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*Ганна Рябчун, асистент кафедри німецької філології
Вінницького державного педагогічного університету
імені Михайла Коцюбинського
ORCID ID 0000-0002-0864-7883
hbalakirjeva@gmail.com*

ФОНОСТИЛІСТИЧНА ХАРАКТЕРИСТИКА НІМЕЦЬКОМОВНИХ ЕМОЦІЙНИХ ВИСЛОВЛЕНЬ (ЕМОЦІЯ СТРАХУ)

Метою дослідження є аналіз фонетичних характеристик емоційних висловлень на прикладі базової емоції страху та визначення ролі компонентів інтонації під час вираження емоцій в спонтанному мовленні. Для вирішення проблем дослідження використано низку взаємопов'язаних методів, таких як системні, теоретичні методи (аналіз, систематизація, порівняння, класифікація наукових джерел інформації), метод отримання експериментальних даних базується на використанні загальнонаукових методів (лінгвістичного спостереження, порівняння, вимірювання), а також фонетичних методів (аудитивний, графічний і спектрографічний види аналізу), а їх опрацювання здійснюється за допомогою кількісного аналізу. Інструментальний аналіз мовленнєвого матеріалу проводився за допомогою програми PRAAT. Versus 4.5. Загалом було проаналізовано 38 синтагм. Для кожного з дикторів порівнювались фонетичні характеристики емоційно нейтрального та емоційно маркованого мовлення. Наукова новизна одержаних результатів визначається тим, що в роботі встановлено спільні та специфічні просодичні характеристики, які визначають німецьке емоційне мовлення для базової емоції «страх», представлених варіативністю тональних, динамічних та темпоральних акустичних характеристик мовлення. За допомогою аудитивного та інструментального аналізу визначено маркери емоції «страх», зокрема, встановлено, що темп мовлення дикторів стає швидшим, а інтенсивність мовлення, порівняно з емоційно нейтральним мовленням, підвищується. Помітною також є різниця у показниках паузальної організації, крутизни зміни частоти основного тону, що дозволяє стверджувати що досліджувана емоція «страху» має всі яскраво виражені відмінності у корелятах порівняно з емоційно нейтральним мовленням. У результаті проведеного аналізу можемо зробити висновок, що як в емоційно нейтральному мовленні, так і при вираженні емоції «страх», переважає проклітичний спосіб утворення ритмічних груп, а у ролі проклітиків та енклітиків можуть виступати як самостійні частини мови (іменники, займенники, дієслова, прислівники), так і службові (сполучники, прийменники тощо). Основним словом ритмічної групи переважно виступають іменник та прислівник.

Ключові слова: просодія; інтонація; емоційне мовлення; базові емоції; інструментальний аналіз

*Hanna Riabchun, assistant of the German Philology Department
Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University
ORCID ID 0000-0002-0864-7883*

PHONOSTYLISTIC CHARACTERISTICS OF GERMAN EMOTIONAL EXPRESSIONS (THE EMOTION OF FEAR)

The purpose of the research is to analyze the phonetic characteristics of emotional expressions on the example of the basic emotion of fear and to determine the role of intonation components in expressing emotions in spontaneous speech. To solve research problems, a number of interrelated methods were used, such as systematic, theoretical methods (analysis, systematization, comparison, classification of scientific sources of information), the method of obtaining experimental data is based on the use of general scientific methods (linguistic observation, comparison, measurement), as well as phonetic methods (auditory, graphic and spectrographic types of analysis), and their processing is carried out using quantitative analysis. Instrumental analysis of speech material was carried out using the PRAAT program Versus 4.5. In total, 38 syntagms were analyzed. The phonetic characteristics of emotionally neutral and emotionally marked speech were compared for each speaker. The scientific novelty of the obtained results is determined by the fact that the work establishes common and specific prosodic characteristics that determine German emotional speech for basic emotion of fear, represented by the variability of tonal, dynamic and temporal acoustic characteristics of speech.

The markers of the emotion «fear» were identified using auditory and instrumental analysis. It was found that the speakers' speech rate becomes faster and the intensity of speech increases compared to emotionally neutral speech. There is also a noticeable difference in the percentage indicators of the pause organization, and the variability of the basic speech tone frequency, which allows us to claim that the researched emotion of «fear» has all pronounced differences in correlates compared to emotionally neutral speech. As a result of the analysis, we can conclude that both in emotionally neutral speech and in the expression of the emotion «fear», the proclitic method of forming rhythmic groups prevails. Proclitics and enclitics can be different parts of speech (nouns, pronouns, verbs, adverbs, conjunctions, prepositions, etc.). The main words of a rhythmic group are mostly nouns and adverbs.

