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Microtonality and Neutral Tone in Contemporary Zheng Performance: Towards an Expanded Interpretive Framework

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Abstract

Zheng is a traditional Chinese plucked stringed instrument that was prevalent in the State of Qin (present Shaanxi) during the Warring States period.Through the change of time, the performance practice of Zheng gradually adapted to the modern innovations following the creativity of contemporary music composers including the application of microtonality from the development of Western contemporary music. In traditional Chinese music, the concept of neutral tone is similar to the concept of microtonality in Western contemporary music. Nevertheless, a majority of people support both concepts are the same, but a few research says otherwise. This research is based on the one that supports microtonality and neutral tone are different concepts, and also discusses the relations to actual performance practice which is overlooked by performers and academics. Based on the perspective that the concepts and techniques are different, this paper emphasizes exploring possibilities of performance practice. The discussion of an expanded interpretation of contemporary Zheng's performance practice is presented by examining four different compositions in order to make a new perspective of interpretation on Zheng. This paper provides an analysis method to differentiate whether the composition utilizes microtonality or a neutral tone, and expands the interpretation indicating that when microtonality is utilized in a neutral tone technique way, the potential of the rhythmical and flexible effect of rhyme will be reflected. Therefore, this article proposes an expanded interpretive framework on the basis of clarifying microtonality and neutral tone both in concepts and techniques on the Zheng instrument.

1 Introduction

The Zheng, also known as Guzheng, is a traditional Chinese plucked strings instrument that was prevalent in the State of Qin during the Warring States (475–221 BCE) and has a history of over 2500 years. According to the Zheng etymological reference book Shi Ming, written by Liu Xi during the Han dynasty, the instrument's name is derived from its bright and pleasant sound produced by casting the strings high. The rectangular soundboard is crafted from curved panels of Chinese parasol wood using chisels. The number of strings on Zheng gradually increased over many centuries, from 5 strings during the Warring States period according to the second-century historical document Fengsu Tongyi, to a fixed 21 strings by the early 1960s.
Each string has a movable bridge for fine-tuning adjustment. The 21 strings are separated into right and left strings by 21 supporting bridges: the right-hand strings are tuned to the conventional pentatonic scale, but can also be tuned to hexachord,

heptatonic, and other newly designed scales in contemporary Zheng compositions. The left-hand strings produce untuned pitches and seldom display the precise pitch in most works.

The unique physical structure of Zheng, with long and flexible strings, provided many possibilities and potentials for creating pitches that can deviate from the standard pitch. In traditional music, this phenomenon is named as neutral tone while in western art music, it's known as microtonality. Although the cultural context is different, the applications of these concepts can be found in contemporary Zheng works.

The similarity between neutral tone and microtone is that they all deviated from the standard pitch—for microtonality, it departs from the note which in 12-tone equal temperament; for neutral tone, it deviates from neither circle of fifths system nor just intonation. Their differences are reflected in various ways, such as culture, characteristic, system, and also in Zheng playing techniques.

Discussions among performers and academics often overlook the similarities and differences in the concept and performance techniques between neutral tone and microtonality. By opening up the space for discussion, performers and academics can broaden the possibilities of interpretation in contemporary Zheng music by recognizing the subtle differences in performance practice between neutral tone and microtonality.

This paper focuses on exploring solo compositions for the Zheng, specifically compositions selected after the 1980s. Around 1980, Zheng's works made a new breakthrough in terms of music concepts, forms, methods and creative styles of works, and professional composers have also begun to intervene after this period (Zhang,1995, p.24).

This paper draws upon the author's understanding and practice experience to propose distinguishing techniques for Zheng's performance, utilizing a musical practice-based research methodology. The focus is on exploring new potentials within the context of microtonality and neutral tone, evaluating existing literature and presents a comprehensive analysis of the Zheng's unique characteristics and historical development, proposing innovative techniques that can be applied to Zheng's performance, utilizing microtonality and neutral tone to enhance the instrument's expressiveness and versatility.

2 Literature review

In China, ethnomusicologists have noted a phenomenon in traditional music as the neutral tone, which deviates from the standard tone. Songguang Zhao brought this issue to light in his thesis On the Temperament Hypothesis of 3 / 4 Note (1982), followed by several other researchers who explored the topic, including Xie gang He's Neutral Interval and Neutral Tone (1985) and Fuchang Luo's On "Neutral Tone" – The Problem of the Chinese Middle Finger (1993). These articles analyze the special temperament in traditional music and discuss the meaning and application of neutral tone by their comprehension.

