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Psychophysiological Responses to "Yogyakarta Nyaman" Music Composition

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ABSTRACT

Humans are always trying to be healthy. When they are sick, they will seek and find medication and methods that are suitable for their physiological and psychological conditions. One of the unique medication and methods in the treatment process is to use music to intervene such psychophysiological conditions. Some studies used modulated high frequency (*HFCs*) in inducing participants (respondents)' condition, and in fact obtaining good results. But the use of these objects in the previous studies is still a single sound chosen from the width of the music frequency range, not yet directed towards music. One type of music that is quite interesting is MIDI as the music is derived from sampling sound composition which turns out to have a fairly wide frequency region, one of which is the ultrasonic region as found in my musical project "Yogyakarta Nyaman". Physically, in the medical world, ultrasonic sound frequencies are used in intervening physiological conditions. Based on the description above, the focus of this study is to use "Yogyakarta Nyaman" in the psychophysiological responses of the respondents. The method used is quantitative with 18 respondents divided into nine men and nine women. Data are collected from structured interviews where the results are converted into numbers to give a numerical description. The results of the study showed that "Yogyakarta Nyaman" was able to intervene in the physiological and psychological conditions of the respondents with $f_{count} > f_{table}$. The f_{count} value is 5.179 greater than f_{table} around 3.86.

Keywords: music composition, ultrasonic sound, response, psychophysiology.

ABSTRAK

Manusia selalu berusaha sehat. Ketika sakit, mereka akan mencari serta menemukan pengobatan dan metode yang sesuai untuk kondisi fisiologis dan psikologis. Salah satu pengobatan dan metode yang unik dalam proses pengobatan adalah menggunakan musik untuk memberikan campur tangan terhadap kondisi psychophysiologicalnya. Beberapa studi lain menggunakan frekuensi tinggi modulasi (HFC) dalam merangsang kondisi peserta dan telah mendapatkan hasil yang baik. Tetapi penggunaan benda-benda ini hanya berupa satu suara yang dipilih dari lebar kisaran frekuensi musik dan bahkan tidak diarahkan ke musik. Salah satu jenis musik yang begitu menarik adalah MIDI sebagai musik yang berasal dari sampel suara komposisi yang ternyata memiliki wilayah frekuensi cukup lebar, salah satunya adalah wilayah ultrasonik dalam proyek musikal penulis yang berjudul "Yogyakarta Nyaman". Secara fisik, dalam dunia medis, frekuensi suara ultrasonik digunakan dalam intervensi kondisi fisiologis. Berdasarkan uraian di atas, fokus dari studi ini adalah untuk menggunakan "Yogyakarta Nyaman" untuk mendapatkan tanggapan psikofisiologis para peserta. Metode yang digunakan adalah kuantitatif dengan

responden 18 yang dibagi menjadi sembilan laki dan sembilan perempuan. Pengumpulan data yang digunakan adalah wawancara di mana hasilnya dikonversi ke dalam angka untuk memberikan gambaran numerikal. Hasil penelitian menunjukkan bahwa “Yogyakarta Nyaman” mampu memberikan campur tangan bagi kondisi fisiologis dan psikologis responden dengan $f_{hitung} > f_{tabel}$. Nilai f_{hitung} adalah 5.179 lebih besar dari f_{tabel} sekitar 3.86.

Kata kunci: komposisi musik, bunyi ultrasonik, respons, psikofisiologi.

PRELIMINARY

Talking about medication and treatment that are suitable for psychology and physiology of a person is not an easy matter. It must not be limited to chemical drugs but also must open opportunities for objects that are able to function medication and therapies, such as music.

Discourses and studies on the use of music in intervening psychological and physiological conditions are currently experiencing a fairly good development but more is done by people outside the art environment; such as Oohashi, *et al* (1993; 2000; 2002; and 2006) which used the component of *HFCs* (high frequency) sound of Balinese gamelan which was modulated as a therapeutic medium for deaf people. They really obtained quite satisfactory results where the component of *HFCs* was able to be responded to by physiological systems of deaf people. By Oohashi, *et al* (1993; 2000; 2002; and 2006), it is called a hypersonic effect. In addition, there is a study done by Balzer (2006) and Stelzhammer (2007) which states that high frequency sounds at modulated 28 KHz can provide a stimulus to the respondent's brain waves.