Keywords: prosody; intonation; emotional speech; basic emotions; instrumental analysis

The relevance of the work is due to the need to reveal the main markers of the basic emotion of fear, which determine the speakers' speech by such prosodic characteristics as variability of melody, rhythmic and pause organization, intensity and tempo of speech.

Problem formulation. Intonation is an integral part of speech and a powerful tool for influencing the listener, as intonation is one of the means of expressing various types of emotions – surprise, admiration, joy, sadness, fear, anger. Intonation is a complex set of tools that includes melody, phrasal stress, speech rate and intensity, pause organization, rhythm, and timbre.

Intonation often conveys more information than words, because the manner in which the utterance is made sometimes has a stronger impact on the listener than the meaning of what is said. Sometimes it is the intonation that helps to finally understand the true meaning of the message. Even more: thanks to intonation, a person is able to recognize a particular emotion of the interlocutor without speaking their language.

The problem of the relationship between intonation and emotion identification has been studied by R. Jakobson, W. Zendlmeyer, M. Klymenko, A. Kalita, O. Steriopolo, and others. Despite the powerful theoretical base and the presence of experiments devoted to the issue of acoustic expression of emotions in speech, there are a number of insufficiently disclosed questions that require resolution. So, in particular, the question of the main prosodic characteristics, which act as defining markers of emotional speech, is debatable.

Results of theoretical and experimental studies on the expression of emotions in speech. Explanation of emotional phenomena in language is one of the

most difficult problems of modern linguistics. First, emotions themselves are complex, both as a phenomenon of the human psyche and their linguistic representations (Balakirieva, 2022, p. 5). Classifications of emotional states differ in the approach to their allocation, which indicates the complexity of the issue and its correlation with a number of disciplines. In numerous studies of emotions, a common position is their division into positive and negative (Honcharuk; Banziger, 2005; Kalyta, 2018; Sendlmeier, 2012). Although this classification is generally appropriate, the concept of positivity/negativity as applied to emotions needs to be clarified.

Emotions such as anger, fear, and shame cannot always be categorized as negative. A systematic consideration of the problem requires the need to describe a certain minimum of characteristics that contain basic emotions.

It can be concluded that at the level of phonetic characteristics, we can talk about a systematic change in a number of means in certain directions, which creates the impression of these basic emotions, which are perceived as «markers» of emotional speech.

One of the main problems in the study of emotional speech is the analysis and synthesis of data on the universality and specificity of the expression of emotional states in different languages. Most physiological studies point to a single biological basis for emotions (Klymenko, 2016; Klymenko, 2018). The reason lies in the fact that some of them have a universal expression that does not require knowledge of the language. But there are also emotions that can be correctly understood by speakers of one language and misinterpreted by speakers of another.

The aim of the study is to analyze the phonetic characteristics of emotional expressions on the example of the basic emotion of fear and to determine the role of intonation components in expressing emotions in speech.

The following **research tasks** were defined:

- to develop a methodology for the experimental phonetic study of the main prosodic characteristics of emotionally neutral and emotionally colored speech;
- to investigate phonetic characteristics in the spontaneous speech of native German speakers in Germany and to establish a certain set of prosodic characteristics inherent in the emotion of fear;
- to describe the common and distinctive features of the main prosodic characteristics of emotionally neutral and emotionally marked speech for the emotion of fear.

Results of prosodic analysis of German emotional expressions

In total, 38 syntagms were analyzed – semantically and phonetically organized parts of a sentence (Steriopolo, 2004, p.219):

- 21 syntagms for expressing the emotion of fear;
- 17 syntagms had neither a positive nor a negative color, which were considered as emotionally neutral and served as a basis for comparison with emotionally colored ones. The phonetic characteristics of emotionally neutral and emotionally marked speech were compared for each speaker.

Speakers' ages range from 20 to 30 years old. The material was downloaded from YouTube and converted from MP4 to WAV format using Movavi Video Converter 10. To achieve the purpose of the study, a comprehensive method of auditory and instrumental analysis of the material was used (Balakirieva, 2022, p. 6).

The emotion of fear can be identified quite easily using the auditory method. It should also be noted that all speakers have a cry in the process of speaking.

For analysis are presented:

- a man's viewing and reaction to scary videos;
- the speech of announcers during the online horror game.