However, the most comprehensive and ground-breaking research on this topic was carried out by Mei Li, in her PhD dissertation, The Temperament Phenomenon of Neutral Tone (2005). Mei Li's research provided a reasonable explanation of neutral tone phenomenon and use the "Transition theory"[1] based on Zhao's to explain the complicated data result, thus solving the difficult problem of temperament.

In contrast, the rise of microtonality in Western contemporary music occurred mainly in the 1920s through the efforts of many composers, including Alois Haba, Harry Partch, Julian Carrillo, Pierre Boulez, Karlheinz Stockhausen, Krzysztof Penderecki, and others. These composers sought a new system in pitch beyond the tuning of equal temperament. Numerous research papers have emerged in relation to microtonality, such as Microtonality and the Tuning Systems of Erv Wilson (Terumi Narushima, 2019), which explores the emerging area of microtonality through an examination of tuning theories, and Tuning and Temperament: A Historical Survey (J. Murray Barbour, 2004) surveys the long-standing problems of tuning and temperament and offers a comprehensive history of tuning and temperament among other resources.

While the theories of neutral tone and microtonality may appear to be independent, some scholars consider the two concepts to be the same thing due to their similarities. For example, an article Opera Window: Microtonality and Neutral Tone (Hong Kong Wen Wei Po, Opera world, 2022) depicts "microtonality, especially micro slightly higher fa and micro slightly lower ti, commonly exists in Chinese traditional music". In Comparison of Chinese Folk Microtone Phenomenon and Western Microtone Music by Hezhou Li (2008), the author equates the two concepts and argues that "Chinese and Western microtonal music have the same characteristics of decoration and style but also have different rules of technical application." However, this paper argues that microtonality and neutral tones are two different things and belong to different temperaments.

[1] Borrowed from the physical concept of quantum mechanics--the jump of an electron from one orbit to another is called a transition. Zhao and Li use this theory to explain the neutral intervals.

Microtonality is based on the 12-tone equal temperament, whereas the neutral tone doesnot belong to any temperament (e.g., circle of fifths system and just intonation), and it is difficult to explain the owner of the temperament until Songguang Zhao and Mei Li established a transition theory to give a reasonable explanation for its temperament. Additionally, the background, cultural context, and different applications of both techniques in Zheng's performance are also different. This paper refers to Ji Qiu's Classification and Development of Zheng Performance Techniques (2004) for more information on Zheng's techniques.

3 The concept of neutral tone and microtonality

In western art music, some composers such as Alois Haba, Harry Partch, and Julian Carrillo, use microtonality in their compositions. The concept of microtonality, which refers to intervals smaller than a semitone, rose mainly in modern times. All intervals lying between the semitones of the 12-note equal-tempered tuning system are microtonalities. Several 20th-century composers have experimented with microtones and quarter-tones (Michael, 2004, p.477). While such intervals have long been used in Asian cultures, their use in Western art music is a 20th-century phenomenon (Alison, 2004, p.112).

Microtones have served both melodic and intonational functions in Western music since antiquity. For instance, in the enharmonic tetrachord of Greek music theory, an interval of a major third is combined with a pair of microtonal intervals that subdivide the tetrachord's remaining semitone. Since the Greek enharmonic scale is a series of such tetrachords, both conjunct and disjunct, its intervallic structure is only periodically microtonal, unlike modern microtonal scales (Don,1986, p.491).

As per its definition, microtonality was in the background of Western serious music and is attached to the theoretical basis of Western music, which primarily uses Twelve-tone equal temperament. Microtonality can be divided into precise values such as 1/4 note,3/4 note, 1/6 note or 1/8 note. It can also be used in any other equally divided forms in an octave, such as dividing an octave into 19 or 31 portions to create an unusual pitch concept. It can even be divided unequally to produce unfamiliar pitches.

The neutral tone phenomenon exists in Chinese traditional music, which has a similar meaning to microtonality but with different backgrounds and cultural contexts. An article titled "On the current temperament system in China" explains that from 3/4 note, refers to the scale of a certain temperament, and its adjacent high and low two temperament distances are 3/4 note, an approximate number. In Persian Arabian temperament,it is often called the neutral third interval and neutral sixth interval because of its position (Feng, 1985, p.65). Chinese music scholars continue to use the term "neutral tone"or "neutral intervals" to describe the phenomenon in a more standardized manner. Feng also explains that similar terms such as "3/4 tone, neutral tone, slightly rising, and slightly falling tone" can coexist with different name angles (Feng, 1985, p.65).

Further explanations and research have been conducted on the phenomenon. "Zhong,"representing "neutral" in Chinese, refers to the nature of intervals. If the interval between two tones is neither a whole tone nor a 1/2 tone, but a 3/4 tone or roughly 3/4 tone, the interval between two tones is less than the major second and more than the minor second, and it is the second interval between the major and minor second, then it should be called a "neutral second." Similarly, in the middle of the major third and the minor third, the interval value is about 1.3/4, which is called the "neutral third," and so on (He, 1985, p.172).

