

**The 17<sup>th</sup>  
International Conference on  
Music Perception and Cognition  
and**

**The 7<sup>th</sup> Conference of  
the Asia-Pacific Society for  
the Cognitive Sciences of Music**

**e-Proceedings**

August 24-28, 2023

The College of Art,  
Nihon University,  
Tokyo, Japan

» Menglan Lyu and Hauke Egermann	
<b>A Cross-cultural Study between Chinese and Western Contexts: Emotion Recognition in Music and the Effects of Acoustic Features</b>	133
» David J. Grüning, Mareike Kaemmerer and Jonna K. Vuoskoski	
<b>Being Moved by Sad Music Across Countries: Characterizing the Experience in Finland, Germany, and France</b>	134
» Yangyang Zhou, Kongmeng Liew, Shuntaro Yada, Shoko Wakamiya and Eiji Aramaki	
<b>Turnin' Up the Musical Heat: Examining Weather and Music Preferences from 103 Cities</b>	140
» David R. Quiroga-Martinez, Gemma Fernandez Rubio, Leonardo Bonetti, Robert Knight and Peter Vuust	
<b>The Neural Representation of Musical Thoughts</b>	141
<b>Session 5D: Development 2</b>	
» Graça Boal-Palheiros and Ana Carolina Cordeiro	
<b>Effects of Music Education on Melodic Perception and Performance of Children from Disadvantaged Backgrounds</b>	147
» Bronya Dean and Rebecca Evans	
<b>Using Macro and Micro Perspectives to Enhance Understanding of Infants' Musical Lives in Aotearoa New Zealand</b>	148
» Angela Dou and Laura Cirelli	
<b>Behavioural Responsiveness across Infancy during Routine Musical Engagement</b>	149
» Sivan Barashy, Solena Mednicoff, Stephen Benning, Joel Snyder and Erin Hannon	
<b>Music Training, Music Perceptual Skills, and Other Affective Auditory Experiences Predict Self-reported Misophonia in Children and Adults</b>	150
<b>Session 5E: Music listening</b>	
» William Randall, Anastasios Mavrolampados, Margarida Baltazar, Fabi Prezja and Suvi Saarikallio	
<b>Changes in Discrete Emotional State Intensity during Everyday Music Listening: An Experience Sampling Study</b>	151
» Sarah Faber, Randy McIntosh, Psyche Loui, Alex Belden and Milena Quinci	
<b>Age-related Variability in Network Engagement during Music Listening</b>	152
» Solange Glasser, Amanda Krause and Margaret Osborne	
<b>Listening Engagement Styles, Cognitive Styles, and Synesthetic Experiences in Response to Music</b>	153
» Alexander Belden, Milena Quinci, Maiya Geddes, Nancy Donovan, Suzanne Hanser and Psyche Loui	
<b>Functional Network Dynamics of Music Listening and Effects of Age</b>	154
» Kjetil Vikene, Håkon Magne Vegrim, Ulvhild H. Færøvik, Geir Olve Skeie, Karsten Specht and Charalampos Tzoulis	
<b>Detection of Rhythmic Beat-omissions across Basal-ganglia Pathologies</b>	155
<b>Session 5F: Memory 1</b>	
» Tim Byron and Emma Hamilton	
<b>Using Continuous Self-Report to Investigate Hooks in Popular Music</b>	156
» Xuan Huang, John Ashley Burgoyne and Henkjan Honing	
<b>What Makes Chinese Music Memorable to the Chinese? The Relationship between Familiarity and Recognition</b>	157
» Avi Mendelsohn	
<b>Learning with Music: The Effects of Musical Tension on Long-term Declarative Memory Formation</b>	158
» Lauren Fink	
<b>Eye Movement Patterns when Playing from Memory: Examining Consistency across Repeated Performances and the Relationship between Eyes and Audio</b>	159
» Douglas Kowalewski, Sijia Song, Ronald Friedman and Dominique Vuvan	
<b>Musical Contingent Self-Worth Moderates the Association between Music Training and Tonal Working Memory</b>	165
<b>Session 6: Poster 1a</b>	
» Haruka Kondo, Shigeto Kawahara and Shinya Fujii	
<b>The Relationship between Singing Power Ratio and Subjective Performance Rating in Opera Singing</b>	166
» Miwa Fukino and Takayuki Nakata	
<b>Subjective and Objective Complexity of Musical Rhythm and Harmony</b>	167
» Masashi Tanaka, Chaelim Woo and Kentaro Abe	
<b>Unique Rhythmic Structure Shared by Music and Birdsong but not by Speech</b>	172
» Yuka Yamaguchi, Daisuke Komazawa, Hiroshi Kawakami and Yuki Mito	
<b>About the Relationship between Jacket Design and Music</b>	173
» Maiko Minatoya, Qi Fang, Tomohito Hamada and Tatsuya Daikoku	
<b>Neurofeedback System and Auditory Creative Experience to Enhance Creativity</b>	179
» Hye Jin Shin and Eunju Jeong	
<b>EEG Connectivity Analysis During Rhythm Reproduction in Children with ADHD</b>	180
» Anna Takeuchi and Gerard Remijn	
<b>The Relation between Pupil Dilation and Positive Affective Feelings Induced by ASMR-sounds, Music, and Other Sounds</b>	181
» Jihyun Lee, Ji-Hye Han and Hyo-Jeong Lee	
<b>Cortical Activity Response to Perceived Emotions of Music Dependent on Loss of High- or Low-frequency Audibility</b>	182

