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Emotional expression in vocal skill from the perspective of multiculturalism

Expressão emocional na habilidade vocal na perspectiva do multiculturalismo

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Abstract: The research is devoted to study the influence of emotional singing on the listeners' perception of vocal mastery in the process of intercultural musical dialogue. In the context of studying the influence of emotional singing on the quality of perception by listeners, an experiment was conducted; it involved 11 student vocalists from China, Russia, Italy, Brazil, Azerbaijan, Hungary, Greece, India, Canada, Korea, Nigeria, 5 independent listeners, and 5 music experts. The analytical experiment created an opportunity to reveal the impact of the vocalist's emotional expression when performing a national folk song on the listener perception. The percentage of coherence between emotional production and listener perception ranged from 62.8% to 76.2%. Vocal skills of a singer can reveal the emotional aspects of a piece of music to

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the public, which are of great value in contemporary art; they determine the popularity of a performer on the world stage.

Keywords: Emotional coherence. Emotional singing. Emotional state assessment. Multiculturalism. Vocal skills.

Resumo: A pesquisa se dedica a estudar a influência do canto emocional na percepção do domínio vocal dos ouvintes no processo de diálogo musical intercultural. No contexto do estudo da influência do canto emocional na qualidade da percepção dos ouvintes, foi realizado um experimento; envolveu 11 vocalistas estudantes da China, Rússia, Itália, Brasil, Azerbaijão, Hungria, Grécia, Índia, Canadá, Coréia, Nigéria, 5 ouvintes independentes e 5 especialistas em música. Os resultados do experimento analítico permitiram revelar o impacto da expressão emocional do vocalista ao executar uma canção folclórica nacional na percepção do ouvinte. O percentual de coerência entre a produção emocional e a percepção do ouvinte variou de 62,8% a 76,2%. As habilidades vocais de um cantor podem revelar ao público os aspectos emocionais de uma peça musical, que são de grande valor na arte contemporânea; eles determinam a popularidade de um artista no cenário mundial.

Palavras-chave: Coerência emocional. Canto emocional. Avaliação do estado emocional. Multiculturalismo. Habilidades vocais.

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Introduction

In international law, music is interpreted as a form of cultural heritage that despite such widespread phenomena as cultural hybridity and social identity, preserves its relevance in the modern world as a distinct expression usually associated with certain ethnic groups (HEIMONEN and HEBERT, 2010). Multiculturalism has recently become a commonly accepted and major idea in the education systems of different countries. Indeed, numerous complex types of inequality and diverse identities found around the world today may justify accepting the view that any education system that does not contain any multiculturalism features, in fact, does not provide students with ample opportunities in order to meaningfully adapt to the reality of the human state beyond their immediate experience (HEBERT and KARLSEN, 2010).

Music education is an effective tool in exploring forms of cultural expression that fosters a positive attitude towards cultural diversity (JOSEPH *et al*., 2018). One of the key functions of music and arts education is to "support and enhance the role of arts education [music] in promoting social responsibility, social cohesion, cultural diversity and intercultural dialogue" (UNESCO, 2010). Through the creation of music, intercultural awareness can be considered as a positive way of promoting cultural sensitivity. Music is also a form of cultural identity, so studying music in this context can improve students' cultural development (CHEN-HAFTECK, 2016).

In recent years, vocal music has gained widespread popularity due to the versatile development of music. National vocal music is the artistic essence of national feelings; it contains unique cultural characteristics, aesthetic style and spirit. The ultimate goal of the national vocal music is emotional sublimation. The principle of singing is usually based on a combination of words, rhyme and emotion demonstrating the aesthetics of national vocal music. Sound is of key importance in the art of national vocal music. The charming beauty of the voice is usually manifested in the connection between character and sound that is expanded

through their combination with the control over singing based on good singing skills (SHANSHAN, 2019).