In the field of music theory, the relationship between pitch intervals has been an important subject of investigation. One such relationship is the ratio of 16:15 (112 cents),which signifies the connection between lead and tonic. Prior to the emergence of this homophonic relationship, simpler intervals such as 7:6 (267) and 8:7 (231), 11:10 (165), 12:11 (151), 13:12 (139) and 14:13 (128) were used. These pairs, except for the first two, are classified as "middle" or "neutral" intervals because they fall between the major and minor seconds (Li, 2005, p.1). Li offers a succinct definition of the neutral tone as a homophonic series. In a harmonic series, the seventh, eleventh, and thirteenth notes are prime numbers that give rise to neutral tones because these series do not conform to the pitches of a standard system. The frequency ratios of these notes to other pitches are not simple. Hence, the concept of the neutral tone can be related to other homophonic numbers like 7, 11, and 13. Neutral tones can come from unusual relationships such as 11:10, 12:11, 13:12, and 14:13, in addition to the more common ones such as 2:1, 3:2, 4:3, 5:4, 6:5, 8:5, and 16:15.

Therefore, in a broader sense, neutral tone and microtonality have the same meaning; both describe the phenomenon where the pitch between semitones varies. However, in a narrower sense, they are not equivalent. Firstly, they differ in historical periods, as the neutral tone originated in ancient times, and has a historical explanation for its preference in hearing, whereas microtonality began in the 1920s. Secondly, they differ in temperament. Neutral tone does not belong to any temperament, while microtonality was created in Western art music and based on the 12-tone equal temperament with highly developed music systems. Lastly, the neutral tone employs "three-quarter notes"to describe the "middle interval" or "neutral interval," while microtonality uses "quarter-tone," "one-sixth note," "one-eighth note," "one-sixteenth note," and so on to represent intervals that are smaller than semitones.

4 Categorization of the performance techniques for microtonality and neutral tone

In contemporary Zheng music, microtonal techniques are utilized in a number of works,each reflecting a unique application of these techniques. The Zheng, a traditional Chinese plucked-stringed instrument, provides many possibilities for producing microtonal music due to its flexible design. The left hand of the player can change the tension of the strings to create different pitches, and the placement of the strings on the left and right sides of the instrument, divided by bridges, allows for even more possibilities. Additionally, the strings can easily be tuned into microtonal pitches during performance when necessary. While neutral tone is mainly produced by left-hand techniques, microtonality can be created by left-hand techniques as well as other applications. There are more methods for producing microtonality than neutral tone on the Zheng, breaking through traditional practice and seeking the infinite possibilities of this traditional instrument.

Neutral tone on the Zheng exists in a special context and is attached to a certain musical background such as Chaozhou school and Shaanxi school special scales and particular notes (fa and ti). To establish a visualized research object, one category is set up by separating different utilized areas, and the microtonality applications are further divided to separate the different functions of usage (see Table I).

Table I. A category table shows microtonality vs neutral tone in different applications.

Item	Application1	Application 2	Application 3
Neutral tone	Neutral tone pitch involving both sides of the strings.	(Inapplicable)	(Inapplicable)
Microtonality	Microtonal pitch involving both sides of the strings.	Microtonal pitch involves using an external tool object.	Microtonal pitch involves moving the bridge or tuning box.

Microtonality and neutral tone can overlap in the first application, which involves both sides of the strings. By plucking the right-side strings and using left-hand techniques on the left side of the strings, microtonality or neutral tone pitch can be produced. Other applications of microtonality can be produced by using external tool objects such as a coin or a bow and by moving bridges or the tuning box to obtain the microtonal pitch.In the overlap application of left-hand techniques, the most prominent difference is the extent of richness, rhyme change, and delicacy of the left-hand technique. Contemporary compositions embody microtonality and use simplified rou-yin-hua-an (揉-吟-滑-按) techniques, whereas traditional genres, especially in Chaozhou school (see Table II) and Shaanxi school (see Table III), possess generous left-hand techniques. Moreover, each left-hand technique is commonly used in combination and has a variety of changes during the process.

