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CONSIDERATIONS OF THE PHENOMENON OF "ETHNO-HEARING": THE PERCEPTION OF "NATIVE" AND "ALIEN" MUSIC IN CHINESE AND RUSSIAN UNIVERSITY STUDENTS

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Abstract

The focus of the present article is on the phenomenon of "ethno-hearing" in the context of the search for categories of instrumental research in musical-psychological anthropology. Musical-psychological anthropology as a field of knowledge integrates a complex psychological and cultural methodology for the study of human interaction with created forms and styles of musical art. The series of investigations in the article is based on the methodology of the cross-cultural study of the peculiarities of perception of "native" and "alien" music by groups of Russian and Chinese recipients. All the subjects were student musicians of Moscow universities (N = 53). The procedures, methods and results of the studies of music perception of different ethnic styles are presented: a) using bipolar scales of the emotional content assessment; b) by means of electroencephalographic measurements of the alpha-activity of the brain. It has been shown both in the psychosemantic and EEG study that there are no differences between the groups in the perception of classical music, but there are significant differences between Russian and Chinese musicians in the perception of traditional Russian and Chinese music. It may be concluded that the perception of the emotional context of "native" and "alien" music is associated with the internal picture of a world view formed by national culture and traditions.

Keywords: ethno-hearing, native music, alien music, cross-cultural investigations, music perception, psycho-semantic, electroencephalogram, alpha range.

Introduction

Studying ethnic aspects of music listening is at the intersection of related scientific fields consisting of the psychology of the perception of music, the comparative

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study of musical traditions and ethnic musicology. This group determines the frame of the related issues under study and gives a separate interdisciplinary research orientation, namely the psychological anthropology of music (Merriam, 1969; Myers, 1992; Nettl, 2015; Toropova, 2018).

It is widely known that even a person without any music education or much acquired experience and knowledge of music theory has no difficulty in distinguishing a piece of classical music from a piece of folk music and, conventionally speaking, "Western" music from Oriental. Studying the ethnic aspects of interpreting the music of different traditions is often considered to be research into music specificity of other cultures ("non-Western cultures"). Musicology holds investigations analyzing music "markers", i.e. music features allowing to reveal differences between music of different traditions. Meanwhile, distinguished musicologists are aware that there cannot be any holistic approach to the study of the object only, that is, music, if there is no subject of perception, i.e. a listener, involved in the analysis. I. I. Zemtsovsky, an ethnomusicologist and a folklorist, introduced the explanatory concept of "ethno-hearing", or "ear" (2009, 2012). The concept reflects an empirically observed closeness and expert subjectivism of the listener towards the music of his or her "native" tradition. According to a small number of papers, "ethno-hearing" is often associated with cognitive ease in recognizing linguistic structures of the mother tongue (Peretz et al., 2004; Bidelman et al., 2013; Chang et al., 2016) From the standpoint of ethno-art history, the phenomenon of ethno-hearing makes it possible to study the musical and language features of peoples. A sin the study by Utegalieva & Sytchenko, "the sound world of the Turkic peoples" is studied (Utegalieva & Sytchenko, 2016). Hove's work (Hove et al., 2010) contributes to the comparison of absolute musical hearing in representatives of different nationalities. Izumova S.A. et al. (Izumova & Zhen, 2009; Izumova & Yan, 2011) have studied cross-cultural differences in the realization of mnemic and intellectual abilities. Within the interdisciplinary methodology, A. V. Toropova has undertaken the theoretical comprehension of "ethno-hearing" in the context of "the language personality" of a representative of a certain culture (Toropova, 2014, 2018; Toropova, Simakova, Kabardov, & Bazanova, 2014).

At the present stage, one of the topical tasks of musical-psychological anthropology is to find psychological and psychophysiological "markers" of ethno-hearing that enable cross-cultural differences in experiencing the music of different traditions to be revealed, primarily in the perception of ones that are so-called "native" and "alien".

According to the investigations in the literature into music perception, when listening to an "alien" music, subjects being tested do not know rhythmic patterns and turns consisting of unusual metres and accents. But they are able to recognize basic emotions (Fritz et al., 2009; Argstatter et al., 2011).There are suppositions that their emotional-auditory system is based on such sound features as timbre, sound volume, tempo, and articulation, when listening to the music of an alien culture ciphered in the unknown systems of pitches and rhythms (Geiser et al., 2009).

