THE TYPOLOGICAL ANALYSIS OF EMOTIONAL SPEECH PROSEODY

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ABSTRACT

Emotion and its linguistic expression form a system: information about emotion comes by lexical cues, syntactic structure and prosodic indicators. This paper describes some further attempts to identify the acoustic parameters of emotional texts in English, Russian, and Ukrainian.

INTRODUCTION

In recent years a convergence of interest has developed among linguists /1/, psychologists /2/, physiologists /3/ and other specialists in the theory of emotion. Significant research has been conducted in the area of the verbal and non-verbal types of emotional expression /4/. Many recent writers on the manifestation of emotion have found it natural and useful to state that emotion, language and speech are related in some way as language being the principle mode of communication is also a means of expressing emotions and arousing them in others. The main aim of the present study is to reveal the system of linguistic devices of expressing emotions in English, Russian and Ukrainian.

APPROACH

Emotion and its linguistic expression form a system. In order to characterise and understand its function we need to consider the system properties.

Our investigation of 30,000 pages of English fiction has pointed out that all levels of linguistic system may be involved in the process of emotional manifestation.

The syntactic analysis of the material under investigation proves that the structural means of expressing emotions form a special syntactic code. Language inspired by emotion undergoes a wide variety of formal changes - a breakdown of grammatical structure of the sentence, repetitions of subjects, subjects + predicates, introduction in the sentence structure of the formal elements - interjections, adverbs, particles and so on.

At the lexical level we must find to what extent words alone can still yield further information in the study of emotional speech. Usual emotions are identified in the text due to the adjectives which emphasise the high degree of some quality (e.g., magnificent, awful etc.), the corresponding adverbs (e.g., terribly, exceedingly etc.), nouns (e.g., treasure, ruffian), verbs (e.g., hate, adore).

Despite the fact that in the majority of cases the emotive meaning depends on the integration of prosodic, syntactic-segmental and contextual information the role of intonation must not be ignored as there are cases in which it is the only carrier of effective information.

In this research ten English, six Russian and four Ukrainian speakers participated as subjects. To preserve the identity and comparability of the experimental material 115 English texts and their Russian and Ukrainian translations were chosen. These texts expressed the 16 most frequently observed positive and negative emotions. As the emotional aspect of textual prosody implies that the effective analyses can be superimposed on the neutral texts the material was recorded twice - as samples of emotional and non-emotional speech. The tape was then presented to 30 Russian, 30 English and 30 Ukrainian listeners who were instructed to listen carefully to the presentation of the texts and to decide which emotion the speaker was trying to convey. A criterion of 50% correct identification was set for including the text into the further instrumental analysis.

The original speech material was instrumentally analysed into separate components - fundamental frequency, amplitude, duration and spectral composition. Oscillograms were obtained with the help of the Plan-Pitch and M-4030-1 computer which has been programmed to yield the desired speech parameters. Spectrograms were made on a Scope-Graph of the Kay Elemetrics Corporation, using the wide-band filter (300 Hz). The synthesis of emotional speech was done on a format synthesizer.

ANALYSIS AND RESULTS

The typological study of emotional and neutral texts in English, Russian and Ukrainian disclosed common ways of expressing emotion. The detailed contrastive analysis of their acoustic structure has revealed that the frequency range, frequency internal of the terminal tone, of the semiotic centre are the most informative parameters differentiating emotional and non-emotional speech in all the languages under study. In this way the similarity of emotion expression is manifested. The application of methods of mathematical statistics (t-ratio, Student's t) proved that the difference between the above mentioned acoustic parameters of emotional and non-emotional speech was statistically significant as they belong to two different population variances.

Our study presents experimental evidence that it is the movement of the fundamental frequency (its configuration) which bears the meaning of emotional intention in a particular language. For instance, the utterances expressing anger are pronounced by the majority of English speakers with a sliding scale, while Russian and Ukrainian speakers use the broken descending scale with two peaks of the fundamental frequency. The corresponding neutral utterances are pronounced with the gradually descending scale with the peak of the fundamental frequency on the first stressed syllable. On the whole in the majority of emotional texts (with the exception of the texts expressing sorrow, tenderness, offence) a more complicated character of the fundamental frequency was observed.

It appears probable that both configuration and pitch levels have to be specified for certain emotions in the languages under study. The pitch level is higher in the texts expressing anger, delight, joy, amusement and lower in those expressing sorrow, guilt, tenderness, offence as compared with the neutral texts.

The textual aspect of prosody enables us to state the degree of communicative text dynamism. Each text contained semi-
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The synthesis program was as follows: first the so-called "neutral" sentence was recited, then the emotional one with the identical lexical-grammatical structure. Altogether 30 Russian sentences expressing delight, surprise, anger, fear were obtained. The constructed model comprised the normalized contours (Fn) of initial, mid and final accent groups (I, M, F), each containing prenuclear (1), nuclear (2) and postnuclear parts (3).

Fig. 1 represents the normalized fundamental frequency contours for sentences expressing surprise (a), delight (b), fear (c) and the same neutral ones.

Our experiments on synthesis show that for expressing some emotions (e.g. surprise) fundamental frequency is the most important prosodic variable, and others need only minimal changes. For expressing other emotions some changes of formant structure must be added to a neutral sentence.

Conclusions

The systematical level approach to emotion realization in a text made it possible to single out some regularities in the interaction of components in this system and to disclose the isomorphism in its expressive means.

The results of this typological study permit us to suppose that a prosodic structure of emotional texts in English, Russian and Ukrainian display universal as well as particular properties in manifestation of emotion.

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