Table II. Left-hand techniques in Chaozhou school.

symbol	♪	↳	↓	4♪,7♪	~	↳~	♪~	7 7 ·	大 ③ 5	ω	~~	∞
name in English	up glide	down glide	click press	press gliding	vibrato	vibrato after down glide	vibrato after up glide	double press	pressing by thumb	string-kneading	Chant a string	round glide
name in Pin in and mandarin	shang huayin (上滑音)	xia huayin (下滑音)	dian an (点按)	an huayin (按滑音)	chan yin (颤音)	xia hua hou chan (下滑后颤))	shang hua hou chan (上滑后颤)	shuang an (双按)	da zhi an yin (大指按音)	rou xian (揉弦)	yin (吟)	hui hua (回滑)

Table III. Left-hand techniques in Shaanxi school.

symbol	♪	↳	↓	4♪, 7♪	~	↳ ♪ ~ , ~	大 大 ③ b7→4 5 ·	∞	~ 4	≈ 4
name in English	up glide	down glide	click press	press gliding	vibrato	vibrato during gliding	pressing by thumb	round glide	vibrato during press	heavy vibrato
name in Pin in and mandarin	shang huayin (上滑音）多用小三度上滑音	xia huayin (下滑音)	dian an (点按)	an huayin (按滑音)	chan yin (颤音)	chan hua (颤滑)	da zhi an yin (大指按音)	hui hua (回滑)	an chan (按颤）按颤游移音	zhong chan (重颤)

Table IV. Left-hand techniques in contemporary zheng works after 1980.

symbol	♪	♭	↓	~~	≈	③ 5	ω	ω
name in English	up glide	down glide	click press	vibrato	heavy vibrato	pressing to the same pitch as a note already on strings	round glide	string-kneading
name in Pin in and mandarin	shang huayin (上滑音)	xia huayin (下滑音)	dian an (点按)	chan yin (颤音)	zhong chan (重颤)	tong yin an（同音按）	hui hua（回滑）	rou xian (揉弦)

The traditional Zheng is tuned based on a pentatonic scale mode and does not include Fa and Ti pitches on the tuned string. Therefore, it is necessary to press the left hand to produce the pitch on the left side of the Zheng bridges. With the flexible varieties of rou-yin-hua-an techniques, the Fa and Ti pitches are fully utilized to create a variety of timbre and musical expression. The essence of Zheng music is "yun" (rhyme), which means the musical flavor resulting from left-hand bending strings and is reflected in these techniques.

The exact pitch of Fa and Ti in different schools has subtle differences and deviates from the standard pitch in Twelve-tone equal temperament or any other temperaments. Due to the approximate nature of these pitches, they are also called "two changing notes" in traditional Zheng music, which are displayed incisively and vividly in the context of neutral tones. These two pitches vary with different schools and even have different scales in different tunes or styles in the same school. For example, in Shaanxi school, the "ku yin" scale, Chaozhou school "light-three, heavy-six," "heavy three-six," "active five" and other different scales have different types of sounding in neutral pitch.

5 Comparing different applications through analysing compositions

Based on the categorization outlined in Table 1, four representative pieces of music have been selected for analysis in order to examine the differences between neutral tones and microtonality in performance practice. These pieces include:

i）“Cat’s Romp” by Yuan-Chen Li (2003),

ii）“Phase Transition” by Lily Chen (2008),

iii）“The Shadow of the Sun IV” by Wenchen Qin (2000),

iv）“Lan Yin Hua Shan” by Wenjia Liu (2005).

These selections were made for their representative characteristics, which can effectively demonstrate the problem at hand. "Cat's Romp" and "Phase Transition" correspond respectively to the categories of "Microtonal involves moving the bridge or tuning box" and "Microtonal pitch involves using an external tool object". Meanwhile, "The Shadow of the Sun IV" and "Lan Yin Hua Shan" are selected to discuss the third category of "Microtonal pitch involving both sides of the strings".

In the following discussion, each piece will be examined by comparing the same excerpt in two different interpretations. First, the selected excerpt will be interpreted as microtonality, followed by an interpretation as a neutral tone. Then, the composer's intention will be included in the discussion in order to discover the link between interpretation and the composer's intention.

"Cat's Romp" is a composition by Yuan-Chen Li, whose creative inspiration came from the composer's two cats. This work represents a departure from previous performance practices, as it is written in a theatre music style that exaggerates the characteristics of the feline spirit animal. The piece includes many visualizable actions, such as pacing, tickling, and jumping, to imitate the cat's character. The focus of this analysis is on the special tuning utilized in this composition, which requires the adjustment of seven of the twenty-one strings by 40 cents either up or down (see Figure 1).

To adjust the pitch following the tuning system, the pitches of the strings are tuned into an artificial tuning before the performance of the work. When performing on these seven strings, which have been altered by 40 cents either higher or lower, microtonality can be produced directly. This work is classified as the type of "microtonal that involves moving the bridge or tuning box". This approach to application provides a creative method for producing microtones.

