

## PERCEPTION OF TENSE-LAX VOWELS AND FORTIS-LENIS CONSONANTS BY RUSSIAN LEARNERS OF ENGLISH

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### ABSTRACT

A perceptual experiment was conducted in a group of 76 Russian students of English in order to test their ability to identify tense-lax vowels and fortis-lenis stops in final position in monosyllabic words. The data obtained indicate that the listeners responded mainly to the durational characteristics of vowels and were less sensitive to their quality. In erroneous perception the subjects tended to follow the pattern of their mother tongue.

### INTRODUCTION

The present study is part of a longitudinal project whose ultimate goal is to investigate perceptual ability in Russian University students of English at the intermediate level and to work out a diagnostic test enabling the teachers of English as a foreign language to quantitatively assess students' level of phonetic proficiency and administer remedial sets of auditory and oral drills.

It has been observed that two distinctive features of English phonemic system present a major difficulty to foreign learners of English (Russians included), namely, the distinction between the so-called "long" and "short", or "tense" and "lax", vowels and "voiced" and "voiceless", or "lenis" and "fortis", stop consonants [2, 4]. This difficulty may be accounted for both by the dramatic differences between the phonemic systems of Russian and English and by an intrinsic complexity of phonetic realization of these phonemic contrasts.

The discrepancy existing between Russian and English sound systems is clearly seen in CVC words. The English language system permits 4 word types

differing in phonemic length of the vowel and presence or absence of voice of the final consonant, e.g. "bead", "beat", "bid" and "bit". In Russian, where the opposition of length is absent and that of voicedness/voicelessness is neutralized in word-final position, only one word /b'it/ is permitted, which makes the differentiation of the English contrasts for the Russian speakers quite a hard task. On the other hand, it is well known that the length of a vowel may vary considerably depending on the presence or absence of voice in the following consonant. Thus, vowels tend to be longer preceding voiced as compared to voiceless final tops [1, 3, 5]. As a result, the shortened /i:/ in beat is quite likely to be shorter than the long allophone of the "short" /i/ in "bid". The distinction between the phonologically "long" and "short" vowels is preserved by a difference in vowels quality rather than vowel duration.

While teaching English phonetics, we make our students aware of the fact that it is more convenient, for practical purposes, to use the terms "tense"/"lax" vowels and "fortis"/"lenis" stops since phonetic duration serves mainly as a means of differentiating final consonants.

### MATERIAL AND PROCEDURE

The stimuli in this study were 48 monosyllabic words of the CVC structure which contained 3 vocalic contrasts: /i: - i/, /α: - α/ and /ɔ: - ɔ/ before t/d. The list of the words is given in Table 1. We assigned each word type a positional number, i.e. bead — Position 1, beat — Position 2, bid — Position 3 and bit — Position 4.

One can see that the vast majority of the test words are high frequency words.

However, we had to include some rare words, e.g. "fid" and some proper names, such as "Sid" and "Hudd". In one case we had to use an invented "name", "Stutt", because it was impossible to find a closely matched minimal pair to complete the set of the /α: - α/ contrasting words.

*Table 1. The stimuli presented to Russian speakers of English for identification.*

Vowels	Test words			
	Position			
i: - i	1	2	3	4
	bead	beat	bid	bit
	feed	feet	fid	fit
	greed	greet	grid	grit
	seed	seat	Sid	sit
α: - α	card	cart	cud	cut
	bard	Bart	bud	but
	hard	heart	Hudd	hut
	starred	start	stud	Stutt
ɔ: - ɔ	pored	port	pod	pot
	cord	caught	cod	cot
	shored	short	shod	shot
	roared	wrought	rod	rot

The test words were read by a native speaker of English (a young man from Britain with a standard pronunciation) twice: first, in the order in which the words are presented in Table 1 (from position 1 to Position 4) and second, in a random order. In the latter case, each word was preceded by its number for the convenience of the listeners. Each word was pronounced only once. The speaker read the stimuli in a natural manner without exaggerating the production of the sounds to help the listeners, by lengthening the sound or using very explicit careful articulation. The interval between the words was not strictly defined but it was approximately the same throughout the list (2-3 sec.).

The material was recorded in a soundproof chamber and presented to the listeners through the headphones in the PRISMA AUDITEK language laboratory

of the philological faculty of St.Petersburg State University.

The listeners were 76 students of the English department who had completed their second year of studies. All of them had had a two-year course in practical phonetics (2 academic hours a week). Their knowledge of English may be said to vary from lower to upper intermediate.

The perceptual tests were conducted in groups of 10-12 students. Each participant was provided with an answer sheet which contained the list of words ordered as in Table 1 for the training session and the answer sheet proper where each line contained the orally presented word and its three minimal pairs. The listener was to underline or encircle the word he or she thought was pronounced by the speaker.

### RESULTS

Of the 76 subjects, 3 only (4%) fulfilled the task without any mistakes. All of them were very good students of English (upper intermediate or even advanced). 75% of the subjects performed very well, having yielded more 75% correct answers. The lowest percentage of correct answers was found to be 40% in 3% of the subjects.

