



# Induction *Kelentangan* as a Pre-Therapy Psychobiophysics Media

Ketut Sumerjana<sup>1(✉)</sup> and Ary Nugraha Wijayanto<sup>2</sup>

<sup>1</sup> Music, Performing Arts Faculty, Institut Seni Indonesia Denpasar, Denpasar, Indonesia  
ketutsumerjana@isi-dps.ac.id

<sup>2</sup> Ethnomusicology, Performing Arts Faculty, Institut Seni Indonesia Yogyakarta, Yogyakarta, Indonesia

**Abstract.** Potency of Indonesian music as a medium for inducing a person's psychobiological has so far been limited to *gamelan* intra-extramusical, whereas in cultural activities in Indonesia one can find other Indonesian music used as a treatment, such as *Kelentangan* in the Bali ritual. As a macrosystem, *Kelentangan* is an instrument that has an important role, timbre has the potential to work on therapy but optimized potency still in little areas so transmission experience degradation. Based on this, the focus of the research is to explain the induction *Kelentangan* as a media pre-therapy psychobiophysics. This study used a quasi-experimental, with 16 respondents who were randomly selected, range 20-25 years with a background of cultural differences. Divided into two groups, experimental group consisting of 8 respondents and the control group are 8 respondents. The data collection procedure uses a questionnaire and measurements at the pre-test, test and post-test. The results showed that the musical composition of *Kelentangan* was able to induce a psychobiophysics response through changes in the electrical magnitude value of the experimental group which had a value greater than the control group, while the cognitive interpretation aspect showed that the experimental music was able to provide an objective assessment of music transmission at the preference level and comfort level of the experimental group who received value 75%.

**Keywords:** Induction, *Kelentangan*, Therapy, Psychobiophysics

## 1 Introduction

Potential value of Indonesian music as a therapeutic medium has long existed in people's cultural activities, where the unique character of the timbre is an interesting part to be developed to induce a person's condition. The description of the archipelago music brand as therapy is indeed centered on *gamelan*, *karawitan* because temporal and spectral timbre components is low, medium and high frequency areas. Interesting research on the high frequency sound components produced by Indonesian musical instruments can be used for therapy as stated by [1], [2], [3] who conducted research on HFCs on someone who is deaf, the results show that HFCs from the timbre of the Balinese *gamelan* can be felt by someone who have deafness.

This fact shows that the intramusical part of ethnic archipelago instruments is interesting as there is a high frequency that can be implemented to induce a person's

© The Author(s) 2024

Z. B. Pambuko et al. (eds.), *Proceedings of the 4th Borobudur International Symposium on Humanities and Social Science 2022 (BIS-HSS 2022)*, Advances in Social Science, Education and Humanities Research 778,

[https://doi.org/10.2991/978-2-38476-118-0\\_31](https://doi.org/10.2991/978-2-38476-118-0_31)

psychobiophysics condition. From the perspective of social interaction in a space for several decades there has also been interesting research on the use value of *gamelan* in influencing emotions initiated by the good vibration project which uses the harmony of *gamelan* instruments to improve the social interactions of prisoners, the results of the research show that there is a significant increase in emotion, social empathy between the prisoners [4], [5], [6], [7].

Talking about working on the potential of Indonesian musical instruments is not an easy matter, because until now in the world of therapy it is still limited to *gamelan* instruments whose experimentation has been able to penetrate scientific disciplines and local wisdom. The development of *gamelan* research began to attract various scientific disciplines when Kunst published the *gamelan* tone vibration numbers in Indonesia which were based on calculation results, especially for modern *slendro* concepts having the same interval distance, namely 200 cents [8]. Kunst's calculation of the vibrational number gives a contradiction when Wasisto Surjodinigrat et. al. re-measures the results. The results can be interpreted differently between the pitch intervals [9] so that Martopangrawit manifests that *slendro* is a tuning with almost the same interval value [10].

In contrast to research in the field of continuous intra-extra musical *gamelan*, which has continuity, the faces of other Indonesian ethnic musical instruments, the elaboration context of which is still limited to a social activity, so that they often forget the philosophical aspects that underlie the presence of a music in the midst of society, such as the *Kelentangan* musical instrument which is often used in the Bali ritual, a ritual for treating someone who uses music as a healing medium for patients who cannot be cured by the medical system. Irawati (2022) explained that *Kelentangan* in the Bali ritual process is indeed believed by the community to be able to provide healing or be able to induce sick conditions to become healthy [11]. Based on the point of view of organological acoustic transmission, *Kelentangan* is also considered unique because the manufacturing process is not carried out at the same time but is based on the principle of barter trade so that it gives unique characteristics to the tone area, the resulting timbre, therefore the focus of this research is on music induction sickness based on the *Kelentangan* musical instrument as pre-therapy media.