The problems associated with the study of the cross-cultural specificity-universality of emotions have been under discussion for a long time in psychology.

Investigations into the behavior of people of different cultures have found that in the sphere of the expression of emotions, there are both universal types of reactions and those specific to certain cultures. That is, the language of emotions contains both common and cultural-specific elements (Esposito et al., 2009; Knyazeva, 2014; Knyazeva & Toropova, 2014). The elements that have differences among the representatives of various cultures are rather a result of socialization and therefore, are subject not only to a natural training but a purposeful one, as well.

However, probably, the comprehension of music is based not on a cultural experience but on panhuman emotional-semantic universals. The universals or archetypes appear to be more profound, maybe, innate structures that provide a musical-emotional resonance and the understanding of music regardless of the cultural affiliation of a listener.

Thus, when perceiving music, various levels of the multiple identity can be actualized in the listener's consciousness: from archetypal universal layers to sociocultural or professional identities (Toropova, 2018).

At the same time, the research has left a question almost unstudied: do the features of perception of a "native" and "alien" music coincide in the representatives of different cultures?

Methods

The Research Objective and Hypothesis

Our research aims at studying the Russian and Chinese musicians' perception of music belonging to different cultures. The study is based on the idea that the multiple identities of the listener influence their understanding of music. At the same time, we distinguish in the listener the difference between an ethnic-cultural musical identity and an educational-musical professional identity.

Our study has tested the hypothesis about some differences between Russian and Chinese listeners in the perception of "native" and "alien" music, and the absence of any differences in the perception of classical music.

The hypothesis is based on the supposition that each person "tends" to the codes of his/her own culture, since his or her perception is based on the developed musical and language standards specific to a particular culture (ethno-cultural identity). At the same time, one may assume that in the course of Western academic music education, new musical patterns and standards form as well as ways of musical thinking and perception. They are going to be similar to students of different nationalities (the educational-musical professional identity). This unified musical experience levels ethnic differences in the perception of classical music.

The comparison of the musical perception of participants was carried out by means of the psychosemantic method and, additionally, the analysis of the electroencephalogram recorded while listening to music. Both of these approaches to the study of musical perception are well known but seldom used within one study. For instance, A. N. Lebedev and T. S. Knyazeva show in their research that differences in the semantic "portraits" of music are accompanied also by EEG-activity

patterns specific to each musical fragment (Lebedev & Knyazeva, 1999). In addition, the cultural specificity of music memory by the fMRI investigation was studied by Demorest et al. (Demorest et al., 2010). The study provides the evidence of the influence of culture on music perception and memory performance at both behavioral and neurological levels. These and other investigations (Toropova & Knyazeva, 2017; Toropova, Simakova, & Bazanova, 2014) provide reasons to employ a comprehensive methodology to study musical perception taking into account the ethno-factor of both music itself and the ethno-hearing of recipients.

Participants

Fifty three Russian and Chinese musicians, bachelors and masters, from Moscow universities of music took part in the present study. The Russian sample consisted of 27 persons, 80% were female, the mean age was M = 24.7 (SD = 6.5). The Chinese sample consisted of 26 individuals, 87% were female, the average age was M = 25.6 (SD = 4.4). The Chinese participants came to Russia for music education, and spoke the Russian language well enough to understand the instructions. All subjects had given their informed consent for inclusion before they participated in the study.

Measures

The participants evaluated music fragments on 12 bipolar psychometric Likert scales indicating the emotional-dynamic characteristics of music. Each scale had seven grades from −3 (one pole) to +3 (the opposite pole). When processing the data, the estimates were translated into a seven-point scale from 1 (corresponding to −3) to 7 (corresponding to +3). The names of the scales were presented to the Chinese subjects in the sample being tested both in the Russian and Chinese languages. The choice of the scales was made due to their good psychometric features and a satisfactory validity. It was shown in the previous research that the selected scales made it possible to divide different groups of subjects. For instance, musicians could be distinguished from non-musicians, as well as significant differences in the perception of recipients could be identified when evaluating different types of music (Knyazeva, 2010, 2014; Knyazeva & Toropova, 2014).