Pauses

Using the PRAAT electronic program, the following indicators were established, which are presented in Table 1.

Table 1. A fragment of the protocol for recording experimental data of the study of the time limits of pauses in the expression of the emotion «Fear»

Length of pauses	Emotional speech	Emotionally neutral speech
	in %	in %
extra short (<200 мс)	33	56
short (220–500 мс)	8	33
medium (520–800 мс)	–	11
long (820–1200 мс)	–	–
extra-long (>1200 мс)	58	–

All three speakers had extra-long pauses of tension when they found it difficult to choose words and describe their reaction. The pauses were used for psychological needs: to catch their breath, to calm down.

The conducted analysis allows us to state that the speakers' speech coloured by the emotion «fear» is characterised by a small number of hesitant pauses: only 3 examples of «noisy hesitation», namely sighs, were found.

The emotionally neutral speech included 4 hesitation phrases (*genau, aber, ich weiß, und ja*) and 2 examples of lengthening of speech sounds.

Table 2. Hesitation pauses in speech coloured by the emotion «fear»

	Fear	Emotionally neutral speech
	Quantity	

Silent pauses	24	21
«Noisy hesitation»	3	–
Phrases of hesitation	–	4
Lengthening of speech sounds	–	2

2. Speech tempo

After listening to the recording, it was concluded that emotionally coloured statements were spoken faster, with noticeable emphasis. The 2 speakers repeated shouts such as «*Nein, nein, nein*» or «*oh Gott, oh Gott*» when they were anxious. In such cases, the speech tempo was as fast as possible.

Table 3. Speech tempo (number of syllables spoken per minute)

	Emotional speech	Emotionally neutral speech
Speaker V.M.	300	312
Speaker L.	305	298
Speaker E.M.	296	280

The analysis of the obtained data made it possible to establish a partial contrast of the phonetic characteristics of the speech tempo of emotionally colored and emotionally neutral speech, which consists in the fact that 2 announcers have a significantly faster tempo of emotional speech, and the maximum difference between the number of spoken syllables per minute of emotionally colored and emotionally neutral speech is 16 syllables.

3. Sound intensity

With the help of electronic analysis in the PRAAT program, the intensity indicators were established, which are shown in the table 4 below.

Table 4. A fragment of the protocol for recording experimental data on the intensity of the expression of the emotion «Fear»

	№	Emotional speech	Emotionally neutral speech
		Sound intensity (dB)	Sound intensity (dB)
5	1.	81,5	78,0

	2.	77,8	79,2
	3.	75,2	80,6
	4.	77,7	77,5
	5.	74,7	75,6
	6.	81,6	76,3
	7.	81,1	77,2
	8.	84,2	—
Speaker L.	1.	78,8	79,9
	2.	71,5	74,8
	3.	73,3	73,1
	4.	68,5	74,9
	5.	73,0	74,2
	6.	75,5	—
Speaker E.M.	1.	77,6	76,1
	2.	80,6	71,9
	3.	83,0	76,1
	4.	80,2	75,9
	5.	79,2	75,5
	6.	76,1	—
	7.	77,5	—

Table 5. Intensity range (in dB)

	Emotional speech	Emotionally neutral speech
Speaker W.M.	9,5	5,0
Speaker L.	10,3	6,8
Speaker E.M.	6,9	4,2

According to the study, the intensity range in emotionally colored speech is much higher, with a maximum difference of 4.5 dB.

4. Analysis of emotional expressions according to the variability of the basic speech tone frequency

Table 6. The variability of the basic speech tone frequency (in %)

Melodic		Emotional speech		Emotionally neutral speech	
		Number of syntagms	In %	Number of syntagms	In %
	constant	2	10	14	78
	ascending	13	62	3	17
	descending	6	29	1	6

According to the results of electronic analysis in the PRAAT program, it can be concluded that in emotionally colored speech, ascending melody is more often observed in all three speakers, and the variability of the basic speech tone frequency is mostly sharp, as illustrated in the spectrograms of the syntagms «*Nein, geh weg! Wo ist er?*» in the speech of speaker W.M. and «*Mir fehlen die Worte. Mir fehlen die Worte!*» in the speech of speaker E.M., shown in Figure 1.

Figure 1



The spectrograms of the syntagms «*Nein, geh weg! Wo ist er?*» in the speech of speaker W.M. and «*Mir fehlen die Worte. Mir fehlen die Worte!*» in the speech of speaker E.M.

