

## The Effects of Bayan Tabla Timbre on Stimulus Discrimination and Perception of Music Emotion in a Dangdut Music Fans, Neutral, and Haters Group

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### Abstract

**Background:** A theoretical issue about the control factors of the subject response on musical timbre between acoustic factors (including attack-decay) and type of music (genre) still unclear.

**Objective:** Examine the effects of bayan tabla timbre and its attack-decay changes on stimulus discrimination and perception of music emotion in a dangdut music fans group, neutral group, and haters group.

**Method:** A randomized experiment between-within subjects design was used in the research method. Research conducted in an Experimental Psychology laboratory at Gadjah Mada University of Indonesia. The research was supported by the participation of undergraduate and graduate students from Social-Humanities and Veterinary Medicine Sciences at Gadjah Mada University. All subjects aged 17-32 years. A dangdut music fans group/KE (N=18), neutral group/KK1 (N=18), and haters group/ KK2 (N=18). Each subject in KE, KK1, KK2 receive a random series treatment of three music: M1 (a music which has natural bayan tabla timbre [in G#1 pitch and its tone's attack was 0.403 seconds per stroke]), M2 (a music without bayan tabla timbre as the control/placebo), and M3 (a music which has synthetic bayan tabla timbre [in G#1 pitch and its tone's attack was 0.085 seconds per stroke]). Main outcome measures. The subject response was measured by StimoV1.0 software which consists of stimulus discrimination scale (similarity scaling), emotional perception scale (semantic differential scale): strong-not strong, happy-not happy, fun-not fun, erotic-not erotic, and the reaction time measurement in seconds.

**Results and Conclusion:** In general, the results shown that the effects of musical timbre on stimulus discrimination is more controlled by acoustic factors (including attack-decay) and is not controlled by preference factors to type of music (genre). But however, the effects of musical timbre on perception of music emotion can be controlled by preference factors to type of music (genre).

**Keywords:** Stimulus discrimination; Perception of music emotion; Timbre; Attack-decay; Bayan table; Dangdut music

### Introduction

The ability of timbre discrimination was needed to listen to music. According to Mazzucchi, et al. [1] people who experience decreased ability to distinguish the sound timbre would lose the aesthetic pleasure as appreciation for the music. In addition, instrument timbre can also affect the perception of emotion because, according to Hailstone et al. [2] timbre as an instrument of identity can affect the emotional perception of music (such as joy, sadness, fear, anger), where synthetic timbre with slow attack associated sadness, while fast attack linked angry or happy, but it should be noted that this effect was also controlled by acoustic, cognitive, and another behavioral factors. According to Padova et al. [3] timbre can affect recognition memory and emotional response of the subject, but this effect was also controlled by genres (music types) and gender (female better than male) [2,3] findings still raises fundamental theoretical issues concerning the factors which control the response over the subjects of musical timbre between whether the factor of acoustic instruments (including attack-decay) or cognitive factors such as the preference of the genre. Interesting issue to be answered by testing the effects of bayan tabla timbre on stimulus discrimination and perception of music emotion in a dangdut music fans, neutral, and haters group (on the subject of men and women). Yudi Latief [4] shown that in 2008, Reform Institute survey data indicate dangdut still be the kind of most preferred music that was equal to 38.36% of the total sample of 2500 respondents in 33 provinces of Indonesia. The use of tabla assumed from Setiawan [5] claim that the word of dangdut comes from the tabla sound because it can produce sounds 'nduut' and it was said to provide a psychological effect, enhance erotic charm, and fun for the rhythm of the music itself. Tabla was an instrument that characterizes dangdut

[5]. According to Fletcher and Rossing [6] the instrument consisting of a dayan tube and a bayan tube (which was bass). Assuming that the sound of 'nduut' bass that was more produced than bayan tabla then by controlling factors of the dangdut music preference and gender of the subject, the timbre effect tested on stimulus discrimination and the perception of musical emotion likes; strong-not strong [7] happy-unhappy [2] fun-not fun and erotic-not erotic [5] in the context of the musical response test.

