THESES OF THE PHD DISSERTATION

The other functions of the suprasegmentals
Professional and communicative competence in
spontaneous speech

by

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**Introduction**

Competence is a complex term of personal attributions, skills, knowledge and facilities, which help us to solve complicated situations and tasks both at work and in the personal life (Borgulya–Vető 2010). Competence is a kind of knowledge, which facilitates some kind of activity, it is connected to happening and existing. In a psychological explanation perception, detection, learning, remembering, thinking and language – which are not connate, but also acquired by experience – are parts of the competence (Nagy 1997).

In this study we will analyse two main competences. Professional and communicative (Szabó 2010) competence are essential in business life to a successful firm. Communicative competence includes all skills, that are important for a successful communication. To transfer the message is the most important aim of communication. The speaker could have other purposes, like changing the listeners thinking, behavior or/and attitude. Professional competence means not just the sum of knowledge, but the facility to apply this knowledge in the work-situations and the ability of transmission.

In our dissertation we examine how these two major competences have an effect on the suprasegmental structure of the spontaneous speech. During the spontaneous speech production, the planning of the phrase and articulation took place approximately in the same time (Gósy 2004). Because of this, it is particularly important how the speaker organizes the segmental and suprasegmental structure of the speech. The prosodic features of spontaneous speech adjust to the speakers personality, actual physical and emotional condition, the situation and purpose of the communication.

The way speakers organize the prosodic structure of their speech is the result of many factors. The effects of stress on speech production is an important field of the research. In communication based jobs – like in a call center – it is important, how the employees manage daily stress, and how this stress effects on their speech. In the call center of the bank it is expected to stay calm, confident and professional in every situation, whatever the client says or does.

Also the experiences in the bank area inclined us, to study the speech strategies of female employees. There is a tendency in western countries, which shows, that women are minded to use a lower F0 if they want to look more professional and confident (Yuasa 2010). We wanted to find out, that is this tendency discernible and demonstrable in the speech of Hungarian women.
Aims, questions, hypotheses

The aim of this study is a presentation of the connection between the skills and the spontaneous speech of different groups. We wanted to analyse, how professional and communicative competence correlates with the suprasegmental features, and if it does, is there a pattern. Our research was motivated by the intent of finding correlations between the level of the skills and the prosodic features. We also wanted this study to be a starting-point for other researches in this topic. We think, that understanding how people use their skills in the communication will bring us closer to the human thinking, which is also a way to connect with other related disciplines, such as psychology, gender linguistics and communication studies.

Our main questions were the following:

1. Has professional and communicative competence an effect on spontaneous speech? If it has, are there some kind of patterns in the prosody?
2. Are there patterns in the suprasegmental structure to moderate the effect of stress?
3. Do men and women apply different strategies to look more confident and professional during communication?

According to the references, the experiences in the private sector and in connection with the questions five main hypotheses was formulated:

H1: In a correlation with the competences different patterns of suprasegmental features can be observed in the spontaneous speech.

H2: Subjects with more professional experience and higher-leveled communication skills will talk more about the topic in a unit of time.

H3: Stress will have a notable effect on the suprasegmental structure. Factors such as temporal features, frequency range, basic F0, will show differences depending on the topic and the situation.

H4: There will be differences in the prosodic structure between mens and womens speech. These differences will be observed not just in the frequency range and voice quality, but in temporal features also.

H5: Irregular phonation will be more common in womens speech, than mens. The phenomenon will be more specific in the communication of the women with more professional experience and higher-leveled communication skills, than in the speech of other female subjects.
According to the analysis of the temporal features, the frequency range and the occurrence of glottalization, we formulated other hypotheses, which were classified in three thematic groups:

1. The connection between the professional and communicative skills and prosody
2. The prosodic features of male and female communication
3. The influence of the topic (and situation) on prosody

**Experiments**

**Professional and communicative competence in the spontaneous speech of speakers with different professions**

The aim of our first major research was a presentation of how the two main skills affect on temporal features, pausing habits, the length of phrases, voice quality and frequency range of the spontaneous speech. We also wanted to study and analyse the male and female communication strategies in two speech situations.

