

**The Relationship between Speech Production and Speech Perception:  
Working Up Radio News**

**Theses**

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## 1. Introduction

The experience of listening to radio news but not understanding them properly is a topic belonging to the borderland between psycholinguistics and phonetics. There is little doubt that not only the listener (receiver) but also the news editor and the announcer (sender, interpreter) are responsible for that. What consequences can be expected if the listener misunderstands an important piece of news because of a failure in the interpretation? This was what happened in February 2002 in Hungary, when a hypermarket Electro World opened in Budaörs. According to the news, all the goods were on sale to celebrate the opening. The shopping center was overrun by customers, the motorway was clogged with traffic, and several persons got injured and failed in the crowd. This could happen because persons were not informed that the sale would last for a whole week, so it would not have been necessary to go there in the very first day. In my thesis, I concentrate on the effect of this case.

Another case is, when the mistake in the interpretation is not deliberate. A badly written sentence and an incorrect intonation can significantly change the meaning of the news. The announcer is expected to speak clearly and understandably, and intonation is essentially important; the lack of any of these can make it more difficult for the listener to understand the real message.

Nevertheless, both sides take responsibilities. As by law enacted, the press – included electronic media – should inform citizens authentically, precisely and fast, and it should help persons understand the connection between the different phenomena in society.

In my thesis, I would like to concentrate on the news on radio. The series of research displayed in my thesis examine the effects of radio news on human perception. By modifying the suprasegmental characteristics of the news, the experiment aiming at defining the level of perception tries to describe what kind of temporal and fundamental frequency ranges can be ordered to radio news. By applying different structural and phonetic changes, the experiment about the comprehension of radio news examines the effects of different factors which significantly affect understanding news. I also examine whether the genre of news can be defined without taking into consideration the age of the listeners. My thesis is the first examining Hungarian news from the point of view of the listener with carefully chosen variables and experimental methods.

## **2. The structure of the thesis**

The thesis consists of 12 chapters and a CD supplement.

In Chapter 1, I give an introduction and write about the importance of the field I examined.

In Chapter 2, I give a definition of news, describe the genre of news and its textual characteristics, and examine the special characteristics of radio news.

From Chapter 3 on, I concentrate on radio news. I describe radio news approaching from the productive side, through the suprasegmental acoustic structure of radio news, reading and speech.

In Chapter 4, I examine radio news from the receiver's point of view: I examine the perception of news and describe the models of speech comprehension.

In Chapter 5, I give my hypotheses and aims. In my work, I present an acoustic experiment and two perception researches. As for the latter, the first examines the special acoustic characteristics of radio news through the expectations appearing on the side of perception, while the other tries to map the comprehension of radio news. The hypotheses and aims of the three researches create one common chapter. The reason is that the final aim of the researches is the practical application of the results; these researches should help in editing and presenting radio news in a way where there are the least possible misunderstandings on the listeners' side. Nevertheless, in the further parts of my thesis, I present the researches separately, as they require different approaches and methods.

In Chapter 6, I present an acoustic analysis of radio news. The examination of suprasegmental layer covers the temporal characteristics and the tune of radio news.

In Chapter 7, I examine the research of news and media types. Here I introduce the persons taking part in the experiment, the methods and materials, and then I present the results in terms of the temporal and basic pitches. Finally, I present what conclusions can be drawn from the experiment.

In Chapter 8, I present a perception research of comprehending radio news. After introducing the material, method and persons taking part in the experiment, I present the results and draw the conclusions.

In Chapter 9, I summarize the results of the experiments presented.

Chapter 10 contains the theses of the dissertation, Chapter 11 contains the bibliography.

In Chapter 12, I give the supplement, which contains the texts of the news used in the experiment, the test sheets and the Print Screen of two Excel charts. The supplementary CD contains the acoustic version of the radio news presented in the supplement, read by the newsreaders taking part in the experiments.