The study conducted by Oohashi (1993, 2000, 2002 and 2006), Balzer (2006), and Stelzhammer (2007) is a *sampling* of the various sounds produced by musical instruments, not directly from the sound of musical instruments and the sounds used are single while the use of sound compiled into a music from the results of original sound sampling is still rare or even nonexistent, one of which is MIDI. MIDI (*musical instrument digital interface*) according to Campbell, *et al* (2004: 465) has a meaning:

*"*It is a standard specification for digital interfaces, or connections, which allows electronic instruments and related information from different manufacturers to speak to each other*".*

In the studies done by Oohashi, *et al* (1993, 2000, 2002; and 2006), Balzer (2006), and Stelzhammer (2007), working on the potential of MIDI has a great opportunity as a pre-therapy media in providing a stimulus to physiological and psychological systems. The potential for working on MIDI has this study in trying to explore one of MIDI the author did in 2011 entitled "Yogyakarta Nyaman" (meaning "comfortable Yogyakarta") to intervene in a person's psychological and physiological conditions. Musically, "Yogyakarta Nyaman" is almost the same as most music that distinguishes is having dots or ultrasonic frequency patterns.

According to Gabriel (1996), ultrasonic sound in the world health is used in interfering with physiological participants (respondents) because it has advantages compared to other sounds, such as its strong nature, has a short range so that it can become a diagnostic tool to provide an overview of the conditions suffered by patients, especially those related to physiology.

Psychic responses according to Schahter and Singer (1962) are divided into sensations and perceptions or interpretations. Sensation is a factor that is felt by the body, which has not been stored in the brain and has not been expressed, is spontaneous, while the perception system is more objective because someone starts to inform what is felt and try to combine with past events so that they can interpret emotions or feelings.

Schahter and Singer (1962) also added that physiological responses are about how individuals are able to explain conditions that can arouse emotions, explaining reactions due to the action of stimulus. Schahter and Singer's concept of stimulus, provides a choice for MIDI to be a stimulus action in intervening the physiological and emotional changes of respondents in sick conditions so that it is expected to be an alternative medicine or pre-therapeutic media. Based on the description above,

the focus of this study is the respondent's psychophysiological response to “Yogyakarta Nyaman” music composition.

THEORY

Schacter and Singer (1962) provide an explanation of the *two factor theory of emotion*. Emotion is a function of interaction between cognitive factors and the state of physiological awakening; each experience that evokes emotions will be labeled in a cognitive map. The labels are used as a pattern for new experiences where each stimulus received will be assessed based on the label stored in two factors.

Physiological Changes

Stimulus such as *epinerphine* used in injecting respondents' physiological responses can cause physiological changes such as blood flow to the muscles and increase heart rate. Physiological changes are how individuals can explain conditions that can describe a statement that evokes emotions, then explain the reactions and difficulties in dealing with these situations.

Cognitive Interpretation

Information received by individuals and past experience is a memory stored in the brain and perceptions to interpret their feelings. In simple terms, Schahter and Singer (1962) give the logic flow as below.

Stimulus ⟶ physiological ⟶ perception/interpretation (subjective emotion).

The concept of Schachter and Singer (1962) provides an overview of the importance of a stimulus or action that determines the physiological response and the level of perception experienced by the subject. This important position is what makes stimulus have a bargaining value as an action that is used as an object that causes the birth of a reaction.

The concept of the *two factor theory of emotion* is almost the same as the that of Carl Gustav Jung (in McFarlone, 2000) explaining the potential ability of spontaneous or unconsciousness and cognitive interpretation or awareness when receiving a stimulus. Jung added that unconsciousness is the experience of the whole aspect of the soul, based on subjective and objective relations while consciousness is the rational thought of a person that can be observed. Unconsciousness is an inner reaction and synchronization of the bridge between inner and outer experience.

Brandes (2009) explains that therapy or treatment processes using music have existed since ancient times with an approach between listening and practice. Music therapy as a combination of listening and practice is a systematic application of music as a stimulus in intervening in the physiological and psychosocial aspects of pain or dysfunction. Brandes (2009) also added that the interventions that occurred made therapeutic values improved in the music treatment system, where physiological and psychological responses became the value of the parameters.

METHODS

The research design uses quantitative experiments. According to Creswell (2012), quantitative research in applying the method of data collection uses predetermined questions or interviews whose indicators are to observe and measure information numerically (numbers) which can describe the research process.

Respondents in this study were 18 people, consisting of 9 male and 9 female with an age range from 28-55 years. The combination of respondents is expected to provide an overview of the impact of music on gender while the data collection techniques with interviews are used to determine the system of sensations and cognitive interpretation (perception) after listening to music in the transformation of numbers.

RESULTS AND DISCUSSION

The use of "Yogyakarta Nyaman" to induce physiological and psychological responses to the 18 respondents get results as shown in Table 1. Respondents with blue columns are women while white ones are men; with the five's, pay attention to factors related to psychological and physiological conditions. The "yes" answer so converted to value 1 while it is not converted to 0, along with a description of the numerical transformations of the respondents in Table 1.