Before the psychosemantic study, 20 Russian and 20 Chinese musicians from the total sample had an electroencephalogram recorded in quiet and during four musical fragments. The EEG was recorded in the monopolar lead Pz (by the system of 10–20%) in the width at 0.3 50 Hz with a sampling rate of 720 Hz. At the beginning, the EEG was recorded in quiet with eyes closed during 1 min., then with eyes open for the same duration. This test (the EEG recording of the same duration with closed and open eyes) was used, when listening to three fragments of musical works. The alpha activity indicators were chosen for analysis, as many studies had shown the relationship of musical perception with the indicators of different ranges of alpha rhythm (Bazanova, 2012; Bazanova & Vernon, 2014). The following indicators were recorded: the dominating frequency of the maximum peak of the alpha

range; upper and lower boundaries of the alpha range; the width and depth of suppression and the duration of suppression in the individual low-and high-frequency boundaries. The data was presented in the form of tables with the spectral power of EEG and the frequency of the maximum peak in the given ranges.

For musical material, Russian traditional folk music (an East Slavic folk tune on the folk violin), music in the ancient Chinese tradition of Qin (the Chinese zither) and music of the European violin classics ("Caprice a-moll" by N. Paganini) were used.

Results

A Psycho-Semantic Study of the Perception of Music

The table shows the mean (M) and standard deviations (SD) of the semantic evaluations of traditional music (Russian and Chinese) for the Russian and Chinese samples, and the significance of differences between the samples (*p*).

On a number of the scales, significant intergroup differences in the perception of traditional Russian and Chinese music were identified (the Mann–Whitney U test).

Table 1

Mean and Standard Deviations of Traditional Music Scores on Semantic Scales in Groups of the Russian and Chinese Students, and the Significance of Differences Between the Groups

Scales	Russian music			Chinese music		
	Russian students	Chinese students	*p*	Russian students	Chinese students	*p*
	M (SD)	M (SD)		M (SD)	M (SD)	
Heavy — light	3.11 (1.45)	3.42 (1.02)	0.245	5.70 (1.06)	4.76 (1.55)	**0.023**
Sad — joyful	3.50 (1.55)	5.15 (1.28)	**0.000**	5.33 (1.07)	3.46 (2.08)	**0.001**
Weak — strong	4.65 (1.52)	5.00 (1.13)	0.475	4.59 (1.71)	4.42 (1.50)	0.688
Dark — light	3.62 (1.33)	5.31 (1.25)	**0.000**	5.59 (1.30)	5.58 (1.10)	0.918
Passive — active	5.04 (1.34)	3.57 (0.98)	**0.000**	5.95 (1.28)	4.07 (2.24)	0.003
Relaxed — tense	6.00 (1.00)	3.19 (1.20)	**0.000**	4.33 (1.46)	2.96 (1.45)	0.002
Hard — soft	2.92 (1.49)	3.19 (1.09)	0.196	4.62 (1.59)	4.58 (0.80)	0.650
Aggressive — peaceful	3.88 (1.36)	4.30 (1.15)	0.298	5.85 (1.06)	5.62 (1.29)	0.642
Static — dynamic	4.66 (1.70)	4.46 (0.94)	0.591	5.95 (0.83)	4.76 (1.33)	0.001
Rough — tender	2.44 (1.01)	3.59 (1.30)	**0.002**	5.07 (1.41)	5.73 (1.11)	0.083
Unhappy — happy	3.57 (1.41)	3.76 (1.06)	0.457	5.29 (1.46)	6.42 (0.70)	**0.002**
Disquieting — calm	2.53 (1.36)	4.14 (0.99)	**0.000**	3.85 (1.81)	6.31 (0.73)	**0.000**

Note. The significant differences are in the bold font.

The comparison of N. Paganini's music scores by the Russian and Chinese students detected a weak difference between the groups on only one scale: the Russian students heard the music as more dynamic in comparison with the Chinese students ($p = 0.34$).

The analysis of the interaction of the factors "nationality" and "music" showed that the type of music ("native" or "alien") differently influenced its perception depending on the ethnicity of the subject. A statistically significant aggregate influence of ethnicity and the type of music on the assessment of musical scales "heavy — light", "sad — joyful", "dark — light", "relaxed — tense", "static — dynamic" was found. This interaction manifests most strongly in estimates of the scale "sad — joyful" ($p = 0.000$). A graph of the mean values allowed some interpretation of the detected interaction (Figure 1). Evidently, on that scale, the Russian and Chinese recipients oppositely assessed the Russian and Chinese music. It is true, the Russian musicians perceived the Chinese music as more joyful than Russian. On the contrary, the Chinese musicians considered the Russian music to be more joyful in comparison with the Chinese.