Health and illness are physical, biological and psychological actualizations, in various reviews that indications of health or illness are adjusted by measurements at positive frequency of illness or vice versa, while other opinions state that health and illness conditions are determined based on a person's cognitive awareness area interpreting what is felt. and clinical measurements [12], [13], [14]. This description of health and illness becomes an interesting one because in the Bali ritual macrosystem the position of the *Kelentangan* musical instrument is the main attraction, where rhythm, timbre, loudness and tempo are determinants in ritual accompaniment. The problem that arises is that the use value of this *Kelentangan* musical instrument is still limited to Bali rituals or is still limited to regionalism, even though looking at cultural tradition events, the sounds produced from these musical instruments have the opportunity to be worked on as a source of therapy.

The use of music as therapy always involves the emotional system, Schater (1962) explains the two-factor theory of emotion [15]. Emotion is a function of the interaction

between cognitive factors and physiological awakening states, every experience that evokes emotion will be given a cognitive map label, then becomes a new experience. The new stimulus will be assessed based on the experience label stored in two factors, namely physiological changes, where one can explain the circumstances that evoke emotional states and explain the reactions to dealing with them, while the cognitive interpretation factor positions a person using past information to interpret feelings. The process of physiological change is usually always associated with an overview of the changes that occur during the process of measuring the biophysical response.

## 2 Methods

The method used was a quasi-experiment with a sample of 16 respondents aged between 20-25 years, based on different backgrounds, then divided into 2 groups, namely group A and B. Groups A and B each consisted of 8 respondents. Research Design showed in Fig. 1, whereas participant in group A is experiment group that give stimulants Composition music Baliant. participant in group B are not stimuli.

Adopting [16], the data collection technique uses an open-ended question model as a cognitive interpretation when someone listens to an experimental music composition based on dexterity and measures biophysical responses using a simple measuring instrument through the secretion system, namely the skin. Questionnaire interview; to find out the condition of the respondent before, during and after listening to the stimulus. This is necessary because in the principle of induction a stimulus is stated to have an impact or not depend on the interpretation response. Sonification; to determine the biophysical response of the respondent by measuring the acoustic area which is enumerated through the secretion-excretory system, namely the participant's skin.

Group A	R-----X-----O
Group B	R-----O

Fig. 1. Research Design Induction *Kelentangan*

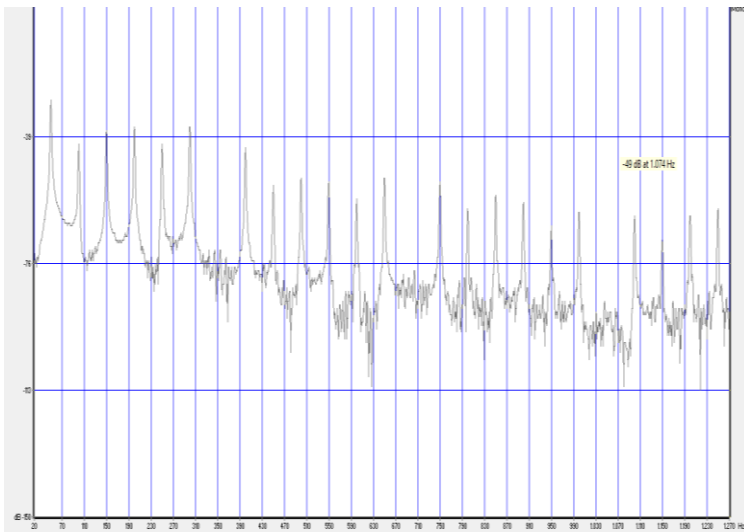
## 3 Result and Discussion

The sensations experienced, expressed by the participants when they heard the musical stimulus of *Kelentangan*, were a psychobiophysic response, namely a response that related the stages between unconsciousness and awareness, where the sensations felt could be imaged through the sonification process. Herman (2009) explained that the acoustic sound of objects can be converted in the form of digital visualization [17]. This is done to explain the part of the sensation felt by participants in the realm of the electrical potential vibration spectrum as a biophysical response, while the perception area is carried out through a study of cognitive interpretation experienced during the process of listening to a stimulus in the form of music such as Table 1.

