

DOI: <https://doi.org/10.18454/RULB.2020.23.3.5>**ПРОСОДИЧЕСКАЯ ВАРИАТИВНОСТЬ И КОНСТРУИРОВАНИЕ ПРОСОДИЧЕСКОГО ПОРТРЕТА**

Научная статья

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Аннотация

Целью нашего исследования является конструирование просодических портретов десяти персонажей, озвученных одной языковой личностью. Предметом исследования стали временной, частотный и качественный аспекты просодии языковой личности. Материалом исследования является автобиография лингвиста Дэвида Кристала, прочитанная самим автором. Задачей исследования является анализ просодических особенностей ритмических единиц в речи языковой личности, выявление просодических единиц, наиболее склонных к варьированию, а также выявление тех просодических черт, которые оказались ключевыми для создания того или иного образа героя. Полученные данные показали важность анализа комбинаторики просодических признаков, выявили важность качественных характеристик голоса для обозначения принадлежности к возрастной группе, частотных характеристик – для обозначения принадлежности к социо-культурной группе и временных характеристик – для обозначения эмоционального состояния персонажа. Практическая значимость исследования состоит в возможности использования полученных результатов в чтении курсов теоретической и практической фонетики английского языка.

Ключевые слова: просодия, языковая личность, мелодика, темп, качество голоса.

PROSODIC VARIABILITY AND PROSODIC PORTRAIT CONSTRUCTION

Research article

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Abstract

The aim of our research is to provide an overview of scientific literature on prosodic variation and to construct prosodic portraits of ten book characters voiced by one linguistic persona. The main objectives are determining the variability of prosodic features of a linguistic persona and identifying the prosodic characteristics that are stereotypically associated with a particular social/cultural group and/or an emotional state. Thus, the object of the research are pitch, rate and voice quality characteristics of a linguistic persona in voice acting. The new aspect brought to the field is the focus on variation of prosodic features of one linguistic persona performing ten different voice-overs. The method used for the purpose is acoustic analysis. The material is David Crystal's autobiography read by the author. The data suggest the presence of relevant discriminating parameters common to the three distinctive age and gender groups and prove the necessity to resort to cluster analysis while constructing a prosodic portrait. Thus, frequency aspect helps to affiliate a character to a particular gender-age group while temporal aspect is associated with the emotional state of the speaker. Voice quality may indicate age group of a speaker but its parameters are found to be most constant among all prosodic cues. It is revealed that specific personal characteristics of a character depend on the combinations of pitch, articulation rate and voice quality parameters.

Keywords: prosody, linguistic persona, articulation rate, pitch, voice quality.

Introduction

The predominant anthropocentric paradigm sees the focus of linguistic research shift towards the study of man. The tendency is observed in various linguistic fields, and it has contributed to the emergence of a relatively new branch of linguistics – linguistic personality studies [2].

Our research adopts a classic socio-cultural approach, which arguably constitutes the key aspect of anthropocentric paradigm, and applies it to the study of a linguistic persona developed by Yu. N. Karaulov, G. I. Bogin, V. I. Karasik for the purpose of studying prosodic portrait of a linguistic persona. In the study we aim to give an overview of prosodic variation literature and then construct prosodic portraits of ten different book characters voiced by David Crystal, a prominent British linguist, by using previously found data on prosodic aspects of pitch, rate and voice quality and their socio-cultural and emotive cues. Thus, the aim of the study is to provide an overview on prosodic variability; to search for the variability of prosodic features of a linguistic persona; find out prosodic characteristics that are stereotypically associated with a particular social/cultural group and/or an emotional state of the person; find the combination of means of conjuring up the desired image of a character in the mind of the listener.

It seems logical to start with the notion of linguistic stereotypes as it is they that contribute to building the character. Language stereotypes are recognized as a key character building tool due to the capacity of stereotypical linguistic features to trigger social stereotypes [17]. It is maintained that listeners use speech cues to infer speakers' social group membership(s). Thus it is agreed that language is "a quick way to build character and reaffirm the stereotype" and we "associate specific characters and life styles with specific social groups by means of language variation" [14, P. 85]; language varieties evoke a stereotypical image and "actors can exploit this" [17, P. 33]. We argue that the idea is relevant for the suprasegmental language level with prosodic cues and prosodic variation acting as a character building tool. We now proceed to look at suprasegmental features that are associated with various socio-cultural and emotive cues.

