

SOME FEATURES OF FILLED HESITATION PAUSES IN SPONTANEOUS RUSSIAN

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ABSTRACT

This article examines the results of research conducted on different varieties of hesitation phenomena. The research, based on the spontaneous speech recordings of 10 Russian speakers, compares the spectral characteristics of these speakers' vocalizations from hesitation pauses and the vowels /a/ and /e/ within words from spontaneous monologues. Filled pauses in Russian, as in many other languages, fall towards the center of the vowel space, but there is substantial inter-speaker variation in exactly what sounds are used.

Keywords: spoken language, filled hesitation pauses, Russian, spectral characteristics

1. INTRODUCTION

The existence of various hesitation phenomena is a universal characteristic of spontaneous speech in any language. They arise in speech when the speaker is at a loss in the choice of lexical or syntactic means of expressing an idea, and these hesitation pauses may vary: they can be silent (non-filled) pauses, which may or may not be coterminous with pauses between intonational units; filled pauses; prolongation of the last sounds before a pause; prolongation of the first sounds after a pause (lengthenings); and so forth.

This paper pays particular attention to filled hesitation pauses.

2. METHODS AND MATERIAL

Analysis of hesitation phenomena was carried out on recordings of spontaneous monologues uttered by 5 male and 5 female speakers chosen from different age groups, from 18 to 55 years. Most importantly, all speakers were born in St. Petersburg and have standard Russian pronunciation without any dialect features. Multilevel segmentation of the material into

intonational units, accent groups, open syllables, and phonemes was performed by teams from the St. Petersburg University Phonetics Department[2]. Segmental and prosodic analyses were performed using the programs PRAAT and EDS.

The total duration of the analyzed spontaneous speech is about 50 minutes (5 minutes for each speaker).

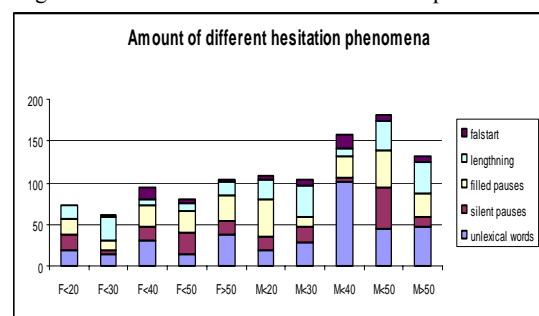
For this project all types of hesitation phenomena were noted, their frequency as well as unique features of their realization by each speaker counted, and certain acoustic characteristics measured: duration and F1 and F2 values of vocalizations in filled pauses (about 200 vocalizations) and of stressed vowels /a/ and /e/ in ordinary words from the spontaneous monologues of these speakers (about 350 vowels).

3. RESULTS AND DISCUSSION

It is interesting to note how such universals for all language phenomena as hesitation are realized in the speech of each individual Russian speaker.

It appears that the number of various hesitation phenomena changes from 180 in the speech of speaker M < 50 to 60 for speaker F < 30 in 5 minutes of spontaneous speech (see fig.1). (Letters correspond to each speaker's gender, and numbers indicate age).

Figure 1. The number of various hesitation phenomena



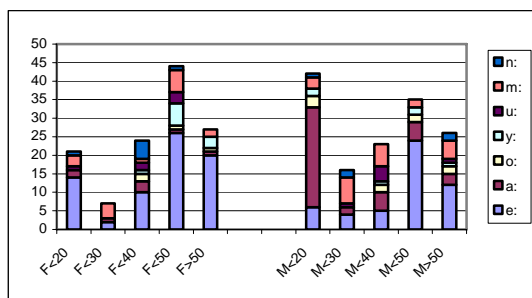
As can be seen from the diagram, the most frequent hesitation phenomena are pauses filled by

asemantic words (in fig.1-“unlexical words”). In our material the most frequent are /vot/ and /nu:/, particularly in the speech of M<40). Silent hesitation pauses are relatively frequent occurrences (particularly in M < 50’s speech), but more frequent are pauses filled by different m- and vocal sounds.