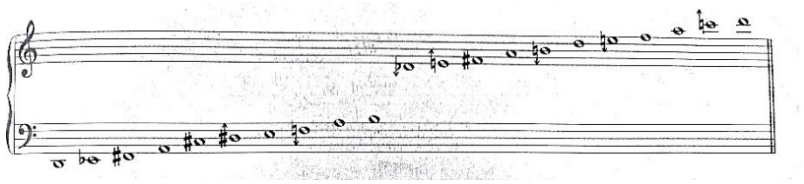

Fig.1. The tuning of “Cat’s Romp” by Yuan-Chen Li. The arrows imply the increasing or decreasing of the pitch by 40 cents.

When considering the application in a neutral tone way, the use of left-hand techniques would need to be taken into account. For pitches that have already been adjusted slightly higher or lower than the Twelve-tone equal temperament, using left-hand techniques in a neutral tone way could increase the difficulty of application but with more musicality. For example (see Figure 2), when performing the round glide (bar 6), vibrato (bar 7), and up-glide (bars 7, 9, and 10), the neutral tone effect could be considered, such as playing vibrato during or after gliding techniques, to enhance the performance with more musicality and a lingering sound. This would result in an interpretation of the composition with a wider range of expression.

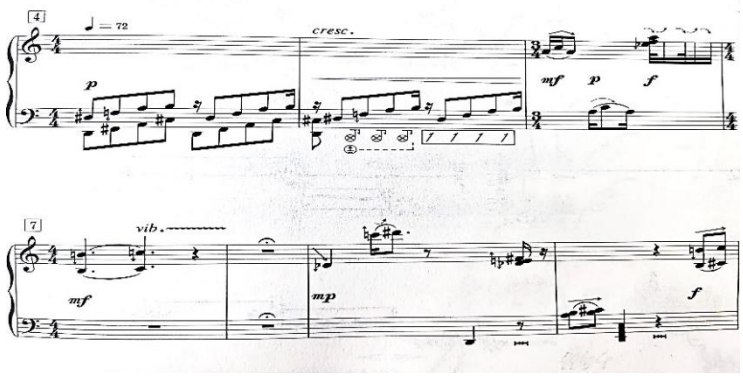

Fig. 2 shows a segment of “Cat’s Romp” that demonstrates various left-hand techniques. The arrows in different directions indicate gliding, while the wavy line represents vibrato.

With regards to the background of this work, it can certainly follow the composer's intention. Since the seven notes are randomly adjusted and without traditional background, these notes should be considered as microtonality, and ordinary left-hand techniques can be applied as what has been written in the scores. However, the application of neutral tone techniques unveils a new possibility in this work. It enhances the interpretation of microtonality and provides the work with more space to explore. The developmental potential can break the fixed mindsets of both composers and performers, and promote more vivid musical communication.

"Phase Transition" is a prepared 21-stringed Zheng solo composed by Lily Chen in 2008. This work employs the object incisively and vividly. It confirms the categories of "microtonal pitch involving using an external tool object" classification. In this composition, different tools, including a bow, superball, paper, and clips, are used on an unfretted 21-string Zheng as performing devices, creating timbre diversity and allowing new sonorities to emerge from the traditional instrument.

There are various methods of producing microtonality in this piece. For instance, one can hang several paper clips on the string, entwine tissue paper around the string near the movable bridge, fix a medium-sized binder clip on the string near the nut, or hang small bells on the string, among other objects. These objects are applied to one or three strings, causing 11 string pitches to deviate from their original pitches in a microtonal way. Therefore, when performing on the prepared Zheng, the "real pitches" shown on the staff in Figure 3 can be displayed. Furthermore, microtonality can also be produced by other tools like a bow or superball, which make it more unstable from the perspective of pitches.

Regarding the possibility of neutral tone in this composition, it can be a mixed situation to explore. The prepared condition has already been set for the deviated pitches, so left-hand techniques like vibrato or pressing should be established on these pitches and displayed with more variation. For example, the vibrato could increase the richness of the rhyme by creating a non-average frequency or density, width, and the pitch produced by left-hand techniques can further deviate with a "wander" pitch. From the composer's perspective, the intention is to seek new possible sonorities out of the traditional instrument, which is contrary to the concept of neutral tone application. Thus, it can still be considered a microtonality application. However, neutral tone application can also be possible to demonstrate a wider consciousness.