### **3. The hypotheses, aims and expected results of a perceptive and acoustic research of radio news**

Radio news has characteristics which appear in the acoustic structure as well. It is assumed that the value concerning the articulation speed and the speech tempo are basically the same, as radio news should be presented in a speed adjusted to that of the everyday speech. As spontaneous speech planning requires more time because of the pauses and hesitation, the speed of news reading should show a higher value than that of the everyday speech. (Laczkó, 1993.) It was also assumed that, taking an elderly speaker, the expected value of articulation speed should be slower and the number and length of pauses should grow.

Reading news belongs to the interpretative and artistic style of speech, so it is assumed that the register and the value of pause are higher than that of spontaneous speech. (Fónagy-Magdics, 1967.)

According to my hypothesis, the genre of radio news can be further divided. News on commercial channels and news on public service media should be examined separately. This separation also appears in the suprasegmental acoustic structure of reading news, in its temporal characteristics and in the values of the fundamental frequency (Bóna 2007, Olaszky 2005).

It is assumed that the mistakes in structuring the text makes comprehension more difficult than deviations in the segmental structure, so most misunderstandings can be derived from grammatically incorrect texts. Age is a decisive factor examining the correct working of text comprehension (Kozma 2005, Gocsál 2002). Consequently, it can also be assumed that in the experiment of speech comprehension elder persons will reach lower scores than younger persons. After reading out news too fast, the most deformations in comprehension can be expected in the group of persons above 60, while young persons's comprehension is not assumed to be basically influenced by speed. The Hungarian Radio does not give a permission to colleagues with any speech defects. In my research, I also examine how speech defects affect comprehension and whether it is young men or young women who perform better in understanding radio news.

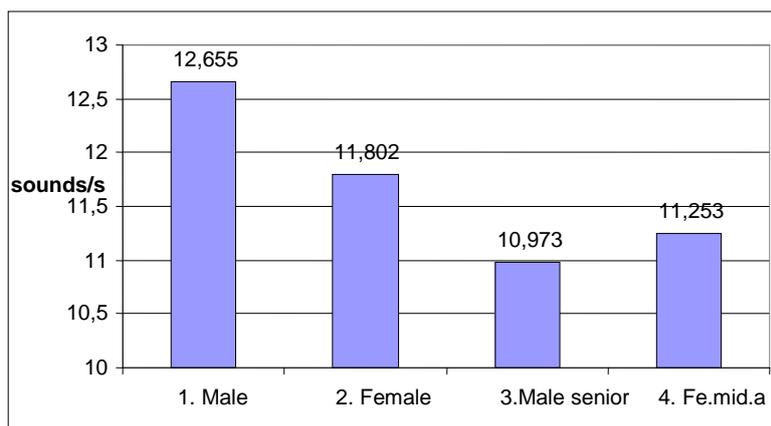
#### **4. The Acoustic Analyses of Radio News**

In order to be able to analyze the suprasegmental level of radio news, I started from Wacha's hypothesis (Wacha, 1993). According to this, the research in the phonetics of the text can be most successfully carried out if a text is told by more persons and then the different versions are analyzed. After comparing the versions, the acoustic differences between the types of texts will reveal themselves.

In my research, the pieces of news are read by four professional newsreaders, two women and two men. A man and a woman are the representatives of the young age group, while one announcer is middle-aged, one is an elderly person. The two young persons work for commercial channels, the others for the public service radio. As for the analyzed text, five short pieces of news were chosen. I asked the newsreaders to read out the news as if they were doing it in live broadcast.

