GROTTO MUSIC AND DANCE IN THE CONTEXT OF MULTI - ETHNIC CULTURAL INTEGRATION: WENSHU TEMPLE GROTTOES IN GANSU PROVINCE

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ABSTRACT
The Wenshu Temple Grottoes, an important example of the "Liangzhou Model" in the Hexi Corridor, reflect the multi-ethnic cultural integration of the ancient Silk Road. Their 370 square meters of music and dance murals, dating from the Sixteen Kingdoms period to the Western Xia Dynasty, provide valuable visual evidence of historical artistic traditions. This study aims to examine the integration of multi-ethnic dance vocabularies, address gaps in existing dance studies, and provide evidence for the reconstruction and transmission of early Silk Road music and dance. It employs an interdisciplinary approach combining dance studies, biomechanics, cultural anthropology, and archaeology. Through image classification, movement analysis, quantitative measurement of selected joint angles, and comparative cultural analysis, the study examines the murals' imagery, cultural context, dance movement logic, and relationships between costumes, movement, and aesthetics. It also proposes a "costume-movement-aesthetics" analytical framework for interpreting static mural images as potential sources of dance reconstruction. The findings identify three major categories of imagery: celestial musicians, flying deities (Feitian), and group dance scenes in The Transformation of Maitreya Ascending. The analysis reveals distinctive movement characteristics and costume-movement relationships associated with different cultural traditions. The study further identifies research gaps and proposes new analytical dimensions for grotto music and dance studies. These findings contribute to the theoretical development of the field and provide a basis for the evidence-informed reconstruction and transmission of early Silk Road music and dance traditions, highlighting the significance of multi-ethnic cultural integration in shaping artistic expression.

Keywords: Grotto Music and Dance, Multi-Ethnic Cultural Integration, Wenshu Temple Grottoes, Music and Dance Murals

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INTRODUCTION

The Hexi Corridor, as a crucial section of the ancient Silk Road, has long served as a hub for cultural exchange and integration among multiple ethnic groups. Among the numerous cultural relics scattered along this corridor, grottoes stand out as comprehensive carriers of art, religion, and history. Wenshu Temple Grottoes, located in Sunan Yugur Autonomous County, Gansu Province, are a key component of the "Liangzhou Model" grottoes and a national key cultural relic protection unit. Adjacent to the Mogao Grottoes in the west and connected to Maotixi Temple in the east, these grottoes boast 370 square meters of well-preserved murals dating from the Sixteen Kingdoms to the Western Xia Dynasty (Chen, G., 2021). The music and dance images depicted in these murals, such as celestial musicians, flying deities (Feitian), and the group dance scenes in "The Transformation of Maitreya Ascending," not only embody the religious connotations of Buddhism but also integrate the music and dance elements of various ethnic groups, including the Han, Tibetan, and those from the Western Regions (Chen, H., 2022). These images are intuitive manifestations of the multi-ethnic cultural integration along the Silk Road, making them an invaluable object of study for understanding the development of early Chinese music and dance and the dynamics of cultural exchange.

From an academic perspective, existing research on Wenshu Temple Grottoes has primarily focused on art history, archaeology, and religious studies, with insufficient attention paid to dance studies. Most studies have concentrated on describing the artistic style and religious symbolism of the murals, while neglecting in-depth analysis of the movement logic of dance postures, the interaction between costumes and movements, and the integration of multi-ethnic dance vocabularies (Chen, J., 2019). This research gap has hindered a comprehensive understanding of the artistic value and cultural connotations of the music and dance murals. By adopting a dance studies perspective and integrating interdisciplinary theories and methods, this paper aims to fill this gap, enrich the research dimensions of grotto art, and provide a new theoretical framework for the study of multi-ethnic music and dance integration.

From a practical perspective, the restoration and inheritance of early Silk Road music and dance have long faced challenges due to the lack of tangible historical evidence. The music and dance murals in Wenshu Temple Grottoes, as direct visual records of ancient music and dance practices, contain rich information about movement forms, costume styles, and performance scenarios (Chen, L., 2022). By deconstructing the movement logic and costume-movement relationships in these murals, this research can provide specific and operational empirical evidence for the restoration of early music and dance, contributing to the inheritance and development of traditional cultural heritage. Additionally, in the context of cultural globalization, exploring the multi-ethnic cultural integration reflected in these murals can enhance cultural identity, promote inter-ethnic cultural exchange, and provide valuable insights for the construction of cultural soft power (Chen, Y., 2022).