Prosody variation has been widely explored by linguistic scientific community from different perspectives. The correspondence between emotional state and prosody has been on the scientific agenda since the middle of the previous century and several various ways to classify emotions have been suggested. There exist an approach distinguishing emotional states with high (e.g. anger, fear, joy) and low (e.g. sadness) levels of physiological arousal whereby high physiological arousal is associated with increases in mean F0, F0 variability and vocal intensity [8]. Much research has been done on the so-called basic emotions, such as happiness and sadness, and five broad emotional categories (anger, fear, happiness, sadness, and love-tenderness) [15], [16]. According to these studies, anger and happiness are associated with increases in mean F0, F0 variability, speech rate, vocal intensity and high-frequency energy (voice quality). Sadness and tenderness, on the contrary, are marked by decreases in mean F0, F0 variability, speech rate, vocal intensity and high-frequency energy (voice quality) [12].

An alternative system for studying and classifying emotions is to organize them in a dimensional manner. There exist a circumplex model advanced by James A. Russell (the USA). The model represents emotions through their placement along the two dimensions of arousal/activation and valence/evaluation/pleasure. The emotions and their prosodic cues have been explored according to the model and it has been established that arousal is positively correlated with increases in mean F0, F0 standard deviation, F0 range, mean loudness, shimmer and speech rate. There is less evidence to suggest a clear correlation between valence and prosodic parameters but based on various studies it is possible to conclude that high valence is positively correlated with lower F0, larger F0 variability, larger F0 range, decreased loudness, less high-frequency energy, “warm” timbral voice quality, increases in speaking rate and shorter pauses [16].

Prosody has also been widely discussed in terms of its variability due to an array of social factors. The role of gender in prosodic variability and the social status of men and women have been studied by T. G. Medvedeva and T. I. Shevchenko in British English [6]. American female speech has been found to be manifested through a broader pitch range compared to male speech. In contrast with it, British female speech is characterized by a narrower pitch range compared to British male speech. Furthermore, prosodic variability has been studied from the point of view of territorial differentiation (E. A. Babushkina, T. I. Shevchenko [1], [6]). It is known that American Standard speech (General American) is associated with a narrow pitch range while British Standard speech (Received Pronunciation), which reflects high social standing, is associated with a wide pitch range [6, P. 168]. Professional voices have been scrutinized by D. Crystal [10]. O. P. Kryukova explored the said variability within the confines of public speech [4]. L. V. Postnikova brought into focus the prosodic features typical of American presidents’ speech [5]. M. V. Yakutina studied the prosodic features typical of the speeches delivered at U.S. Supreme Court hearing [7]. Interestingly, the author found correlation between the aggressive Prosecution stance and such prosodic cues as high mean F0 and F0 variability while the Defence speech is characterized by lower mean F0 and F0 variability. Concerning the temporal aspect it was found that the Prosecution’s aggression is manifested through a slow speech rate and short pauses while the Defence’s speech is characterized by fast speech rate and long reflection pauses [7].

Thus, the overall conclusion based on the studies conducted is that the main ways to achieve prosodic variability are through the increase in F0 variability, vocal intensity and speech rate though voice quality is becoming increasingly more frequently studied in relation to interpersonal prosodic variability.

Materials and methods

The material for the research is David Crystal’s autobiography ‘*Just a Phrase I’m Going Through*’ read by the author. The overall corpus presents an hour long recording (t = 60 min) from where by way of perceptive analysis we have selected the sections where the author-narrator voices ten different characters resorting to variation in his prosody. The selected material was then organized into three main gender and age groups: the ten characters’ speech was described as *children’s*, *adult male* or *adult female*. The main method of the current research is acoustic analysis. For the purpose we extracted the following parameters: *minimum*, *maximum* and *range* of the fundamental frequency (*Fo*) in Hz (pitch *M*, pitch *min*, pitch *max* and pitch *range*, respectively); *mean* loudness in dB (loudness *M*); *Average Syllable Duration* (ASD); and the *means of jitter* in %, *shimmer* in %. The extracted parameters were measured across the entire sections. (word order) The analysis was conducted with the help of computer software program PRAAT [9].

Results

The conducted acoustic analysis allowed us to reveal the interdependence of acoustic speech parameters and specific gender and age groups.

We established the narrator’s voice to be the speaker’s modal voice and compared other voices to it. The narrator’s voice is characterized by: F0 min (74 Hz), F0 max (267 Hz), pitch range (22 st), ASD (193 ms), Shimmer (13%), Jitter (5%).