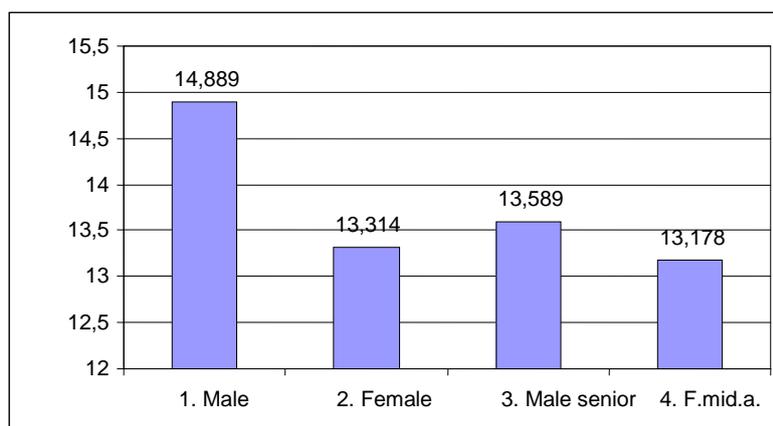
When choosing the suprasegments examined in the dissertation, it was very important that the aim of the research is to expose the suprasegmental features of radio news. On the other hand, it was also essential that the chosen suprasegments should be suitable for making an objective data recording and that the results of the research should be subjected to statistical analysis. There were two groups of suprasegmental characteristics covering these requirements: the temporal characteristics of news reading and some characteristics of the fundamental frequency.

For working out the material, I used the softver Praat 4.2. The suprasegmental characteristics of the text which can be grabbed with the help of the length of time were categorized under the temporal characteristics. Out of the characteristics of the fundamental frequency, the global and local minimum and maximum of frequency and their relationship (that is, register and pause) were examined. Finally, the values of register and pause were compared to those of other spontaneous speech texts. The two figures bellow show the values of the speakers' speech tempo and that of the articulation speed examined in the news.



*Figure 1.* Average values of speech tempo with four newsreaders

As the figure displays, it was the young male reader that read the text with the highest speed, the second fastest reader was the young woman, the third the middle-aged woman, while the elderly male reader was the slowest.



*Figure 2.* Average values of speed of articulation with four newsreaders.

The average values of the speed of articulation are displayed in Figure 2. It shows that the average speed of articulation in radio news is 13,297–14,617 sounds/sec.

Examining the values of the speed of articulation with the four chosen readers, the result, ranked in descending order is as follows: the young man has the fastest speed of articulation, he is followed by the elderly man, third is the young woman, and the fourth is the middle-aged woman reader.

As for the average Hungarian speech tempo in everyday language, different data can be found in the secondary literature: Lajos Hatvany's measurement in 1957, based on the

speech of radio announcers, was 12 sounds/sec; in 1960, Fónagy and Magdics measured 11,35 sounds/sec. As for the outside values, Subosits measured 5,6-22,5 sounds/sec (1990), Gósy in 1991 measured 7,25–14,3 sounds/sec. According to Hatvany's data, the average speed of reading radio news in 1957 was 12 sounds/sec (Hegedűs, 1957). Angéla Imre examined the temporal characteristics and the perception of suprasegmental characteristics in different tv and radio programs in 2005. According her measurements, the speed of articulation in news is 14,4 sounds/sec. Gábor Olaszy (2005; 2006) examined the suprasegmental structure and the temporal characteristics of reading news. The average value with male readers was 14,11 sounds/sec, with female readers 13,82 sounds /sec. The highest speed of articulation was 17 sounds/sec, the lowest 9,45 sounds/sec. Judit Bóna examined the broadcasters of different radio stations in the commercial and in the public service radio. She points out that the newsreaders of the public service radio read with a slower articulation and speech tempo, and with more pauses. The experiment showed that the average speed of articulation in the public service radio is 13,3 sounds/sec, the average speech tempo is 11,06 sounds/sec, while the average speed of articulation in the commercial channels is 14,96, the average articulation of speed is 13,23 sounds/sec.

As for the results of the experiment presented here, the following conclusions can be drawn: the speed of articulation in newsreading is faster than that of the everyday speech. The average speech tempo in public service radio is 11,1 sounds/sec, while in the commercial radio it is 11,8 sounds/sec. As for the speed of articulation, in the public service radio it is 13,4 sounds/sec, in the commercial radio 14,1 sec.