Scientists and philosophers have considered common cognitive origins of music and lyrics and their ability to express emotions. Study of JUSLIN and LAUKKA (2003) building on the broader context of earlier studies of Vocal Expression and Music Performance, states that music and speech have a common acoustic code for expressing emotions: "Studies of vocal expression and music performance have converged on the conclusion that encoders can communicate basic emotions to decoders with above-chance accuracy" (JUSLIN and LAUKKA, 2003, p. 777). SCHELLENBERG *et al*. (2012) states on the basis of experimental verification that listeners prefer music that expresses emotions that contrast with the established context. The empirical study "tested the third hypothesis by examining liking for music as a function of whether the emotion it expressed contrasted with the emotion expressed by music heard previously" (SCHELLENBERG *et al*., 2012, p. 1).

Music comes from ancient ceremonies, which related the expression of vocal emotion to singing. Through music, people began to express various emotions, ranging from happiness and love, ending with anger and sadness. Soon such singing began to be mixed with music that accompanied cultural events such as holidays, funerals, wars, etc. (SHIOTA *et al*., 2014, 2017). Emotional expressions are usually categorized into emotions associated with important life issues such as danger, fear of loss or competition, loneliness, social inequality, etc. (JUSLIN, 2001, 2013a).

Emotional expressions perform important functions in social interactions, allowing you to transmit information about your current state to others, which contributes to coordinated interaction (NORDSTRÖM, 2019). Emotional expression is a challenge well known to both actors and musicians, especially vocalists. Although the portrayal of musical emotions is mostly subjective, musicians must provide high-quality emotional expression of the essence of the work in front of the audience if they seek to truly show the peculiarities of the music and its context (SZELOGOWSKI, 2021).

This study is intended to confirm the importance of emotional expression in vocal performance, in particular in a multicultural context. It should be noted that this topic, although considered by other researchers, has not been studied enough. Thus, a study (HAKANPÄÄ *et al*., 2019) examined emotion recognition in contemporary commercial music (CCM) and classical singing styles, but did not address the multicultural aspect. At the same time, there is a cross-cultural study of the performance and perception of affective expression in music (LAUKKA *et al*., 2013), but it involved string musicians, not vocalists. In addition, our study demonstrates a wide sample of vocalists from 11 countries who represent different cultural contexts.

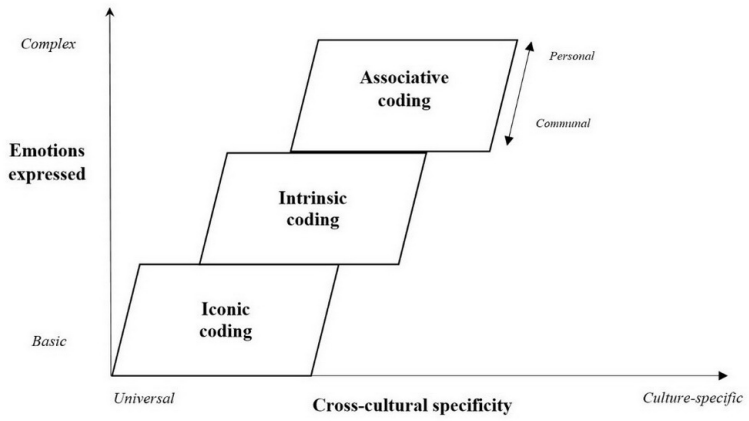
Acoustic signals make music emotionally rich. In fact, some emotion cues apply to all types of oral communication, so emotionally expressive speech and music are similar in terms of acoustics. When listening to unfamiliar music from a foreign culture, the listener can quite accurately capture the emotions expressed in it, which implies the presence of universal culturally common signals for musical emotional expressions (SWAMINATHAN and SCHELLENBERG, 2015).