By way of perceptive analysis the following roles (apart from the voice of the narrator) were identified:

1. Adult male voices;

Table 1. Prosodic characteristics of *adult male* voices (n=4)

Character	F0 min, Hz	F0 max, Hz	Fo range, st	ASD, ms	Shimmer, %	Jitter, %
Professor	74	497	33	323	12	3
Porter	75	484	32	294	10	4
Father Clark	75	300	24	244	14	5
Humpty-Dumpty	74	497	33	400	12	4

2. *Adult female voices;*Table 2. Prosodic characteristics of *adult female* voices (n=2)

Character	F0 min, Hz	F0 max, Hz	Fo range, st	ASD, ms	Shimmer, %	Jitter, %
Mother	75	417	30	210	12	4
Sister Mary	75	410	30	210	10	3

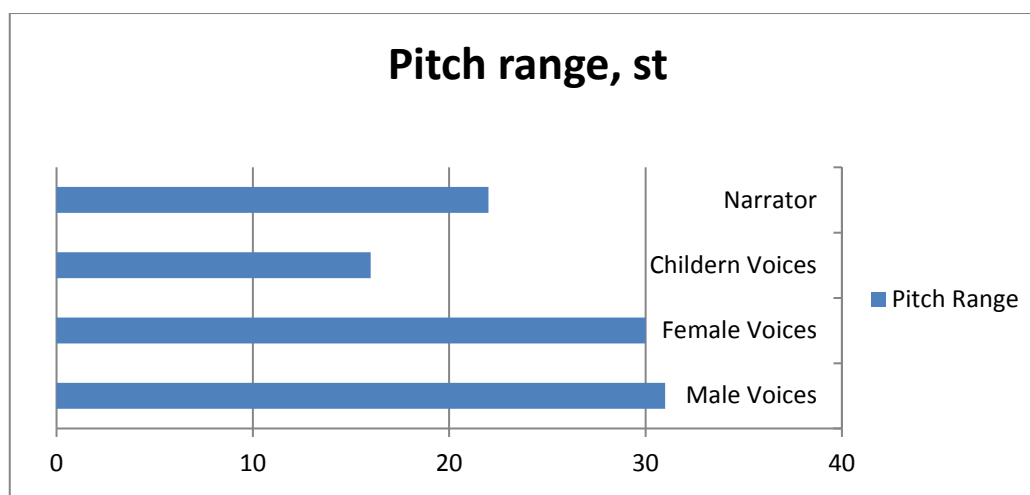
3. Children's voices.

Table 3. Prosodic characteristics of *children's* voices (n=3)

Character	F0 min, Hz	F0 max, Hz	Fo range, st	ASD, ms	Shimmer, %	Jitter, %
Know-it-all Classmate	117	232	12	435	8	3
Alice "Alice's Adventures in Wonderland"	75	305	24	270	9	3
Narrator as a Child	89	177	12	313	6	2

Discussion

Linguistic community seems to agree that F0 parameters are most informative in phonetics experiments. It is known that pitch range of an adult male varies between 75 and 200 Hz while pitch range of an adult female varies between 130-300 Hz. Hence, it is insightful for the purpose of our study to scrutinize the pitch range of the modal voice – the Narrator. David Crystal demonstrates an extremely wide range surpassing the mean male F0 variability by 33%. Furthermore, David Crystal's modal voice is characterized by a high speech *rate* and high level of *shimmer* parameters which indicates his elderly age. These characteristics taken as a mode, we can now compare other characters' voice characteristics against the Narrator's to determine prosodic variability of the linguistic persona selected for analysis.

Fig.1 Mean Pitch Range of *adult male*, *adult female* and *children's* data*Adult Male Voices*

Starting our analysis with the characteristics of adult male voices we expected to find few points of difference with the modal voice of the Narrator as the latter belongs to that particular gender-age group. It is noteworthy that the adult male voices as portrayed by David Crystal are indeed characterized by highest values of Fo max and a wide pitch range which corresponds to his modal voice features. However, *male* characters speak with a slower speech rate (244-400 ms compared to the Narrator's 193 ms) which contributes to their perception of high status people. Besides, the pitch range values also reach their maxima, compared to the rest of the characters (See Table 1).

It is agreed that speech rate cannot be considered a constant measure. It is measured by Average Syllable Duration (ASD) and is generally highly influenced by the emotional state of the speaker or his/her intentions [13]. Average articulation rate is considered to be in the range of 190-210 ms [1].