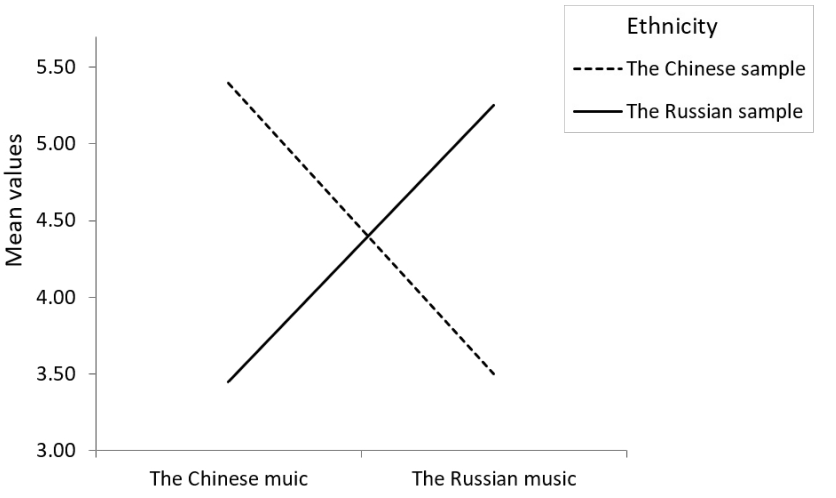
At the same time, the Russian participants ascribed a greater dynamism and tension to both the native and alien music, while the Chinese students heard relaxation and peace in both fragments.

Factor analysis (principal component analysis, Varimax rotation and eigenvalues were greater than 1, the interpretation of the factor included the variables with factor loadings above 0.6), was carried out to compare the factor structure of the data in the Russian and Chinese samples.

The factor analysis of the students' assessments indicated that the dimension of the factor space (the number of independent categories-factors) was not the same

Figure 1

Average Values of Music Scores in the Russian and Chinese Samples (for the Sad – Joyful Scale).



in the Russian and Chinese samples. The factor structure of the Russian music scores in the Russian sample was described by four factors (the coefficient of variance — .76), and in the Chinese — by three factors (the coefficient of variance — .65). The factor analysis of the Chinese music scores showed the opposite ratio. Three factors (the coefficient of variance — .73) were identified in the data structure of the Russian sample, and five factors (the coefficient of variance — .82) were in the Chinese sample. The results of the processing showed that there was increase in the contribution of the factors to the total variance of coordinate axes in the native music. This indicated some change in the subjective significance of the categorization grounds.

The content of the factors in two groups also differed. For example, the scale "unhappy — happy" in the Russian and Chinese samples was "bonded" with different features. The semantic content of the notions of "happiness/unhappiness" in the Russian subjects under test was in the same factor with the notions of "joy", "activity" and "light". In the Chinese subjects under test, the semantic content of the notions of "happiness/unhappiness" was associated with the ideas of "peace" and "peacefulness".

The factor analysis of classical music perception did not identify differences between the groups in the number of factors: a four-factor structure of twelve semantic features was identified. Its total information value was .73 for Paganini's music in the Russian sample and .80 in the Chinese one.

EEG-Study of the Music Perception

During the perception of traditional Russian music by the Russian and Chinese samples, differences in the growth of the alpha-1 width in comparison with the background were found. In the Chinese sample, the growth in the alpha-1 width (due to a lower boundary limit), in comparison with the state of rest, was significantly greater than in the Russian sample ($p < 0.05$). It was known that the expansion of the alpha range in which desynchronization occurred (a decrease in the alpha-waves amplitude) reflected the increase in the number of frequency generators included in the activation reaction. And changes in the low-frequency alpha-1 range were connected with the processes of involuntary excitation and inhibition (Bazanova & Vernon, 2014).

During the perception of all the three fragments of music, the increase in the power in the low-frequency range in the both groups was recorded. When listening to the Russian and Chinese music, differences between the groups were found on the indicator of the maximum power in the alpha-1 range. In the Chinese group, the maximum power was during the Russian music, and in the Russian group –during the Chinese music. However, although reaching significant values, the differences in the Russian sample were not as significant as in the Chinese one. The changes in the Chinese and Russian samples may be interpreted as a response to music most distant from their traditional experience. Those changes in the capacity in the low-frequency alpha range as well as the expansion of the alpha-1 range according to the literature (Bazanova, 2012; Bazanova & Vernon, 2014) also indicated an increase in the processes of involuntary inhibition (relaxation).