5. Rhythm of speech

According to Table 7, the largest share in both emotionally colored and neutral speech is made up of rhythmic groups formed by the proclitic method. The share of proclitic rhythmic groups in emotionally neutral speech is 80%, in emotionally colored speech it is slightly lower – 64%.

Table 7. Structural types of rhythmic groups

Types of rhythmic groups	Emotional speech (%)	Emotionally neutral speech (%)
proclitic	64	80
enclitic	29	13
proclitic-enclitic	7	7

Symbols used for notating rhythmic groups:

— combining lexical items into one rhythmic group

˘ accent in a rhythmic group

/ short pause (Volfovskaya, 2011, p. 260).

Examples of proclitic rhythmic groups of emotionally colored speech (when expressing the emotion «fear»): *wo* _ *ist* _ 'er (proclitic – adverb + verb) / *da* _ *ist* _ 'jemand (proclitic – conjunction + verb) / *und* _ 'ja (proclitic – conjunction) / *ich* _ 'sehe (proclitic – pronoun) / *habe* _ *ich* _ 'mega (proclitic – verb + pronoun) / *einfach* _ 'Hammer (proclitic – particle) /

Examples of proclitic rhythmic groups of emotionally neutral speech: *die* _ *Kommentare* _ *ge'schrieben* (proclitic – article + noun) / *und* _ 'gut (proclitic – conjunction) / *ist* _ *ja* _ 'schön (proclitic – verb + particle) / *ich* _ *bin* _ 'Wiki (proclitic – pronoun + verb) / *dabei* _ 'sind (proclitic – adverb) / *wieder* _ 'Outlast (proclitic – adverb) / *in* _ *diesem* _ 'Video (proclitic – preposition + pronoun) / *habe* _ *ich* _ *mal* _ *wieder* _ *ge'dacht* (proclitic – verb + pronoun + adverb) /

According to the table data, the share of enclitic rhythmic groups in the expression of the emotion «fear» in speech is 29%, and emotionally neutral speech is 13%.

Examples of enclitic rhythmic groups of emotionally colored speech (when expressing the emotion «fear»): 'das _ *denn* (enclitic – conjunction) / *über'haupt* _ *nicht* (enclitic – adverb) / 'Schreck _ *bekomme* (enclitic – verb) /

Examples of enclitic rhythmic groups of emotionally neutral speech: 'viele _ *Leute* (enclitic – noun) / 'spiele _ *ich* (enclitic – pronoun) / 'deswegen _ *dachte* _ *ich* _ *mir* (enclitic – verb + pronoun) / 'ich _ *gucke* _ *mal* (enclitic – verb + adverb) /

The share of proclitic-enclitic rhythmic groups in emotionally colored speech is the smallest and amounts to 7%; with emotionally neutral speech, this indicator is also only 7%.

Examples of proclitic-enclitic rhythmic groups of emotionally colored speech (when expressing the emotion «fear»): *ich* _ 'will _ *mich* (pronoun) / *aus* _ 'deinem _ *Spiel* (preposition + noun) /

Examples of proclitic-enclitic rhythmic groups of emotionally neutral speech: *dass* _ *du* _ *jeden* _ 'zweiten _ *Tag* (conjunction, pronoun, noun) / *und* _ *was* _ *wird* _ *da* _ 'besser _ *passen* (conjunction and verb) /

6. Part of speech of the main word of the rhythmic group

The conducted analysis allows us to state that when expressing the emotion «fear» the main word of the rhythmic group is most often a noun and an adverb (32% and 21%, respectively).