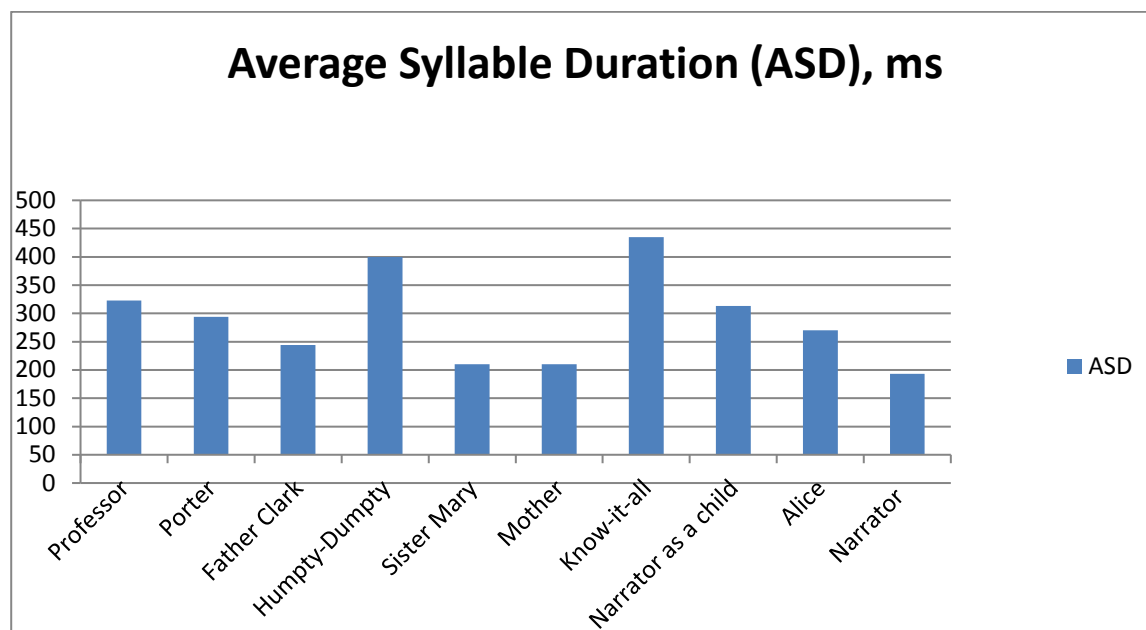


Fig. 2 Average Syllable Duration (ASD) across the ten characters' data

It should be noted that *Professor* and *Humpty-Dumpty* sound as if they have similar wide pitch range values (33 st) and the slowest temporal characteristics (323 ms and 400 ms, respectfully), which indicates their importance/status, but at the same time *Professor's* voice is colored with a high level of *shimmer* which characterizes him as an elderly person and distinguishes him from *Humpty-Dumpty* whose speech is not marked by that voice quality [11].

Father Clark is portrayed as the one who has a narrower range (24 st), an average speech rate and a high *shimmer* value. He also displays the lowest *Fo* max which makes his voice stand out from everyone else's (see Table 1).

Porter's voice is characterized by a similar pitch range which helps the listener to identify him as a male; his lowest shimmer level among other male voices distinguishes him as the youngest person in that group.

Thus, we see that in general male voices as portrayed by David Crystal have many features in common with the narrator's voice as was expected. However, each character has a particular feature that clearly affiliates him with a specific social gender-age group and distinguishes him from other characters so as to be identified by the listener by his voice.

Adult Female Voices

Sister Mary and *Mother* have the same pitch range (30 st) and the same speech rate (210 ms). Female voices are thus characterized by a wider pitch range compared to the Narrator's one but not as wide as those of male characters which corresponds to the data regarding British male and female voices reported in previous research [6].

Women's voices are also characterized by a higher speech rate and a lower *shimmer* values. The absence of substantial differences between the two female characters within the group and broad differences in *F0*, speech rate and *shimmer* parameters as compared to the male voices group shows the intention of the narrator to emphasize the characters' affiliation with the gender group without focusing on their individuality.

Children's Voices

Children's voices as portrayed by David Crystal are of special interest to our experiment due to their expressiveness. All characters enjoy several common features – namely, a high *Fo* min level, a narrow pitch range and the lowest *shimmer* values compared to adult male and female voices. These features help the listeners to identify the characters as children. Particular combinations of those prosodic characteristics facilitate identification of specific personalities within the group.

