A Cross-cultural Comparative Analysis of Music Cognition and Emotion Regulation Mechanism

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ABSTRACT
The functions of music cognitive processing and emotional regulation have been long discussed under the paradigm of western centralism. This article aims to construct the biocultural interaction theoretical framework that clarifies the cognitive specificity of music and functional pathway of emotional regulation in different cultural backgrounds. Besides, this article examines and compares the fundamental differences between eastern and western groups in auditory attention orientation, strategies of decoding music structure, and construction of aesthetic preferences. Collectivism channels venting towards a social with-peers connection whereas it reinforces introspective self-control strategies for an individual by bringing a focus on themselves. Ritual music and daily music have differing aging patterns and social functions in emotion regulation. Standardized music therapy schemes have limited direct applicability to multicultural contexts. It is important for clinical practice to recognize the role of cultural scripts in influencing neural circuits and to create a culturally adaptable personalized intervention model.

Keywords: *Music cognition, Emotional regulation, Cross-cultural comparison, Bio-cultural interaction, Musical therapy.*

1. INTRODUCTION

Music is one of the oldest and most common social behaviors of human beings. It is the core carrier of artistic aesthetics and an important resource for individuals to adjust their emotions and maintain their mental health [1]. Music can directly activate the limbic system by bypassing the language center, thus causing strong physiological activation and emotional resonance. For a long time, the research paradigm in this field is mostly based on western centralism, which may acquiesce that the psychological effect of music has cross-cultural biological universality [2]. Discussion divorced from the specific cultural context may lead to misunderstanding of the correlation mechanism between music and emotion. Some studies overemphasize the physiological decisive role of the physical properties of sound, ignoring the shaping of the listener's cultural background on the perception mode [3]. Although ethnomusicology has enriched the case descriptions of music practice in different cultures, it lacks a unified quantitative standard to explain the differences in emotional regulation strategies.

The purpose of this article is to integrate the relevant achievements of cross-cultural psychology, cognitive science and sociology, and to construct a theoretical framework that can be compatible with biological mechanisms and social situations. This helps to understand the commonness and individuality of human musical mind, and provides some reference for music therapy, multicultural education and cross-cultural policy.

2. THEORETICAL CONSTRUCTION AND COMPARATIVE DIMENSION

Music cognition refers to different groups' acquired understanding of the rules of sound organization from a cross-cultural perspective. It covers the process of perception, memory and evaluation [4]. Emotional regulation is a goal-oriented process in which individuals correct their emotional reactions. Using the theory of bio-cultural interaction as the leading framework, it emphasizes the guiding role of cultural norms in neuroplasticity

and avoids falling into the misunderstanding of extreme universalism or constructivism [5]. In order to ensure the operability of cross-cultural comparison, three systematic core analysis dimensions are established: values, musical form and function. By systematically comparing the influence of emotional expression tendency and mode system between East and West on emotional arousal, as well as the difference between ritual and daily music functions, a set of standardized cross-cultural comparison index system is constructed.

3. CULTURAL SPECIFICITY OF MUSIC COGNITION

Before discussing the mechanism of music emotion regulation, we should analyze the non-universal characteristics of music cognition itself. Although human beings have a common auditory physiological basis, the cultural background profoundly reshapes the neural circuits of the brain in processing sound information, which leads to cognitive differences among different groups in attention distribution, information integration and meaning construction [6]. Differences are reflected in the level of perception, and also affect how individuals interpret music signals and turn them into specific emotional reactions. This constitutes the core variable of cross-cultural comparative analysis.

3.1 The Cultural Orientation Mechanism of Auditory Attention

The listener's attention focus when listening to music is influenced by long-term cultural influence. Individuals in the western cultural background tend to adopt analytical treatment strategies. His attention is highly focused on the contour changes of melody lines and the logical deduction of harmonic progression [7]. This approach is potentially isomorphic with the syntactic habit of emphasizing subject-predicate-object structure in language. Listeners with East Asian cultural background often adopt a holistic approach, that is, starting from the macro situation [8]. When evaluating a piece of music, they not only pay attention to the physical properties of pitch and rhythm, but also capture the subtle changes of timbre texture more keenly. “Figure 1” shows the phenomenon of shunt between eastern and western subjects at the input stage.