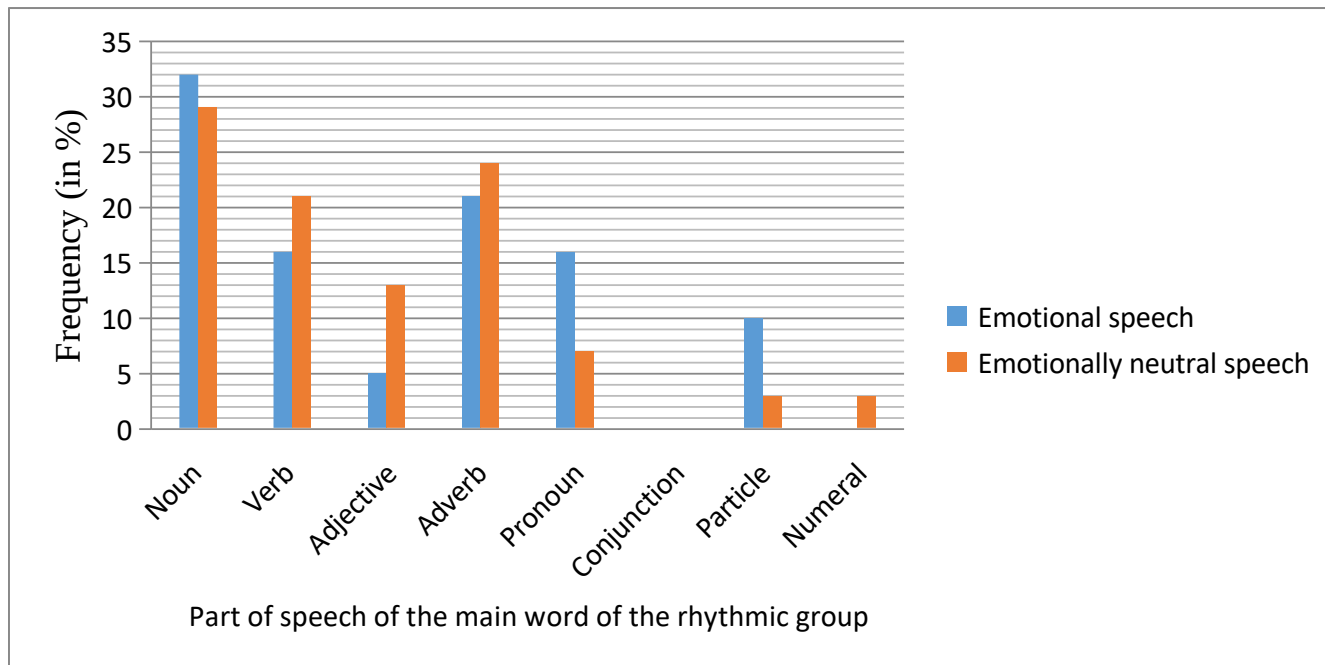
For example: *einfach* _ 'Hammer / *dieses* _ 'Spiel / 'Hilfe / Oh _ *mein* _ 'Gott / *ist* _ *auch* _ 'Peck / (the main word of the rhythmic group is a noun); *das* _ *habe* _ *ich* _ *über'haupt* _ *nicht* _ *erwartet* / *geh* _ 'weg / *nein* _ 'nein / 'wieder (the main word of the rhythmic group is an adverb).

In emotionally neutral speech, nouns (29%), adverbs (24%) and verbs (21%) are also often emphasized. For example: 'Gaming / hey _ 'Leute / von _ *der* _ 'Schule / *wieder* _ 'Outlast / in _ *diesem* _ 'Video / im _ 'Titel / *diese* _ 'Clips / auf _ *meine* _ *Reakti'on* / (the main word of the rhythmic group is a noun); *über'haupt* / schön _ *dass* _ *ihr* _ 'wieder / 'deswegen _ *dachte* _ *ich* _ *mir* / 'doch _ *bitte* (the main word of

the rhythmic group is an adverb); *die* – *Kommentare* – *ge'schrieben* / *Blog* – *hoch'lädst* / *dabei* – *'seid* / *'spiele* – *ich* / *'werde* / *ich* – *ganz* – *sachlich* – *rea'gieren* – *kann* / (the main word of the rhythmic group is a verb).

Diagram 1

Conclusions. The markers of the emotion «fear» were identified using auditory



and instrumental analysis. It was found that the speakers' speech rate becomes faster and the intensity of speech increases compared to emotionally neutral speech. There is also a noticeable difference in the percentage indicators of the pause organization, and the variability of the basic speech tone frequency, which allows us to claim that the researched emotion of «fear» has all pronounced differences in correlates compared to emotionally neutral speech. As a result of the analysis, we can conclude that both in emotionally neutral speech and in the expression of the emotion «fear», the proclitic method of forming rhythmic groups prevails. Proclitics and enclitics can be different parts of speech (nouns, pronouns, verbs, adverbs, conjunctions, prepositions, etc.). The main words of a rhythmic group are mostly nouns and adverbs.

Prospective areas of further linguistic research of emotional speech should include the study of prosodic characteristics of emotional expressions for a wider range of emotions, as well as the gender specificity of prosodic expression of emotions.

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*Liudmyla Pradivlianna, PhD (Philology),
Associate Professor of Foreign Languages Department
Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University*