

An Analysis of the Mechanisms Through Which Language Choice in Multilingual Operas Influences Musical Style and Aesthetic Orientation

Chenjie Li ^{1,*}, Hao Luo ², Zhyldyz Takenova ³, Rong Fan ⁴ and Minghui Liu ¹

¹ Sichuan University of Culture and Arts, Mianyang, Sichuan, 621000, China

² Kyrgyz state university named after I. Arabaev, Bishkek, 720040, Kyrgyzstan

³ Ala-Too International University, Bishkek, Kyrgyzstan

⁴ Department of Social and Economic Education, Kyrgyz International University, Bishkek, 550400, Kyrgyzstan

* Correspondence author: lichenjie088039@163.com

Abstract: As a quintessential medium of cross-cultural art, the choice of language in multilingual operas not only influences the expression of the plot but may also profoundly reshape the musical style and the audience's aesthetic preferences through phonological characteristics. Using the Geneva Music Emotion Scale (GEMS) as a measurement tool, this study systematically examined the impact of language choice on opera musical styles (melodic comfort, rhythmic density, dramatic tension, phonological compatibility, and lyricism) and aesthetic orientations (curiosity, transcendence, lyricism, nostalgia, tranquility, power, joy, tension, and sadness). Through empirical analysis, we found that language choice exerts significant effects on the expression of five opera musical styles and six aesthetic orientation dimensions (transcendence, lyricism, nostalgia, power, joy, and sadness). Specifically, the phonological structures, stress patterns, and intonation contours of different languages not only constrain the acoustic trajectory of melodic composition but also, through the phonetic-emotional synesthesia mechanism, independently guide shifts in listeners' aesthetic orientations—separate from semantic content.

Keywords: multilingual opera; language choice; musical emotion scale; musical style; aesthetic orientation

1. Introduction

Opera is a comprehensive art form that integrates music, drama, language, literature, dance, and stage design. It typically consists of arias, recitatives, duets, choruses, overtures, interludes, and dance scenes [1–3]. Opera originated in Italy during the Renaissance, drawing on ancient Greek tragedy, medieval religious plays, musical interludes in folk theater, and pastoral plays [4–5]. Through continuous practice, Western musical forms gradually developed a tonal style, laying a solid foundation for the emergence of opera. By the late 16th century, influenced by humanist thought, people sought comprehensive means to express human ideas, emotions, and events; thus, opera came into being [6–8]. Opera is thus often described as “music as drama, drama as music.” This refers to a dramatic musical work performed on stage with sets and costumes, in which the singing of the characters takes center stage, and an independent, specific musical structure serves as the primary means of advancing the plot [9–12].

Musical style and aesthetic orientation are among the most important elements of opera. Music breathes life into characters, conveys their emotions, and serves as a form of artistic expression [13]. Musical style falls within the realm of musical aesthetics. In the field of music, the term “style” can refer to a specific historical period, a country, a school of thought, a composer, a genre, or a particular work; it denotes the distinctive and characteristic features found in musical thought, means of expression, and techniques [14–17]. The aesthetic orientation of opera is a unity of the subjective and the objective—an aesthetic wisdom rooted in the complete integration of rationality and sensibility [18–19]. In operatic



works, musical style and aesthetic orientation are influenced by numerous factors, among which the choice of language plays a significant role, particularly in multilingual operas [20–21]. Opera is not limited to Italian; French, German, Russian, and even English operas also hold significant positions. The choice of language is closely related to the opera’s place of origin, pronunciation characteristics, and cultural heritage, and therefore directly influences musical style and aesthetic orientation [22].

This study selected the original French version, the German version, and the Chinese version of the multilingual opera “Carmen” as experimental materials and used the Geneva Music Emotion Scale (GEMS) as a measurement tool to systematically investigate the mechanisms by which language choice influences musical style and aesthetic orientation. Specifically, grounded in the Constructivist Theory of Music Emotion (CTMME), the study analyzed the overall characteristics of musical style and aesthetic orientation, as well as their influencing factors, from a more comprehensive perspective.

