

Comparative Study of Melodic Structures: Differences Between Karnāṭik Rāgas and Western Scales

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Abstract

Rāgas are the foundation of Indian music. This foundational system often faces the challenge of being compared to the western music concept called scale. This paper argues that such an equivalence is musicologically flawed. A Rāga is more than a scale and it is multifaceted. This study points out the three major ways in which the two concepts differ: the relational nature of śruti, the melodic movements called gamaka and different types of notes such as jīva svara, amsa svara etc.,. The scale in western music acts as a collection of fixed intervals. A rāga is much more flexible. This difference must be established because this is a foundational theory concept and this will represent both the systems more accurately.

Key words: Karnāṭik music, Music theory, Rāga, Western scales, Musicology.

1. Introduction:

Different genres in the world have different ways of interpreting music and the concept of melodic structures is common among them. Musicians living in the modern age Have to interact with Musicians from across the world for various reasons. When Indian musical logical concepts are being explained, the term scale is used as a translation for rāga. The term scale is very different from the term rāga musicologically and these terms can't be used as an equivalent for the other. The concept of rāga predates the western music concept of scales. The word Rāga evolved as a sophisticated entity by itself in the book Bṛhaddeśi by the sage Maṇḍana. This book is said to have dated between 6th to 8th century CE.

2. Research Problem:

The term “scale” doesn't translate the concept of rāga in its entirety. This usage leads to misrepresentation of the concept of rāga. This also ignores the melodic nuances like gamakas, prayōgas and different kinds of svaras that make Indian music unique. The term rāga doesn't represent the word scale either. This practice of using these terms interchangeably doesn't represent both the genres accurately.

3. Scope of the study:

This paper showcases the differences between a karnāṭik and western scale. The concepts discussed in the study are applicable across the landscape of Indian classical music. The examples mentioned in this paper will be based on both karnāṭik and western music theory. The difference between both the terms explained through the role of pitch notes ornamentations and phrases that affect the melodic structure.

4. Meaning of the terms Rāga & Scale:

A scale is defined as a ladder of discrete pitches arranged in ascending or descending order serving as a pitch set or key signature from which a melody is constructed (Parncutt). In simple terms a scale is made up of absolute frequency intervals. In contrast Rāga is defined as something that has a “distinct identity” as per professor P. Sambamūrthy. He mentions that rāgas are so many statues visible or rather perceivable by the aural sense (Sambamūrthy). Mataṅga, in his work, mentions rāga as-

*Yo'sau dhvaniviśeṣastu svaravarṇavibhūṣitaḥ |
Rañjako janacittānām sa rāgaḥ kathyate budhaiḥ ||*

This very sloka explains why rāga is more than a collection of fixed frequencies or notes. Mataṅga mentions “Dhvani viśeṣaḥ” which literally means a special sound. On a deeper level this word implies, a specific soundscape or a melodic entity. The following words Svara varṇa vibhūṣitaḥ means adorned with svaras and varṇas. The sloka mentions rāga as something that is beautified by notes and patterns. It's important to note that Mataṅga didn't limit rāga to notes alone. The next line Rañjakaḥ Janacittānām means that which colors the minds of people. In an Indian music concert different rāgas evoke different emotions among the listeners, and this concept is explained by the previous line. The words *rāgaḥ kathyate budhaiḥ* means learnt by the wise. In ancient India the concept of Rāga was learnt by musicologists and experts. According to Mataṅga, the Rāga is something that creates a specific soundscape, it is adorned by varṇas, evokes different emotions in minds of people and is learnt by the wise. These definitions of both rāga and scale show how fundamentally different these two concepts are. The forthcoming sections will explain how these two concepts differ based on various musicological angles.

5. Pitch Based differences:

Rāga and scale differ Fundamentally based on how each system handles pitch. In Western Musicology a scale is a collection of intervals which are in a particular pitch. According to the dictionary of music, A scale is a set of pitches in distinct relationships frequently governed by Equal temperament system where each note has fixed standardised frequency (Randel). This definition explains that scales are actually fixed to the pitch. For example, the scale C major is defined by starting frequency of it. If the starting frequency is changed the scale will no longer be C major. The musician can only change the pitch with a procedure called transposition which

alters the character of music in harmonic context. The rāga, is not tied to a pitch. The ādhāra ṣaḍja can be any frequency as long as the intervals of the rāga is maintained. So, this ādhāra ṣaḍja serves as a flexible starting point rather than a fixed frequency. Rāga can be performed by Male or female musicians at any pitch and the essence of it will not be lost. In western music the pitch gives a fixed structure for maintaining the melodic framework. In Indian music, the pitch of a rāga is flexible. The definition of a rāga doesn't rely on a specific frequency.