Each musical system has its own structure, musical meanings and methods of their transmission. For example, in Western music, major notes evoke positive emotions in listeners, while minor notes evoke negative emotions. Listeners are more receptive to emotions they hear from the music of their native culture than from a foreign one. Also, foreign music may seem less emotional than music that is culturally familiar. But, it should be borne in mind that in research, when compiling self-reports, listeners confuse perception and experience of certain emotions. However, studies using physiological indicators confirm that listening to music induces emotional arousal, which implies increased electrodermal activity (EDA), heart rate, and respiratory rate. Imaging the brain while listening to music also reveals activation of emotional arousal in the limbic system. Much fewer physiological indicators indicate that music causes variations in emotional basicity, although

facial electromyography (EMG) shows that music with pleasant sound causes more cheekbone movement than sad melodies (SWAMINATHAN and SCHELLENBERG, 2015).

To the three "levels" of musical expression of emotions correspond appropriate encoding types. The lower (basic) level consists of traditionally encoded fundamental emotions based on vocal expression. This level explains the all-purpose functions of fundamental emotions in the expression of vocals and music. However, the other two levels can extend and modify the basic level with internal and associative coding; this allows listeners to understand more complex and less invariant emotions. The formation of emotional expressions that are time-dependent is facilitated by the dynamic change in the boundaries of pre-coded emotions. Associative coding adds more complex emotions typically being characterized by with an inadequate level of interpersonal agreement. Each of the coding levels covers a range from the more personal levels of perception (Personal) to the more widely divided in the community (Communal) (Figure 1) (JUSLIN, 2013b).

Figure 1 - Multi-layer conceptualization of musical expression of emotion



Source: own development based on work of JUSLIN (2013b)

The purpose of the article is to study the influence of emotional singing on the listeners' perception of vocal mastery in the process of intercultural musical dialogue.

The research objectives are as follows:

- to conduct the experiment among student vocalists from China, Russia, Italy, Brazil, Azerbaijan, Hungary, Greece, India, Canada, Korea, Nigeria, independent listeners, and music experts during training student vocalists on the online Emotional Singing course on the Coursera platform within the framework of the educational activities;

- to analyze the value of the vocalist's emotional display in the process of performing a national folk song on the listener's perception;

- on the basis of the reports on the emotional expression of performers and the reports on emotional reactions of listeners made with the help of the MorphCast video platform, to compare the emotional backgrounds of producers and recipients of musical content;

- to compare the level of consistency of the emotional expression of the vocalist and listener perception with the expert assessment of vocal skills.

The following hypotheses were put forward.

Hypothesis 1. The formation of an empathic attunement to the listener in the process of vocal performance allows the singer to convey the emotions and feelings of the song with maximum accuracy.

Hypothesis 2. Emotional singing emphasizes the level of vocal skill.

Hypothesis 3. The emotional manifestation of the performer of the national folk vocal song has a major influence on the character of the transfer of the intercultural context inherent in the musical work.

Hypothesis 4. Coordination of the vocalist's emotional manifestation and the listener's perception ensures maximum perception and understanding of the national cultural identity.

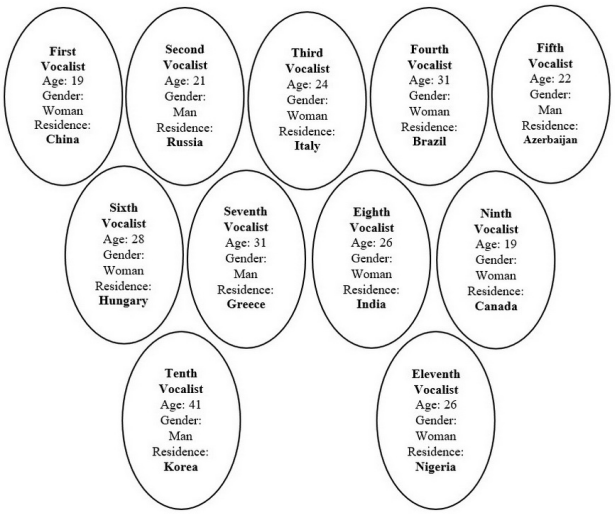
Hypothesis 5. The ability to produce emotions and generate feelings in the process of vocal execution of a musical composition clarifies the professional competence of a vocalist in the context of intercultural perception.