2. Theoretical Foundation

2.1. Musical Aesthetics

2.1.1. Basic Definitions

Aesthetic emotion belongs to the specific-domain model, as shown in Figure 1, and is a multi-component, multi-level, and nuanced composite emotion modulated by an individual’s aesthetic judgments and preferences [23]. In aesthetic activities, the elicitation of aesthetic emotions is moderated by individual aesthetic judgments and preferences. Each aesthetic emotion is attuned to a specific type of perceptible aesthetic arousal and predicts the intensity of subjective experiences such as pleasure or displeasure, liking or disliking, and is characterized by strong approach and avoidance motivations. The aesthetic emotion model emphasizes the interaction between the aesthetic object and the subject, focusing on aesthetic pleasure and rewarding emotional experiences.

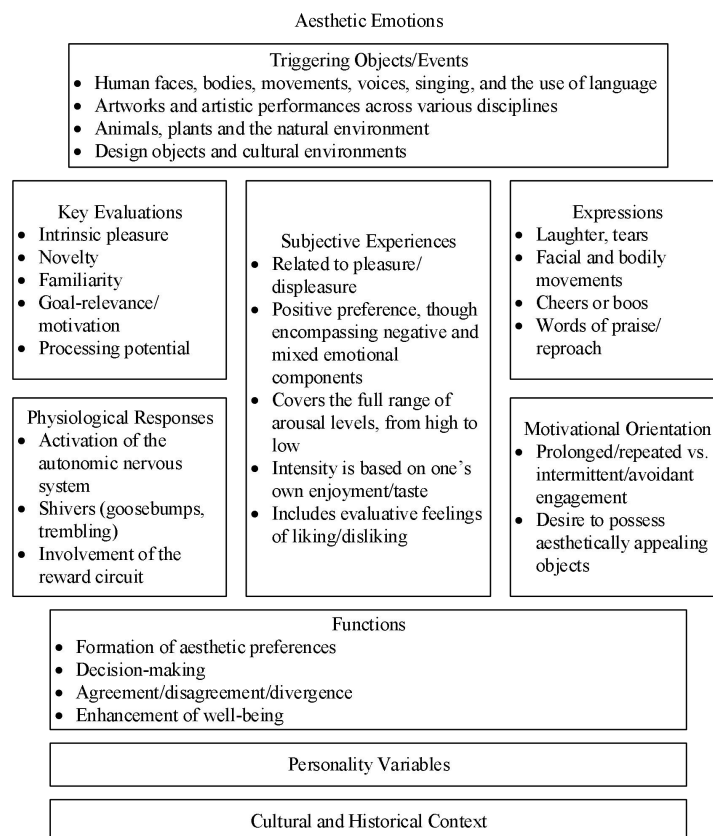


Figure 1. Multi-component model of aesthetic sentiment

As an auditory art form, music plays a significant role in human culture. The aesthetic orientations evoked by music also fall under the category of domain-specific models. Compared to the discrete emotions (such as joy, sadness, calmness, fear, and love/warmth) included in traditional models, music

evokes more nuanced and complex aesthetic orientations, such as nostalgia, emotional resonance, transcendence, curiosity, and empowerment. Beauty is the core concept of aesthetic judgment, and aesthetic judgment serves as the cognitive foundation for musical aesthetic orientations. Aesthetic emotions evoked by music are distinctly different from other emotions, and the aesthetic orientations induced by music are often more beautiful than utilitarian ones.

2.1.2. Measurement Methods

Currently, the main scales used to measure musical aesthetics are the Geneva Music Emotion Scale (GEMS) and the Aesthetic Emotion Scale (AESTHEMOS).

(1) GEMS Scale

This questionnaire, developed based on aesthetic emotion theory, is used to measure the recognition and experience of musical aesthetic orientations. The scale includes nine types of musical aesthetics: curiosity, transcendence, lyricism or warmth, nostalgia, tranquility, power, joy, tension, and sadness. Based on aesthetic arousal levels ranging from “tranquility” to “excitement,” these are categorized into three dimensions: low arousal (tranquility, nostalgia, sadness), medium arousal (curiosity, transcendence, lyricism), and high arousal (tension, power, joy). This scale uses ecological musical works as stimuli. Through four systematic studies involving cluster analysis and behavioral assessments of 425 aesthetic emotion words, it ultimately identified nine types of musical aesthetics. The scale employs a Likert scale ranging from 1 (“not at all”) to 5 (“very much”) to assess the arousal level associated with the recognition and experience of musical aesthetics.