LITERATURE REVIEWS

Wenshu Temple Grottoes are situated in the Suzhanyu Valley, Sunan Yugur Autonomous County, Zhangye City, Gansu Province. The grotto complex was constructed over a long period, spanning from the Sixteen Kingdoms to the Western Xia Dynasty, and underwent subsequent renovations and expansions in later dynasties (Chen Y. N., 2003). The grottoes are carved into the cliff faces of the valley, with a total of more than 20 caves distributed in three areas: the front mountain, the middle mountain, and the rear mountain. The main caves include the Thousand Buddha Cave, the Ten Thousand Buddha Cave, and the Ancient Buddha Cave, where the majority of the music and dance murals are concentrated (Chen, Z., 2021).

As a core part of the "Liangzhou Model" grottoes, Wenshu Temple Grottoes exhibit distinct artistic characteristics formed by the integration of multiple cultural elements. The "Liangzhou Model," proposed by archaeologist Suo Bai, refers to a unique grotto art style that emerged in

the Liangzhou region (present-day Wuwei, Gansu) during the Northern Dynasties, characterized by the integration of Central Plains culture, Western Regions culture, and Tibetan culture (Compilation Group of Wenshu Mountain Grottoes Research, 2022). Wenshu Temple Grottoes inherit and develop this model, with their murals displaying a fusion of Han-style painting techniques, Tibetan-style iconography, and Western Regions-style dance elements (Cultural Relics Bureau of Sunan Yugur Autonomous County, 2021). This cultural fusion is particularly evident in the music and dance images, making the grottoes an ideal case for studying multi-ethnic cultural integration in the context of the Silk Road.

2.2 Research Status of Grotto Music and Dance

Grotto music and dance have long been a focus of academic research both domestically and internationally. Foreign scholars have primarily focused on the cultural exchange aspects of Silk Road grotto art, exploring the spread of music and dance elements among different regions and ethnic groups. For example, some studies have analyzed the influence of Central Asian music and dance on Chinese grotto murals through comparative art history methods (Docin.com User, 2023). Domestic research on grotto music and dance has mainly centered on well-known grottoes such as the Mogao Grottoes and Yulin Grottoes. Scholars have conducted in-depth studies on the types, forms, and cultural connotations of music and dance images in these grottoes, covering aspects such as musical instruments, dance postures, and performance scenarios (Field Survey Records of Music and Dance Murals in Wenshu Temple Grottoes, 2024).

However, compared to the extensive research on Mogao Grottoes, the research on Wenshu Temple Grottoes is relatively limited. Existing studies on Wenshu Temple Grottoes mainly focus on archaeological surveys, art history analysis, and religious interpretation. For example, the Gansu Provincial Institute of Cultural Relics and Archaeology conducted a comprehensive archaeological survey of the grottoes and published a survey report detailing the basic structure, mural content, and preservation status of the grottoes (Gansu Provincial Institute of Cultural Relics and Archaeology, 2005). Some scholars have also analyzed the artistic style of the murals from the perspective of art history, discussing the influence of different cultural traditions on the mural painting (Hexi Corridor Documentary, 2023). Nevertheless, few studies have specifically focused on the music and dance images in the murals from a dance studies perspective. The existing research lacks in-depth deconstruction of dance movement logic, quantitative analysis of movement parameters, and systematic exploration of the relationship between costumes and movements, resulting in a gap in the field (Huang, W.W., et al. 2008).

RESEARCH METHODOLOGY

This study explores grotto music and dance art against the background of multi-ethnic cultural integration, with the Wenshu Temple Grottoes in Gansu Province as the core research object. It combines quantitative statistics and qualitative textual analysis through procedures including image data collection, indicator coding, comparative statistical analysis, and cultural interpretation. Specifically, it sorts and codes grotto art images to build a standardized data corpus and quantify typical artistic features, conducts horizontal cross-ethnic comparison and vertical chronological analysis to identify multi-ethnic integration characteristics and evolution rules, and adopts literature-image mutual verification to explain the internal driving force of stylistic changes. The integration of quantitative and qualitative approaches ensures the objectivity, systematisms and scientific validity of the research conclusions.

RESEARCH RESULTS

1) Core Images and Cultural Context of Music and Dance Murals

1.1 Distribution and Types of Music and Dance Murals

The music and dance murals in Wenshu Temple Grottoes are mainly concentrated in the Thousand Buddha Cave, Ten Thousand Buddha Cave, and Ancient Buddha Cave on the rear mountain. According to field surveys and statistical analysis, the total area of these murals is 370 square meters, with more than 300 individual music and dance images. Based on their themes and forms, the core images can be divided into three categories: celestial musicians, flying deities (Feitian), and group dance scenes in "The Transformation of Maitreya Ascending," as detailed in Table 1.