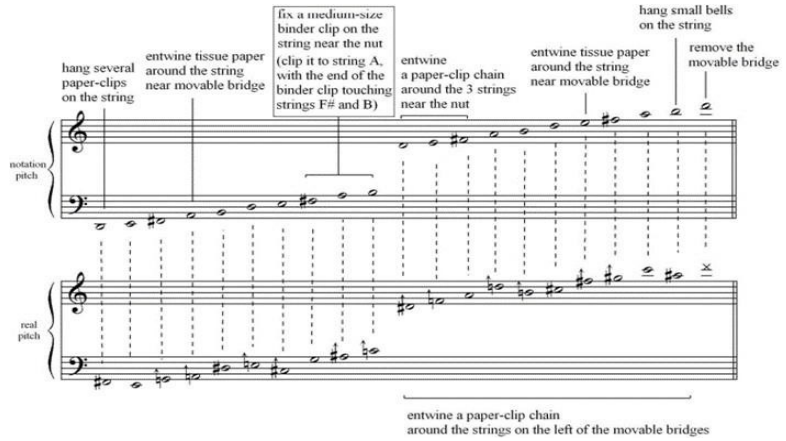

Fig.3. The Zheng tuning of “Phase Transition” (cite from Yi-Chieh Lan, 2018, p.154).

"The Shadow of the Sun IV" is a modern Zheng composition for solo Zheng. The application of this work is classified as "Microtonal pitch involving both sides of the strings." Composer Wenchen Qin used Mongolian music elements associated with his childhood memories and compositional experiments to express his attachment to his hometown. The work consists of five sections:

1) Klang (籁),

2) Lange Diao (长调),

3)Stille und Sonnenlicht (静谧与光),

4) Zichende Wolken (行云), and

5) Lied auf den (弦上的歌).

Each section is related to the number "9" like a digital symbol that is replicated in different forms (Qin, 2020). In this modern composition, microtonality is a preferred technique used to imitate playing on the string of horse-headed fiddles, a bowed stringed instrument with a scroll carved like a horse's head that is used by the Mongols.

The score and music descriptions of "The Shadow of the Sun IV" outline three types of microtonality, which include raising three-fourths of a note, raising one-fourth of a note, and reducing one-fourth of a note. The Hua yin technique is utilized to produce these microtonalities. For instance, in bar 13 (refer to Figure 4), two original notes are elevated by three-fourths of the pitch, while the other two notes remain unchanged. To create the microtonal pitch, the left hand applies the up-glide technique by pressing the left string. The thumb, and a set of index, middle, and ring fingers press string numbers 14th and 15th simultaneously and respectively. In bar 15, a quarter-tone is achieved by shifting D to one-fourth E pitch utilizing the up-glide technique. As a result, the original pitch is raised by one and one-fourth notes. Moreover, in bar 20, a sharp three-fourth note can be observed, which glides from a chord in bar 19. Here, the original D moves to three-quarter-tones D, and the original G slides to three-quarter-tone G pitch. The exact notation for each quarter tone precisely reflects the microtonality inclination.

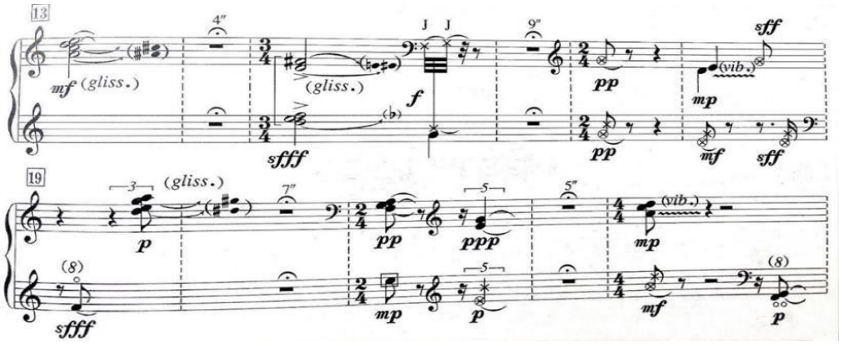

Fig. 4. The fragment of microtonality used in Wenchen Qin’s “The Shadow of the Sun IV”.

Another example can be found in the second section of the piece, entitled "Lange Diao" (see Figure 5), which translates to "long tune." This section comprises of only one bar with two extended phrases. Within this section, flat quarter tones D and A

are employed multiple times, causing the sound to fluctuate between normal pitches. This effect is produced by using the sustaining up-glide and down-glides in the left hand to prolong the sound.

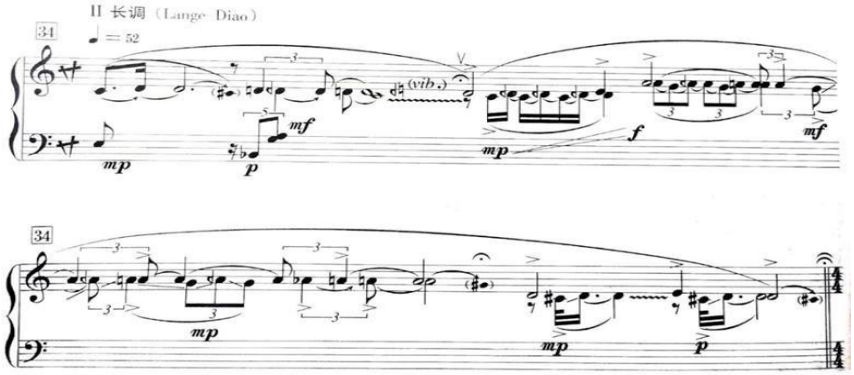

Fig.5. The fragment of reduced 1/4 microtonality used in Wenchen Qin's "The Shadowof the Sun IV".