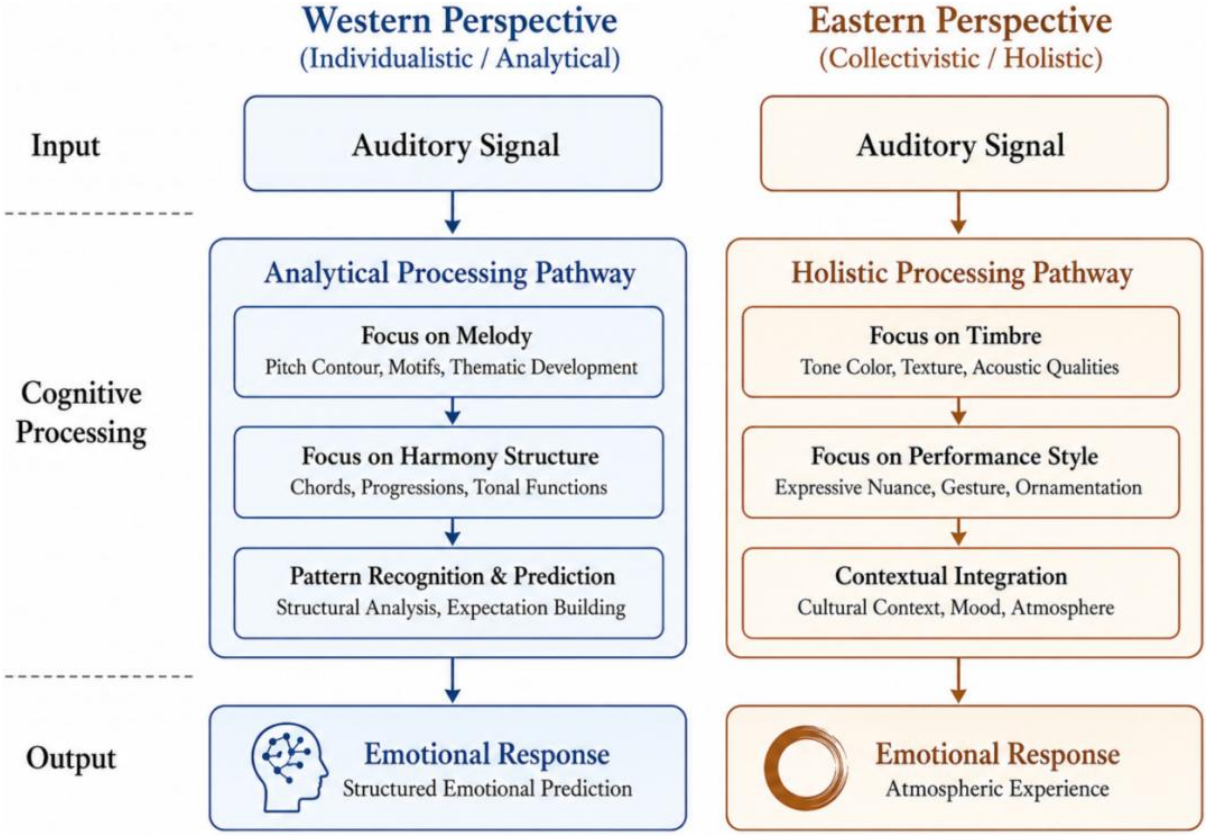


Figure 1 Differences in cognitive processing paths between East and West music

3.2 Differences Between Music Grammar and Decoding of Emotional Symbols

The emotional symbolic meaning carried by the internal structural elements of music has a high degree of cultural relativity. The traditional universalist view holds that major represents happiness and minor represents sadness, but empirical data does not support this absolute assertion. In China's traditional music theory, the tone under the five-tone system of Gong Shang's horn is often given a sad color. This is different from the disharmony of MINUS seven chords in the western functional harmony system. When the listener faces the same melody, his brain will decode it according to the learned cultural grammar, and then activate different associative memory banks. For example, a piece of music ending in a chromatic descent may be regarded as a final sadness in the ears of American listeners, but it may be interpreted as a suspense or sigh in the narrative in the ears of some classical opera listeners in China. This decoding deviation leads to the uncontrollable feedback effect of the same emotion regulation intention on different cultural subjects.

3.3 Reconstruction of Aesthetic Preference by Cultural Schema

The above cognitive processes converge into a stable aesthetic preference. This preference, in turn, strengthens the specific emotional regulation path. Cultural schema refers to the cognitive structure of the world internalized by individuals during their growth. In music selection, it shows the conditional reflex dependence on specific types of works. For a society with a strong collectivism tendency, individuals tend to prefer music forms with strong rhythm and suitable for group interaction. This kind of music can activate the sense of social connection, thus achieving emotional comfort at the group level. Individualist societies prefer solo works with high complexity and allowing them to immerse themselves alone, so as to achieve self-reflection and internal balance. This preference is the result of cognitive adaptation after repeated games between social norms and individual needs. This mechanism requires that when music is used as a regulatory tool, the cultural coding rules of the target group should be evaluated first, so as to avoid imposing the universal norms that one party regards as standards on the other.

4. FUNCTIONAL PATH OF EMOTIONAL REGULATION

Emotional adjustment is the core psychological function of individuals to adapt to the environment. It is manifested in the selective maintenance or change of the internal emotional state in the musical context. This process is deeply rooted in the specific cultural soil. Individuals in different cultural backgrounds will use different cognitive resources to intervene with music when facing pressure or emotional fluctuations. For this reason, analyzing the differences of these functional paths is the key premise to understand the global applicability of music therapy.