Methods and Materials

Participants

In the educational process the influence of emotional singing on the quality of perception by listeners, an experiment was conducted; it involved 11 student vocalists from China, Russia, Italy, Brazil, Azerbaijan, Hungary, Greece, India, Canada, Korea, Nigeria (Figure 2). The experiment was carried out as part of the online Emotional Singing course on the Coursera open educational platform.

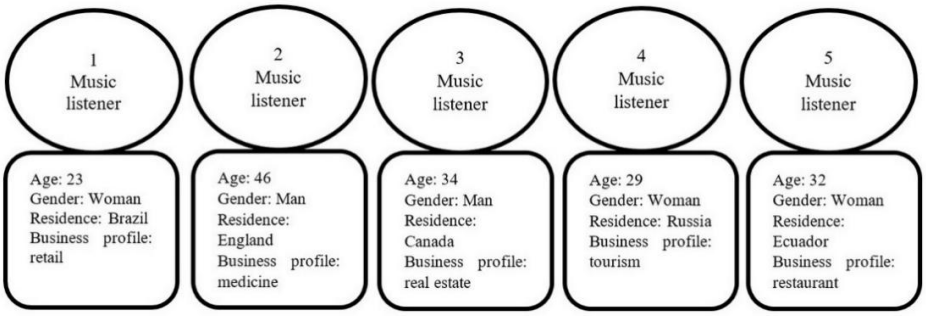
Figure 2 - Students of the course "Emotional Singing" participating in an educational experiment



Source: own development

The second group include 8 active participants in music discussion forums on social networks Facebook were invited to take part in an educational experiment, 5 of which agreed and made up the experimental group of independent music listeners (Figure 3). The listeners were asked to listen carefully to the recorded videos of the vocal performances.

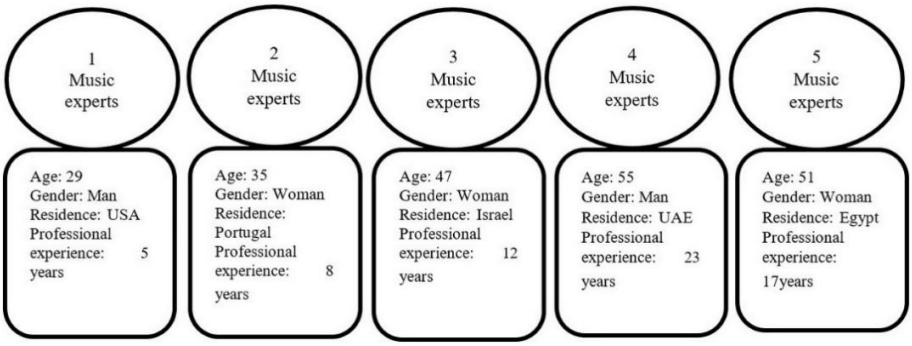
Figure 3 - Independent music listeners participating in an educational experiment



Source: own development

The third group involved music experts – vocal teachers (5 people), who were asked to assess the quality of vocal performances and the level of professional competencies of vocalists (Figure 4).

Figure 4 - Music experts participating in an educational experiment



Source: own development

Research design

Each participant recorded the analyzed piece of music using the MorphCast online tool. The MorphCast video platform (MORPHCAST, 2021) is a digital platform that enables the creation of emotional interactive videos with the help of artificial intelligence. MorphCast creates a new category of media queries by combining high-quality interactive videos with facial emotion analysis (Figure 5).