In Indian music concerts, the pitch of the songs remains the same throughout the entire performance. This creates focused acoustic atmosphere where the listeners can focus on the micro tonal nuances in relation to constant drone. Whereas in Western concert, the key would change multiple times during the performance. For example, a Symphony might move from C major to G major which basically shifts key from C to G. As a result, the scale is mobile in western music. It is allowed to change during the performance. This is another difference between the western scale and rāga based on the pitch of performance.

6. Differences based on Ornamental elements:

The major ornamental element used in western music is a vibrato. This is an oscillation in a note which can be used as a stylistic ornament. The function of vibrato is very different from the ornamental elements in Karnāṭik music called gamakas. In western music, the presence or absence of a vibrato doesn't alter the identity of a scale. For instance, the C major scale will remain structurally same whether it is performed with straight notes or with wide vibrato. As mentioned by Robert Donington, ornamentation in western context serves as a "grace" to enhance a note that already possesses a fixed, discrete identity (Donington).

In Karnāṭik context, the usage of gamaka defines a rāga. The gamaka isn't for ornamentation only. The application of gamakas distinguishes different rāgas with similar notes. For example, the ārohana of the rāgas Malahari and Sāveri is the same S R1 M1 P D1 Ś. but the way the note Ri is treated decides the identity of the rāga. In malahari the svaras can be rendered plainly as the rāga is primarily used for teaching, the notes are steady. However, in sāveri the Ri is rendered with a kampita gamaka which is taken from Sa. This immediately signals the essence of the rāga bhāva. Without this gamaka on Ri, the rāga is reduced to a static scale, losing the rāga bhāva. Hence gamakas, which are commonly known as ornamental components become defining element for the rāga structure. In a western scale, elements like vibrato are purely ornamental. But in Indian music, the usage of ornamental elements defines the rāga.

7. Differences based on usage of notes:

There is this concept of jīva svaras which exists in Indian music but not in western music. The jīva svara is the life-giving note for a rāga. It is the focal point of a rāga's identity. The usage of jīva svaras bring out the essence of the rāga. In the rāga Kharaharapriya the svaras Dha and Ni are the jiva svaras. It means when the performer is singing or playing this rāga, the essence of the rāga will not be felt until they use dha & ni. If the performer is building phrases around the notes S R G M only in Kharaharapriya, for the listener it might make them think of all the other rāgas which also use the S R2 G1 M1 combo. Only when the performer uses phrases that

touch D and N the rāga bhava of Kharaharapriya will be established.

Another concept is the importance of phrases. Rāgas aren't entirely note based. A western scale has to be collection of notes where any combination of notes is considered valid until it's within the key. Whereas in Indian music linearity isn't expected. For instance, Rītigaṇḍa is known for it's phrase "NDMNNŚ" without this phrase the rāga's identity won't be established. The ārohana and avarohana of the rāga is also jumbled like SGRGM NDMNNŚ and ŚNDM GMPMGRS. If the nonlinear and definitive phrases are removed from Rītigaṇḍa it'll lose it's identity and sound like Kharaharapriya instead. Western musicology Scale as a pitch class set which is inherently permutational. This means the order of the notes does not change the identity of the scale itself (Forte). But in Indian music Rāga is procedural, in certain rāgas, like Rītigaṇḍa, Ānandabhairavi, Nāṭṭakuriṇḍi etc, the phrases define the rāga. Hence the creativity of musician is not about creating phrases in any combination, but it is about exploring the allowed paths which are defined by these prayōgas.

