The school children performed better than the preschool children in the other tests as well, but this only occurred as a tendency. In some parts of speech processing, e.g. phonetic perception or sentence comprehension, there are slighter individual differences, whereas in serial perception or text comprehension they seemed to be greater. In terms of difficulty, the age groups showed similar tendencies, the types of errors do not vary as the children age. The qualitative analyses highlight the typical characteristics of sound- and sound series perceptions or morphological and syntactic patterns. Based on the research data it is notable that controlling age-based speech perception mechanisms and decreasing delays and disorders with targeted development is of vital importance.

4.2 The Effect of Development on Speech Processing Among Preschool Children

The end-term performance of the examined group showed statistically supported improvement in acoustic-phonetic and phonological perception compared to their performance at the beginning of the school year. In phonetic perception they reached near-average results by the middle of the term. The control group performed in all perception tests, excluding the acoustic-phonetic GMP3, in a significantly better way than during the pre-testing phase. Concluding the speech perception results, with the exception of one test, significant differences are not seen between the initial and end-term results of the two groups (except initial GMP4 test). By the end of the term both groups show satisfactory values on the acoustic-phonetic and phonetic levels, as their

default was not higher than 10 percentage points. The same cannot be stated about phonological perception, where improvement occurred in both groups, yet 85,7% of the children performed lower than the expected average compared with all the other perception tests. The default is several years. In serial perception, as to the average values of the two test phases, there was no significant difference between the two groups' end-term performances, simultaneously, improvement was statistically supportable in the examined group. Despite this fact, the default in both groups was considered to be two years. In both groups the data with extreme deviation show relatively great differences when compared with the average at the end of the term as well.

During pre-testing the examined group performed lower than the standard average in visual perception, whereas by the end of the term average performance in both groups reached the age-related standard value. In rhythm perception the majority of the children in both groups performed in the expected range. No statistically provable performance difference was detected between the two groups. In the examined group 92,8% of the children, in the control group 71,4% of the children got "B" results. Although in speech sound differentiation no statistical difference was shown between the two groups, the examined group solved the exercise with less errors (3), than the control group (4,2). If the differentiation mistakes in the time perception of vowels and consonants are not considered, this result accounted for 1,5 errors in the examined group and 2,2 errors in the control group.

Based on the average results of speech perception processes, it can be ascertained that in both groups and in both tests sentence comprehension reached the age-adequate value. Improvement in both groups was mathematically proven as well. At the onset of the term, the examined group did not perform in text comprehension near the expected standard value, by the end of the term, though, they reached the expected standard. Although no statistical difference was found between the two groups' performances, the end-term average results of the examined group showed better values in both tests, improvement was statistically proven in the area of text comprehension as well.

Children's verbal and visual short-term memories, based on the pre-testing and the post-testing phases, functioned satisfactorily, as neither group deviated significantly from the minimally expected 5 words. During visual memory tests, the examined group showed significant improvement, the control group performed lower, which was also mathematically proven.

During the word detection pre- and post-testing phases the examined group performed according to the age-adequate standard and showed improvement between the two test phases, which was also statistically proven. The control group performed under the age-adequate values in both tests. In the post-testing a statistical difference was detected between the two groups: the examined group performed significantly better than the control group.

By the end of the term both groups demonstrated a statistical difference in word activation, where the examined group performed significantly better than the control group. Although in the other tests no mathematical difference was seen, the post-test phase of the examined group showed better average results in all the tests than the control group. Comparing the results of the two performance checks, improvement in the control group was statistically supportable in five from twelve tests, a significant default in one test, which was statistically proven. On the contrary, eight studied processes in the examined group showed statistically measurable improvement. This proves that the children in the examined group improved more evenly, individual

differences had a decreasing tendency by the end of the term. In the control group most differences remained and in some cases increased by the end of the term.

4.3 The Effect of Development on Speech Processing Among First-year School Children

With time both acoustic-phonetic and phonetic perceptions showed improvement in both groups. By the end of the term the default was maximum 10 percentage points compared to the average, regardless of development, although improvement was not significant in either group. On the phonological level both groups' results were statistically proven: default compared to the average was three years behind by even the end of the term.