(2) The AESTHEMOS Scale

Schindler et al. developed a scale to measure aesthetic emotional experiences based on aesthetic emotion theory. This scale can be used both to assess the intensity of short-term aesthetic emotions (such as those evoked by works of art, poetry, certain musical compositions, or movie scenes) and to measure the frequency of emotional experiences during extended aesthetic experiences (such as an entire art exhibition, a complete musical composition, a theatrical performance, or a natural scene). The scale consists of 42 items across 21 subscales (e.g., Beauty–Ugliness, Calm–Excitement), with two items per dimension (e.g., “I found it beautiful” or “I found it ugly”). The subscales cover typical aesthetic emotions (e.g., beauty, emotion, fascination, and awe), cognitive emotions (e.g., interest and insight), and recreational emotions (e.g., humor and delight). In addition, the subscales also capture the arousal (energy and vitality) and tranquility (relaxation) effects of aesthetic experiences, as well as negative emotions that may lead to aesthetic discomfort (such as experiences of ugliness, boredom, and confusion). The scale uses a Likert scale ranging from 1 (“Never”) to 5 (“Very frequently”) to assess the intensity or frequency of aesthetic emotional experiences.

Upon comparison, the GEMS scale was found to be more suitable for this study; therefore, the nine types of musical aesthetic emotions identified by the GEMS scale were used to investigate between-group and within-group differences in musical aesthetic recognition and experience in multilingual opera works.

2.2. *The Mechanisms Underlying Musical Aesthetics*

2.2.1. Language Selection

Music and language are the two major communication systems humans use to convey information. They share significant similarities at the physiological level—such as the medium and methods of sound production—as well as at the morphological level, including rhythm, meter, and intonation. Music and language did not simply emerge in parallel by chance, nor did one cause the other; rather, both originated from a common “evolutionary precursor.” The “musical-linguistic” model of music is illustrated in Figure 2. Through a comparative analysis of the syntactic structures and phonological characteristics of music and speech, he discovered that both speech and music are forms of “melodic-rhythmic structures.” Within this structure, the melodies and rhythms of both derive from three sources: basic acoustic units (such as pitch combinations, duration, and volume); the sequential arrangement of these acoustic units (combination rules); and the adjustment of acoustic characteristics in words and phrases based on expressive and rhetorical mechanisms to convey intent and emotion (rhetorical rules).

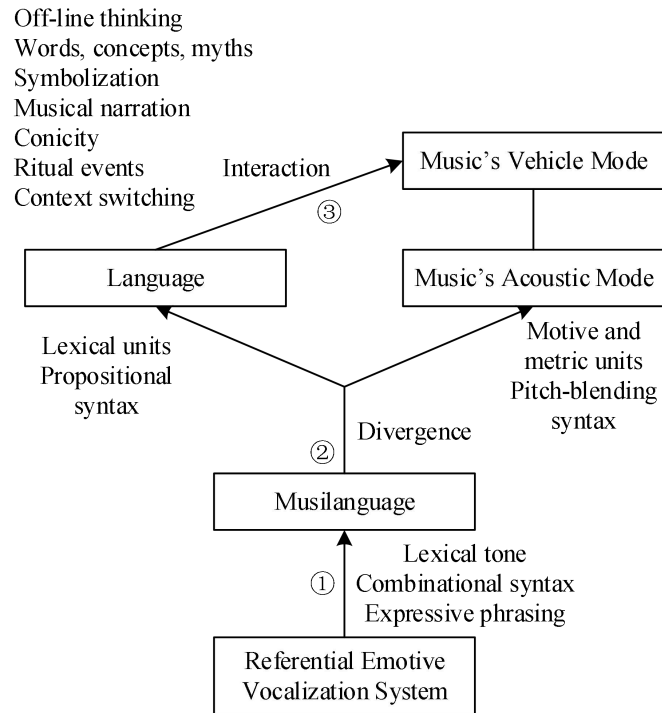


Figure 2. The "MUSILANGUAGE" model of music

As the common “evolutionary precursor” of music and language, “musical speech” should possess at least three corresponding characteristics: the intonation of words, the structure of phrasal combinations, and the rhetorical mechanisms of expression. Although, from a functionalist perspective, both music and language possess both referential meaning (the denotative function) and emotional meaning (the expressive function), they gradually diverged during their subsequent evolution: music came to emphasize the emotional meaning of sound, while language emphasized its referential meaning.