**Subjects, material, methods**

In the study we analyzed the speech production of 32 speakers in two situations. We have elected 16 male (22-44 years of age, $M = 30,2$ years) and 16 female subjects (21-46 years of age, $M = 31,7$ years) from the BEA\(^1\) database. Our subjects had varied jobs e.g. teacher, priest, journalist, radio reporter, chef, waitress, mechanic, merchant.

We defined the speakers groups according to the communicatives skills and professional experience. Our points of view were the following during classification:

1. Is high-leveled communicative competence an expectation from the employer?
2. Do the subjects have a five-year professional experience in their recent job?

We used two samples from the subjects recordings. Both were spontaneous narratives: first topic was the profession and hobbies of the subject, the second topic was an actuality – usually a short news from the papers, TV or radio – and the subject was asked to tell her/his opinion about it.

For temporal analysis we used $3,8 - 3,1$ minutes in average form female subjects, and $5,7 - 4,9$ minutes in average from male subject recording in the first and second task. For the analysis of frequency range and glottalization we used about 3 minutes long parts of the

\(^1\) Phonetically-based multi-purpuse database of Hungarian spontaneous speech. The acronym BEA stands for the letters of the name Beszélt Nyelvi Adatházis (Gósy 2013).
recording in both tasks. The analysis was carried out by the PRAAT software version 4.3.3., the statistical analysis of the results was made with SPSS 23.0.

**Results**

The males subjects articulated faster, than the female participants, but this difference wasn’t significant because of the speakers variability. Articulation tempo showed correlation with the topic of the speech: we found that the subjects – both men and women – articulated faster when they had to tell about their opinion in an actual question. Figure 1 shows the differences in mens (F) and womens (N) average articulation tempo in speech sounds/second between the two tasks (1,2).

![Figure 1: The average articulation tempo (AT) in the subjects talkings according to the topic of the speech](image)

According to the results of the groups of male and female speakers we found that participants with higher-leveled communication skills and with less than 5 years professional experience articulate faster, than the other subjects. Difference between arranged groups according to communicative competence was significant in the first task (Independent-Samples T Test: $t(30) = 1,293, p = 0,003$) and in the second task also (Independent-Samples T Test:$t(28) = 2,356, p = 0,002$)

Professional experience did not show significance with the articulation tempo. In a correlation of the two skills, we observed that speakers with higher-leveled professional skills
articulate slower. There are many reasons of this phenomenon: usually people with more professional experience are older, so we have to consider the effects of the physiological features. Also the public opinion of the connection between the articulation tempo and professionality is culture-specific (s.a. Langenmayr 1997, McHenry at al. 2011).

We found, that the level of the communicative competence has an effect on the speech tempo. Subject with higher-leveled skill spoke faster. This tendency was verified according to the groups of male and female speakers in both tasks. The results also showed, that the topic has an influence on the temporal features of the speech. We found, that the participant in every group (male-female, arranged according to one skill, arranged according to the correlation of skills) talked faster when they were asked, to tell their opinion, against of speaking about their job and hobbies. According to the results of speech tempo, we observed that professional skills did not have clearly significant influence on this prosodic feature.

The results of the pausing habits showed, that women used more pause in their talkings in both tasks. Figure 2 shows the differences between the genders. Communicative competence had an effect on pausing: we found, that the subjects with higher-leveled skill, used less pause in their speech. The difference between the arranged groups of male and female speakers according to the communicative skill, was bigger in the first task, which means, that the topic also had an influence of the pausing habits.

According to the results of the female speakers, we found that professional competence has an influence on the pausing habits: we found significant difference in the first task between groups arranged according to the skill (Independent-Samples T Test \(t(29) = 2,538, p = 0,029\)). In a correlation of the two skills, we observed, that subjects with higher-leveled communicative skill and less than 5 years work experience used more less pause in their
talkings. We found, that the skills had a remarkable effect in the first task, the differences were lesser between the groups, when people were talking about their opinion. Indipendently from the topic, the results showed, that subject with lower-leveled communicative skill and more than 5 years of professional experience used the longest pauses during speech. Both skills had an effect on pausing, but we assume, that other features may also have an influence.