Prolongation of final vowels in a word, and sometimes consonants (in fig.1 –“lengthning”), can be heard in the speech of all of 10 speakers, but is especially frequent in the speech of speakers F <30, M <30, and M > 50.

Also remarkable is that in these samples the number of hesitation phenomena in the speech of the female speakers is lower (fewer than 100 in all cases), than in speech of the male speakers (over 100 in all cases). This distinction appears statistically significant. Only Batliner et al [1] have written about the gender factor noted in hesitations in German spontaneous speech; however, their study does not indicate a difference between men and women in this aspect. This can be explained by the large number of subjects in the German study (56 female speakers and 81 male speakers). Further investigations on Russian material are necessary.

Figure 2. The number of various vocalizations



Auditory analysis of pause vocalizations has shown that it is basically /e/-shaped vowels and vocalizations with closed lips that are perceived as nasal sonants [m] (see fig.2).

However, in one speaker’s monologue hesitation pauses were generally filled by /a/-shaped sounds. Particularly significant is that a brief review of investigations of this phenomenon based on various languages conducted by Giannini [3] reveals that the researchers come to opposite conclusions. Some studies find that the quality of these vocalizations depends on the phonologic system of the speaker’s language (Levelt, Giannini, O’Shaughnessy); others pay attention to differences in these vocalizations from vowels

uttered in ordinary words (Paetzold, Simpson). Giannini, investigating vocalizations based on the speech of representatives of different Italian provinces, has found that their realization depends on the phonetic features of the dialects in these provinces.

In order to check this assumption, values F1 and F2 of sounds from hesitation pauses and the frequency of formants in stressed vowels /a/ and /e/ between non-palatalized consonants were measured, as auditory analysis showed similarities in precisely these elements. We did not analyze unstressed vowels in Russian because of strong vowel reduction in unstressed syllables, in which they are almost completely defined by the previous and following it consonants. (A great deal has been written about this, for example in [4]). F1 and F2 values were measured at the central point of the formant pattern. The same spontaneous monologic speech of seven of the ten speakers was used: In the speech of F < 30, M<30, and M < 40, the number of filled hesitation pauses was not enough for statistical analysis.

The results were analyzed using STATISTICA: the statistical significance of distinctions between the values F1 and F2 of vocalizations (F1h, F2h) and of stressed vowels (F1a, F2a, F1e, F2e) for each speaker was determined. Table 1 shows in which cases the distinction is significant (marked by a plus sign) and in which cases insignificant (marked by a minus sign).

It can be seen from Table 1 that in F > 50’s speech vocalizations coincide in the values of F1 with stressed vowels /e/, produced between non-palatalized consonants in a spontaneous monologue (distinctions between them are insignificant).

Table 1. The statistical significance of distinctions between the values F1 and F2 of vocalizations and of stressed vowels

Speakers	F1h / F1a	F2h / F2a	F1h / F1e	F2h / F2e
F<20	+	+	-	+
F<40	+	+	+	+
F<50	+	+	-	+
F>50	+	+	-	-
M<20	-	-	+	+
M<50	+	+	-	+
M>50	+	-	+	+

In speech of speaker $M < 20$ vocalizations do not differ significantly from his vowels /a/ from a non-palatalized context, as confirmed by auditory analysis.

In the speech of the other speakers vocalizations differ either on F1 or F2 both from /a/ and from /e/ in lexically significant words.

For example, fig. 3 shows the average meanings F1 (fig. 3a) and F2 (fig. 3b) with standard deviations of vocalizations (hes), vowels /a/ (a-lex), and vowels /e/ (e-lex) from the speech of speaker $M > 50$.

It can be seen that according to F1 vocalization is realized as an intermediate vowel between /a/ and /e/, but according to F2 it has the same value as vowel /a/.

