

Abstract

- Schematic knowledge shapes interpretations of melodic conformity, i.e., the goodness of the fit of notes within a linear sequence
- Simplicity of Western tonality → ability to form schemas, even in non-musicians
- Aim: investigate the impact of tonal-system complexity on our ability to discern melodic inaccuracies

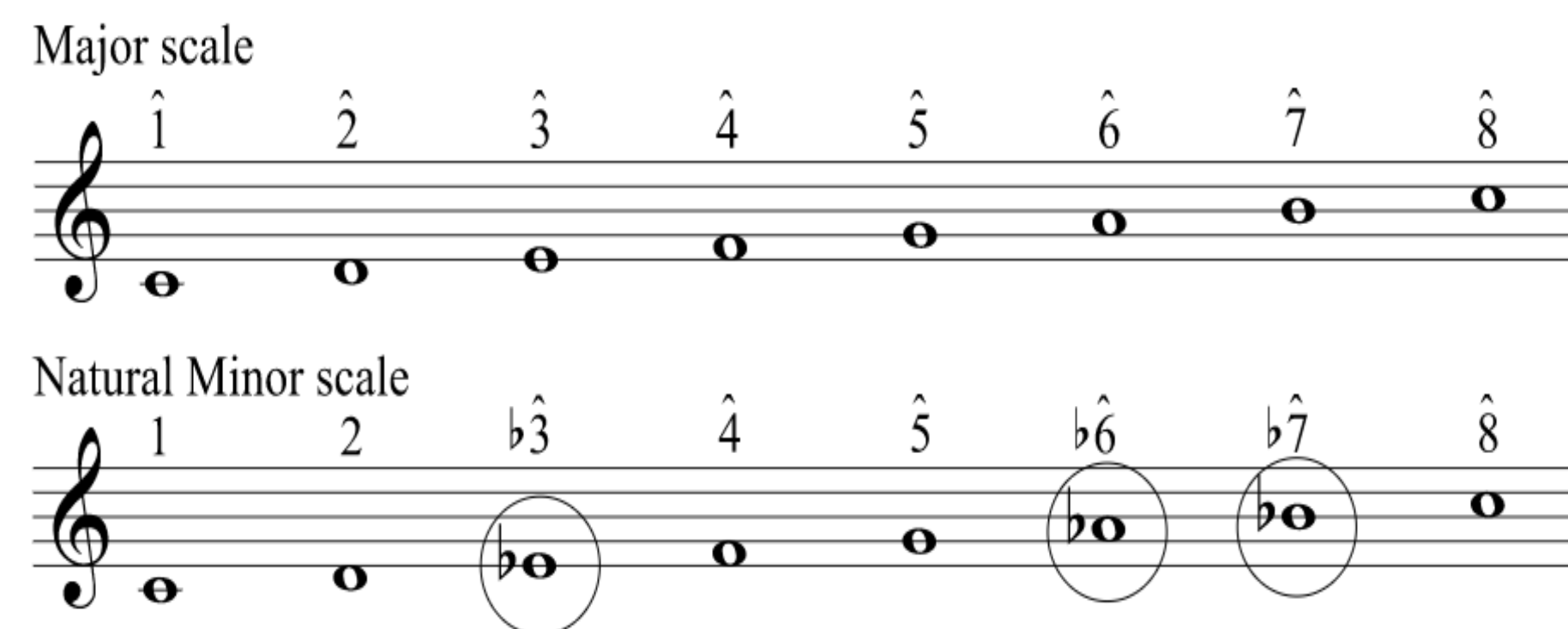


Figure 1: Two Western modes: major and minor (Hutchinson)

Background

- Three types of classical Chinese music (CCM): Chinese opera music, ensemble or orchestral music, and solo instrumental music
- CCM is very region-dependent
- Main and most common theoretical framework of classical Chinese music is built on pentatonic scales → 5 modes



Figure 2: Chinese Modes (Luo-Ting, H. & Kuo-huang, H., 1982)

