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THE INFLUENCE OF INTERFERENCE FACTOR ON THE VARIABILITY OF PROSODIC UNITS

Most of the literature on language interference deals with such questions as which aspects of foreign speech are influenced by negative transfer, how to acquire the native-like command of a second language. Not much attention is devoted to positive features of the phenomenon – in bilingual cicumstances interference manifests language dynamism since it modifies units of a target language.

The analysis of linguistic sources on the issue under consideration shows that not every language level has acquired equal amount of scientific attention as far as interference is concerned. An evident example of little interest on the part of linguists to describe interference on the level of prosody is foreign speech of Polish learners. Indeed, contrastive Polish-English and Polish-Russian studies have long tradition but the problem of prosodic transfer with its numerous forms requires extensive experimental investigations.

Besides, positive approach to any type of interference is conducive to the revelation of the relations between the elements of the subsystems and can serve as an explanation of other linguistic phenomena. Prosodic interference, for example, is believed to belong to the factors that influence prosodic variation.

The above observations prompted the author of the article to look at the prosodic interference as one of the linguistic facts that generates changes in the prosodic organization of interferred foreign speech as well as to ascertain their types and extent. In my study I did not intend to assess if the transfer was negative or positive but rather to describe the mo-

difications of prosodic characteristics of English and Russian declarative sentences read by Polish speakers for whom these are their second languages acquired in the process of foreign language learning. The choice of two foreign languages (English and Russian) was determined by the curiosity whether there are significant differences in prosodic characteristics of speech according to the foreign langauge Polish students use.

The language material for the experiment consisted of 80 declarative sentences (40 in Polish, 20 in English and 20 in Russian). English and Russian sentences were translated into Polish to have them all semantically identical. English and Russian sentences were compared to their Polish equivalents. The linguistic frame of refernce in the experiment was represented by recordings of the same sentences in the realization of native speakers of English and Russian.

Data were collected from a group of ten Polish students of English Philology and from a group of ten Polish students of Russian Philology (both groups of students from University of Bialystok). English Philology students were asked to read English sentences and their Polish translations and Russian Philology students were asked to read Russian sentences and their Polish translations. The sentences were recorded into computer disc. Soundtracks of the material were converted into waveform using Sony Ericsson Mobile AMR Converter software (http://www.underbit.com). Additionally, when all the recordings were completed, the interlinear transcription of all the sentences was made. The experiment comprised auditory investigation, acoustic analysis carried out with PRAAT Version 5.0.43 (http://www.praat.org) and mathematical calculations.

By means of investigation I wanted to reveal how Polish learners of English and Russian divide L2 declaratives into phrase units (intonation groups), where the nuclear stress is located (students were asked to read the sentences in neutral, emotionless style to avoid possible nuclear stress shifting), what pitch patterns intonation groups in the sentences have. As for more specific objectives of the analysis I took into consideration:

1. structure of intonation groups,
2. structure of rhythmic units,
3. tonal features of the nuclear and pre-nuclear parts of an intonation group: pitch level, pitch range, the rate of pitch variations, the shape of the terminal fall and rise,
4. tempo in which the sentences were read.

The first stage of auditory analysis consisted in the identification of the number of intonation groups in experimental material. The results are presented in the table below·

Table 1. Number of intonation groups in English and Russian sentences read by native and non-native speakers