It should be emphasized that the middle-aged speaker's and the elderly speaker's speech tempo is inside the average, their speed of articulation was above the average, so the values of speed were lower only in comparison with that of the younger speakers'. Compared to the younger speakers, the two elder speakers' articulation speed did not decrease. The decrease appeared only when the speech tempo was examined. It is due to the fact that the two elder speakers divided the news with more pauses. So, the experimental results saying that speech tempo and the speed of articulation are significantly influenced by the speaker's age (Gocsál, 2000; Balázs 1993) have not been justified in my experiment. The cause may be that the newsreaders are usually professional speakers, who adjust precisely to the suprasegmental characteristics of the radio news. The factors that can slow an elderly person's speech – the physical and mental fatigue, different gerontological changes – do not significantly influence professionals' speech. The differences in the pattern of the tempo can be explained by the fact that the two young speakers work for commercial radio.

In the experiment, four types of pauses have also been examined: pauses after short news, pauses during reading short news, pauses between sentences and pauses in one sentence. As it could be expected, the elder speakers' slower speech tempo resulted in longer pauses. All speakers took the shortest pauses inside one sentence, and the longest pauses between two pieces of news. Pausing between the news helps understand them. In the readings examined, the shortest pause took 27 ms, while the longest one, between the pieces of news, 2673 ms. This latter result was produced by the young male speaker. The values of the silent pauses of the readings were between 150–200 ms.

All the four speakers' vocal range spanned over one octave. The middle-aged female reader used the widest range; she is followed by the elderly man and the two young readers.

Fónagy and Magdics' result, namely that the vocal range in newsreading is higher than that of the spontaneous speech could not be checked, as I did not have any spontaneous speech corpora by the four readers. Nevertheless, the voice of range and the values of pauses in newsreading can be compared to any spontaneous speech texts.

After comparing the data, Fónagy and Magdics' suggestion, namely that the voice of range in newsreading is wider and the values of pauses are higher than in spontaneous speech could be justified, as for clear articulation a wider range of voice is needed.

## **5. Examining the relationship between news styles and media types with a perception test**

To describe the acoustic structure of news as a genre I carried out a perception test. The members of the first group of experimentees were persons aged 18-25, while in the other group they were above 60. The first group consisted of students, the second of retired persons, 10 of whom lived in retirement homes. The only criterion was that the experimentees should not be hard of hearing; there were no requirements in education. The young group consisted of 10 men and 10 women, (so in this group the results could also be compared on the basis of the gender), while the elderly group consisted of 14 women and 6 men, which means that there were 24 women and 26 men taking part in the experiment altogether. As for the test, 6 sentences were chosen for each newsreader, which were manipulated. The chosen sentences were cut out of the text with the help of a software (Praat 4.2), and their speech tempo and fundamental frequency were measured. Then, the tempo and the fundamental frequency were manipulated. The speech tempo was accelerated or slowed, but the structure of frequency and

the intensity in speech sound remained unchanged. In this way, a text was created, where the speech tempo was unrealistically fast or slow, compared to the average speech tempo in Hungarian radio news. The speech tempo was fastened and slowed with 20–40–60%.

48 accelerated and 72 slowed sentences were tested on the experimentees. Taking the basic sentences into consideration, which means 24 sentences by the 6 newsreaders, 144 sentences were made for the examination of speech tempo in radio news. The measured value in the slowest sentence was 7,52 sounds/sec, while in the fastest 24,35 sounds/sec.

In the 24 basic sentences, the fundamental frequency values were manipulated with the softver Praat 4. 2. The intonation, intensity and the temporal structuring were not changed. In the chosen sentences, the deepest ones were deepened, while the highest versions further heightened. In this way, a text was created, where the pitch was unrealistically deep or high, compared to the average level of pitch in Hungarian radio news. It means that with men speakers 30% decrease in frequency could be performed, with women speakers it was 40%. (The program could not carry out further orders.) The increase in frequency was 100% with male speakers, which means that the speakers' voice range was heightened with a whole octave. With female speakers, the value of heightening was 70%. 42 sentences were examined with lowered pitch, and 102 with heightened pitch. Taking the basic sentences into consideration, 168 sentences were examined in the research of frequency manipulation. The lowest basic pitch value was 57 Hertz, the highest 306 Hertz.