In the pronunciation of speakers $F < 20$, $F < 50$, and $M < 50$ vocalizations coincide with the vowel /e/ from words according to F1, and are between /a/ and /e/ according to F2. (Figures are not presented here because of space limitations).

Vocalizations of speaker $F < 40$ differ significantly from both vowels according to both formants.

Figure 3. Average meanings F1 (a), F2 (b) and standard deviations of vocalizations (hes), vowels /a/ (a-lex), and vowels /e/ (e-lex) (speaker $M > 50$)

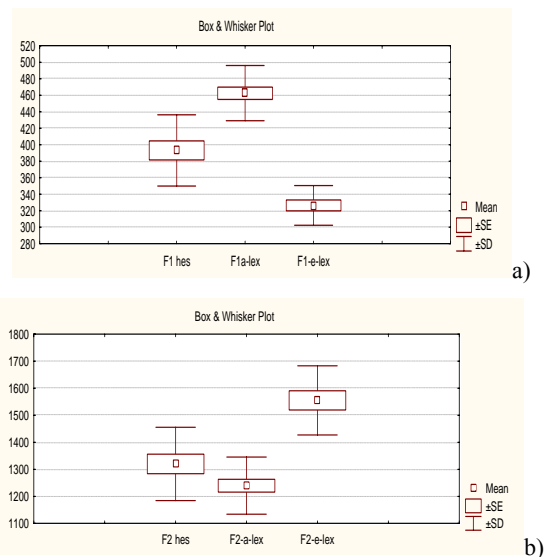
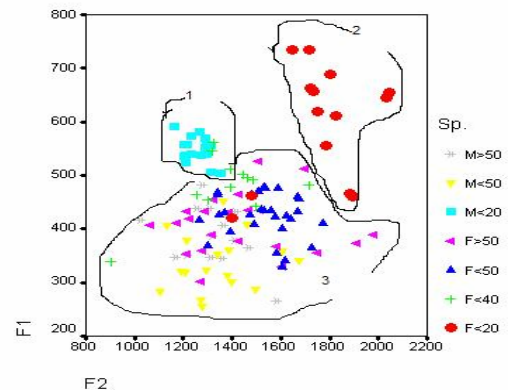


Fig.4 presents the vocalizations of all speakers in coordinates F1-F2. It should be noted that the vocalizations of speakers $F < 20$ and $M < 20$ are different from the vocalization of other speakers and from each other: $F < 20$ produces as vocalization an open front vowel, $M < 20$ – an open central one (russian /a/), other speakers – schwa-

shade closed central vowels. One can assume that the age difference between them and other speakers somehow influences their hesitation pauses, but only two young subjects do not provide enough material to make conclusions.

Figure 4. The Vocalizations in coordinates F1-F2 (“1”- $M < 20$, “2” – $F < 20$, “3” – $M > 50$, $M < 50$, $F > 50$, $F < 50$, $F, 40$)



4. CONCLUSIONS

In response to questions discussed in Gianini [3], it can be said that the Russian speech material analyzed here hardly allows us to make an unequivocal correlation between vowels that fill hesitation pauses and certain vowels in the Russian vocalic system that occur in ordinary words (in this case distinction between speakers would be less), although native speakers clearly recognize them as /a/ or /e/-like vowels. Our conclusions come closer to those of Paetzold and Simpson, that “vocalizations are phonetically different from the lexical items” and that their pronunciation is due to articulatory economy [5]. It seems that speakers in the moments of fluctuation before deciding how to continue produce sounds that are as neutral as possible, demanding minimal movements of tongue and lips, and that this neutral position can vary from speaker to speaker for physiological reasons. Thus, in our opinion, one can explain for physiological, rather than linguistic, reasons the distinctions revealed in these samples in vocalizations among speakers born and living all their lives in the same city and speaking in the same language without dialect distinctions.

The specific features of speakers shown at filling hesitation pauses can be useful in the process of speaker identification.

Further investigations on Russian material are undoubtedly necessary.

5. REFERENCES

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