Thus, *Know-it-all-classmate* enjoys the slowest speech rate among children (435 ms) which illustrates his haughtiness and arrogance. The same tool was used by David Crystal to portray the arrogant *Humpty-Dumpty*.

The *Narrator's voice as a child* is characterized by the lowest *shimmer* level which may indicate the author's wish to make a clear distinction between himself as an adult and as a child.

Alice's voice ('*Alice's Adventures in Wonderland*') enjoys the pitch range close to that of adults' but her peculiarity is the fastest tempo (270 ms) which fits the stereotype of a young girl as a chatter-box.

Conclusion

The data obtained in the course of the acoustic analysis show the great prosodic variability used by David Crystal for the purpose of creating a number of literary characters. The importance of prosodic features for creating a particular image of a person and for the correct perception of said person is indisputable. The experiment showed that a particular combination of prosodic features serves to create an individuality of a linguistic persona. The parameters of pitch (*Fo*, or fundamental frequency) helps to affiliate a character to a particular gender-age group while speech rate is associated with the social status and the emotional state of the speaker. Voice quality parameter of *shimmer* may indicate age group of the speaker but its values are considered to be most constant among all prosodic cues. This justifies the necessity to focus on voice quality when studying the voice image of a particular linguistic persona and its identification. Thus, based on the previous research data and our current experimental work is our knowledge about the prosodic aspects of constructing a number of sound images created by one linguistic persona. The results of the current research may prove to be useful in the course of theoretical and applied phonetics.

Конфликт интересов

Не указан.

Conflict of Interest

None declared.

Список литературы / References

1. Бабушкина Е. А. Темп речи как социальный маркер / Бабушкина Е. А. // Вестник БГУ. Язык, литература, культура. – 2010. – №11. – С. 13–17.
2. Иванцова Е. В. Проблемы формирования методологических основ лингвоперсонологии / Иванцова Е. В. // Вестник Томского государственного университета. (Серия: Филология). – 2008. – № 3(4). – С. 27–43.
3. Караулов Ю. Н. Языковая личность / Караулов Ю. Н. // Русский язык: энциклопедия. – М., 2003. – С. 671–672.
4. Крюкова О.П. Фоностилистические особенности ораторской речи. : дис. канд. филол. наук. – М., 1982. – 168 с.
5. Постникова, Л.В. Просодия и политический имидж оратора: На материале речей американских президентов : дис. канд. филол. наук. – М., 2003. – 198 с.
6. Шевченко Т. И. Социофонетика: Национальная и социальная идентичность в английском произношении / Шевченко Т. И. – 2-е изд., доп. – М. : ЛЕНАНД, 2016. – 240 с.
7. Якутина М. В. Просодические формы речевого поведения участников судебного процесса (экспериментально-фонетическое исследование на материале аудиозаписей Верховного суда США): автореф. дис. канд. филол. наук. – М., 2002. – 22с.
8. Bachorowski J.A. Vocal expression of emotion: Acoustic properties of speech are associated with emotional intensity and context / Bachorowski J.A., Owren M.J. // Psychological Science. – 1995. – Vol. 6. – P. 219–224.
9. Boersma P. Praat: Doing phonetics by computer [Computer program] / Boersma P., Weenink D. Version 6.0.36. 2017. – URL: <http://www.praat.org/> (дата обращения: 31.05.2020)
10. Crystal D. Prosodic and paralinguistic correlates of social categories / The English Tone of Voice. Essays in Intonation, Prosody and Paralanguage / Crystal D. – London, 1980. – P. 84-95.
11. Farrús, M. Jitter and shimmer measurements for speaker recognition / Farrús, M., Hernando, J., Ejarque, P. // INTERSPEECH-2007. – P. 778–781.
12. Juslin P.N. Communication of Emotions in Vocal Expression and Music Performance: Different Channels, Same Code? / Juslin P.N., Laukka P. // Psychological Bulletin. Vol. 129. – 2003. – N 5. – P. 770–814.
13. Laver J. Principles of phonetics / Laver J. – Cambridge, Cambridge University Press, 1994. – 707 p.
14. Lippi-Green, R. English with an Accent. Language, ideology, and discrimination in the United States / Lippi-Green, R. – London: Routledge. – 1997. – 354 p.
15. Murray I.R. Toward the simulation of emotion in synthetic speech: A review of the literature on human vocal emotion / Murray I.R., Arnott J.L. // Journal of the Acoustical Society of America. – 1993. – №93 – P. 1097–1108.
16. Scherer K.R. Vocal expression of emotion. In: Davidson, R.J.; Goldsmith, H.H.; Scherer, K.R., eds. Handbook of affective sciences. – New York: Oxford University Press. – 2003. – P. 433–456.
17. Wells, J. C. Accents of English 2: The British Isles / Wells, J. C. – Cambridge: Cambridge University Press. – 1982. – 212 p.