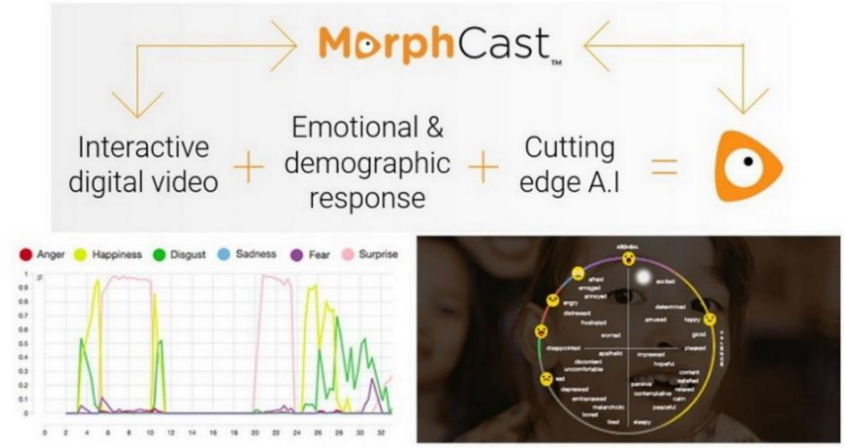
Each of the participants themselves formed the final record, presented to the attention of the experts and for the final assessment. The length of the performance, the requirements for the quality of acoustics and other requirements were controlled by the MorphCast online platform during the recording process. A record formed by the research participant could be accepted only if it met the requirements of the quality of the record presented.

Dissimilarity in the evaluation of the emotional impact of male and female voices in this case were not carried out, since studies by other authors indicate that for those expressions of those five basic emotions that were evaluated in the experiment, this difference can be taken as insignificant (JUSLIN and SCHERER, 2005; SCHELLENBERG *et al*., 2012; SCHERER, 1995). This point requires more detailed future research.

To assess the learning outcomes on the course, the vocalists were given the task of choosing a national song that would maximally reflect the national identity and color of the country and prepare the final vocal performance. Another requirement was the performance of the national songs only.

At the end of the Emotional Singing course, the participants were asked to record a video performance of a national folk song using the MorphCast video platform. In the process of performing a national folk song on the MorphCast video platform, the emotional condition of the vocalist was analyzed and a detailed report on their emotional expression was compiled. The duration of the performances ranged from 1.45 to 2.35 minutes.

Figure 5 - Assessment of the emotional state on the MorphCast video platform



Source: MORPHCAST (2021)

Similarly, in the process of listening, the state of the listeners was automatically analyzed based on facial expression scanning and a detailed report of their emotional responses to vocal performance was generated.

At the final stage of the experiment, the correspondence between the emotional message of the performer and the emotional perception of the listener was analyzed, and the level of consistency between emotional production and listener perception was determined. The level of consistency of emotional production and acceptance during the recording of vocal performance and listening to video recordings was assessed by the course moderator in the process of comparing reports generated by the MorphCast software.

In addition, was conducted a survey of all the participants of the experiment in order to clarify their personal attitude to the hypotheses put forward in the study (Table 1).

Table 1 - Questionnaire of the experiment participants

Statement	Subjective assessment of consent		
	Disagree	Partially Agree	Strongly agree
Empathic attunement to the performer, allows the vocalist to convey the emotions and feelings of the piece with maximum accuracy			
The performer's emotional expression emphasizes the level of his vocal mastery			
The emotional intelligence of the performer of the national folk vocal song is a necessary background for the high-quality transfer of the intercultural context in musical art.			
The consistency of the vocalist's emotional manifestation and the listener's perception determines the promising line of popularity of a musical performance			
The vocalist's professional competence in the context of intercultural perception is formed by the ability to produce emotions and generate feelings in the process of vocal performance.			

Ethical issues

The participants of the educational experiment were informed about the goals, objectives and structure of the research and gave a written agreement to participate in the experiment, and had the opportunity to withdraw from the participation. Study approved by Hubei Polytechnic University research ethics committee (Protocol Number TZ 04739256). Also, this study was not preregistered.