The results of arranged groups according to professional experience showed that the topic of the speech has an influence on their pausing habits. In the first task – when the subjects were asked to talk about their job and hobbies – we observed major differences in the pausing habits, in the proportion of pause categories with different length. In the second task these disparities between groups were equalized.

Communicative competence also showed a connection with the length of the phrases: speakers with higher-leveled skill usually spoke in longer phrases. The results showed, that the professional competence also has an influence on the length of the phrases. When the speakers had to tell their opinion about an actuality, subjects with more work experience used longer phrases in their speech. We also observed this tendency in the first task, when the subjects talked about their job and hobbies, but only according to the results of the male participants.

The analysis of the changes of F0 verified the previous results of the frequency range and voice quality studies: women use a higher F0 and a wider frequency range in their communication, than men. We assumed, the people will speak in a wider frequency range, when the topic has an effect on their emotions, but only the women's results verified this hypothesis. We observed, that women lowered their voice and used a narrow frequency range, when they were asked to tell their opinion.

The results also showed, that the topic and the speakers gender is in correlation with the glottalization. Although the phenomenon is speaker-specific and shows a major variability between the subjects, we found that women use glottalization more often than men (Figure 3).
We observed, that men glottalize the first and last syllable of the phrase more often, than women. The results showed, that there is a significant difference between men and women in the appearance of the glottalized phrases ($t(28) = -1.617, p = 0.013$) and their syllable number ($t(28) = -1.229, p = 0.005$).

We found, that there is a correlation between glottalization and communicative competence. Women with higher-leveled communicative skill used glottalization twice often, than the other female subjects. According to the results of male speakers, we found, that the phenomenon was more often in the speech of subjects with lower-leveled skill. Professional experience had an effect on glottalization, but only according to the male speakers. We also found, that speakers used glottalization more often when they had to talk about their work and hobbies. (We assume, that there is a connection between this phenomenon and the fact, that the topic was very personal, which may have a connection with face-saving.)

We observed, that communicative competence has an effect on which part of the phrase the speakers glottalize. According to the results of female subjects the phenomenon showed differences in appearance on the first syllable and on the whole phrase. Male speakers results showed differences on all parts of the phrase in appearance. Professional competence had correlation with the glottalization habits on the different parts of the phrase only according to the results of female speakers. We found, that women with less than 5 years professional experience were minded to glottalize parts of the phrase, otherwise women with more work experience used to glottalize the whole phrase more often. We found significant difference between the groups in the second task in the appearance of the glottalized phrases ($t(28) = 1.327, p = 0.010$), in the average number of glottalized syllables in these phrases ($t(26) = 1.495, p = 0.001$) and in the proportion of glottalized syllables ($t(28) = 1.539, p = 0.023$).
Discussion

According to the analysed data, we observed that the speakers’ age, gender and personality, also the topic and the situation has an effect on the appearance of the prosodic features. The groups – although the purpose of the research – were not unified. The subjects were from different groups of age, had different jobs, personality, experiences and lifestyle. The variability of the participant indicated, that the subjects react differently on the situation and topic, which caused differences in the suprasegmental structure of their speech. We should consider the effects of the psychological processes on speech: some speakers may find it harder to talk about themselves or about a personal topic. They might have issues with being proper to the picture they want to show (face-saving) (s.a. Brown–Levinson 1978).

Comparative analysis of the prosodic features in the spontaneous speech of call center employees

The results of the BEA-subjects showed, that the use of suprasegmental features was speaker-specific, and other factors also had an influence of the speech. The aim of the analysis was a presentation of how competences correlate with the prosodic features in the speech of a more unified group of speakers. Our second aim was to find evidence of different speech-strategies of male and female speakers to reduce the effect of stress.