	N*	ENGLISH DECLARATIVES READ BY NN**										N	RUSSIAN DECLARATIVES READ BY NN									
		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
I***	5	3	3	3	3	3	4	3	3	4	3	5	2	2	2	2	2	2	2	2	2	2
II	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	3	3	2	3	2
III	4	4	4	3	2	3	3	3	4	3	3	4	3	2	3	2	3	3	3	4	3	3
IV	6	3	3	3	3	3	3	3	4	5	3	5	4	1	2	3	3	3	3	4	3	3
V	2	2	3	3	2	3	3	3	2	2	2	2	1	1	1	1	1	1	1	2	2	1
VI	3	2	4	3	3	3	3	4	2	3	3	5	3	3	3	3	3	4	3	4	4	3
VII	1	1	1	1	1	1	1	1	1	1	1	3	3	1	2	3	3	3	2	2	3	3
VIII	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	3	2
IX	3	1	2	2	2	2	3	3	1	1	2	3	3	2	3	1	2	2	2	2	3	2
X	1	2	1	1	1	1	2	2	1	1	1	2	1	2	2	1	1	2	1	1	1	1
XI	5	3	3	3	4	4	3	3	3	3	3	6	3	4	4	4	3	3	3	3	3	4
2XII	3	3	3	3	3	3	3	3	2	3	2	4	3	4	3	3	2	2	2	2	3	3
XIII	4	4	4	3	2	4	3	3	3	3	4	5	3	3	3	2	3	4	3	3	4	4
XIV	5	3	3	3	3	4	4	3	3	4	4	5	3	3	3	4	3	3	3	3	3	3
XV	3	2	4	3	3	3	3	2	4	3	3	3	2	3	2	2	2	2	2	3	3	3
XVI	3	4	3	3	3	3	3	3	2	2	3	4	2	3	3	3	3	3	3	4	3	2
XVII	4	2	3	2	4	4	4	4	3	3	3	5	3	3	3	4	3	3	4	4	3	3
XVIII	3	3	3	3	3	3	2	3	3	1	3	4	3	3	3	3	3	3	4	4	4	3
XIX	3	3	3	3	2	2	3	2	3	3	3	5	3	3	3	3	3	3	3	4	4	3
XX	3	2	2	2	3	3	3	3	1	3	3	3	2	3	3	3	2	1	1	3	2	2

* N – native speaker of English
** NN – non-native speaker of English or Russian (here Polish speaker)
*** I – Roman numerals were used to mark the experimental sentences

The number of intonation groups in sentences read by Polish speakers varies. However, there is a tendency to their reduction both in English and Russian sentences. Then, intonation groups were divided into four functional types: nuclear (with nuclear stress only), short (with nuclear stress and 1–2 full non-nuclear stresses), medium (with nuclear stress

and 3–4 non-nuclear stressses) and long (with nuclear and more than 4 non-nuclear stresses)[1], for example:

(1) in the English sentence read by a native speaker:

| ˈ**Luckily the** ˈ**chemist •under‿stood him** |**and** ˈ **gave him the**‿**remedy** |**he‿wanted**

there are 3 intonation groups: Luckily the chemist understood him (Short IG); and gave him the remedy (Short IG); he wanted (Nucler IG);

(2) in the Russian sentence read by a native speaker:

|**Тайˊга** |**это огˈромные леˊса,**| **в коˈторых жиˈвет** ˈ**много звеˈрей и‿птиц.** |

there are also 3 intonation groups: Тайга (Nuclear IG); это огромные леса (Short IG); в которых живет много зверей и птиц (Medium IG).

Table 2. Types of intonation groups found in English and Russian sentences read by native nad non-native speakers, in percent

	ENGLISH		RUSSIAN	
	N	NN	N	NN
NUCLEAR IG (NIG)	19	15	31	10
SHORT IG (SIG)	70	45	59	53
MEDIUM IG (MIG)	6	25	6	27
LONG IG (LIG)	5	15	4	10

The data here may serve as an explanation why there are fewer intonation groups in English and Russian sentences read by Poles in comparison to their native realizations. They are of different types: medium and long intonation groups constitute 40% of all in English NN sentences and 37% of all Russian NN sentences whereas in native realizations there are 11% of medium and 10% of long intonation groups in both languages.

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[1] As for partial stresses in an intonation group they can be found in all enumerated types.

In the next table the results of the auditory analysis of intonation groups in 20 Polish sentences out of 40 have been presented.

Table 3. Intonation groups in Polish variants of English and Russian sentences

	Polish variants of English sentences				Polish variants of Russian sentences				
	Number of IG	Types of IG			Number of IG	Types of IG			
	in a sentence	NIG	SIG	MIG	LIG	in a sentence	NIG	SIG	MIG	LIG
I	4	1	2		1	2		1	1	
II	4	1	3			2		2		
III	2		1		1	2		1		1
IV	4		4			2			1	1
V	3		3			2	1	1		
VI	1			1		3		2		1
VII	2	1		1		3	1	1		1
VIII	3	1	1	1		3	1	2		
IX	2	1		1		2		1		1
X	1			1		1				1

In all Polish sentences translated from English 10 (19%) nuclear, 28 (54%) short, 10 (19%) medium, and 2 (8%) long intonation groups have been identified whereas in Polish translations of Russian sentences there are 6 (13%) nuclear, 22 (50%) short, 4 (9%) medium, and 12 (28%) long intonation groups. Special attention should be directed to the significant presence of medium and long intonation groups in Polish variants of English (27%) and Russian (37%), the fact that justifies the frequency of their occurance in foreign sentences.