Research limitations

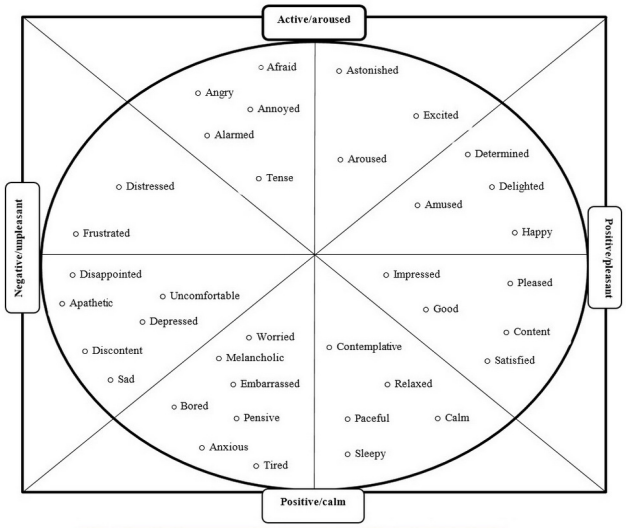
The experiment was limited by the technological capabilities of the MorhCash video platform; however, there was an opportunity

to compare the emotional states of a producer and a recipient of a musical product. In turn, this made it possible to identify the importance of emotional singing in intercultural music. Small sample (only 21 people) provide the results of the study with just a conceptual review of the relationship between emotional expression and vocal skills in the context of intercultural perception of music.

Results and Discussion

The emotional interactive video platform MorphCash allowed vocalists to practice the emotional naturalness of performing a song, as well as create an interactive video of a vocal performance with an assessment of emotional states during the performance. Similar or similar methods of fixing vocal and musical performance and measuring its parameters are discussed in the works of a number of researchers (BHATARA *et al*., 2014; COWEN *et al*., 2019). Functionally, the MorphCash platform made it possible to assess the vocalist's complex emotional background based on the manifested emotional states during the performance, such as Active / aroused, Positive / calm, Negative / unpleasant, Positive / pleasant (Figure 6).

Figure 6 - The scale of emotional states of the interactive video platform MorphCash



Source: own development

In the context of educational practice, the MorphCash interactive platform has proven to be an effective digital tool for developing and training natural emotional expression skills while singing. For the students, the educational experience using MorphCash was fun, rewarding and interesting, which was confirmed by all participants of the learning course. Educational practice actualized the importance of the aesthetic harmony of the performance and the emotional truthfulness of the vocalist in the students' understanding. The students confirmed the opinion that the aesthetic criteria of singing should give priority to the "truth" that refers to true emotions, true beauty, and true heart. True emotions are the basis for emotional expression. Thus, the emotion veracity of the singer is the key to the efficient emotional expression (JI, 2015).

The results of the analytical experiment reveal the impact of the vocalist's emotional expression when performing a national folk song on the listener perception. The listeners confirmed that in the process of watching the vocal performance, they naturally developed emotional synchronization with the performer - empathic attunement. In addition, they confirmed that the emotional naturalness of the singer in the process of singing had a significant impact on their assessment of the musical performance in whole.

The presence of coherence was established only in the case of the uniformity and one-pointedness of the emotional reaction of the performer and listeners (if the song is sad, the performer should express sadness which listeners can feel). Reports on the emotional expression of performers and the reports on emotional reactions of listeners showed a comparison of the emotional backgrounds of producers and recipients of musical content was carried out (Table 2).

Table 2 - The level of emotional coherence between the emotional expression of the vocalist and listener perception

Vocalists Group	Listeners Group					Total %
	listener 1	listener 2	listener 3	listener 4	listener 5	
Singer (China)	69	82	79	63	74	73.4 %
Singer (Russia)	72	74	72	57	81	71.2 %
Singer (Italy)	85	65	75	34	89	69.6 %
Singer (Brazil)	73	60	63	41	83	64 %
Singer (Azerbaijan)	65	57	68	43	81	62.8 %
Singer (Hungary)	67	81	71	47	75	68.2 %
Singer (Greece)	71	72	76	51	70	68 %
Singer (India)	87	80	83	50	81	76.2 %
Singer (Canada)	76	82	70	53	82	72.6 %
Singer (Korea)	75	70	81	48	79	70.6 %
Singer (Nigeria)	80	87	73	41	90	74.2 %

The percentage of coherence between emotional production and listener perception ranged from 62.8% to 76.2%. The strongest coherence was demonstrated by the singer from India. Based on the investigation of the coherence between emotional production and listener perception, it was concluded that empathic attunement to the performer allows the vocalist to convey the emotions and feelings of the piece of work most accurately.

