

INTONATIONAL UNIVERSALITIES AND PERCEPTION
OF EMOTIONAL INTONATIONS

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ABSTRACT

The article presents the results of an investigation on the problem of universality in the intonational means for expressing emotions. Identification of seven modal and emotional connotations (regret, joy, surprise, irritation, insistence, doubt and evidence) is analysed. It is concluded that the adequate perception of emotional intonations and consequently the degree of their intonational universality depends on the type of modal and emotional connotation.

Thanks to a great number of various studies the information on the similarity of some intonational forms in different languages has been obtained. The intonational resemblance of languages is considered to be the largest in the field of expression of emotions. Actually the data obtained is not sufficient to judge whether this statement is true. The analysis of perception of intonations can serve as one of the ways of finding out intonational universalities: the identification of modal and emotional connotations in a foreign language may be regarded as a proof of universality of the means of their expression. It seems that the more alike the intonational representations of some emotional connotation in two languages (native and foreign) are, the easier this connotation will be identified in the foreign language.

The investigation based on the concept mentioned above has been carried out. It dealt with the perception of French intonations expressing surprise, joy, regret, irritation, insistence, doubt and evidence. The majority of the phrases was sampled from the recordings - supplements to the manuals of French phonetics for foreign students /1/, /2/, /3/, their authors regarding these phrases standard. Some phrases were specially composed and recorded in the interpretation of a Frenchman to obtain the more homogeneous and complete material.

Three groups of listeners participated in the experiment. The first group (I gr.) consisted of 70 Russians who did not speak French. So they could use intonational characteristics only, Russian intonational system taken as a basis. The second group (II gr.) united 30 Russians speaking French; they understood the meaning of the phrases, had a large experience of perception of the spoken French and were well acquainted with the intonational system of French on which they could base. The third group (III gr.) consisting of 14 native speakers of the French language participated in the experiment as an expert group.

The listeners of all the groups were to determine a) the presence or absence of emotion in a phrase and b) the type of emotional connotation. The phrases were presented either separately or in pair with a neutral phrase (narrative, interrogative or incomplete) having the same or similar lexical content. In order to simplify to some extent the identification of modal and emotional connotations the listeners were proposed to use the list which contained the denominations of ten connotations: seven of them were really presented while three (anger, fear, tenderness) were not included in the material to be analysed. Besides, it was specially indicated that listeners could use any other denomination of emotion and not only those given in the list. They were also allowed to mark the presence of two and more emotions underlining if they could the main one. All the answers were taken into account. The total number of the answers obtained is more than 65 000.

Statistical tests (a t-test and a sign-test) were used to compare the results obtained from different groups, in different series of experiment and to find out the consistency of the data.

The results of this analysis are presented in tables 1-3.

All the groups of listeners perceive the presence of emotional connotation (the results are consistent) in an ut-

terance even in case when there are neither lexical nor contextual support (see table 1).

Table 1
Perception of the presence of emotional connotation in the phrases presented separately (average per cent)

Listeners Emotions	I gr.	II gr.	III gr.
surprise	70,0	78,4	93,6
joy	94,2	97,6	100,0
regret	93,9	99,2	98,3
irritation	77,7	56,8	88,3
insistence	83,8	81,1	98,8
doubt	64,4	53,7	92,4
evidence	85,3	91,1	96,2

The presence of emotional connotation was perceived best of all in the phrases expressing joy, regret, evidence and insistence. The results were worse for the phrases rendering surprise and irritation. The lowest results were obtained for the sentences expressing doubt, their intonational structure being similar to neutral questions.

In all cases the presence of emotional connotation was detected better by the French listeners: naturally, they were able to perceive slight distinctions between emotional and neutral phrases even without their comparison. The Russian listeners gave the similar results only when emotional phrases were presented in pairs with neutral ones (see table 2).