In the perception test, there were altogether 288 sentences manipulated. The sentences were randomized with the help of the Praat script, and 12 sentences chosen by the program at random were built into the final sound file twice, so, after that there were 300 sentences altogether. Between the sentences a two-second-long white noise was played, before and after which there was a 500ms-long interval. The interval served to divide the sentences, so that the tempo and speed of the sentences following each other at random would not influence the experimentees' judgments about which category, on the basis of the acoustic parameters, the piece of news belonged to (A – commercial news; B – public service news; C – both; D – not radio news ). At the end I had a 37,14 minute-long recorded material in waw format. The volume of the sentences were normalized, equalized, and leveled with the volume of the white noise.

The statistic test was performed with an SPSS softver (version number is 13.0). Examining the suprasegments of radio news, I asked persons from four different age group, so the significance of the differences between the answers was examined. On the four independent patterns one-way ANOVA, i.e. the variation analyses with one factor was

applied. The relationship between the data of the different groups was examined with the Tukey post hoc test.

The data of the temporal measurements is summarized in the charts below.

Public Service News				Commercial News		
Min.	Max.	Average		Min.	Max.	Average
9,25	17,14	12,95	<b>Everyone judges</b>	10,43	21,87	15,63
10,00	17,14	13,31	<b>Female judges</b>	10,43	18,26	15,06
9,25	17,14	12,82	<b>Male judges</b>	10,43	18,26	15,28
10,00	17,14	12,95	<b>Young person judges</b>	10,43	18,26	15,63
9,25	17,14	12,93	<b>Elderly person judges</b>	10,43	18,26	14,71

*Chart 1.* The values of speech tempo in the news of public service and commercial radio, on the basis of a perception test.

Not radio news						
Not radio news (slow)				Not radio news (fast)		
Min.	Max.	Average		Min.	Max.	Average
7,52	11,60	9,32	<b>Everyone judges</b>	15,80	24,35	20,55
7,52	11,14	9,26	<b>Female judges</b>	15,80	24,35	20,97
7,52	11,60	9,08	<b>Male judges</b>	15,80	24,35	20,80
7,52	11,60	9,07	<b>Young person judges</b>	15,80	24,35	20,64
7,52	11,14	9,25	<b>Elderly person judges</b>	15,80	24,35	20,64

*Chart 2.* Values of non-acceptable speech tempo in radio news based on a perception test

Comparing the data, it can be seen that the experimentees (women, men, young person, and elderly person) judged news on public service radio to have a lower value of speech tempo than news on commercial radio. To the latter, a higher value of speech was ordered. The experimentees characterized the category “not radio news” with two different values of tempo, with a fast one and with a slow one. The data in the slow group represented a lower

value than it is characteristic of the news on public service radio, while the faster group showed higher values than it is characteristic of news on commercial radio.

As for judging the speech tempo of radio news, there were no significant differences between the experimentees' answers, independently from whether the speaker was male or female.

On the basis of the fact that the answers "can't decide" and "not radio news" appeared in both the slow and the fast lane, the conclusion can be drawn that fastening and slowing speech tempo in radio news creates frustration both in young and elderly listeners, independently from whether they are male or female.

My hypothesis that the genre of news could be extended towards the values showing a higher speech speed, has only been partly justified. The results show that in the public service news the listeners are tend to be more tolerant towards slow speech tempo, and elderly listeners tend to choose slower speech tempo. As for the gender-based relations, male listeners tend to give lower values of speech tempo. However, in commercial news the experimentees showed more tolerance towards faster speech tempo, and younger people tended to give higher values of it. As for the gender-based relations, male listeners tend to give higher values of speech tempo. So, elderly people prefer slower, while young people faster speech speed, and male listeners are more tolerant towards the changes in speech tempo (fastening-slowing) than female listeners.