In native English intonation groups the tone in pre-nuclear and nuclear parts is predominantly high with either high fall-rise or full fall (in the final intonation groups of declaratives). In contrast, English pre-nuclear part is uttered by Poles on medium level, nuclear part has medium or low rises and final intonation groups are completed with medium or low fall. As regards the speech melody of Russian sentences, they were read by native Russians with high tone of voice with final medium rise, high or medium fall (in final intonation groups) or medium rise-fall. Relatively high level of tone was observed in Russian sentences read by Poles. But it was not as high as in realizations by Russian speakers. The auditory observations were supplemented by acoustic analysis of pitch level, pitch range and the shape of tonal variations.

Table 4. Acoustic data of the experimental material

	English read by native speakers	English read by Polish speakers	Polish translations of English	Russian read by native speakers	Russian read by Polish speakers	Polish translations of Russian
Pitch level	280 Hz	256 Hz	261 Hz	381 Hz	280 Hz	290 Hz
Pitch range	55*–253** Hz	60–90 Hz	45–110 Hz	135–203 Hz	100–140 Hz	60–267 Hz
Average pitch of pre-nuclear part	190 Hz	228 Hz	225 Hz	247 Hz	259 Hz	271 Hz
Falling terminal tone	concave	concave	concave	concave and convex	concave	concave
Rising terminal tone	concave and convex	concave	concave and convex	convex	concave	convex

* minimum value; ** maximum value

A closer look at the values in the table above shows that pitch level differences occur in both English and Russian sentences of Poles and the influence of Polish language is evident.

The pitch range is not as wide in English sentences read by Poles as in native realizations but rather as in Polish variants. The interference from Polish cannot be treated as a modifying factor when the pitch range in Russian declaratives is analysed because Polish speakers read Russian sentences in quite narrow range.

The instrumental study helped to identify the shape of simple terminal tone, which has been labelled as either concave or convex depending on the rate of pitch variations and intensity changes[2].

Generally, the tonal structure of intonation groups in English sentences read by non-native speakers were similar to their Polish equivalents. However, there have been some examples of English sentences whose seech melody contour was neither like original English, nor Polish translation (Picture 1 presents English sentence read by a native speaker, Picture 2 – Polish translation, Picture 3 – English sentence read by a non-native speaker).

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[2] Here I follow E.Couper-Kuhlen's [1985] definition according to which the shape of the fall is convex when accompanied by the increase of intensity; it is concave when accompanied by the decrease of intensity. Similarly, the rise of terminal tone: intensity decreases or increases result in convex or concave shape of the curve.