## Listening engagement styles, cognitive styles, and synesthetic experiences in response to music

Solange Glasser (a), Amanda E. Krause (b), Margaret S. Osborne (c)

(a) The University of Melbourne, Australia, [solange.glasser@unimelb.edu.au](mailto:solange.glasser@unimelb.edu.au) (b) James Cook University, Australia, [amanda.krause1@jcu.edu.au](mailto:amanda.krause1@jcu.edu.au) (c) The University of Melbourne, Australia, [mosborne@unimelb.edu.au](mailto:mosborne@unimelb.edu.au)

**Keywords:** Synaesthesia / synesthesia, music, music listening, listening engagement styles, cognitive styles, perception.

### Introduction

Music listening engenders a variety of individual experiences that are based on the interaction of both emotional and cognitive processes. Empathizing and systemizing are two cognitive processes that are theorised to differ according to gender. Furthermore, increased systemizing has been linked to the presence of certain forms of synesthesia, however this link is yet to be examined in relation to music. The experience of listening to music, therefore, may depend on the specific engagement style, cognitive style, and potential synesthetic experiences of the listener. This study therefore investigated the association between listening engagement styles, cognitive styles, and synesthetic experiences in response to music, in a population of young adults.

### Methods

The sample comprised of 310 individuals aged 18-34 ( $M = 20.03$ ,  $Mdn = 19$ ,  $SD = 3.06$ ), with 237 identifying their gender as female (76.50%). Participants were asked to complete an online questionnaire that included demographics, the musicianship module of the MUSEBAQ (Chin, et al., 2018), the Music Engagement Test (MET; Greenberg & Rentfrow, 2015), the short version of the Music-Empathizing-Music-Systemizing Inventory (MEMS Inventory; Kreutz, et al., 2008), and items from the Synesthesia Battery (Eagleman, et al., 2007).

### Results

A binary classification based on whether the participants had endorsed none ( $n = 193$ ) or at least one of the synesthesia types ( $n = 109$ ) was created. An all subsets logistic regression analysis was undertaken to predict the characteristic of having synesthetic experiences from a set of explanatory variables, including the MET Cognitive listening style score, the Music Systemizer (MS) average score, MUSEBAQ formal music training score and MUSEBAQ music making score. MET Cognitive was strongly correlated with MS, formal music training, and music making. Therefore, MET Cognitive was used as the primary explanatory variable. Additionally, given reported gender differences in empathizing and systemizing processes, an interaction with gender was also explored. For males, the MET Cognitive odds ratio was 0.99 (no effect), whereas for females the odds ratio was 1.1, meaning that an increase of one point on the MET cognitive increased the odds of reporting synesthetic experiences in response to music listening by 10%.

### Discussion and Conclusion

This study provides a valuable first step in examining how listening engagement is influenced by cognitive listening styles and synesthetic experiences. Recognising future research is needed with larger, gender-balanced samples, this study presents novel evidence that for females, a strong cognitive listening engagement style is associated with an increase in the odds of reporting synesthetic experiences. This study, therefore, extends previous evidence of sex differences in relation to music listening at different levels of processing, including perception.

### References

- Chin, T.-C., Coutinho, E., Scherer, K. R., & Rickard, N. S. (2018). MUSEBAQ: A Modular Tool for Music Research to Assess Musicianship, Musical Capacity, Music Preferences, and Motivations for Music Use. *Music Perception: An Interdisciplinary Journal*, 35(3), 376–399. <https://www.jstor.org/stable/26417402>
- Eagleman, D. M., Kagan, A. D., Nelson, S. S., Sagaram, D., & Sarma, A. K. (2007). A standardized test battery for the study of synesthesia. *Journal of Neuroscience Methods*, 159(1), 139-145.
- Greenberg, D. M., & Rentfrow, P. J. (2015). Rules of engagement: The structure of musical engagement and its personality underpinnings. Paper presented at the *Proceedings of the Ninth Triennial Conference of the European Society for the Cognitive Sciences of Music*, Manchester, UK.
- Kreutz, G., Schubert, E., & Mitchell, L. A. (2008). Cognitive styles of music listening. *Music Perception*, 26(1), 57-73. <https://doi.org/10.1525/mp.2008.26.1.57>