Список литературы на английском / References in English

1. Babushkina E. A. Temp rechi kak social'nyj marker [Speech Rate as A Social Marker] / Babushkina E. A. // Vestnik BGU. Yazyk, literatura, kul'tura. – 2010. – №11. – P. 13–17. [in Russian]
2. Ivanczova E. V. Problemy formirovaniya metodologicheskix osnov lingvopersonologii [On the Problems of Laying Down the Foundations for Linguistic Persona Studies] / Ivanczova E. V. // Vestnik Tomskogo gosudarstvennogo universiteta. (Seriya: Filologiya). – 2008. – № 3(4). – P. 27–43. [in Russian]
3. Karaulov Yu. N. Yazykovaya lichnost' [Linguistic Persona] / Karaulov Yu. // Russkij yazyk: e'nciklopediya. – M., – 2003. – P. 67 –672. [in Russian]
4. Kryukova O.P. Fonostilisticheskie osobennosti oratorskoj rechi [Phonostylistic Characteristics of Public Speech] : dis ... of PhD in Linguistics. – M., 1982. – 168 p. [in Russian]
5. Postnikova, L.V. Prosodiya i politicheskij imidzh oratora: Na materiale rechej amerikanskix prezidentov [Prosody and Political Image of Orator: based on American Presidents' discourse] : dis ... of PhD in Linguistics. – M., 2003. – 198 p. [in Russian]
6. Shevchenko T. I. Sociofonetika: Nacional'naya i social'naya identichnost' v anglijskom proiznoshenii. [Sociophonetics: National and Social Identity of English Pronunciation] / Shevchenko T. I. 2-nd edit. – M. : LENAND, – 2016. – 240 p. [in Russian]
7. Yakutina M.V. Prosodicheskie formy rechevogo povedeniya uchastnikov sudebnogo processa (eksperimental'no-foneticheskoe issledovanie na materiale audiozapisej Verhovnogo suda SSHA) [Prosodic features of court hearings discourse (based on the USA Supreme Court hearings)]: avtoref. dis ... of PhD in Linguistics. – M., 2002. – 22p. [in Russian]
8. Bachorowski J.A. Vocal expression of emotion: Acoustic properties of speech are associated with emotional intensity and context / Bachorowski J.A., Owren M.J. // Psychological Science. – 1995. – Vol. 6. – P. 219–224.
9. Boersma P. Praat: Doing phonetics by computer [Computer program] / Boersma P., Weenink D. Version 6.0.36. 2017. – URL: <http://www.praat.org/> (accessed: 31.05.2020)
10. Crystal D. Prosodic and paralinguistic correlates of social categories / The English Tone of Voice. Essays in Intonation, Prosody and Paralanguage / Crystal D. – London, 1980. – P. 84-95.
11. Farrús, M. Jitter and shimmer measurements for speaker recognition / Farrús, M., Hernando, J., Ejarque, P. // INTERSPEECH-2007. – P. 778–781.
12. Juslin P.N. Communication of Emotions in Vocal Expression and Music Performance: Different Channels, Same

Code? / Juslin P.N., Laukka P. // *Psychological Bulletin*. Vol. 129. – 2003. – N 5. – P. 770–814.

13. Laver J. *Principles of phonetics* / Laver J. – Cambridge, Cambridge University Press, 1994. – 707 p.

14. Lippi-Green, R. *English with an Accent. Language, ideology, and discrimination in the United States* / Lippi-Green, R. – London: Routledge. – 1997. – 354 p.

15. Murray I.R. Toward the simulation of emotion in synthetic speech: A review of the literature on human vocal emotion / Murray I.R., Arnott J.L. // *Journal of the Acoustical Society of America*. – 1993. – №93 – P. 1097–1108.

16. Scherer K.R. Vocal expression of emotion. In: Davidson, R.J.; Goldsmith, H.H.; Scherer, K.R., eds. *Handbook of affective sciences*. – New York: Oxford University Press. – 2003. – P. 433–456.

17. Wells, J. C. *Accents of English 2: The British Isles* / Wells, J. C. – Cambridge: Cambridge University Press. – 1982. – 212 p.