The results of the research examining the tune of newsreading are shown in Chart 3.

<b>Everyone judges</b>						
<b>Male</b>				<b>Female</b>		
<b>Min.</b>	<b>Max.</b>	<b>Average</b>		<b>Min.</b>	<b>Max.</b>	<b>Average</b>
56,76	171,9	105,19	<b>Public service news</b>	70,66	188,03	112,28
73,83	184,31	135,16	<b>Commercial news</b>	101,22	244,4	199,33
150,94	186,48	170,31	<b>Not radio news</b>	222,21	305,89	261,98
<b>Female judge</b>						
<b>Male</b>				<b>Female</b>		
<b>Min.</b>	<b>Max.</b>	<b>Average</b>		<b>Min.</b>	<b>Max.</b>	<b>Average</b>
56,76	171,9	104,19	<b>Public Service news</b>	70,66	144,6	103,74
73,83	184,31	136,58	<b>Commercial news</b>	127,19	244,4	202,49
150,94	186,48	170,7	<b>Not radio news</b>	222,21	305,89	263,34

<b>Male judge</b>						
<b>Male</b>				<b>Female</b>		
<b>Min.</b>	<b>Max.</b>	<b>Average</b>		<b>Min.</b>	<b>Max.</b>	<b>Average</b>
56,76	158,51	94,67	<b>Public Service News</b>	70,66	170,47	107,83
83,34	184,31	138,3	<b>Commercial News</b>	162,93	243,92	202,12
150	186,48	169,17	<b>Not radio news</b>	228,11	305,89	265,12
<b>Young judge</b>						
<b>Male</b>				<b>Female</b>		
<b>Min.</b>	<b>Max.</b>	<b>Average</b>		<b>Min.</b>	<b>Max.</b>	<b>Average</b>
56,76	171,9	105,12	<b>Public Service News</b>	70,76	144,6	103,74
93,24	180,94	133,8	<b>Commercial News</b>	162,93	233,92	197,16
150	186,48	168,67	<b>Not radio news</b>	222,21	305,89	263,34
<b>Elderly persons judge</b>						
<b>Male</b>				<b>Female</b>		
<b>Min.</b>	<b>Max.</b>	<b>Average</b>		<b>Min.</b>	<b>Max.</b>	<b>Average</b>
56,76	142,56	87,62	<b>Public Service News</b>	70,66	174,23	109,84
73,83	184,31	135,35	<b>Commercial News</b>	162,93	244,4	209,73
166,67	180,94	174	<b>Not radio news</b>	228,11	305,89	268,56

*Chart 3.* The values of fundamental frequency in news of public service and commercial radio, with male and female readers, on the basis of a perception test

The lowest value of frequency was ordered to the news on public service radio, independently from whether the newsreader was male or female. The news on commercial channels has a higher pitch level, the non-acceptable data can be found in the highest frequency range. The answers “can’t decide” and “not radio news” can be found only in the highest range.

The outside values of the frequency range could not be properly defined. With male newsreaders, there is a bigger overlap between the fundamental frequencies characteristic of the different types of radio (overlaps between 20–80 Hz) than with female newsreaders, where the borderlines can be drawn more clearly (overlaps between 10–20 Hz).

The answers justified my hypothesis that the genre of radio news can be further divided into public service news and commercial news, and that this difference also appears in the suprasegmental acoustic structure of newsreading.

My hypothesis, that there is a significant difference in judging the news of radio types in different age groups, was justified only with news read out by a male newsreader both in public service and commercial radio. There were no significant differences between the answers judging the different genres of radio news, independently from the newsreader's sex.

Young experimentees ordered a much narrower scale of frequency to the category of "commercial news" and "not radio news" than the elder ones did. However, the elder listeners could classify the category of "public service news" with much more self-confidence. The consequence is that listeners could more precisely define the structure of frequency when they listen to radio news on the radio channels which they frequently listen to. That is, young listeners know commercial channels better than elder listeners, while elder listeners know public service channels better than young listeners. It is in accordance with the fact that the public service radio targets elderly listeners as well, while the commercial radio, whose main activity is advertising and sale, mainly targets listeners under 50. As it can be seen, the different age groups listens to the radio types which is the most suitable for them.