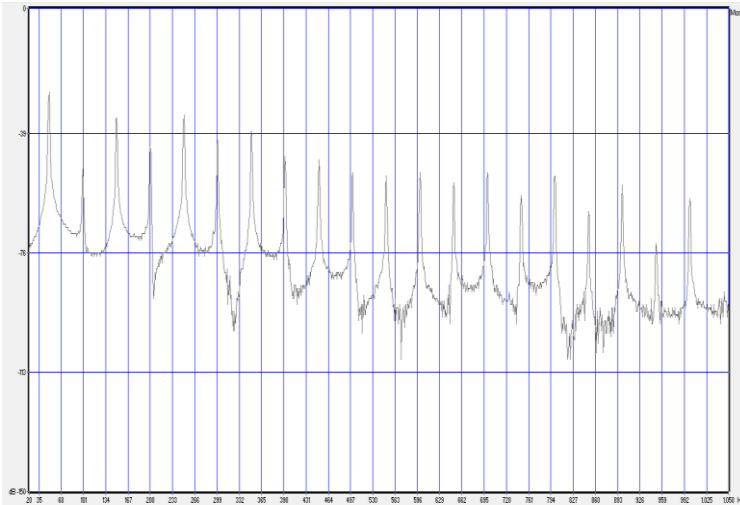
**Table 1.** Cognitive Interpretation of Respondent

Group A	Group B
Music that is used as a stimulus is able to give a goosebumps sensation because there are sounds that seem mystical, besides that it is able to provide an uplifting atmosphere (interpretations of 6 participants out of 8 people)	8 respondents in group B provided information that musical compositions that did not have a timbre element of loudness stated that the conditions tended to be the same, during the pre-test, test and post-test.

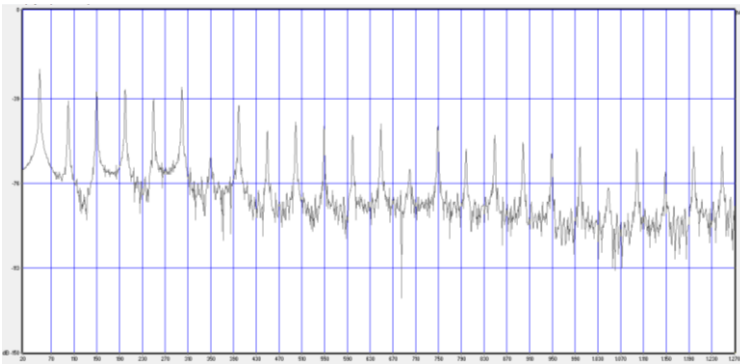
Process of cognitive interpretation of the stimulus is the second stage of a sensation that is felt when listening to music. for the experimental group, the image of cognitive interpretation, namely in the form of a comfort level, is a process born of an unconscious system which is then processed in the realm of consciousness. The goosebumps sensation caused by *Kelentangan* Induction is an effort of the body's biophysiological response that provides a basis for the construction of labels on cognitive maps, has the value of abstraction so that its manifestations are discrete. Farlone [18] stated that there is a relationship between abstraction and real values in the soul aspect, where the unconscious is a potential basic ability that cannot be observed while the awareness aspect is the actualization of the soul aspect that can be observed [19], [20]. The collective unconscious felt by the participants is based on the objectivity of the soul, while the personal unconscious is based on the subjectivity of the soul. Therefore, the sonification area in describing the induction *Kelentangan* as a pre-therapy medium is carried out through the process of measuring the participants' body sounds through the conversion of electrical potentials, in spectral mode which can be seen in the Fig. 2, Fig. 3, Fig. 4, and Fig. 5.



**Fig. 2.** Post-test condition. Vibrational spectrum is based on the sonification of the electrical potential signals of the experimental participants



**Fig. 3.** Pre-test condition. Vibrational spectrum is based on the sonification of the electrical potential signals of the experimental participants



**Fig. 4.** Test condition. Vibrational spectrum is based on the sonification of the electrical potential signals of the experimental participants

Fig. 2, 3, and 4 show that composition music based on *Kelentangan* can induction wave group from sonification process in frequency and amplitude. Music has potency to reduce noise in body participant and stabilized ratio in amplitude. Spectral mode as reflection data can described that amplitude as representment for system biophysics has arithmetic function in contains level.

Then, in Fig. 5, series 1 is pre test condition, show that in number sample 60-100 experience gradation in loudness body system, series 3 is pos test condition show linear, stable in loudness at -13 dB. Music can overflow body system with increase loudness and stable. The sonification results show that there are groups of frequency waves that are dynamic, if in the pre-test the signal pattern is not stable, it is indicated that a change in the ratio occurs in frequency group 6, while in the post-test, the patterns and ratios

of the imaged wave groups look more stable. The key to these changes is the musical stimulus used to induce the participant's condition that there are harmonic frequencies in the overtone series that change the ratio and composition.