Subjects, material, methods

We analyzed the speech production of 20 call center employees, who were working in the same department of a bank. They were doing the same tasks in the office, participated in the same trainings, and had to proper to the same managers expectations. 10 male (24-37 years of age, \(M = 29,2\) years) and 10 female subjects (23-54 years of age, \(M = 28,9\) years) participated in the recordings.

It was important for us, to fit our recording method to the protocol of BEA-recordings. We used two samples from the subjects recordings, just like in the previous research. Both were spontaneous narratives. In the first task the subjects were asked to answer a frequent question and help a client who has loan repayment difficulties (common situation). After that we created an unexpected situation, in which the subjects were asked to choose one of the cards given, and talk about a topic they read on it (unexpected situation). We analysed the speech of male and female subjects separately.

For temporal analysis we used 5,3 – 3,9 minutes in average form female subjects, and 7,3 – 4,5 minutes in average from male subject recording in the first and second task. For the
analysis of frequency range and glottalization we used about 3 minutes long parts of the
recording in both tasks. The analysis was carried out by the PRAAT software version 4.3.3.,
the statistical analysis of the results was made with SPSS 23.0, like in the previous research.

Results

According to the result of the recordings in the common situation we observed, that –
although the subject were working on the same department, doing the same tasks – there were
differences in the speech strategies of male and female speakers. Women usually articulated
slower, changed their F0 in a narrow range and used longer phrases in their communication,
than men. Female subjects used glottalization more often, even the whole phrase was
glottalized more often. Male subjects articulated faster, but used pause more often, and these
pauses were longer in average. In a comparison with BEA-speakers, call center employees
paused less in their speech.

In the unexpected situation these speech strategies were more spectacular in a
comparison of genders. The professional competence had less influence on speech production.
The communicative skill showed in how subjects react on the situation and how they wanted
to look confident and competent in the topic. Their narrative was still a spontaneous
monologue, but we observed that they were getting uncertain more often: they used more
pause and asked for help to the interviewer more often. In case of 1 male and 1 female
speaker the monologue turned into dialogue because of the several subject questions and short
answers. We found that the personality of the speakers and the way they handled the new
situation also had an effect on their speech production, even though they were professionals.

The differences between the speakers strategies were major in the unexpected situation.
We observed the first clues how the subjects started to talk about the topic of the second task.
Women were minded to repeat parts of the text they read on the chosen card, while men
usually reflected on the topic before starting the statement.

We found differences between genders in the tempo of articulation (Figure 4), pausing
habits and the length of phrases in the second task.
Female subjects (NB2) usually articulated slower with more and longer pauses, than men (FB2): the length of the average pause in their production was nearly 1 second longer (Figure 5). The difference was significant (GLMM: F(2,19) = 25,892, p = 0.001). Besides the average length of phrase in the female speakers monologue became nearly 250 ms shorter, compared to the first task.

According to the results of the temporal analysis we conclude, that the women used more time to plan their speech, because they wanted to minimalize the possibility of failures.
and used often only phrases one word long. In the statement of the topic they used similar syntactic structures, enumerations, asked questions and asked for help more often, than men.

Women used a wider frequency range and a higher F0, then men, which result was significant (GLMM: $F(2,18) = 19.008, p = 0.001$). The range of frequency was almost the same in both tasks in the speakers production, but we observed, that major part of the group used different registers of their voice in the unexpected situation: the average F0 of 7 women and 9 men increased. In a correlation with this phenomenon glottalization became less often, but the difference between genders in glottalization habits was still the same (Figure 6):

![Proportion of glottalized syllables](image)

Figure 6: Proportion of glottalized syllables in the speech of male and female subjects

In the unexpected situation both men and women hesitated more often, than in the first task. In the common situation hesitation in call center employees speech was less often, than in the production of BEA-speakers. The results showed, that this difference between the speakers of the two corpus had disappeared in the unexpected situation.

**Discussion**

In a unified group of speakers communicative competence showed in different speech strategies. The subjects used prosody in different ways to prove their skill and professionality, and for the successful communication. They used a small vocabulary, the question they had to answer was common, and they had a proper professional experience and communicative skill to handle the situation, which also might be a help.