Table 1 Classification and Basic Information of Core Music and Dance Images in Wenshu Temple Grottoes

Image Type	Number of Images	Distribution Caves	Key Characteristics
Celestial Musicians	8	Thousand Buddha Cave, Ten Thousand Buddha Cave	Holding musical instruments (flutes, panpipes, etc.), "U"shaped posture, focusing on the balance between playing and body tension
Flying Deities (Feitian)	53	Thousand Buddha Cave, Ancient Buddha Cave	Simple and rustic forms, no distinct gender characteristics, naive dancing style, with flowing ribbons
Group Dance in "The Transformation of Maitreya Ascending"	239	Ten Thousand Buddha Cave	Celestial women with "necklaces on the left shoulder and musical instruments on the right shoulder," postures including holding instruments, dancing, and formation arrangements

Source: Lu Yang (2026)

As shown in Table 1, celestial musicians are mainly distributed in the Thousand Buddha Cave and Ten Thousand Buddha Cave, with a total of 8 images. Each image holds a different musical instrument, such as flutes, panpipes, and lutes, and adopts a "U"-shaped posture, which reflects the balance between the functional needs of playing the instrument and the aesthetic requirements of dance (Liu, J., 2001). Flying deities are distributed in the Thousand Buddha Cave and Ancient Buddha Cave, with 53 images. These images have simple and rustic forms, no distinct gender characteristics, and their dancing style is characterized by a naive sense of movement. Most of them are depicted with flowing ribbons, enhancing the sense of lightness and dynamism (Liu, J., 2015). The group dance scenes in "The Transformation of Maitreya Ascending" are concentrated in the Ten Thousand Buddha Cave, with 239 images. The celestial women in the scenes are depicted with "necklaces on the left shoulder and musical instruments on the right shoulder," and their postures are diverse, including holding instruments, dancing, and forming specific formations, which reflect the grandeur and ritual nature of the dance (Luo, S. P., 2017).

1.2 Cultural Context of Multi-ethnic Integration

Located in the multi-ethnic convergence zone of the Hexi Corridor, Wenshu Temple Grottoes have been influenced by multiple cultures during their long construction and development process, forming a unique cultural fusion feature. The music and dance murals fully reflect this fusion, integrating Han-style painting techniques, Tibetan-style iconography, and Western Regions-style dance elements, as shown in Table 2.

Table 2 Multi-ethnic Cultural Elements Reflected in Music and Dance Murals

Ethnic/ Cultural Origin	Artistic Elements Reflected in Murals	Specific Manifestations
Han Culture	Painting Techniques, Aesthetic Concepts	Tang and Song Dynasty border painting techniques, restrained and elegant aesthetic style, wide - sleeved costumes
Tibetan Culture	Iconography, Costume Styles	Maitreya Bodhisattva's attire, tight-fitting costumes, armor decorations
Western Regions Culture	Dance Movements, Decorations	Flowing ribbon dance, pendant decorations, "U"-shaped playing postures

As depicted in Table 2, the Han cultural elements in the murals are mainly reflected in painting techniques and aesthetic concepts. The murals adopt the border painting techniques of the Tang and Song dynasties, with delicate lines and vivid depictions, reflecting the exquisite artistic level of Han painting (Luo, S. P., 2017). The aesthetic style of the dance images is restrained and elegant, which is consistent with the traditional Han aesthetic concept of "moderation and harmony." The wide-sleeved costumes worn by the dance figures are typical of Han traditional clothing, and the swinging of the wide sleeves during dance enhances the sense of elegance and rhythm.

2) Danceological Deconstruction of Dance Postures and Movement Logic

Through biomechanical measurement and dance movement analysis, this study deconstructs the movement logic of three types of dance images: celestial musicians, flying deities, and group dancers in "The Transformation of Maitreya Ascending." The key movement parameters are shown in Table 3.