2.2.2. Aesthetic Judgment

Aesthetic judgment relies more heavily on cognitive functions and domain-specific knowledge than the seven mechanisms of brainstem reflexes, emotional conditioned responses, emotional contagion, visual imagery, episodic memory, musical anticipation, and rhythmic engagement. Upon hearing a piece of music, listeners spontaneously categorize it preliminarily as “art,” focus their attention on the music, and perceive it through a set of aesthetic criteria, thereby forming a certain “aesthetic attitude.” This psychological attitude then triggers corresponding musical emotions, as shown in Figure 3. This mechanism can work in parallel with the seven mechanisms mentioned above to induce musical aesthetic emotions.

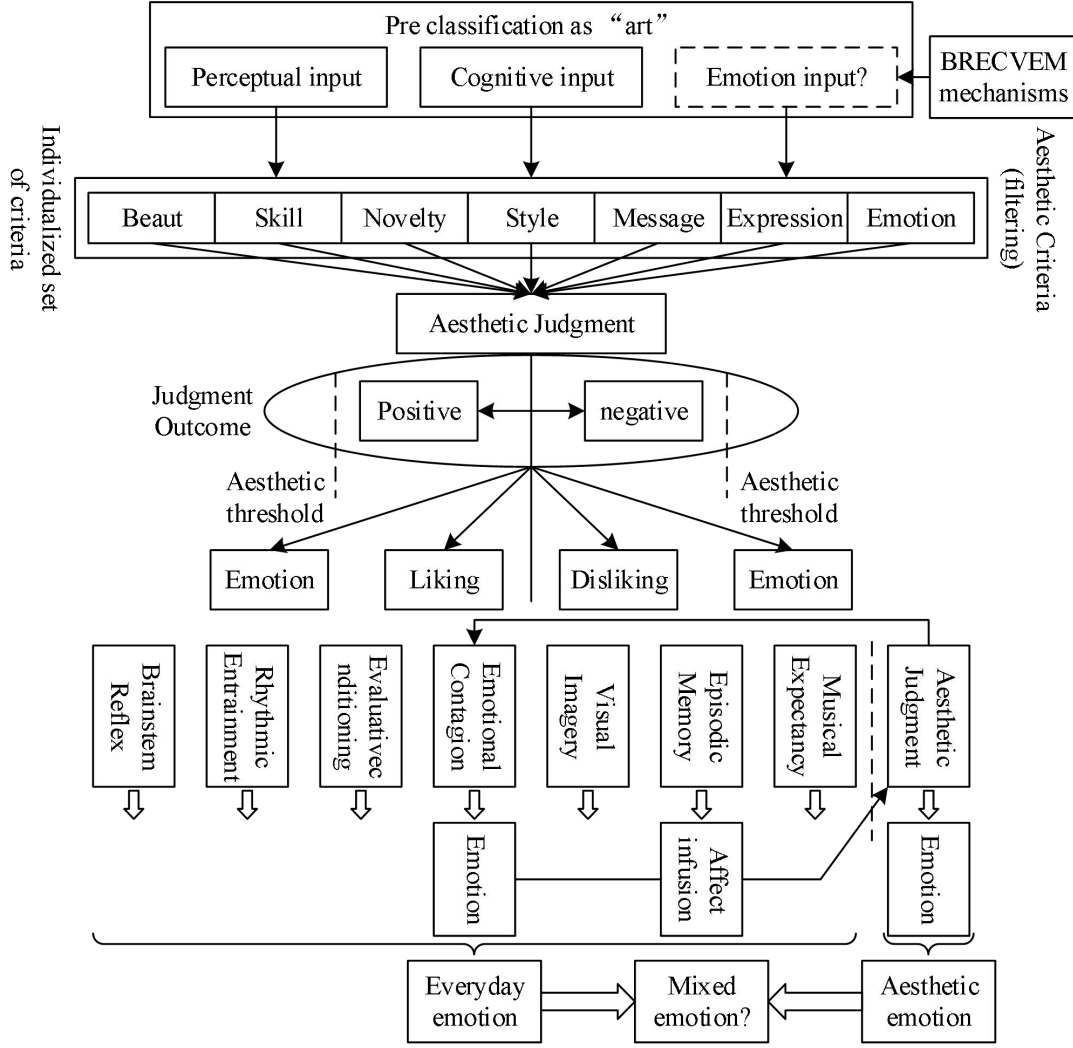


Figure 3. Model of music emotion induction mechanism

2.3. Theoretical Basis

This study focuses on the factors influencing the processing of aesthetic emotions in music and examines the processing of aesthetic emotions related to language selection in multilingual opera works. Over the years, researchers have conducted extensive theoretical and empirical explorations into questions such as “how people perceive aesthetic emotions in music” and “what factors may influence this perceptual process.” Among these, the two most influential models are the multi-mechanism model (BRECHEMA) and the multi-factor process model. Although their perspectives differ, both models hold that the processing of aesthetic emotions in music is the result of the interaction among music, the individual, and the context.

However, the models do not address or explain the possible interactions among these factors—that is, how the interactions between different factors lead to different recognitions and experiences of musical emotion. At the same time, both models focus solely on the perceptual attributes of music as an emotional stimulus, neglecting its sociocultural significance. When listening to music, individuals not only perceive a series of acoustic features but also sense the cultural connotations of the music; the interaction among cultural background, musical material, and personal characteristics gives rise to specific and context-dependent recognition of musical emotions. Therefore, this study adopts the “Constructivist Theory of Music Emotion (CTMME)” [24], which takes sociocultural environmental variables into greater account, as its theoretical foundation. As illustrated in Figure 4, the study analyzes the overall landscape of musical styles and aesthetic orientations, as well as their influencing factors, from a more comprehensive perspective.