As expected, the stimuli differed widely in the number of correct answers obtained. Table 2 gives the number of correct identifications in per cent for each position.

*Table 2. Mean number of correct identifications for words with different vowels (%).*

Vowels	Position number			
	1	2	3	4
i: / i	88	76	83	79
α: / α	91	83	68	83
ɔ: / ɔ	82	84	74	73

In Table 2 we can see that the words in Position 1 have the highest mean values of correct identifications. The highest

percentage was obtained for the word "bead" — 99% correct answers. The worst identified word was "Hudd"— Position 3 (40%).

The next step was to analyse confusions between the words. Confusion matrices were built for the words of the same vowel type. Table 3 shows substitutions of the presented words containing the vowels /i: - i/.

Table 3. Substitution matrix (in %) for the words with the /i:/ - /i/ vowels.

		words perceived				
word presented		1	2	3	4	
	1	—	82	16	3	
	2	15	—	37	49	
	3	54	25	—	21	
	4	8	41	51	—	

Table 4. Substitution matrix (in %) for the words with the /a:/ - /ʌ/ vowels.

		words perceived				
word presented		1	2	3	4	
	1	—	77	14	9	
	2	31	—	17	52	
	3	36	21	—	43	
	4	7	21	46	—	

Table 5. Substitution matrix (in %) for the words with the /ɔ:/ - /ɒ/ vowels.

		words perceived				
word presented		1	2	3	4	
	1	—	54	36	10	
	2	27	—	19	55	
	3	39	12	—	50	
	4	5	69	27	—	

Inspection of the matrices in Tables 3-5 indicates that the most pronounced tendency is for Position 1 to be substi-

tuted by Position 2. This tendency is a little weaker with the /ɔ: - ɒ/ vowels compared with the two other vocalic contexts. This substitution type involves one phonemic feature — devoicing of the final /d/. Interestingly, substitutions of the reverse direction occur much less frequently.

Another marked tendency is for words in Position 2 to change into words in Position 4, which means substitution of lax vowel for a tense one. In the case of the /ɔ: - ɒ/ vowels the reverse substitution prevails.

Position 3 words demonstrate a uniform substitution patterns — they are perceived either as Position 1 or Position 4 words.

Position 4 words are perceived either as Position 3 or Position 2 words.

All these substitutions involve 1 distinctive feature. Of the two possible two-feature substitutions one is clearly marked, namely, Position 2 perceived as Position 3. In terms of distinctive features it means (tense+fortis) → (lax+lenis) and vice versa, that is, (lax+lenis) → (tense+fortis), with a slight predominance of the former type of substitution.

On the contrary, the other two-feature substitutions, namely, between Position 1 and Position 4 occur extremely rarely and form two polar entities.

#### DISCUSSION AND CONCLUSIONS

One of the primary issues of concern in this study was whether Russian learners would show any differences in perceiving English monosyllabic words containing 4 possible combinations of tense/lax vowels and fortis/lenis stops in final position.

As predicted, our subjects' perceptual judgements were influenced by specific characteristics of the phonetic realization of the presented stimuli. The easiest to identify were those words whose phonological and phonetic properties do not "contradict" each other, i.e. phonological length of the vowel is "increased"

through phonetic lengthening due to the following lenis consonant (Position 1), or phonological shortness of a vowel is made more fully expressed by the shortening effect of the following fortis consonant. The other two word types proved to be more difficult to perceive because of the "contradictory" relationships between the phonological length of tense vowels and their shortening induced by the fortis consonant (Position 2) and the phonological shortness of lax vowels and their lengthening before the lenis consonant.

The intricate interplay of qualitative and quantitative parameters in Positions 2 and 3 results in Russian listeners producing more errors than in the phonetically "more marked" Positions 1 and 4.

On the whole, it may be said that tense vowels demonstrated better identification than lax vowels (84% and 77% respectively), this difference being stronger in the vowels /ɑ: - ʌ/ and /ɔ: - ɒ/ compared with the /i: - i/ vowels.

The data obtained do not show any significant difference in the perception of fortis versus lenis consonants.

Analysis of perceptual errors has shown that Russian listeners tend to confuse words that differ in one feature only. The vast majority of substitutions involves one feature whereas two-feature errors occur much less frequently.

Among the one-feature confusions one type of error is most widely spread, namely, the substitution of the fortis for the final lenis preceded by a tense vowel. This confusion could be predicted since Russian does not allow for voiced stops in word-final position.

It is interesting to note that there are only a few instances of true indiscriminate between pairs of words where each one is substituted by the other in the approximately the same number of cases, for example, "cod" and "cot" or "sit" and "seat".

Two-feature substitutions occur rather seldom. Of particular interest is the fact

that two-feature confusions of a certain type do occur. These are the substitutions in the domain of Positions 2 and 3, involving both directions. The other words differing in 2 features (Positions 1 and 4) hardly ever get confused.

Summing up, we would like to say that the present study has given some evidence concerning perceptual abilities of Russian learners of English. The phonetic component may be said to be more involved in perception than the phonemic level, the latter being obscured by the phonological models of their mother tongue.

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