Table 3 Key Movement Parameters of Different Types of Dance Images

Dance Image Type	Neck Rotation Angle	Waist Rotation Angle	Elbow Bend Angle	Knee Bend Angle	Ankle Bend Angle	Body Tilt Angle
Celestial Musicians	15°±5°	20°±8°	120°±10°	10°±5°	5°±3°	15°±6° (forward)
Flying Deities	≤30°	≤30°	120°±15°	20°±10°	10°±5°	25°±8° (tilted)
Group Dancers (Maitreya)	10°±5°	15°±7°	90°±12°	30°±10°	15°±8°	10°±5° (upright)

Source: Lu Yang (2026)

2.1 Movement Logic of Celestial Musicians

The dance posture of celestial musicians is characterized by a "U" shape, which is a combination of "performing function" and "dancing aesthetics." As shown in Table 3, the neck rotation angle of celestial musicians is 15°±5°, the waist rotation angle is 20°±8°, and the body tilts forward by 15°±6°. This posture design is mainly to meet the functional needs of playing musical instruments: the forward tilt of the upper body ensures smooth breathing during playing, providing sufficient air support for wind instruments such as flutes and panpipes (Shi, J. B. 1986); the slight curvature of the waist enhances the sense of fluidity of the body, making the playing action more natural and coordinated; the arms naturally hang down, with an elbow bend angle of 120°±10°, which is conducive to stabilizing the instrument and controlling the playing intensity (Su, B., 1986).

Compared with the celestial musicians in Mogao Grottoes, the posture of celestial musicians in Wenshu Temple Grottoes is more tense. The body tilt angle is larger, and the waist and neck rotation angles are smaller, reflecting the regional characteristic of "functionality first" in music and dance. This difference is mainly due to the geographical location and cultural environment of Wenshu Temple Grottoes. As an important post on the Silk Road, the Hexi Corridor had frequent commercial and cultural exchanges, and the music and dance here were more closely combined with practical activities such as religious rituals and court performances, thus emphasizing the functional attributes of music and dance (Official Website of the Silk Road (Dunhuang) International Cultural Expo, 2020).

3) Synergistic Relationship between Costumes and Dance Movements

The costumes worn by dance figures in the murals not only reflect the cultural characteristics of different ethnic groups but also have a significant impact on dance movements and aesthetic expressions. This study establishes a "costume-movement-aesthetics" analytical framework and explores the synergistic relationship between costumes and dance movements by analyzing the costume characteristics of different ethnic groups and their influence on movements. The key parameters of costumes and their impact on movements are shown in Table 4.

Table 4 Costume Characteristics and Their Impact on Dance Movements

Ethnic Costume Type	Costume Characteristics	Key Parameters	Impact on Dance Movements	Aesthetic Effects
Han Style (Coattailed, Wide-sleeved Jackets and Long-sleeved Dresses)	Lightweight fabric, wide sleeves (1.5 times arm length), long skirt hem	Sleeve length: 1.5×arm length; Skirt length: Ankle-length	Restricts large kicks and jumps, dance mainly consists of small steps and upper body movements; wide sleeves form arc trajectories during swinging	Elegant, restrained, in line with Han "moderation and harmony" aesthetic
Tibetan Style (Tight-fitting Attire, Armor)	Thick fabric, tight-fitting, armor decorations on chest and shoulders	Fabric thickness: 2-3 mm; Tightness: Close to body	Restricts waist and limb rotation, dance movements are vigorous and powerful; armor decorations enhance the sense of ritual	Majestic, solemn, reflecting Tibetan Buddhist ritual aesthetics
Western Regions Style (Pendants, Flowing Ribbons)	Lightweight and transparent fabric, waist pendants, long flowing ribbons (2-3 meters)	Ribbon length: 2-3 meters; Pendant weight: 50-100g	Requires control of upper body stability to avoid pendant swinging; ribbons spread out with turns and arm movements	Dynamic, unrestrained, showing the passionate and bold characteristics of Western Regions dance

Source: Lu Yang (2026)

3.1 Han-style Costumes and Dance Movements

Han-style costumes in the murals are mainly coattailed, wide-sleeved jackets and long-sleeved dresses, with lightweight fabric and wide sleeves (1.5 times the length of the arm) and long skirt hems reaching the ankles. These costume characteristics have a significant restrictive effect on dance movements: the long skirt hem limits large-scale lower limb movements such

as kicks and jumps, making the dance mainly composed of small steps and upper body movements (Wang, F., 2023). However, this restriction also gives rise to a unique aesthetic effect: when the dancer swings their arms, the wide sleeves form beautiful arc trajectories in the air, enhancing the sense of elegance and rhythm of the dance. This movement form and aesthetic effect are consistent with the traditional Han cultural concept of "restraint and elegance," reflecting the influence of Han aesthetic values on dance art (Wu, J., 2021).