Objectives

- Previously, Western tonal-harmonic music (THM) was compared with South Indian Carnatic music, which is theoretically complex, e.g. multiple scales
- All participants, except the non-expert Carnatic listeners, identified non-conforming melodies → non-experts did not have schematic knowledge
- CCM and THM are similar in terms of theoretical simplicity (see Figure 3)

| Components | Tonal Harmonic Music (THM) | Classical Chinese Music (CCM) |
|-----------------|---|---|
| Note Collection | 7 notes in a scale: tonic, supertonic, mediant, subdominant, dominant, submediant, leading tone | typically, 5 notes in a scale: <i>gong</i> (corresponds to tonic), <i>shang</i> (corresponds to supertonic), <i>jue</i> (corresponds to mediant), <i>zhi</i> (corresponds to dominant) and <i>yu</i> (corresponds to submediant) |
| | diatonic scales: contain five whole steps and two half steps within an octave (usual interval pattern: T,T,S,T,T,S) | scales are not diatonic and do not contain half-steps (T,m3,T,T,m3) |
| | major scale: half steps between mediant and subdominant; half step between leading tone and tonic | modes are built upon the individual notes in the scale 1st mode: <i>gong</i> (corresponds to Ionian mode) 2nd mode: <i>shang</i> (corresponds to Dorian mode) 3rd mode: <i>jue</i> (corresponds to Phrygian mode) 4th mode: <i>zhi</i> (corresponds to Mixolydian mode) 7-note scale: <i>qing yue</i> corresponds to the major scale |
| | harmonic minor scale: half step between supertonic and mediant; half step between dominant and submediant, half step between leading tone and tonic | 5th mode: <i>yu</i> (corresponds to Aeolian mode) |
| | melodic minor scale: half step between supertonic and mediant; raised submediant and leading tone while ascending and lowered while descending | |
| Note Collection | 12 keys | 12 keys |
| Transposibility | major: C, G, D, A, E, B, F#, C#, F, Bb, Eb, Ab, Db, Gb, Cb minor: A, E, B, F#, G#, D#, A#, D, G, C, F, Bb, Eb, Ab | minor: A, E, B, F#, G#, D#, A#, D, G, C, F, Bb, Eb, Ab major: C, G, D, A, E, B, F#, C#, F, Bb, Eb, Ab, Db, Gb, Cb |

Figure 3: Comparing THM and CCM Theory

- Therefore we expect **all** listeners of CCM will detect wrong notes in melodies, i.e., they will have schematic representations of CCM
- Suggests the complexity of the tonal system determines our ability to form mental schema

Methods

- Designed a multi-part online experiment
- Two sets of sixteen stimuli—conforming and non-conforming—were written using the classical Chinese tonal system (see Figures 4 and 5)
- Each stimulus was written in A-major with 16 eighth notes using a tempo of 80 bpm
- Glissandi written for descending intervals (at least P4s)
- Synthesized violin sound played each of the stimuli, emulating the *erhu* (traditional Chinese stringed instrument)



Figure 4: Conforming Stimulus Example



Figure 5: Non-Conforming Stimulus Example

- Two groups of participants: expert and novice CCM listeners
- Participants will use a 7-point scale to judge the various stimuli → how certain are they that this phrase has a wrong note?

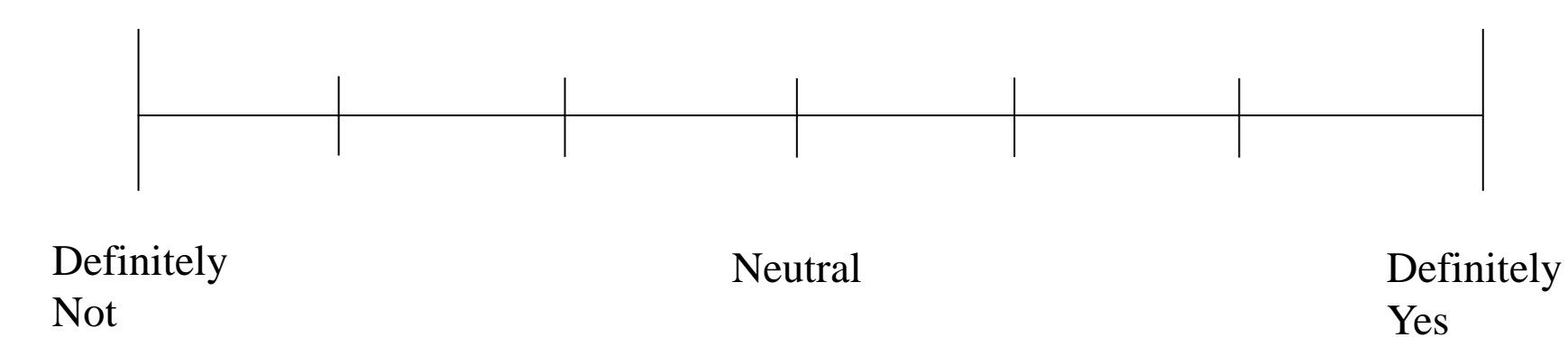


Figure 6: Sliding Scale Response Example

Next Steps

- Participants: casual/occasional listeners and experienced CCM listeners
- Data collection via SONA
- Data processing → sliding scale corresponds to a score from 0-7 (e.g., see Figure 7)