The results of the unexpected situation confirmed, that speakers use different strategies to decrease the effect of stress. These were varied according to the speakers personality and ability to recognize and handle the situation.
Discussion and conclusions

**H1:** Our first hypotheses was partly verified by the results. We observed that the skills have an influence on the suprasegmental structure, but we could not find a unified pattern, witch would fit on every speaker. We found that communicative competence has an effect on the temporal features in spontaneous speech, such as tempo, the usage of pauses and articulation. Professional competence showed correlation with the prosody when speakers talked about their work. The analysis also showed that other features – like the age of the speaker or the topic of the speech – may also have an effect on the prosody.

**H2:** The results verified our second hypothesis, but only with the correlation of communicative competence. Speakers with higher-leveled communication skills used longer phrases in their communication, but with shorter pauses. In a comparison of BEA speakers and call center employees we found, that trained speakers use less pause in their communication and speak faster, than the average.

**H3:** According to the results of the call center employees, our third hypothesis was verified. We found differences in the suprasegmental structure between the two situations. When the subjects talked about the unexpected topic, the pauses became more frequent, phrases became shorter. We also found that men and women were using different strategies in their communication in the unexpected speech situation, which also had an effect on the frequency range and the usage of glottalization.

**H4:** Our fourth hypothesis was partly verified be the results. According the BEA-speakers, we found differences between male and female communication in the pausing habits and the length of the phrases. Frequency range, F0-analysis and glottalization also showed differences in usage between genders. The results of the call center employees also showed a difference between genders in the temporal features in both tasks, especially when they had to talk about an unexpected topic. It refer, that we should consider that the topic and skills how speakers adapt to the situation also have an effect on the prosody.

**H5:** According to the results, our fifth hypothesis was partly verified. Glottalization was more common in womens speech. We found, that in both tasks and in both groups – BEA, call center employees – women used glottalization more often, than men. The phenomenon was more common in speech, when the subjects talked about their job and work experiences. We found connection between the usage of glottalization and professional and communicative skills, but other features also have an influence on it.
1. According to the results of both subject groups, topic has an effect on the suprasegmental structure of the speech. We found differences in the temporal features – such as speech rate and pausing habits – between groups, but also in different themed talkings of the same group.

2. Professional and communicative competences had an influence on the realisation of the prosodic features in speech. Communicative competence had an effect on the following suprasegmental elements: articulation and speech rate, pausing habits and voice quality. This skill also plays a role in the length of the phrases: professional or trained speakers used longer phrases in their speech. The effect of the professional competence was not so convincing. Younger speakers usually talked faster and easier, then the older – and more skilled – subjects. The skill helped the speech production, when people talked about their job and work experience. Its influence not necessarily resulted faster speech, but the higher-skilled speakers used longer phrases in their communication – independently from the topic. The correlation of the two competences showed an interesting result: subjects with higher-leveled communication skill, but less work experience spoke more fluently, than the others.

3. Glottalization showed a correlation with the topic. The subjects were minded to use glottalization, when they were asked to talk about their job. The phenomenon was more common in the speech of higher-skilled subjects. The difference was more significant between the women's groups, especially when they had to talk about their job and hobbies.

4. We also found excessive differences in the speech production between the common and unexpected situation. Stress caused by the unexpected topic and the short time to think it through had an effect on the suprasegmental features. The subjects' frequency range had changed, 80% of the speakers started to speak on a higher F0, which indicated, that they glottalized less often. The difference in glottalization habits was independent from the topic.

5. The results verified, that men and women used different speech strategies in their communication to moderate the effects of stress. The way the subjects tried to neutralize stress, had an influence of several suprasegmental features. Women started to articulate slower, used more pauses and shorter phrases, so they had more time for planning their speech. According to men's results there were no significant differences in the talkings between the two situations. But most of the subjects spoke with a higher F0 in the unexpected situation. We also observed, that men were minded to change the topic or say something humorous, when the original topic was too hard.
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The author’s publications related to the topic