4.1 Neural Basis Differences in Psychological and Physiological Processes

The mechanism of music-induced emotion involves the rapid connection between auditory cortex and limbic system. This physiological process has significant differences in neuroplasticity among different cultural groups. This difference stems from the different default mode network configurations caused by long-term cultural training. For fast-paced and big-mode music fragments, some western listeners' brains will interpret them as signals of excitement and reward, triggering dopamine secretion. Some East Asian listeners may interpret it as a potential unstable factor and activate the alert mechanism of the sympathetic nervous system. The response curves of physiological indexes such as heart rate variability (HRV) in the two groups are statistically different. This means that the same acoustic stimulus triggers different autonomic nervous system responses in different cultural subjects.

4.2 The Adjustment Strategy of Collectivism and Individualism Is Divided

Cultural values powerfully influence the selection and pathway of adjustment goals due to their deep entrenchment. Individualist culture tends to regard emotion regulation as an internal task, emphasizing the individual's ability to control, analyze and reorganize emotions. They often use cognitive reappraisal strategy to try to reinterpret the meaning conveyed by music in their hearts. Collectivism culture is more inclined to social-oriented adjustment, using music as a medium to establish interpersonal connection and social support. They dilute negative emotions by sharing listening experience,

participating in chorus or discussing the meaning of lyrics. As shown in "Figure 2", the model shows the trend of emotional feedback loop guided by different cultural norms.

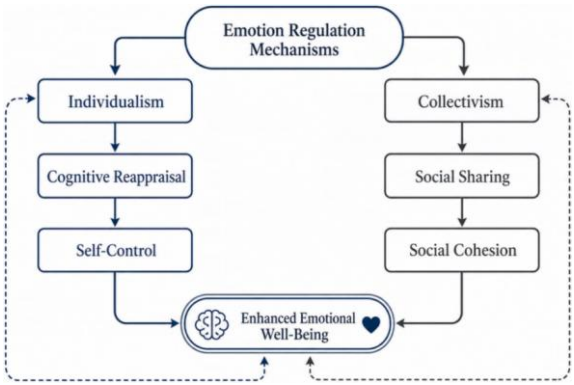


Figure 2 Interactive model of cross-cultural music emotion regulation.

4.3 Functional Boundary Between Ritual and Daily Music Use

Ritual music usually has a fixed social script and sacredness. Its emotional regulation function mainly lies in confirming identity and strengthening group cohesion. In this situation, emotions are defined by the public. For example, the purpose of elegy singing at some traditional funerals is often not to express personal sadness, but to fulfill the mourning role entrusted by society. In contrast, daily music serves more for immediate emotional management in the private sphere. Background music on demand, which is popular in modern urban life, is often used to vent anger, compensate for loss or improve concentration based on current psychological needs. These two kinds of music show obvious differences in adjusting timeliness and stability, and the effect of ritual music is often a long-term and structural identity construction. The effect of daily music is short-term and situational state adjustment. The functional path of emotional regulation is a complex network woven by physiological basis, cultural strategies and social situations.

5. PRACTICAL ENLIGHTENMENT

The regulatory effect of music on emotion is composed of the product synergistic effect of biological mechanism and cultural script. This core discovery directly challenges the existing over-standardized intervention paradigm in music therapy, suggesting that strict cultural adaptability evaluation procedures must be introduced into clinical practice. For the audience with collectivism tendency, we should strengthen the social connection attribute of music and use group resonance to effectively alleviate loneliness and anxiety; For the audience with individualistic tendency, we should focus on improving their self-expression depth and cognitive reconstruction ability. Future research should combine long-term neural tracking technology to further clarify the dynamic process of cultural experience reshaping the brain auditory circuit.

6. CONCLUSION

This article shows the culture bicultural comparative analysis of music cognition and emotional regulation mechanism is an important role in regulating factors in a psychological effect of music. Music is not a simple biological stimulus, but a carrier of meaning deeply encoded by cultural schema. The division between the eastern and western groups in auditory processing mode and emotional attribution logic determines the choice direction of emotional regulation strategies. Both the differences in physiological basis based on neuroplasticity and the differences in behavior patterns derived from social values have proved the limitations of universal music prescriptions. This requires practitioners to go beyond the technical level and understand the cultural background and emotional expression norms of the target audience. Future intervention programs should focus on integrating localized resources and organically combining collective resonance with individual reflection. Although there are still some shortcomings in sample breadth and longitudinal tracking in this study, its analytical framework provides a new methodological tool for understanding the global musical psychological phenomenon. Respect for cultural diversity can give full play to the potential of music to promote mental health and promote the transformation from general intervention to precise support.

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