Within speech perception partial processes, the examined group showed significant improvement in visual perception after development. At the onset of the term the average performance did not reach the age-adequate standard, by the end of the term it did. The performance of the control group showed one year default compared to the average standard, in our case no significant improvement was seen. In rhythm perception the majority of the children, regardless of the group, showed age-adequate results. By the end of the term the examined group got "B" results on average than the control group, yet this difference was not statistically supportable. In serial perception the end-term results a significant difference was shown between the two groups. The control group even initially showed a 4-year default, by the end of the term the average performance continued to decrease. On the contrary, the examined group performed significantly better than both itself and the control group, improving a default of several years, thus their average performance was minimally (4%) under the standard. In speech sound differentiation no significant difference was shown between the two groups, yet by the end of the term both groups demonstrated statistically proven improvement. By the end of the term the examined group made less than one error, whereas their average amount of errors was 5 at the beginning of the term. The number of errors was higher in the control group, their average error count was one by the end of the term. By the end of the term the age-based results of the examined group were 29% higher. In transformation perception neither group showed age-adequate improvement. In both testing phases the control group came near the expected value, in both groups 1-1 child fell behind it. During the post-test, the default was caused by 1 child in the examined group, whose performance was outstandingly poor. In both testing phases the significant majority of the children performed as to be expected based on their age.

Examining speech comprehension processes, regardless of development, the children in both groups performed significantly better in sentence comprehension tests by the end of the term. Based on their average performance, it was concluded that in both the pre- and post-testing phases their sentence comprehension showed age-adequate results. Both testings had worse results in text comprehension, regardless of development. As to the results of the control group, no significant difference was seen between their initial and end results but their default was still several years. The same was shown in the examined group. Statistical analysis demonstrated that the initial and end-term performances of both groups showed no significant differences in either sentence comprehension or text comprehension.

Based on the average performance of the children, the results of verbal and visual short-term memories reached the standard minimum (5 words) in both groups. In visual memory no statistically supportable difference was seen between the two groups by the

end of the term, yet in verbal memory the control group performed better than the examined group at the end of the term, which result did not differ significantly from the standard minimum (5 words). As to memory structuring, time is not relevant, that is, no significant difference was shown between the initial and the end-term results. In word activation the two groups showed no difference in either their initial or end-term performances. In the pre-test phase both groups showed a default to the standard, and although by the end of the term both groups showed age-adequate improvement, the children stayed behind the standard. Their end-term performance reached their pre-test results, thus the one-year default remained by the end of the term as well.

In the examined group the end-term average was higher than at the beginning of the term, while in the control group both averages showed a decrease.

4.4 Speech Perception Processes of Preschool Pupils Exposed to Development and School Pupils Without Development

Examining speech perception processes, no significant difference is seen between the two groups in certain test types, yet in acoustic-phonetic and phonetic tests, the examined group tended to perform better. The default occurred in especially the phonological test, regardless of development.

In the partial processes of speech perception no significant difference was detected between the groups, yet in visual perception and sound differentiation, the examined group performed better than the control group as a tendency. In serial perception 88% of the 28 first-year pupils who started school and the 14 preschool pupils who were about to start school, showed various types of default. Later this meant a problem for all the children, as serial perception is especially important for every child entering the school system. The default, on the other hand, is shown to be reducible with development. This fact is proven by the formerly shown data, according to which all the school children partaking of development significantly reduced their default and nearly reached the expected standard, unlike the children who did not take part in development. In rhythm perception (GMP14), most children in both groups had age-adequate results, yet in the examined group a greater rate of children had “B” results compared to the control group.

Within speech comprehension processes, sentence comprehension resulted in the examined group performing better on average than the control group but no significant difference was seen between the two groups. Text comprehension, on the other hand, showed a significant difference. The examined group’s performance was statistically better than that of the control group.

In short term memory values no significant difference was found between the two groups.

In word detection the two groups showed a significant difference with the examined group having better results, with a score near the standard, unlike the control group which showed a default of one year.