In the above two examples, every single quarter-tone pitch should be strictly followed by the notation when considering quartertones as microtonality. The microtonality in these two segments is produced by techniques such as hua yin (gliding), chan yin (vibrato), which include up-glide, down-glide, hui huayin (round-glide), vibratos and so on. When considering microtonality, these techniques should be performed following the score, with the pitch kept at the exact the same pitch. The frequency of vibratos should also be controlled evenly and consistently.

In contrast, when considering these same musical examples as neutral tones, the performance changes slightly. The left-hand techniques are broadly the same as for microtonality, but in the performance practice of neutral tone, these techniques could be performed more lively. For example, the pitches could be varied in vibrato and round-glide, and need not strictly stick to the exact standard pitch but instead should reflect the deviation character of the neutral tone. The vibrate rate and frequency of these vibrato techniques can be performed more flexibly under the essence of left-hand techniques. The pitch creates a "wandering" pattern, and the flexible in depth, density and frequency characteristics all build the left-hand techniques more vividly in neutral tone situations.

In summary, the composer's intention can be realized in both situations. On the one hand, the first musical example (see Figure 4) is marked with symbols that are the same as those used in contemporary Western art music, requiring the exact pitch that can be considered microtonality. On the other hand, the second example from Figure 5 embodies rich left-hand techniques and is based on Mongolian tone, making it better suited to being considered neutral tones. However, although the composer does not provide more information on which application the work is adapted to, both can be considered neutral tones to augment the flexibility and rhyme through the use of neutral tone left-hand techniques.

"Lan Yin Hua Shan" **(**阑引花珊**)** was composed by Wenjia Liu in 2005. She is also a famous Zheng performer herself. The creative inspiration for the music comes from the Chaozhou folk Zheng music played by the composer. The performance technique, pitch organization, and rhythm characteristics of Chaozhou Zheng music are integrated into a series of modern acoustics, and the melodies of Liu qingniang in "active five" and Liu qingniang in "heavy six" are quoted. The work strives to expand and enrich the connotation of modern music with the temperament and spirit of Chinese traditional music (Liu, 2005, p. 68).

This work employs the main melody segment (see Figure 6), wherein the notes with downward arrows in bar 3 and bar 4 in this figure were transcribed in music texture several times in different music paragraphs. These melodies come from the representative repertoire of Liu Qingniang in the Chaozhou school, and the different tuning scales"active five" and "heavy three-six" were also incorporated, as were the neutral tone techniques.

The Chaozhou "light three-six" scale is identical to the pentatonic tuning of the open strings: sol, la, do, re, mi. However, the scale changes to "light-three, heavy-six" if the mi (six) is pressed to become a neutral fa (sol, la, do, re, fa) in the course of playing. The "heavy three-six" scale is used when la (three) is pressed to a neutral ti and mi(six) is pressed to a neutral fa (sol, ti, do, re, fa). The "active five" scale contains a neutral ti and a neutral fa combined with a distinctive heavy vibrato centred on a neutral re (five). A modal variant of "light-three, heavy-six" that starts on its dominant is called "reverse string" (Han, 2013).

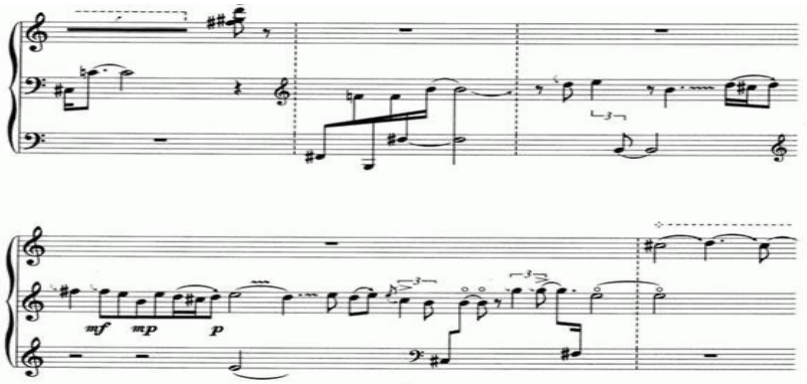

Fig.6. A segment from “Lan Yin Hua Shan” which applied down-glide and vibrato techniques to create traditional characteristic.