Then an expert assessment of the vocal quality was carried out (Table 3). According to the expert assessment, singers from China, Russia, India, Canada, Korea and Nigeria had the highest level of vocal skills.

Table 3 - Expert assessment of vocal skills

Vocalists Group	Vocal quality assessment (scores 0-100)			
	0-25	25-50	50-75	75-100
Singer (China)				x
Singer (Russia)				x
Singer (Italy)			x	
Singer (Brazil)			x	
Singer (Azerbaijan)			x	
Singer (Hungary)			x	
Singer (Greece)			x	
Singer (India)				x
Singer (Canada)				x
Singer (Korea)				x
Singer (Nigeria)				x

The comparison of the level of consistency of the emotional expression of the vocalist and listener perception with the expert assessment of vocal skills revealed their analytical correspondence. The singers, whose vocality was highly praised by experts, also demonstrated a high level of emotional coherence with the audience. This shows that emotional expression of the performer can be used to confirm the level of their vocality and is one of the essential skills of transferring intercultural context in music.

A survey of participants in an educational experiment, in which students, independent listeners and experts took part, confirmed the decisive role of emotional singing in vocal skill (Table 4).

Table 4 - Results of questioning the participants in the experiment

Statement	Subjective assessment of consent		
	Disagree	Partially Agree	Strongly agree
Empathic attunement to the performer, allows the vocalist to convey the emotions and feelings of the piece with maximum accuracy		1	19
The performer's emotional expression emphasizes the level of his vocal mastery		2	18
The emotional intelligence of the performer of the national folk vocal song is a necessary background for the high-quality transfer of the intercultural context in musical art.		8	12
The consistency of the vocalist's emotional manifestation and the listener's perception determines the promising line of popularity of a musical performance		6	14
The vocalist's professional competence in the context of intercultural perception is formed by the ability to produce emotions and generate feelings in the process of vocal performance.		3	17

Vocal performance should be based on the listener's ability to correctly recognize vocal emotional expressions. Research shows the level of authenticity that can be achieved when conveying emotions in music, and with what tools the listener can get it (JUSLIN, 2013b; WAARAMAA and LEISIÖ, 2013). Studies of the emotional perception of vocal music have determined that the average accuracy of recognizing vocal emotions is 65% for such emotions as disgust, surprise, shame, interest, joy, fear, sadness and anger (BEZOOIJEN, 1984). The capability to interpret emotions in musical performance correlates with the indicators of the listener's emotional comprehension (RESNICOW *et al*., 2004).

There is cross-cultural competence that relates to deciphering primary emotions in vocal expression, including in the so-called traditional societies not influenced any media (BRYANT and BARRETT, 2008). Most research on the recognition of intercultural

emotions mainly focuses on facial characteristics. To combine the body of evidence on vocal expression of emotion, a meta-analysis of 37 cross-cultural studies of emotion recognition based on speech characteristics and non-linguistic vocalizations was performed by speakers from 26 cultural groups and perceivers from 44 different cultures. The results showed that a wide range of positive and negative emotions can be recognized with exceptional accuracy in intercultural conditions (LAUKKA and ELFENBEIN, 2021; LAUKKA *et al*., 2013).

Expression and emotion in musical performance affect listener perception. Music perception is inexplicable and goes beyond the use of words. The performer's vocal skills make the musical performance dynamic (PALUSIS, 2017). The register of the pitch is directly correlated with emotions, such as a higher note for happiness and a lower note for sadness. Rhythm and tempo also affect emotions, for example, slower rhythm or tempo provoke sadness. Several other music effects, such as dynamics, tempo, melody, and rhythmic variation, shape different reactions. Minor keys often cause sadness, and major ones –happiness (POON and SCHUTZ, 2015). In vocal music, different styles of singing should match different timbre. In artistic performance, vocalists should integrate into the performance environment and the atmosphere of the song promptly, and then through emotional expression, influence the emotional state of the audience (KAMILOĞLU *et al*., 2020). In the process of opera singing, vocalists must have a strong dramatic tone in order to make the ups and downs of the plot more attractive to the audience. When performing some national songs, vocalists should adjust the timbre well to ensure a singing mood, better control the timbre, and reflect the style of the song (SHANSHAN, 2019). For singers, the act of emotional expression is particularly demanding, as emotion alters the tone of the voice, often reducing its optimally balanced sound. When expressing emotion, singers need to be aware of the impact that emotional expression has on vocal sound so that they can send