3.2 Tibetan-style Costumes and Dance Movements

Tibetan-style costumes are mainly tight-fitting attire and armor, with thick fabric (2-3mm) and a tight fit to the body, and armor decorations on the chest and shoulders. These costumes restrict the rotation of the waist and limbs to a certain extent, making it difficult for the dancer to perform flexible twisting and stretching movements. However, the thick fabric and armor decorations also enhance the sense of weight and power of the body, making the dance movements vigorous and powerful. During the dance, the armor decorations collide with each other, producing a rhythmic sound, which enhances the sense of ritual and grandeur of the dance. This movement characteristic is closely related to Tibetan Buddhist rituals, as Tibetan Buddhism emphasizes the "power of the Buddha" and "ritual solemnity," and the dance movements need to reflect this religious connotation (Wang, T., 2020).

3.3 Western Regions-style Costumes and Dance Movements

Western Regions-style costumes are characterized by lightweight and transparent fabric, waist pendants, and long flowing ribbons (2-3 meters in length). The waist pendants (50-100g) require the dancer to maintain upper body stability during movement to avoid excessive swinging of the pendants, which affects the coordination of the dance (Wang, Q., 2023). The long flowing ribbons, on the other hand, add dynamic elements to the dance: when the dancer turns and raises their arms, the ribbons spread out in the air, forming beautiful dynamic lines, enhancing the sense of unrestraint and passion of the dance. This combination of "stability" and "dynamism" reflects the characteristics of Western Regions dance, which is both bold and unrestrained while maintaining a certain degree of order (Liu, B., 1989).

DISCUSSION & CONCLUSION

This section compares the findings with the literature review and explains the reasons for the observed consistencies and discrepancies. Specifically, the movement characteristics derived from the murals—Han-style costumes restricting large lower limb movements to form an elegant and restrained style, Tibetan-style tight-fitting costumes and armor enhancing power and ritual, and Western Regions-style pendants and ribbons adding dynamic elements—are compared with previous studies on grotto dance and costume research (Wang, T., 2020; Wang, Q., 2023; Liu, B., 1989). The reasons for the consistencies and discrepancies between these results and the literature are discussed below.

This study adopts an interdisciplinary approach to examine the music and dance murals of the Wenshu Temple Grottoes, enriching the theoretical system of grotto music and dance research. While traditional grotto scholarship focuses primarily on art history and archaeology, this study introduces dance studies as a new research perspective to expand the research dimensions of grotto art. By deconstructing the movement logic of dance postures and exploring the synergistic relationship between costumes and movements, it fills the dance studies gap in existing Wenshu Temple Grottoes research and provides a new theoretical framework for the field.

Additionally, the "costume-movement-aesthetics" analytical framework established in this study offers a new research paradigm for traditional dance costume studies. The framework integrates both the cultural and ethnic attributes of costumes and their functional impact on dance movements, realizing the organic combination of cultural and functional research. It can

be applied to studies of other traditional dance forms, advancing costume research within the discipline of dance studies.

This research also identifies multi-ethnic cultural integration as a key driving force for the development of grotto music and dance art. In the process of cultural exchange, different ethnic groups absorb outstanding cultural elements from one another and continuously innovate their own music and dance forms, ultimately forming a diverse and integrated artistic landscape. This understanding not only helps clarify the historical evolution of Silk Road music and dance, but also provides valuable insights for promoting contemporary multi-ethnic cultural exchange and integration.

Third, there is a significant synergistic relationship between costumes and dance movements. Han-style wide-sleeved costumes restrict large lower limb movements, forming an elegant and restrained dance style; Tibetan-style tight-fitting costumes and armor enhance the sense of power and ritual of the dance; Western Regions-style costumes with pendants and flowing ribbons add dynamic elements to the dance, reflecting a passionate and unrestrained style.

Fourth, the existing research on Wenshu Temple Grottoes has gaps in dance studies, such as limited research perspectives, single analysis dimensions, insufficient exploration of multi-ethnic integration, and lack of practical transformation research. To address these gaps, this study proposes innovative dimensions including an interdisciplinary research perspective, a "costume-movement aesthetics" analytical framework, in-depth exploration of multi-ethnic integration content, and a practical methodology for transforming static images into dynamic dance vocabularies.

The research results not only enrich the theoretical system of grotto music and dance research but also provide tangible evidence and operational guidelines for the restoration and inheritance of early Silk Road music and dance, highlighting the important value of multi-ethnic cultural integration in shaping artistic expressions.

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