Table 2
Perception of the presence of emotional connotation in the phrases presented in pairs with neutral ones (average %)

Listeners Emotions	I gr.	II gr.
surprise	87,7	90,8
joy	99,1	100,0
regret	99,0	100,0
irritation	96,9	98,7
insistence	96,1	96,9
doubt	87,9	89,0
evidence	87,0	92,2

The Russian listeners were able to solve a more difficult problem: to determine a type of emotional connotation in a phrase presented even separately (see table 3).

In identification of utterances expressing surprise the results given by the Russian listeners were almost as good as those given by the Frenchmen: the average percentage of adequate perception by all the groups were found to be similar, all the phrases being perceived non accidentally (from the statistics point of view).

The phrases rendering regret were identified worse than the phrases expressing surprise: in all the sentences the type of emotional connotation was determined correctly, but the average percentage is already lower. The command of French by the Russian listeners (II gr.) is assumed to improve considerably the results.

Table 3
Identification of emotional connotations in phrases presented separately (average per cent)

Listeners Emotions	I gr.	II gr.	III gr.
surprise	54,2	60,0	68,7
joy	35,0	41,2	22,4
regret	37,9	59,8	57,6
irritation	29,2	25,3	53,1
insistence	40,1	32,6	74,2
doubt	13,0	7,1*)	40,3
evidence	5,4*)	18,9	37,2

Note. *)-the result is inconsistent.

The phrases expressing insistence were identified by the Russians much worse than by the French listeners. This proves that the determination of the type of emotion in a foreign phrase is based on the melodic component of intonation: despite intensity differences and tempo features distinguishing those phrases from neutral narrative ones the Russian listeners made many mistakes in their identification.

The identification of the kind of connotation in the phrases rendering doubt and irritation by the Russian listeners proved to be more difficult. Furthermore, the command of French (II gr.) did not improve the results.

The lowest results were obtained for connotation defined by the French authors as "evidence". Although all the groups of listeners detected the presence of emotion in these phrases (see tables 1 and 2) the Russians of the first group correctly determined the kind of connotation only in one sentence. They confused these phrases mainly with those expressing surprise and doubt. The listeners of the second group making the same mistakes however were able to identify - though without assurance - this modal connotation. It is worth mentioning that the Frenchmen themselves had difficulties in the identification of this emotion.

The identification of the phrases expressing joy is to some extent paradoxical: this type of connotation was determined better by the Russians than by the French listeners. The adequate perception of these phrases by the Frenchmen might be hindered by their neutral lexical content, while the Russian listeners who based on intonational characteristics - only (I gr.) or mainly (II gr.) - solved the problem easier.

The perception errors may be the result of inaccurate pronunciation on the one hand, and on the other they may be accounted for the similarity of intonational presentation of phrases expressing different emotions. Thus, the listeners of the first group confused doubt and evidence, doubt and surprise.

The adequate perception of an emotion depends not only on the understanding of the phrase lexics (in our experiment the lexical content was neutral and the same phrases were produced with different emotions) but also on the knowledge of the situations of real life which determine the use of this or that intonation /4/, /5/. For the French listeners it was easy to reproduce the situation in which a given phrase was pronounced. The task was much harder for the Russians. The presence of intonational context (presentation in pairs with intonationally neutral phrases simplified the identification considerably. The command of French to some extent helped the Russian listeners to identify the connotations. But in general, the influence of intonational system of the mother tongue appeared to be dominant.

The acoustic characteristics of all the sentences were also analysed: fundamental frequency, sound duration and envelope amplitude were measured.

Almost all the emotional connotations studied were found to be characterised by the change of all the intonation com-

ponents as compared to neutral phrases. Melody changes proved to be the most significant (as it was to be expected) for perception. The change of frequency range is observed in the majority of emotional phrases (see table 4).