The fact that the answers "I can't decide" and "not radio news" appeared only in the high frequency range suggests that the experimentees were much tolerant towards the manipulation accomplished in the deep frequency range. So my hypothesis that the frequency range in radio news can be extended towards the low values has been justified both in young and elder age groups.

The results also show that the experimentees had the most difficulties in defining the limit of media types when the newsreader was a male. As for the age groups, elderly listeners had the most difficulties in this task. The answers also suggest that the limit of the fundamental frequency of a male newsreader's voice in public and commercial radio is between 110–120 Hz, while the limit in commercial radio and in non-radio genres is about 140 Hz. Above that, the frequency is so high that it is hard to make a difference between the sexes only by the speaker's voice. Nevertheless, a precise value which shows where exactly the value of frequency begins when the newsreaders' sex cannot be defined any longer has not been given, as it was not examined in the perception test.

Examining the judgments, the results are the follows: the average fundamental frequency with a female newsreader is 155 Hz (public service radio: 107 Hz, commercial radio: 202 Hz), with a male newsreader 118 Hz ((public service radio: 99 Hz, commercial radio: 136 Hz). The average fundamental frequency in the female voice is definitely low. "The fundamental frequency of the human voice is anatomically limited. In males' voices it ranges from 80-130 Hz, while in females' around 160–260 Hz, which means that it covers

approximately 2 octaves.” (Kassai 1982, 60) Female and young listeners judged the average pitch of the female newsreader’s to be deeper in public service radio than that of the male reader’s. This fact suggests again that the experimentees cannot identify the sex of a speaker in a given (here: lower) range of frequency. There is no precise value defining the limit of range where the sexes cannot be identified by voice only, as the experiment did not examine it. Insecure answers appeared mainly among the young and the women.

The fact that the experimentees could put the sentences of radio news into categories even when they could not identify the speaker’s sex suggests that the style of news and the genre characteristics are much more important factors than the announcer’s sex.

## **6. Researching the comprehension of radio news**

In my perception test, I examined five factors which affect the comprehension of news. These are texts and speaking characteristics which distract the listener’s attention from the content of the news and make it more difficult to understand texts and working up information. These can be sentences structured in a too complicated way, mistakes in the grammatical structure, too fast or too slow speech, and different speech defects. Music played under newsreading, which is a frequently used instrument in commercial radios, also seriously affects comprehension. The first examined factor is the mistake in the grammatical structure (like the improper use of datives, translational failures, confusing casual and purposive clauses, analytical and syntactical structures, mistakes in use of possessives, etc.). Secondly, four phenomena of speech as performative characteristics were examined.

The raw news of the MTI (Hungarian News Agency) was given to me in November 2001, by two commercial channels: Radio Roxy and Inforadio. The raw material was edited by a professional editor. Five news blocks were completed on the basis of five factors. I made one text which was grammatically correct and another one which was grammatically incorrect. Both texts consisted of seven pieces of news. There was one variable (a proper/improper grammatical form) in each piece of news. Then four blocks (each consisting of five pieces of news) were made, which were grammatically proper and which were recorded on two different tapes: with and without music, with fast speech tempo and with normal speech tempo. As a speech defect, lisp was chosen.

There were 60 persons taking part in the experiment, 30 young persons (14 males and 16 females), and 30 elderly persons (8 males and 22 females). Out of the 60 persons, four

groups were made, and the groups were divided into experimental and control groups. In the young age groups, 7 males and 4 females were chosen, so that the gender-based differences in comprehension could be examined as well. (In the group above 60, this kind of research could not be completed because of the proportion.)