Another major difference is how both the systems handle foreign notes or bhāṣāṅga svaras. According to William Drabkin, accidentals are structural markers that temporarily alter the pitch of a note to satisfy the demands of the underlying harmony (Drabkin). The accidental note is a visitor in western music. The accidental note actually belongs to the key signature and it helps in Changing of the key or to create chromaticism for harmonic tension and resolution. In Indian music, bhāṣāṅga svaras are the notes that enhance a rāga's beauty and emotional depth. A classic example is Kāmbhōji, a śāḍva sampūrṇa rāga. This rāga normally uses kaiṣki niṣāda N1 as mentioned in the avarohana. However, whenever the phrase Ś, N P D Ś is used, the N there would be kākali niṣāda. Such a phrase is called viśeṣa praōga in karnāṭik music. A musician might perform Kāmbhōji without ever touching the phrase Ś, N P D Ś but it wouldn't be as complete and beautiful. This particular prayōga adds a distinct colour and aesthetic charm to the rāga. In western music, an accidental note is often a functional tool but in Indian music bhāṣāṅga svaras acts as an identity marker that defines the unique side of a rāga.

The concept of harmony also makes the scale and rāga much different. Western music is highly harmonic. The role of a note in western music is defined by its contribution to a chord. A chord is a vertical stack of notes played simultaneously to create harmony. According to Aldwell and Schachter, western music depends on the harmonic function of a note, where its significance is derived from its position within a triad or seventh chord. In western music chords add color and define the emotional state. The emotional flavours vary based on the kind of chords used in the song. So, the scale becomes the foundation on which these harmonic blocks are built. This kind of polyphonic structures do not exist in Indian music. Additionally, the identity of a scale in western music is defined by the underlying chord progression. In western harmonic context if the chords change significantly the scale used will also change to maintain the harmonic consonance. This is called a chord scale theory. For example, if the Chords used were changed from a C major triad to a D major triad, the scale will shift from C major scale to C Lydian scale simply because the underlying chords changed (Nettles and Graf). In Indian

music, the identity of Rāga is not dependent on harmonic shifts but the rāga gives a set of rules for how far the notes can move or oscillate. This is another major reason why a scale is much different from the Indian rāga. The key differences between both the terms are given in Table 1.

Table 1: Differences between Indian Rāga and Western Scale

<i>Feature</i>	<i>Rāga</i>	<i>Scale</i>
Pitch logic	Any note can be used as the pitch; the intervals must be relational to the starting note	The pitch is tied to absolute frequency (e.g. C or D)
Defining elements	Defined by combination of notes, gamakas and prayōgas	Defined by the interval set and the underlying chords
Hierarchy	Some notes (Jīva svaras) carry the life and weight of the raga	All the notes have set rules based on their position in chord progression.

8. Results:

This comparative analysis showcases that a Rāga is ontologically and functionally a separate entity unlike the western scale. The nature of the pitch itself was found to be different. The scale relies on absolute pitch frequency and the rāga operates on relational śruti system. My analysis proves that gamakas act as identity markers for the rāga, apart from being an ornamental element. The research also explains the priority of svaras, which is a unique concept to Indian classical music. The presence or absence of jīva svaras makes or breaks the rāga's identity. The analysis of viśēṣa prayōgas and bhāṣaṅga svaras prove that rāga is based on procedural grammar than mere permutational pitch set. The results indicate that a rāga is dynamic, procedure driven and cannot be reduced to a combination of notes. The western scale is a functional extension of the harmony which is not the case in Indian music. These fundamental differences make the two terms much different musicologically and highlight the reason it cannot be used interchangeably.

9. Limitation of the study:

This study is primarily theoretical and qualitative focusing on musicological frameworks rather than quantitative musical data. The comparison is limited to Karnāṭik system and western classical music only and doesn't cover other global systems. The 12 note svarastana system is followed to ensure ease of access for both karnāṭik and hindustāni readers. This research is contemporary and focuses on application of theoretical frameworks. It does not attempt to map the historical evolution of rāga or scale antiquity to the present day.

10. Conclusion:

The term scale is frequently used as a translation for rāga. This study shows that such an equivalence is inaccurate. A scale provides the architectural skeleton for the melody and the rāga is a living identity in itself, it gives the flow for movement, hierarchy of svaras and emotional colour. This paper insists on maintaining the term rāga in interviews and lecture

demonstrations related to Indian music to maintain the technical and cultural accuracy of Indian classical music. As the intersection of musicology and technology continues to grow, maintaining these theoretical boundaries is vital for authentic digital representation. Future research may extend this comparative analysis into how computational models must be trained to use the right terminology to preserve the authenticity of Indian music. Linguistic analysis can also be in same direction to find whether using western terminologies reduce the complexity of indigenous concepts. Recognizing that these two elements are different and using the right terms in the appropriate context is important to preserve the cultural integrity of both genres.

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