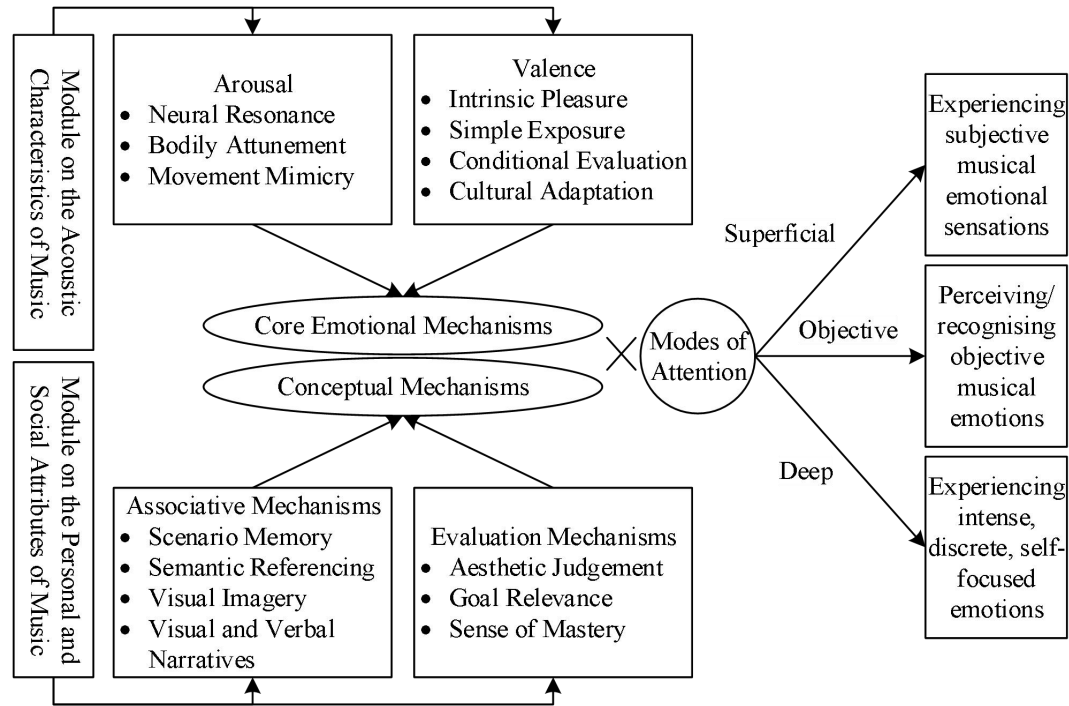


Figure 4. Constructivist Theoretical Model of Musical Emotion Generation

According to the CTMME theory, the generation of musical emotion depends primarily on two modules. Module 1 involves the “acoustic characteristics of music” associated with the musical stimulus itself, while Module 2 involves the cultural and personal attributes of the music. These two modules activate distinct mechanisms for emotion generation: Module 1 is the core affective mechanism for automatic emotion perception, in which various factors influence the valence and arousal of musical emotional experiences; Module 2 is a conceptual mechanism that integrates the cultural and personal attributes of the musical stimulus through processes such as association and evaluation. Within this framework, music-related personal characteristics, individual experiences, and one’s cultural background all lead to conceptual evaluations of musical stimuli, shaping changes in the core emotion from an experiential perspective and thereby producing different outcomes in the processing of musical emotions. The core emotional mechanism and the conceptual mechanism interact to jointly generate musical emotions, and this process also reflects the close connection among musical stimuli, individual characteristics, and cultural background.

In addition, an individual’s processing of musical emotion can influence certain psychological processes. For example, the symbol “X” in the figure represents the interaction between the perceived emotional state of the music and the type of attention the individual directs toward the musical stimulus. This interaction gives rise to three major categories of responses:

- (1) Emotional experience of music;
- (2) Emotional perception of music (recognizing the emotions expressed by the music itself);
- (3) Experiencing intense, discrete, self-focused emotions.

Based on this, this study uses musical stimuli drawn from the languages of various countries in multilingual opera works to examine individual differences in the processing of aesthetic emotions toward music (including the identification of aesthetic orientations and aesthetic experiences) among individuals from different cultural backgrounds. While taking into account both individual characteristics and cultural backgrounds, the study analyzes the impact of language selection in multilingual opera works on musical style and aesthetic orientation. This research approach is grounded in an integrated study of the two major modules of the CTMIE theory; it not only validates the model to a certain extent but also enables the construction of a model for the processing of musical aesthetic emotions across different cultural contexts based on the research findings, thereby accumulating empirical evidence for cross-cultural research on musical aesthetics.

3. Research Design

3.1. Research Objectives