Picture 1[3]
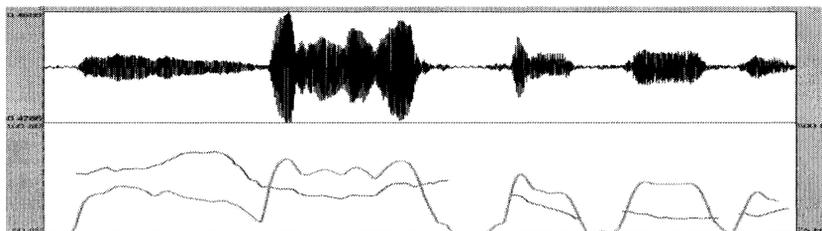
I knew he liked computers

Picture 2
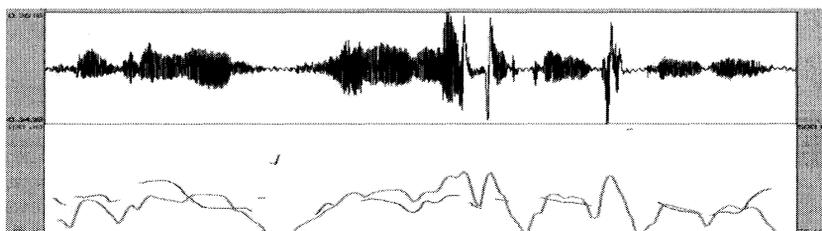

Wiedziałam, że lubi komputery

Picture 3
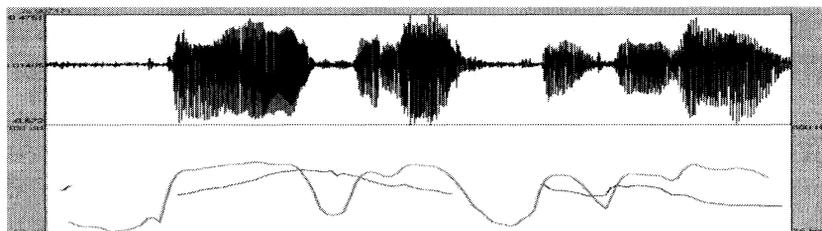
I knew he liked computers

Our Polish speakers produced Russian declarative sentences with Polish contour (Picture 4 and 5 – sentences were read by a Polish speaker, Picture 6 – a native speaker of Russian).
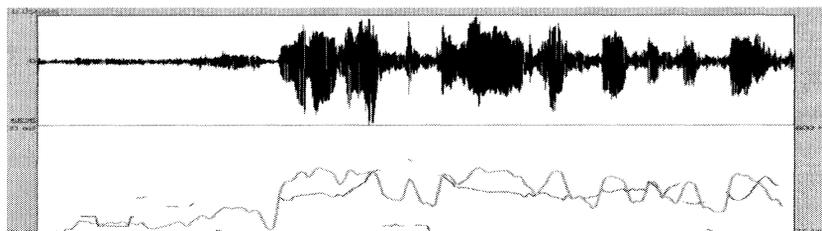
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[3] In the intonograms blue line indicates the changes of fundamental frequence, and green line – intensity modifications.
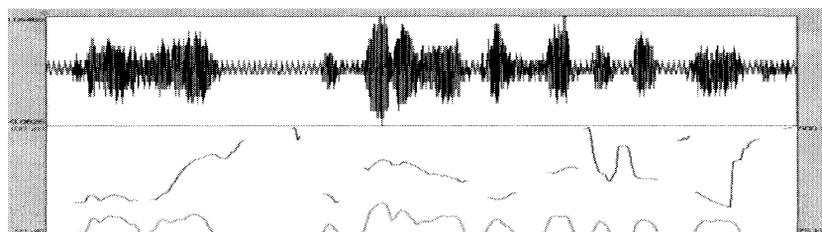
Picture 4
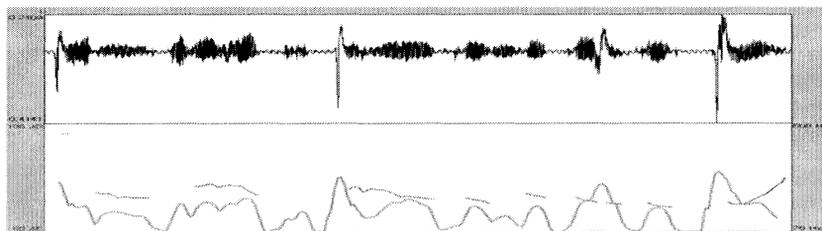
Przyjaciele kupili mi kasetę Tatoo

Picture 5

Друзья купили мне кассету Тату

Picture 6

Друзья купили мне кассету Тату

It should be added that in English and Russian sentences read by native speakers compound tones have been observed. Neither auditory, nor acoustic analysis gave evidence of their presence in experimental English and Russian declaratives read by Polish students.

In the second phase of the experiment the structure of rhythmic groups was identified. The method of division of the semtences into rhythmic units was based on the semantic criterion, according to which syllables of a given word always belong to one unit and a stressed syllable is proceeded and/or followed by unstressed ones. The majority of ori-

ginal English sentences is marked by simple 2–3 syllable rhythmic units of the following patterns: 3/2[4] (24%), 2/2 (22%), 1/1 (18%), 2/1 (12%), 3/3 (12%), 3/1 (10%), for example:

I knew (2/2) / he liked (2/2) / computers (3/2).

A Frenchman (3/2)/ has learned (2/2)/ English (2/2)/ at school (2/2).