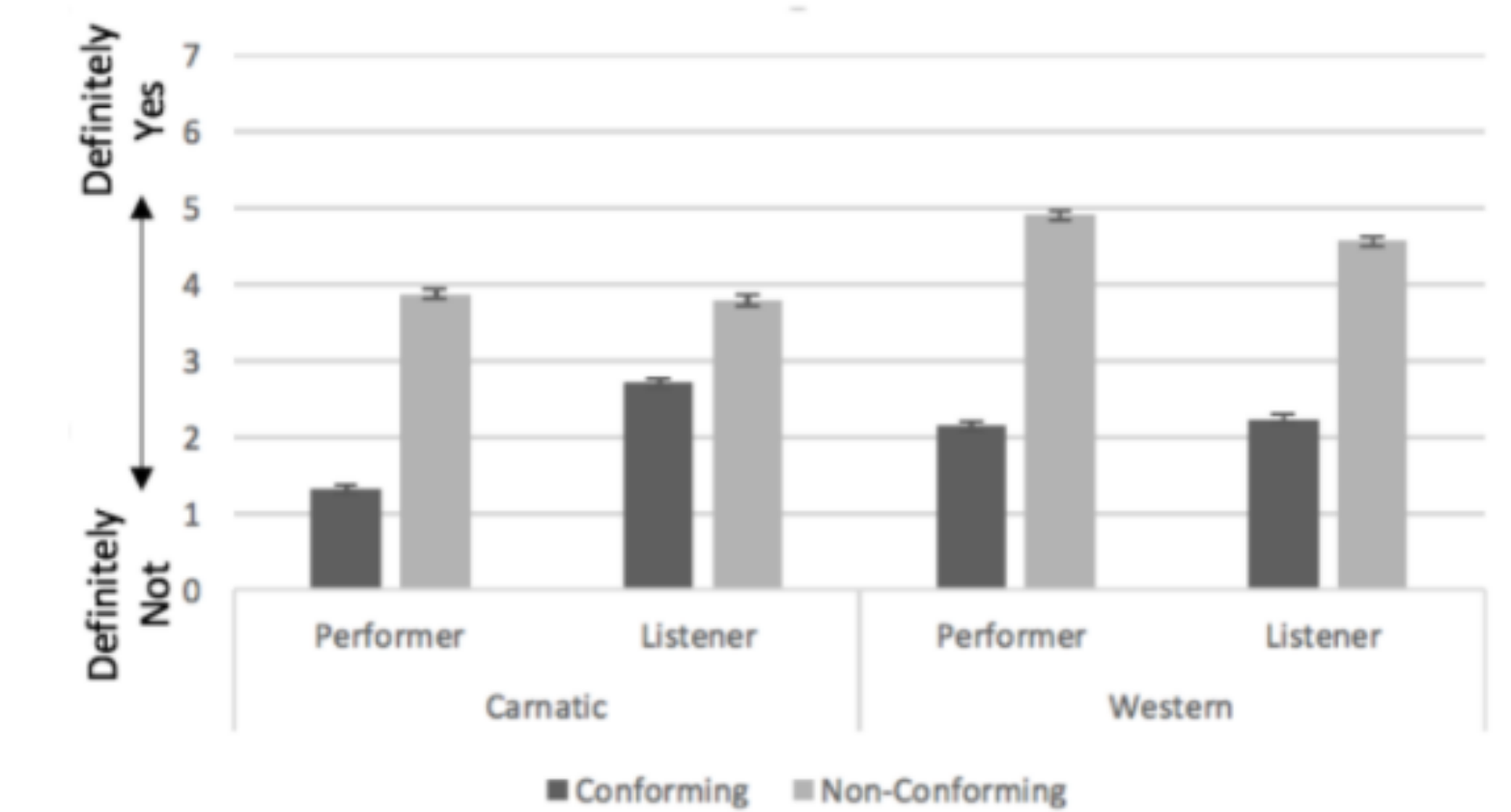


Figure 7: Average Responses to Task (Skantharajah and Woolhouse, 2019)

- CCM results are expected to be similar to the Western group's, i.e., novice listeners will possess schematic knowledge of the CCM tonal system

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