This study aims to systematically investigate how the phonetic, prosodic, and articulatory characteristics of different languages (Italian, French, Russian, etc.) in multilingual operas influence the melodic features, orchestral arrangements, and bel canto techniques of these works. It seeks to explore the mechanisms through which language choice interacts with musical style and aesthetic orientations, thereby providing a theoretical foundation for the interdisciplinary field of linguistics and musicology.

3.2. Research Design

In this experiment, language choice (the original French version, the German version, and the Chinese version of the opera **Carmen**) was used as the independent variable, while the dependent variables included musical style characteristics (melodic comfort, rhythmic density, dramatic tension, tonal compatibility, and lyricism) and aesthetic orientations (curiosity, transcendence, lyricism, nostalgia, tranquility, power, joy, tension, and sadness).

3.2.1. Subjects

Information about recruiting participants for the experiment was posted in a university student group, resulting in the recruitment of 120 music majors. The recruitment announcement must inform participants about the content and procedure of the experiment, and a detailed explanation of the experiment should be provided to participants before it begins. This is a behavioral experiment in music psychology; participants are only required to listen to music and respond by pressing buttons. Upon completion of the experiment, each participant was provided with appropriate compensation. The sample consisted of 120 music majors (44 males and 76 females). Their ages ranged from 18 to 23, with an average age of 20.1 years. All participants had a background in formal music education and had undergone professional music training. All participants had normal hearing and vision and were free of mental or physical illnesses. Before the experiment began, participants were asked to sign a consent form to ensure their willingness to participate. The 120 participants were randomly divided into three groups of 30 each: a French group, a German group, and a Chinese group.

3.2.2. Materials

We selected “Carmen”, a classic opera with authoritative official multilingual versions and fully corresponding musical scores. As the original version is in French, this study uses excerpts from the French, German, and Chinese versions of “Carmen” as research material, ensuring that all musical elements—except for the language—are completely equivalent, thereby meeting the requirements for a single-variable experiment.

3.2.3. Measuring Tools

The Geneva Emotional Music Scale (GEMS) and the Aesthetic Emotion Paradigm (curiosity, transcendence, lyricism, nostalgia, tranquility, power, joy, tension, and sadness) were used to measure participants’ aesthetic evaluations of the music in multilingual operas.