Based on qualitative analyses no difference was seen between the two groups as to which sentence/word identification causes the most problems in the partial tests. No difference was found during the qualitative analysis of sound differentiation either. The speech comprehension tests showed the same tendency, regardless of development, as the same sentences and questions caused problems.

In order to rule out doubt concerning the fact that development had no play in the results, the end-term speech perception performance of the control group was compared to that of the kindergarten group who did not participate in development. The two

groups showed no significant difference in either sentence comprehension or any other test.

5. Conclusion

The research data partially support the hypothesis concerning development: with time first-year pupils perform better in only five processes out of twelve, where differences are also mathematically provable. Individual differences diminished with time in certain perception processes. Great individual differences were found in both age groups but these did not indicate a significant deviation in terms of age.

Through development the examined group showed improvement in all processes as a tendency, demonstrated significant improvement in certain processes due to which individual differences tended to decrease by the end of the term. The research data did not or only partially prove the second part of the hypothesis: both the preschool and the school examined groups tended to perform better than the control groups, though it was mathematically proven in only a limited number of singular tests. Regardless of age, in certain speech perception processes, e.g. in perception and comprehension processes a greater rate of individual performance variability occurs in the control group compared with the more homogeneous results of the examined group. In the examined groups the improvement of the children with a greater default is faster, also proven by statistical analysis, and they could “catch up with” the children who performed better. Without development the difference between the age and the performance of the children in the examined group is supposed to have increased. It must be noted that regardless of age or group several children tended to show no improvement in speech perception processes or showed decreased performance with time. The question arises what might have caused this tendency. It is possible that the time devoted to development was little, especially when the individual differences among the children involved in the research are considered. Performance deterioration might have been due to lack of attention or motivation, fatigue, disinterestedness, etc.

The final hypothesis is partially proven by the research data: the preschool group in a majority of the tests performed better as a tendency than the control group. In some processes the examined group showed a significant difference in performance compared with the control group. The differences between the two groups are mostly quantitative. The majority of the children included in the examined group reached the standard values. In certain tests the average performance of the control group showed default in more processes than that of the examined group, whose performance is more even, whereas the control group demonstrated a greater variety of individual differences.

Summarizing the research data, development is crucial even in typical developmental circumstances in the examined age group. Due to complex development, the GMP test results demonstrated significant and steady improvement. With adherence to the research objective, a program dedicated to the reduction of speech perception disorder and default has been launched. As to the adaptability of development plans, according to the feedback provided by the teachers involved, the children enjoyed the development exercises, which were easily implemented into their class routine and were regarded as playtime activities.

In the future it is vital that every preschool child be tested in perception, developed in speech perception when necessary for a longer period of time and every preschool and school child should be likewise given the same possibility even in typical developmental circumstances.

6. Dissertation Theses

As a summary of the research data the following theses can be formulated:

1. The speech perception level of preschool- and school children as a group, in almost all examined processes, stays behind the age-specific performance level, their default varies in function of the examined processes.
2. With age the individual differences decrease in only certain perception processes. In both preschool- and school age groups there are great individual differences. Default in perception affects school children in more processes than preschool children, therefore one year prior to school is not sufficient for default to disappear through spontaneous development.
3. The targeted development of speech perception among preschool- and school children is of vital importance even for typically developing children.
4. Due to targeted development both groups have experienced a tendency of even development. In certain processes improvement is also mathematically demonstrated.
5. Within the speech perception process, regardless of examination period, group or development, children give the poorest performance in phonological perception, where the extent of default measured in the post-testing phase is several years.
6. It has been ascertained through qualitative analysis that the types of error in the tests do not tend to vary. Age and the level of development influence the differences in the quantity but not the quality of errors.
7. The development of speech perception and comprehension, even in a larger group, proves to be an efficient technique to reduce and/or eliminate default.

7. Bibliography

Adamikné dr. Jászó Anna 1996. A beszédpercepció fejlettségének szerepe az olvasás-írás elsajátításában. In Gósy Mária (szerk.): Gyermekkori beszédészlelési és beszédmegértési zavarok. Nikol Kiadó, Budapest, 228–251.