In English sentences read by Polish students simple units: 1/1 (23%), 2/2 (21%), 3/2 (11%), 2/1 (10%), 3/3 (6%), 3/1, (5%) and 24% of complex units with both full and partial stresses were observed.

In original Russian sentences there were 68% simple rhythmic groups: 1/1 (11%), 2/2 (27%), 3/2 (17%), 2/1 (13%) and 32% of complex rhythmic, for example:

Будем (2/1) / слушать (2/1) / музыку (3/1) / петь (1/1) / и танцевать (4/4).

Каждый (2/2) /день (1/1) /он (1/1) / играет (3/2)/ на компьютере (5/3)/ в разные (3/1)/ игры (2/1)/. In Russian sentences read by Polish students the following types or rhythmic groups were found: 1/1 (6%), 2/2 (21%), 3/2 (12%), 2/1 (10%), 3/3 (9%) and 42% of complex nature.

Table 4. Types of rhythmic units in Polish translations of English and Russian sentences, in percent

Types of rhythmic units	Polish translation of English sentences	Polish translation of Russian sentences
⊥ – 1/1	4	19
(∪)∪⊥∪(∪) – 3/2, 4/2, 4/3, 5/3	54	35
∪⊥ – 2/2	0	2
⊥∪(∪) – 2/1, 3/1	28	35
∪∪∪⊥∪ – 5/4	12	7
Complex with primary and secondary stress	2	2

The identification of simple rhythmic units did not present any difficulty but those with the complex structure were confusing. Undoubtedly, the patterns of rhythmic units in English and Russian experimental sentences are affected by interference from Polish. It must not be forgotten

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[4] The first figure indicates the number of syllables in a rhythmic unit, the second – the position of a stressed syllable, e.g. 2/2 – there are two syllables in a rhythmic unit, the second of which is stressed. ∪ – unstressed syllable, ⊥ – stressed syllable.

that languages under study are of different nature as far as their rhythm is concerned. This fact matters for the rhythmic variations but additional and more profound studies are required.

The tempo was perceived as moderate without any special modifications. Acoustic data (in which the number of syllables per second was counted) contradict this auditory assessment as the values obtained indicate that sentences were read slower than normal[5].

Table 5. Average number of syllables per second

	English read by native speakers	English read by Polish speakers	Polish translations of English	Russian read by native speakers	Russian read by Polish speakers	Polish translations of Russian
Number of syllables per second	5,7	4,2	5,1	5	4,5	4,9

What the author eventually arrived at can be summarized as follows:
1. Prosodic interference belongs to the factors that influence the variation of prosodic units.
2. Interference is manifested by qualitative as well as quantitative deviations from English and Russian norms.
3. Foreign declarative sentences (English and Russian) read by Polish speakers show interference from mother tongue as far as speech melody is concerned:
   - sentences are divided into fewer intonation groups in comparison to their native realisations,
   - there are more medium and long intonation groups (the longer the groups are the fewer of them can be found in a sentence),
   - speech contour of pre-nuclear part is located on medium level,
   - final fall of the nucler tone starts from the medium level and final rise – usually from low or medium level.
4. Differences between the rhythmic arrangement in English, Russian and Polish sentences are manifested by the structures of rhythmic units. Considering the fact that experimental material represented languages with stressed-timed and syllable-timed rhythm, specific studies should be undertaken owing to the fact that not all rhythmic features have been revealed.

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[5] I. Sawicka [1995] notifies that average tempo of Polish speech is 8 syllables per second.

5. On the auditory level the tempo of Poles' foreign speech has been perceived as moderate but acoustic analysis revealed realizations slower than normal.
6. The degree of Polish interference in English sentences is adequate to that in Russian sentences.

LITERATURE

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WPŁYW CZYNNIKA INTERFERENCYJNEGO NA ZMIENNOŚĆ PROZODYCZNĄ

Streszczenie

W artykule omówiono wpływ czynnika interferencyjnego na zmienność prozodyczną. Materiał badawczy stanowiły angielskie i rosyjskie zdania oznajmujące czytane przez Polaków. Wykazano, że 1) modyfikacje dotyczą jednostek melodii, rytmu i tempa wypowiedzi, 2) stopień interferencji z języka polskiego w analizowanym materiale jest porównywalny.