When listening to the East Slavic music, differences between the groups were identified on the parameter of the depth of amplitude decrease in comparison with the

state of rest. In the Chinese subjects under test, in comparison with the Russian sample, significant amplitude changes were recorded in the low-frequency alpha-1 range ($p < 0.01$). The students of the Russian sample found similar dynamics of this EEG-indicator but in the high-frequency alpha-2 range. When listening to the Russian music, the depth of the amplitude decrease was significantly greater than that of the Chinese musicians ($p < 0.05$). According to the literature, the decrease in the amplitude of alpha waves (the Berger effect) was one of the main parameters of alpha activity reflecting the activation response (Bazanova, 2012; Bazanova & Vernon, 2014). Changes in the Berger effect in the low-frequency alpha-1 range indicated the intensity of activation processes, while changes in the high-frequency alpha-2 range were connected with the indicators of cognitive efficiency. The more successfully the task was performed, the less suppression of the amplitude was (Bazanova & Vernon, 2014).

Discussion

Generally speaking, the present study has proved the original hypothesis. Significant differences between the Russian and Chinese musicians in the perception of traditional (authentic) Russian and Chinese music were detected. And no differences (or minimal differences) in the perception of classical music were found. The obtained phenomenon was demonstrated both in the psychosemantic study and in the analysis of the electroencephalogram patterns recorded in the Russian and Chinese experimental groups, when listening to fragments of music.

The differences in the psychosemantic profile of the scores and in the dimensionality of factor space between the experimental groups indicated the ethno-cultural specificity of the perception of the emotional-semantic context of music. For example, in the Russian group, "happiness" heard in the music was "bonded" with "light", "activity" and "joy" in one factor, and in the Chinese group – with "calmness" and "peacefulness". There were other examples. Regardless of ethnicity, the participants attributed a higher positive valence to the "alien" music in comparison with the "native" music (the Russian students – to the Chinese music, and the Chinese students – to the Russian music). At the same time, evaluating the activation characteristics of music, another regularity was observed. The Russian students attributed a greater "dynamism" and "tension" to both the "native" and "alien" music, while the Chinese students attributed a greater "relaxation" and "calmness". Both groups found the increase in the dimensionality of factor space during the perception of the "native" music in comparison with the "alien" one. As far as it was known, the dimensionality of space reflected the cognitive complexity of the subject's consciousness in some content field. The increase in the number of factors might be interpreted as an indicator of a more differentiated, nuanced and multidimensional perception of the emotional-semantic context of the "native" music for the subjects. One might suppose that categorization was based on deeper layers of perception and experience, and on the recognition of not only an emotional context but of an authentic subtext of the musical message, as well. Providing no culturological explanations for the obtained phenomena, in our opinion, it was noteworthy that the observed features of the perception by the Russian and Chinese students reflected the specificity of the worldview of a particular ethnic group, that is, the

specifics of the ethnic picture of the world that was consistent with modern cultural ideas (Seredkina, 2014).

The analysis of the electroencephalogram recorded during the music perception supports the regularities of the perception detected in the psychosemantic study.

The differences between the groups' indicators with a maximum power in the alpha-1 range during the perception of the Russian and Chinese music can be interpreted as a response to the music being the most distant from their traditional experience. These power changes in the low-frequency alpha range and the expansion of the alpha-1 range, according to the literature (Merriam, 1969; Seredkina, 2014), indicate an increase in the process of involuntary inhibition. The obtained result may point out a dispersal in response to less familiar stimuli (in this case, to the "alien" music) marked as "noise", and the decrease in the response of activation and involuntary attention.

At the same time, other results point to the different nature of the identified relaxation response depending also on the subjective cognitive significance and a potential recognizability of the language message of music. The decrease in the depth of suppression in the high-frequency alpha-2 range in the sample of the Russian students listening to "native" music indicates the rise of the efficiency of cognitive activity. It can be also connected with the processes of voluntary inhibition, with the so-called "top-down" control (Toropova, Simakova, & Bazanova, 2014; Simakova & Toropova, 2015). This fact may indirectly support the supposition that alpha activity contributes to cognitively significant information.