3.3. Analysis of Results

3.3.1. The Influence of Language Choice on Musical Style

Figure 5 shows the average scores for the three language groups—French, German, and Chinese—across various dimensions of musical style. It can be seen that, with the exception of dramatic tension, the average scores for the other four dimensions all follow the order French group > German group, indicating that the original language produced a better musical style. In terms of dramatic tension, the German group ($M = 3.87$) outperformed the French group (3.64), suggesting that the German adaptation demonstrated greater dramatic tension than the original version. Overall, among the three language groups, both the French and German groups outperformed the Chinese group in terms of musical style. This is because the original version is in French, and French and German cultures share common roots, whereas they differ significantly from Chinese culture. Consequently, the Chinese adaptation of **Carmen** performed overall worse than the French and German versions.

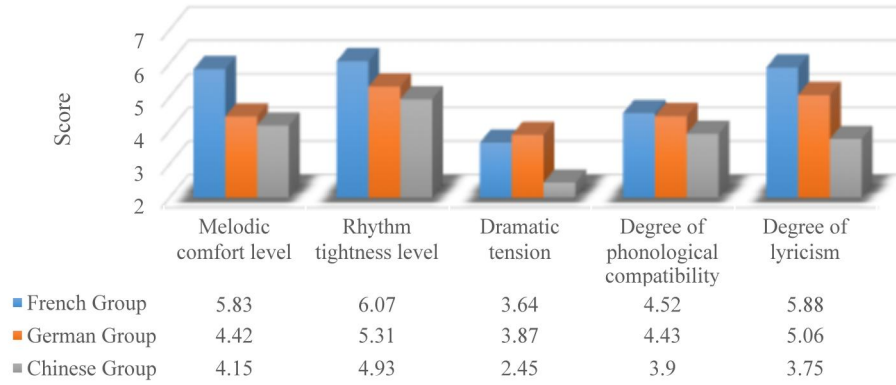


Figure 5. The influence of language choice on musical style

Before testing the hypotheses formulated based on the research questions, it is necessary to first verify whether the experimental numerical data follow a normal distribution. This study employs the *K-S* method, a goodness-of-fit test suitable for examining the distribution of continuous random variables. The test results are shown in Table 1. The *p*-values for the five musical styles showed progressively significant *p*-values less than 0.05; therefore, the null hypothesis should be rejected, indicating that none of the musical styles exhibit normality. This suggests that the effects of different language choices on musical style in multilingual opera works exhibit significant differences.

Table 1. The results of the K-S test for the normality distribution of musical style expression

Musical style expression	<i>N</i>	Mean	<i>SD</i>	Skewness	Kurtosis	Statistic <i>D</i>	<i>p</i>
Melodic comfort level	120	4.80	2.24	0.08	-1.37	0.15	0.000**
Rhythm tightness level	120	5.44	2.37	0.00	-1.28	0.16	0.000**
Dramatic tension	120	3.32	1.50	0.27	-1.36	0.27	0.000**
Degree of phonological compatibility	120	4.28	1.68	-0.25	-1.39	0.18	0.000**
Degree of lyricism	120	4.90	2.32	0.07	-1.38	0.15	0.000**

Note: * $p < 0.05$, ** $p < 0.01$.

The results of the *t*-test on performance data for the five musical styles are shown in Table 2. The results indicate that there were significant differences in the participants' performance across the five musical styles among the three language groups: French, German, and Chinese.

Table 2. Results of Data *t*-test

Musical style expression	Mean			<i>t</i>	<i>p</i>
	French	German	Chinese		
Melodic comfort level	5.83	4.42	4.15	3.242	0.000**
Rhythm tightness level	6.07	5.31	4.93	5.373	0.000**
Dramatic tension	3.64	3.87	2.42	6.056	0.000**
Degree of phonological compatibility	4.52	4.43	3.90	4.337	0.000**
Degree of lyricism	5.88	5.06	3.75	3.283	0.000**

Note: * $p < 0.05$, ** $p < 0.01$.

3.3.2. The Influence of Language Choice on Aesthetic Preferences

Figure 6 shows the probability of three different languages eliciting each of the nine types of aesthetic emotions. The results indicate that "joy" was most prominent in the French group, while "sadness" was most likely to occur in the Chinese group. In the German adaptation, participants most frequently reported experiencing "nostalgia," suggesting that each type of music is most effective at evoking emotions of the same type, but has little effect on emotions of other types.