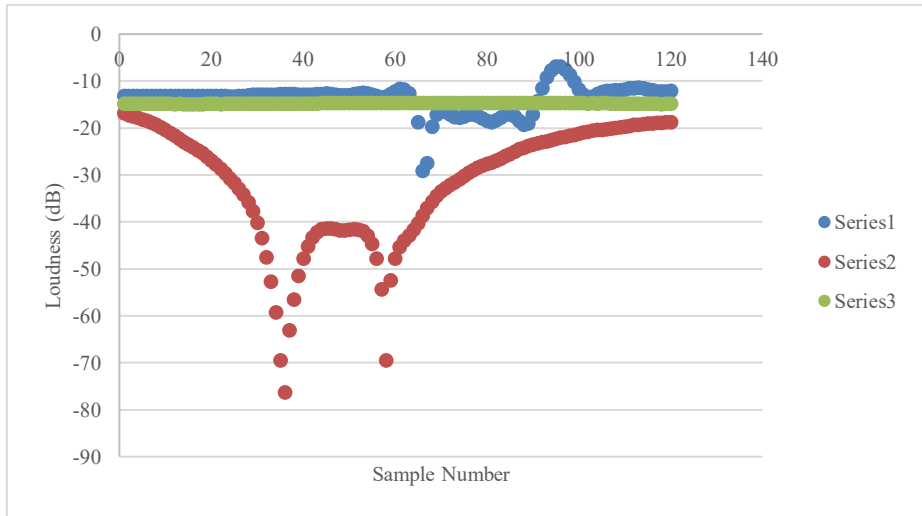


Fig. 5. Response Loudness Biophysics Participants

## 4 Conclusion

The composition of flexibility used as a stimulus for the participants' psychobiophysical responses yielded quite significant results, where 75% of respondents who listened to computer music compositions based on *Kelentangan* tones stated that music is capable of inducing conditions through a sense of comfort and enthusiasm. While the results of measuring the biophysical response obtained an interesting result, namely that there was a pattern of changes in the color spectrum of the body's sound through the participants' electrical potential, this provides evidence that music compositions of flexibility are capable of inducing a person's psychobiophysical conditions. The induction process has stages that the sound heard has elements that contain elements needed by the human body system such as electrical potential.

**Acknowledgment.** The author would like to thank the respondents, lecturers who are willing to give time, opportunity and support this research, and do not forget to thank the institutions that have provided support.

## References

1. O. T. e. al, "On Mechanism of Hypernosic Effect," *IMCM Proceeding*, pp. 432-434, 1993.

2. O. Tsutomu, "Multidisciplinary Study on the Hypersonic Effect," *International Congress series*, vol. 1226, pp. 27-42, 2002.
3. B. (Ed), *Music that Work Contribution Biology, Neurophysiology, Psychology, Sociology, Medicine, and Musicology.*, New York: Springwen, 2009.
4. K. H. a. L. Caulfeld, "Music, Education and Opportunity," *Prison Service Journal*, no. 239, pp. 33-39.
5. L. C. S. A. David Wilson, "Good Vibrations: The long-term impact of a prison-based music project," *Prison Services Journal*, no. 182, pp. 27-32, 2009.
6. C. Eastburn, "Gongs Behind Bars: Evaluation report of the Good Vibration *Gamelan* in Prison Project," Firebrid Trust, Wellington, 2003.
7. "https://www.good-vibrations.org.uk/a-commission-design-and-build-a-new-gamelan-app/," Good Vibration, 2020. [Online].
8. J. Kunst, *Music In Java: Its History, Its Theory, and Its Technique*, Netherland: The Haque Martinus Nijhof, 1949.
9. P. S. A. S. Wasisto Surjodiningrat, *Penjelidikan dalam Pengukuran Nada Nada Gamelan Djawa terkemuka di Surakarta dan Yogyakarta*, Yogyakarta: Lab. Fakultas Teknik Mesin UGM, 1969.
10. Martongrawit, "*Karawitan* : Source Reading in Javanese *Gamelan* and Vocal Music. Judith Becker and Alan Feinstern (ed)," Michigan, Michigan Paper on South and Southeast Asia, University Of Michigan, 1984.
11. E. Irawati, Interviewee, *Kelentangan*. [Wawancara]. Oktober 2022.
12. C. J. d. S. JG, *Medical Physics*, New York: John Wiley, 1978.
13. J. Gabriel, *Fisika Kedokteran*, Bali: Penerbit Buku Kedokteran, 1996.
14. S. Lumbantobing, *Neurologi Klinik Pemeriksaan Fisik dan Mental*, Jakarta: BP Fakultas Kedokteran Universitas Indonesia, 1998.
15. S. a. S. J. Schacter, "Cognitive, social and Psychological Determinant Of Emotion State," dalam *Psychological Review*, 1962, pp. 379-399.
16. J. W. Creswell, *Research Design Qualitative, Quantitatiive and Mixed Methods Approach Third Edition*, California: SAGE Publication, 2009.
17. G. B. a. T. Herman, "Sonification: Listen To Brain Activiy," Austria, Springer, 2009.
18. T. M. Farlone, "Quantum Physics, Depth Psychology and Beyond.," Stanford.org, 2000.
19. L. Candy, "Practice Based Research: A Guide," University Technology Sydney, Sydney, 2006.
20. R. Scruton, *The Aesthetics of Music*, Oxford: Clarendon Press, 1999.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