Table 4
Acoustic characteristics of emotional and neutral phrases (average values)

Emotions	Acoustic characteristics	Frequency range (semi-tones)	Sound duration (ms)	Peak amplitude range*
surprise		14,6	67,9	0,44
joy		14,2	84,9	0,22
regret		6,6	85,3	0,72
irritation		9,2	82,3	0,38
insistence		8,6	118,8	0,50
doubt		8,4	74,4	1,32
evidence		10,6	79,2	0,82
neutral		8,8	77,1	0,86

Note *) The peak amplitude range is the difference between the maximal and the minimal values of the relative maximal intensity of vowels in a phrase.

In case when the connotation is positive (joy) the frequency range widens. If the emotion is neither positive, nor negative it may occur both the widening (surprise, evidence) and the narrowing (doubt, insistence) of the frequency range. When a negative emotion is rendered the frequency range becomes narrower (regret), but it may remain practically unchanged or even widen a little (irritation). The latter statement contradicts in some way the other authors' data concerning the narrowing of the frequency range of a phrase in case of a negative emotion /6/, /7/.

The difference in tempo characteristics in emotional phrases is less significant. In general these utterances are reproduced slower than the neutral constructions. In some cases the tempo becomes more even (insistence), in other cases the tempo contrasts between the beginning and the end of the utterance become greater (joy, regret). Besides, the

lengthening of vowels and the shortening of consonants - particularly in the last syllable - is characteristic of those phrases.

The intensity structure is also important in emotional speech. To some extent it proves to depend directly on the type of emotion to be rendered (it correlates with the opinion of other authors /8/). Smoothing of the intensity structure of emotional phrases in comparison with neutral ones is found out to be their constant feature independent on the type of connotation: the relative peak amplitude range of vowels varies to a smaller extent than in neutral sentences (see table 4).

Thus, it may be assumed that the presence of any emotion is detected not only in one's native language, but also in a foreign one. Listeners detect melody, tempo and intensity deviations from neutral pronunciation, judging by the melodic structure firstly, tempo and intensity being not so important. Besides, it is the general intonational structure that is significant in foreign speech perception (the tune shape, the general tempo, the intensity level of the whole phrase). Little attention is paid to the correlation of acoustic features within the phrase.

In phrase perception in his native language the listener pays attention to intensity and tempo characteristics also, taking into consideration the slightest intonational structure. Thus, the melodic component of intonation is assumed to be the most universal characteristic of a phrase.

From the point of view of perception the hierarchy of the analysed emotional connotations may be proposed. Both the Russian and French listeners identify the phrases expressing surprise, regret and insistence with a certain assurance. So these connotations are alike to the greatest extent in those two languages.

The degree of identification of the phrases rendering irritation and joy by the Russians and the Frenchmen is quite different. It is evident that the intonational structure of these connotations is more specific.

The results of perception of utterances rendering doubt and evidence show that these connotations are differently expressed in Russian and in French.

It should be noted, however, that the character of perception of emotional connotations is connected with some other factors (psychological ones being among them) which are worth analysing.

References

1. P.Léon, M.Léon, "Introduction à la phonétique corrective", Paris, 1968.
2. Callamand M., "L'intonation expressive", Paris, 1973.
3. G.Calbris, J.Montredon, "Approche rythmique intonative et expressive du Français langue étrangère", Paris, 1975.
4. I.G.Torsujeva, "Intonatsiya i smysl vyskazyvaniya" (Intonation and meaning of utterance), Moscow, 1979.
5. G.Brown, "Listening to spoken English", Moscow, 1984.
6. G.S.Poslushajeva, "Intonatsiya vosklitsatelnyh fraz sovremennogo frantsuzskogo jazyka" (Intonation of exclamatory phrases of contemporary French), Moscow, 1971.
7. P.Léon, "Essais de phonostylistique", Studia phonetika, 4, Montréal, Paris, Bruxelles, 1971.
8. N.D.Svetozarova, "Intonatsionnaja sistema russkogo jazyka" (Intonational system of Russian), Leningrad, 1982.