When listening to Paganini's music, there were no significant differences in the change in EEG parameters between the experimental groups.

Thus, the EEG study shows that there are differences in the dynamics of alpha activity patterns during different fragments of music. The ethno-specificity of the EEG responses was detected during the perception of the traditional national music and in the absence of that specificity during classical music.

We interpret the insignificance of differences in the perception of classical music between the groups as the influence of Western classical musical education which the Chinese musicians have received in Russia under similar conditions to the Russian musicians. This gives grounds to admit that in the course of music education, for the participants of the process, similar mechanisms of music perception and common musical standards develop, that is, a common musical experience being built over an authentic ethnic experience.

Conclusions and perspectives

The observation of a series of investigations of music perception in order to identify objective indicators of the "ethno-hearing" phenomenon enables us to make the following conclusions as a motive for discussions.

It is indicated that there are no differences in the perception of classic music between the groups of subjects being tested. But there are significant differences in the perception of Russian and Chinese traditional music. The absence of differences in the evaluation of classic music by the Russian and Chinese musicians may be explained by a unifying effect of their musical educations. At the same time,

musical education does not exert any considerable influence upon unconscious layers of "the cultural code" of a subject's emotions, his/her "ethno-hearing". That is, musical perception is fulfilled through the prism of the peculiarity of national culture and listeners' mentality.

The investigations have shown that the ability to recognize such essential measurements of emotion as valence underlies the emotional comprehension of music. That ability is fundamental, primary, evolutionarily rooted and little influenced by educational and other factors. Whatever culturethe musical language belongs toas a carrier of vital sound intonation symbols, it preserves its communicative meaning within different musical forms.

The thesis of the certain universality of the emotional perception of music is beyond doubt, if we speak in terms of the most general reading of emotional context or about "archetypal perception". More complex levels of musical psychosemantics are connected with ethnic archetypes as complexes of experiences imbued with cultural-historical memory and marked with value sets reproduced in ethnic cultures.

The detected differences reflect the peculiarities in the ethno-cultural systems of sense formation and the categorization of the phenomena regulating the development of consciousness and self-consciousness of in ethnic representatives. This suggests that there is a certain cultural specificity of the music categorization that has deeper roots than a conscious musical experience.

The cross-cultural study of the perception of "native" and "alien" music with the help of encephalographic measurements confirms the hypothesis of the contribution of alpha-activity to the significant cognitive information that is music. It is definitely shown that listening to music reduces the listener's emotional stress, according to the alpha markers, regardless of the style features of the musical work and its ethnicity. In addition, the features obtained of the alpha response to the music of different ethno-styles in the two groups of the cross-cultural studies point out the necessity for the further study of the neuronal correlates of listening to music taking into account ethno-cultural factors.

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Conflicts of Interest

Authors declare no conflict of interest.

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Изучение феномена «этно-слух»: восприятие «родной» и «чужой» музыки китайскими и российскими студентами вузов

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Резюме

Статья посвящена феномену «этно-слух» в контексте поиска инструментальных исследовательских категорий музыкально-психологической антропологии. Музыкально-психологическая антропология как область знания объединяет комплексную психологическую и культурологическую методологию изучения взаимодействия человека и созданных им форм и стилей музыкального искусства. Серия исследований в статье основана на методологии кросс-культурного изучения особенностей восприятия «родной» и «чужой» музыки группами российских и китайских реципиентов. Все испытуемые — студенты-музыканты московских вузов (N = 53). Представлены процедуры, методы и результаты исследования восприятия музыки разных этнических стилей: а) с помощью биполярных шкал оценки эмоционального содержания; б) с помощью электроэнцефалографических измерений альфа-активности мозга. Как в психосемантическом, так и в ЭЭГ-исследовании было показано, что различий между группами в восприятии классической музыки нет, но есть значительные различия между русскими и китайскими музыкантами в восприятии традиционной русской и китайской музыки. Можно сделать вывод, что восприятие эмоционального контекста «родной» и «чужой» музыки связано с внутренней картиной мировосприятия, сформированной национальной культурой и традициями.

Ключевые слова: этно-слух, «родная» музыка, «чужая» музыка, кросс-культурные исследования, восприятие музыки, психосемантика, электроэнцефалограмма, альфа-диапазон.

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