their acoustic message without compromising sonority (MENESES and DÍAZ, 2017). Singers need to express emotion with vocals with sufficient control so that listeners can tune in emotionally to the emotion being conveyed and enjoy the brightness of the musical sound (HAKANPÄÄ *et al*., 2019).

The power of emotion in music is reflected both in sound and in the gestures and facial expressions used by music performers (THOMPSON *et al*., 2008). When vocalists create an emotional performance, facial expressions support or clarify the emotional meanings. When vocalists complete an emotional piece, body movements and facial expressions can linger in post-production allowing expressive communication to remain outside of the acoustic signal and thereby giving the music greater impact and weight. The connection of facial expressions with musical activities goes far beyond the duration of sound production. Facial expression also occurs during music perception illustrating a form of facial mimicry or emotional synchronization that may reflect internal processes such as attention and recognition, and could presumably involve the mirror neuron system (LIVINGSTONE *et al*., 2009; SALGADO, 2005). When a person perceives musical performance, the process of facial mimicry can facilitate rapid and accurate decoding of musical structure and emotional information by highlighting the appropriate visual and kinesthetic signals (STEL and VAN KNIPPENBERG, 2008).

As a major part of vocal performance, the aesthetic imagination of a singer and the level of emotional control in vocal performance often directly affect the level of vocal music performance and the experience and feelings of the audience. Different vocal music pieces have specific melodies and themes that are not only imbued with the emotions of the author, but are also closely related to their environment, historical conditions and the creative past. The skill to identify the emotional value of works is also an important direction in singer's emotional expression training (LV, 2018).

Conclusions

The professional competence of a vocalist is influenced by his musical knowledge and abilities, as well as the skills of emotional self-regulation, the ability to perceive and experience the emotions of people, as well as express their feelings through music. Therefore, vocalist training should be carried out in a harmonious synergy of vocal, artistic and creative, and emotional development. The analytical experiment showed the impact of the vocalist's emotional expression when performing a national folk song on the listener perception. The reports on the emotional expression of performers and the reports on emotional reactions of listeners made it possible to reveal the impact a comparison of the emotional backgrounds of producers and recipients of musical content was carried out. The percentage of coherence between emotional production and listener perception ranged from 62.8% to 76.2%, which made it possible to conclude that empathic attunement to the performer allows the vocalist to convey the emotions and feelings of the piece of work most accurately. The comparison of the level of consistency of the emotional expression of the vocalist and listener perception with the expert assessment of vocal skills revealed their analytical correspondence. The emotional expression of the performer confirms the level of their vocality and can be evaluated as an essential skill of transferring intercultural context in music. The singers, whose vocality was highly praised by experts, also demonstrated a high level of emotional connection with the listeners. Cultural and language differences limit listener's understanding of a piece of music, that's why emotional singing is a determining factor in the vocalist success. The implementation of the research involves training vocalists to controllably and measurably formation the emotional content of the performance, precisely correlated with the emotion recognized by the audience. The ability to produce emotions and generate feelings develop the professional competence of a vocalist in the context of intercultural perception. Vocal skills of a singer can reveal the emotional elements of a piece of music

to the public, which are of great value in contemporary art; they determine the popularity of a performer on the world stage.

In the future, it is planned to expand the sample, to include more countries in the study in order to make the data more evidence-based. In addition, the study of the emotional expression of pianists in a cross-cultural context may become a prospect for further research.

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