Table 1
The use of "Yogyakarta Nyaman" music composition
to induce physiological and psychological responses

No.	Name	1	2	3	4	5	Score
1	Respondent 1	1	1	1	1	1	5
2	Respondent 2	1	1	0	1	1	4
3	Respondent 3	1	1	1	1	1	5
4	Respondent 4	1	1	1	1	1	5
5	Respondent 5	1	1	0	1	1	4
6	Respondent 6	1	1	1	1	1	5
7	Respondent 7	1	1	0	1	1	4
8	Respondent 8	1	1	0	1	0	3
9	Respondent 9	1	1	0	1	1	4
10	Respondent 10	1	1	1	1	1	5
11	Respondent 11	1	1	1	1	1	5
12	Respondent 12	0	0	0	0	0	0
13	Respondent 13	1	1	0	1	1	4
14	Respondent 14	1	1	1	1	1	5
15	Respondent 15	1	1	0	1	1	4
16	Respondent 16	1	1	0	1	1	4
17	Respondent 17	1	1	1	1	1	5
18	Respondent 18	1	1	1	1	1	5

Note:
- ✓ The white column is the male respondent
- ✓ The blue column is the female respondent

Table 1 provides an interpretation that the total score of female respondents is greater than that of male respondents, which is 41 to 35. So that the total score is 76 of these results and it is calculated to determine the f_{count} or the degree of success of

music in intervening in the physiological and psychological responses of respondents; as illustrated in Table 2.

Table 2

No.	Male (L)	Female (P)	L^2	P^2	L + P	$L^2 + P^2$	$\sum (L)^2 + \sum (P)^2$
1	5	5	25	25			
2	4	4	16	16			
3	5	5	25	25			
4	4	3	16	9			
5	4	5	16	25			
6	0	5	0	25			
7	4	4	16	16			
8	4	5	16	25			
9	5	5	25	25			
Total	*35*	*41*	155	191	*76*	346	
Middle value	3.88	4.55					
$\sum (L)^2$	*1225*						
$\sum (P)^2$		*1681*					2906

Based on Table 2, we can determine the value of f_{count} with n = 18; k = 3 and alpha 5% with f_{Tabel} of 3.86 then the formula and calculation are as follows.

JKT $= L^2 + P^2 - (L + P)^2 / n$
$= 346 - (76)^2/18 = 346 – 320,88 = 25,12$

JKK $= \sum (L)^2 + \sum (P)^2 / k - (L + P)^2 / n$
$= 2906/3 - 320.88 = 968 - 320.88 = 647,12$

JKG $=$ JKK - JKT
$= 647,12 – 25,12 = 622$

Msk $=$ JKK / 3
$= 647,12 / 3 = 215,706$

Msg $=$ JKG / n-3
$= 622/15 = 41, 46$

f_{count} $=$ Msk / Msg $= 215,706 / 41,46 = 5,179.$

Based on the results of the calculation of f_{count} obtained value of 5.179 while the f_{table} value is 3.86 then $f_{count} > f_{table}$ so as to obtain a statement that “Yogyakarta Nyaman” is able to influence the psychological and physiological conditions of the respondents. The results of the calculation are then compared with the results of interviews where as many as 16 respondents or around 88.88% consisting of 8 male

and 8 female stated that “Yogyakarta Nyaman” was able to influence physiological conditions while 2 respondents stated that there was no impact on physiological responses.

While the intervention of “Yogyakarta Nyaman” on the psychological condition of the respondents obtained quite good results, for emotions gained a value of 50% because 9 respondents stated that music can affect feelings of pleasure and sadness; whereas in determining the mood of feeling or soul, “Yogyakarta Nyaman” musical intervention ability reached 94.44%.

The percentage of respondents' psychophysiological responses to “Yogyakarta Nyaman” illustrates that as a stimulus in responding, “Yogyakarta Nyaman” is having the ability to provide changes to physiological functions and cognitive interpretations or perceptions of respondents. Changes in physiological responses consist of soul and mind for the better condition, making respondents want to sleep, able to manage emotions well. While the cognitive interpretation of respondents illustrates that listening to “Yogyakarta Nyaman” conveniently evokes memories of the past experienced by respondents.

CONCLUSION

Based on the results of calculations obtained $f_{count} > f_{table}$ which is 5.179 > 3.86 which interpreted that “Yogyakarta Nyaman” is able to make intervene the psychophysiology conditions of the respondents. This fact is reinforced by the results of interviews which show that about 88.88% of respondents stated that “Yogyakarta Nyaman” is able to influence physiological conditions indicated by changes in feelings, feeling like sleeping and managing emotions well while the psychological responses has a value of 50% for sad and happy emotions and 94.44% affect the mood of the respondents.

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