Because of the source material from the Chaozhou school, the down glide and vibratos should be considered in a neutral tone pitch. In this piece, D represents ti and F represents re because of the different notation (tonic solfa used in the traditional school and they commonly use numbered musical notation), and D (ti) should be performed slightly lower than normal D, and F (re) should be a lively neutral F. These two pitches stand out in the score because many left-hand techniques are used to display the neutraltone characteristic. Besides the down glide and round glide and some vibratos in this example, the Chaozhou Zheng school prefers to add vibrato after the up/down glide or yin techniques. In this case, after plucking on the right side of the string, the left hand presses the string several times rhythmically and frustratingly to decorate it with a flexible effect.

When this performance is considered in a microtonal way, the rhyme of the lasting sound would not be as vivid as it would be in a neutral tone. The pitch would also differ from the inherent pitch that originated from tradition and has a unique aesthetic in the particular region. Based on this comparison, these pieces should be played in neutral tones to bring out the traditional essence.

6 Conclusion

From the perspective of different musical concepts and temperaments, cultural and historical backgrounds, and performance techniques, microtonality and neutral tone share similarities but possess distinct characteristics. A better understanding of this comparison is presented in Table V. Although neutral tones are considered a part of microtonal applications, their rich techniques produce a lasting appeal known as "Yun (rhyme)", which cannot be surpassed or compared by microtonality. However, with further possibilities, microtonality can also be demonstrated by using objects (tools) and adjusting the bridge or tuning box, which can result in notes with more Yun (rhyme).

When exploring the overlap in the application of left-hand techniques, it is evident that the process of forming an interpretation in performance is noticeably different when a performer interprets the notation of a pitch written smaller than a semitone as either neutral tone or microtonality. The characteristics and flexibility of these techniques are demonstrated in the four pieces studied.

Table V. Differences between microtonality and neutral tone.

Perspectives	**Microtonality**	**Neutral Tone**
Historical and cultural backgrounds	- Can be traced back to ancient Greece’s “tetrachord”, around 354-300 BC - Arise in the 1920s in Western contemporary music - Established on the 12-tone equal temperament of western music	- Can be traced back to the remote antiquity of China. Or maybe influenced by the Arabic neutral tones which emerged around 750 AD in Arabic - The neutral tone phenomenon exists in Chinese traditional music, for example, in folk songs, and unearthed musical instruments, and has a long history but has been paid attention to since 1982 - Does not belong to the traditional Chinese temperament—circle of fifths system nor just intonation

Musical concepts and temperament	- Does not have limitations, any note deviating from the 12-tone equal temperament can be considered a microtone - Uses "quarter-tone," "one-sixth note," "one-eighth note," "one-sixteenth note," and so on to represent intervals that are smaller than semitones - Created in Western art music and based on the 12-tone equal temperament with highly developed music systems	- Commonly is the fa or ti note and limited in special scales of school - Employs "three-quarter notes" to describe the "neutral interval" - Temperament attributes go beyond the known tuning systems
Performance techniques	- The pitch is relatively fixed - The application of left-hand techniques is rare due to the simplify left-hand techniques in contemporary Zheng performance - The Yun (rhyme) lacks variation, and the density and vibrato rate is average	- The pitch is different and has the "indeterminacy" and "wandering" (the pitch is not fixed and changes) traits. eg: (1) In the Shaanxi school, the descending scale in melody, especially the notes around Fa and Ti, displayed a gradual downward trend, and the pitch in the process is different. (2) In the Chaozhou school, different tuning scales like Huo wu, Zhong liu, Fa and Ti have different pitches. - The techniques of left-hand are rich, many of them are a combination of use - By Yun (rhyme), the depth, density, width, vibrate rate, and frequency are different in left-hand techniques

In summary, the possibilities of interpretation in contemporary Zheng performance practice, based on the different performance techniques of microtonality and neutral tone discussed in this article, show that when performers have a deep understanding of the similarities and differences between the two, the possibility of interpretation is expanded. It is crucial for performers to be aware of these terms, especially in the left-hand techniques used in microtonality or neutral tone, to enhance the performance practice of interpreting contemporary Zheng music. Furthermore, this research provides a basis for exploring the possibility of deviated pitch in interpretation.

The study of microtonal music applications on the Zheng instrument aims to classify and investigate the novel techniques used to develop and explore the instrument's potential and capabilities. The Zheng instrument serves as a lens through which Chinese music can connect with the Western music scene, revealing how ancient traditional instruments can intersect with Western art music and ignite creative sparks.

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