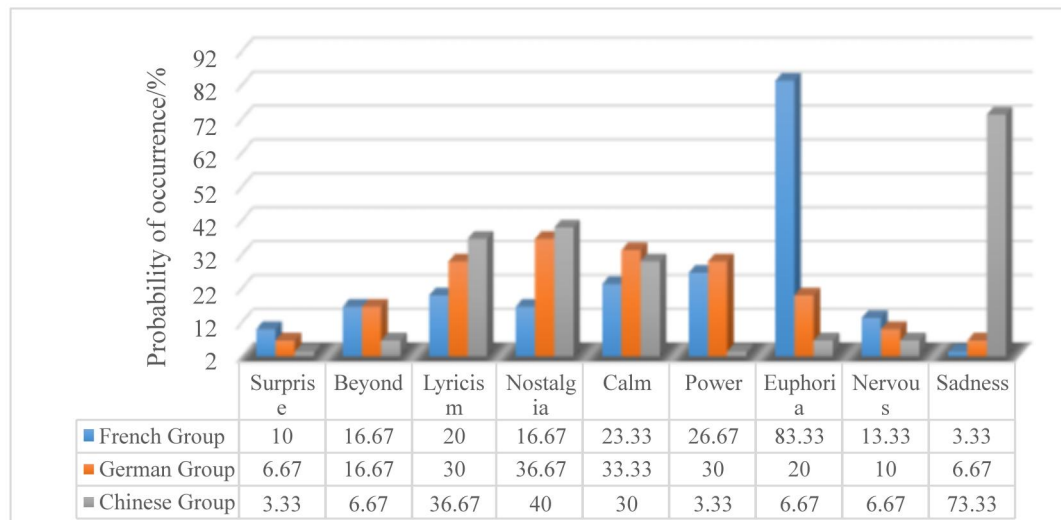


Figure 6. The occurrence probability of aesthetic emotion types

The results of the *t*-tests conducted on the data for the nine aesthetic experiences are shown in Table 3. The results indicate that the three language groups—French, German, and Chinese—exhibited significant differences in the six dimensions of aesthetic experience—transcendence, lyricism, nostalgia, power, joy, and sadness—among the participants.

Table 3. The *t*-test results of aesthetic experience

Aesthetic experience	Mean			<i>t</i>	<i>p</i>
	French	German	Chinese		
Surprise	10.00%	6.67%	3.33%	1.234	0.061
Beyond	16.67%	16.67%	6.67%	2.007	0.043*
Lyricism	20.00%	30.00%	36.67%	0.924	0.119
Nostalgia	16.67%	36.67%	40.00%	3.183	0.005**
Calm	23.33%	33.33%	30.00%	1.256	0.083
Power	26.67%	30.00%	3.33%	4.778	0.000**
Euphoria	83.33%	20.00%	6.67%	10.834	0.000**
Nervous	13.33%	10.00%	6.67%	1.015	0.834
Sadness	3.33%	6.67%	73.33%	8.289	0.000**

Note: * $p < 0.05$, ** $p < 0.01$.

4. Conclusion

This study, grounded in the Constructivist Theory of Music Emotion (CTMME), addresses the shortcomings of previous research on operatic works—specifically, the lack of multilingual comparisons and multidimensional evaluations—and establishes the core objective of “systematically examining the mechanisms through which language choice influences musical style and aesthetic orientation.” Empirical results show that language choice has a significant impact on five musical style dimensions (melodic comfort, rhythmic density, dramatic tension, phonological compatibility, and lyricism) and six emotional dimensions (transcendence, lyricism, nostalgia, power, joy, and sadness). Specifically, a language’s phonological structure, stress patterns, and intonation contours constrain the melodic composition and harmonic direction of operatic works, thereby guiding shifts in listeners’ aesthetic orientations through the phonetic-emotional synesthesia mechanism—independent of semantic content. For example, a vowel-rich language like French enhances the lyrical and joyful aesthetic experience of opera, while a consonant-dense language like German highlights the dramatic tension and sense of power in operatic works. This study not only effectively deepens the audience’s understanding and appreciation of the plot but also establishes a close and profound emotional connection with the audience. Future research could utilize acoustic analysis and neuroaesthetics to explore the relationship between speech parameters and musical acoustic characteristics, further revealing the psychological and physiological foundations of how language influences musical perception, with the aim of constructing a comprehensive understanding of operatic aesthetics through a multi-faceted analysis.

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