The experimental groups listened to the texts where the ways of interpretation significantly affected comprehension (e.g. there was music played under the news, the speech tempo was too fast or too slow, the newsreader had a speech defect). The control groups listened to the text in which the pieces of news were interpreted properly, i.e. without music, and speech defects, with a normal speech tempo. The news blocks could be heard only once, and experimentees were not allowed to make notes. The record was stopped after every text and the experimentees were asked to write down all information they remembered. The order of the news was not significant.

The answers were analyzed in two different ways. I counted how many words each experimentees used when writing down a piece of news and a whole news block. According to my hypothesis, the better a listener comprehends a piece of news, the more words he or she uses. The precise recognition of the main ideas gives information about the proper understanding. Writing down any pieces of information which was not given counted as a mistake, just like any misunderstood pieces of information, as all mistakes give information about the failures in comprehension.

Comparing the results given in the young and elderly age groups, it can be seen that the performance of the young group is almost twice as good as that of the elderly group. However, elderly persons wrote down less pieces of information containing mistakes than the young. It is interesting that in the young control group the results were better than in the elderly age group. The young women's result was (slightly) better both considering the number of words and ideas, and they wrote down less pieces of mistaken information than young men. It suggests that young women perform better in speech- and news comprehension than young men.

The experiment also revealed the ways of interpretation which most seriously affected comprehension. However, the different age groups reacted on the criteria of the experiments in different ways. For this reason, two orders were created. In the young groups, speech defect was the most decisive factor, and improper grammatical structure is the least decisive one. There was also no significant deterioration of comprehension when radio news was read out with different (too fast and too slow) speech tempos. However, comprehension was

significantly affected by slow speech tempo. Playing music under newsreading also made understanding more difficult.

It is important to stress that, according to the results of the experiments, all criteria significantly affected comprehension in the elderly group, even when they reached the highest scores. The most disturbing factor was the fast speech tempo, the less disturbing one the slow speech tempo. Speech defects also caused serious deterioration of comprehension. The third most disturbing factor was the use of damaged grammatical structures. The experimental group, which listened to the news without music, performed better than the control group which had to listen to news with music. Bringing the two orders together, a united rank can be established according to the different criteria.

### **United rank**

1. Speech defect
2. Fast speech tempo
3. Mistakes in the grammatical structure
- 4-5. Slow speech tempo – with music

## **7. Consequences**

Comprehending news is not an easy task even when all affecting factors are eliminated, as understanding news requires being well-informed all the time. When the text of a piece of news contains an improperly structured sentence or it is performed in a bad speech tempo, it makes it even more difficult for the listener to understand them. It is important that editors and newsreaders should do their best to eliminate the factors which affect news comprehension, so proper grammatical structures and clear articulation are essentially important.

The data which the research were based on were checked by a statistic test whenever it was possible. On the basis of the researches carried out, the following theses have been justified:

1. It has been shown that listeners define public service news with a slower speech tempo than commercial news, to which they order a higher value of speech tempo.

2. It has been justified that the experimentees define public service news with a low value of fundamental frequency, while in commercial news this value is higher. The values of fundamental frequency not acceptable in radio can be found in the high frequency range.
3. The findings has showed that the genre of radio news can be further divided into commercial news and public service news, and this difference also appears in the suprasegmental acoustic structure (in this case, in the values of speech tempo and in the structure of frequency) of reading news.
4. In my opinion, the definition of radio news can be grabbed in the ritual model of communication as a wider frame of reference, in the contextual approach of radio news and in the segment of the results of the perception tests presented in my thesis.
5. The research has justified that the style of the news and the characteristics of the genre are much decisive factors than the sex of the newsreader. That is, in an experimental situation, perception is not influenced by whether the announcer is a male or a female.
6. The perception test researching the comprehension of radio news justified that young people perform better in speech comprehension than elderly people. However, there was a significant difference between how young listeners (18-25) and elderly listeners (above 60) reacted on the different experimental criteria. With young listeners, comprehension was the most seriously affected by speech defects, and the least seriously affected by improper grammatical structures. With listeners above 60, comprehension was the most seriously affected by fast speech tempo, and the least seriously affected by slow speech tempo.

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