Bartha Krisztina 2013. A beszédfeldolgozás jellemzői magyar domináns kétnyelvű gyermekeknél. In Gósy Mária (szerk.): *Beszéd kutatás 2013*. MTA Nyelvtudományi Intézet, Budapest, 233–246.

Boets, B. – Wouters J. – Wieringen, A. – Ghesquière, P. 2006. [Auditory temporal information processing in preschool children at family risk for dyslexia: Relations with phonological abilities and developing literacy skills](#). *Brain and language*, 97/1. 64–79.

Bombolya Mónika 2008. Tanköteles hallássérült gyermekek aktív szókincsének vizsgálata. *Gyógypedagógiai Szemle*, 2008/1. 28–37.

Csépe Valéria 2006. *Az olvasó agy*. Akadémiai Kiadó. Budapest.

Gósy Mária 1994. A mondatértés és a szövegértés összefüggései. In Gósy Mária (szerk.): *Beszéd kutatás*. MTA Nyelvtudományi Intézet, Budapest, 94–120.

Gósy Mária 1995/2006. *GMP-diagnosztika*. Nikol GMK, Budapest.

Gósy Mária 2000. *A hallástól a tanuláshoz*. Nikol Kkt., Budapest.

Gósy Mária 2005. *Pszicholingvisztika*. Osiris Kiadó, Budapest.

Gósy Mária 2008. A szövegértő olvasás. *Anyanyelv-pedagógia*, 2008/1.

Gósy Mária – Horváth Viktória 2006. Beszédfeldolgozási folyamatok összefüggései gyermekkorban. *Magyar Nyelvőr*, 2006/4. 470–482.

Gósy Mária – Imre Angéla 2007. *Beszédpercepció fejlesztő modulok*. Nikol Kkt., Budapest.

Horváth Viktória 2007. Megkésett beszédfejlődésű óvodások beszédfeldolgozási folyamatairól. In Gósy Mária (szerk.): *Beszédészlelési és beszédmegértési zavarok*. Regiszter Kiadó és Nyomda Kft, Budapest, 149–162.

Horváth Viktória – Gósy Mária 2012. Születési rizikótényező hatása az anyanyelv-elsajátításra. *Gyógypedagógiai Szemle*, 2012/2. 97–105.

Imre Angéla 2006. Az olvasászavar és a beszédfeldolgozási folyamatok összefüggései. In Gósy Mária (szerk.): *Beszéd kutatás 2006*. Regiszter Kiadó és Nyomda Kft, Budapest, 160–171.

Lengyel Zsolt 1981. *A gyermeknyelv*. Gondolat Kiadó, Budapest.

Markó Alexandra 2007. A mondat- és szövegértés jellemzői és összefüggése 6–9 éves korban. In Gósy Mária (szerk.): *Beszédészlelési és beszédmegértési zavarok*. Regiszter Kiadó és Nyomda Kft, Budapest, 285–300.

Rosta Katalin – Schuchné Rumpfi Henriette 2007. Beszédfogyatékos gyermekek beszédpercepció vizsgálata. In Gósy Mária (szerk.): *Beszédészlelési és beszédmegértési zavarok*. Regiszter Kiadó és Nyomda Kft, Budapest, 137–148.

Stackhouse, J. – Wells, B. 1997. *Children's speech and literacy difficulties I.: A psycholinguistics framework*. Whurr Publisher, London.

8. Publications in the thematic field of the dissertation

Szántó Anna 2014. A beszédpercepció tényezői, fejlesztésének lehetősége óvodás- és kisiskolás korban – egy kutatás tapasztalatai. In Drávucz – Haindrich – Horváth (szerk.): *Doktoranduszok a nyelvtudomány útjain – A Félúton 9. konferencia kiadványa*. ELTE BTK Nyelvtudományi Doktori Iskola, Budapest, 87–100.

Szántó Anna 2014. A célzott beszédpercepció- és beszédértés fejlesztés hatása utánkövetéses vizsgálatban. In Gósy Mária (szerk.): *Beszédkutatás 2014*. MTA, Nyelvtudományi Intézet, Budapest, 112–123.