According to Parker [8] music was a product of mind, elements of vibration (physics and the cosmos) of the frequency (number of vibrations per second), amplitude (maximum displacement upwards or downwards from the stop position of a mass), duration, and form yet be music to the people until all were transformed by neurological and interpreted by the brain into pitch (high-low sound), loudness (loud-soft sound), time (in terms of tonal) and timbre (sound color). According to Rossing et al. [9] 'timbre' was a French term used to indicate the color or sound quality, and The American National Standards Institute defines timbre as an attribute of auditory sensation in which a listener can determine the difference in two sounds that have similar loudness

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(sounds violent) and pitch (high-low sound), which was controlled by the character of the difference waveform, pressure, placement of the frequency spectrum (spectral) and temporal characters (including attack). The definition suggests that the determination of a timbre should be placed in a condition of loudness, pitch, and the same duration. But according to Hajda [10] there was no a single definition of timbre that can be widely accepted both constitutional and operational. According to Dowling and Harwood [11] two main acoustic sources that contribute to the perception of timbre was the spectral aspects and sound dynamics of instruments. Spectral point to structural differences of some harmonies of the same pitch but a variety of conditions produced by different instruments, while the dynamics refers to changes in attack speed (the speed of onset) and changes in the structure of harmony along the onset of an instrument tone that sounded with a variety of ways. According to Risset and Mathews [12] timbre was controlled by tone's attack (the time series of sound addition at the beginning) and tone's decay (the time series of sound reduction at the end). According to Berger and Erickson [12] reversal of the attack-decay natural position to decay-attack although no effect on the structure of harmony but would be perceived to other sounds. According to Pitt and Crowder [11] differences in onset or tone attacks (dynamic aspect) of the same instrument can also significantly affect the differentiation task tones with a certain pitch. According to Reiterer et al. [13] general hypothesis about timbre discrimination occurs in the right temporal cortex, but their findings show that timbre discrimination process also activate Broca's language area in the left hemisphere and the volume response in the right parietal. Activities that occur in Broca's area was a sign that Broca's area also had a role in the discrimination task of phonetic change of the signals of non-language-like vowels. So during the process of musical timbre discrimination, in the right temporal cortex (right hemisphere) there was a process of harmony structure (spectral) discrimination and in the left hemisphere occurred a dynamics (attack or onset) discrimination and timbre of language. According to Boucher and Bryden [14] there was no difference in timbre discrimination ability between men and women. According Hajda [10] stimulus discrimination of timbre was defined as a subjective distinction on a number of auditory stimuli, in which the subject was directly listen to the differences in order to perceive the quality of the style of sound articulation. Stimulus discrimination of timbre in here was defined as the sound color detection of the bayan tabla in a musical stimulation.

According to LeDoux [15] sound conditioned (in mice) can be directly processed from the thalamus to the amygdala to trigger neuroendocrine responses and peripherals before then processed more broadly through the auditory cortex and association areas, as well as music can also be evaluated by the brain at the most basic level was to create emotional response. According to Gosselin, Peretz, Johnsen, and Adolphs [16] the amygdala was more needed in the process of musical emotion. But according to LeDoux and Phelps [17] in humans, the cerebral cortex (that was connected with the amygdala, hypothalamus and other limbic system) was believed to be involved in cognitive appraisal processes, mechanisms of language, complexity of thought, and ability to regulate emotions depends on executive functions of the prefrontal cortex behind the forehead. According to LeDoux [17] at the same time, people can have two different emotional reactions, which one was unconscious triggered by the amygdala and the other was an awareness of the cortex activity. According to Scherer and Zentner [15] the emotivist believes that music can really create an emotional response to a listener but the cognitivist argues that music was just an expression or representation of emotions. According to Juslin and Sloboda [15] emotions grow in line with changes in the nervous system, stimulus

conditions, regulation of emotion, cognition, expressive behavior, the influence of culture, and language, then there were studies on the emotional expression in music and the effect of music on cognitive performance which focused on emotional memory. In the music emotional expression study, there were assumptions that the assessment of listener emotions can also be influenced by the musical parameters including timbre, articulation, tone attacks, and harmony. Musical timbre may have the stimulating effects [7] According to Kotlyar and Morozov [15] fast attack linked happy or angry expressions, while the slow attack was related sad expression. Timbre playing technique was also one of creative improvisation to create an erotic atmosphere in music [18]. But there were no two systems that will respond to a timbre in the same way [19]. According to Padova et al. [3] timbre can affect the performance of recognition memory and emotional response of the subject, but this effect was also controlled by genres (music types) and gender (sex), while the effect of changing attack hybrid (synthetic), which tested only more influence on the subject of memory recognition task than the task of emotional appraisal. According to Hajda [10] all musical perception (including perception of music emotion) was defined as one way of thinking (mind) to transform, organize, and structure a physical/physiological information (from outside the mind) and psychological (from inside the mind) stimulation due to musical sound elements. Perception of music emotion here was defined as rating the intensity of strong-not strong emotion, happy-not happy, fun-not fun, erotic-not erotic, of the bayan tabla timbre stimulation in a musical stimulation.

According to Fletcher and Rossing [6] bayan tabla was made of copper or of terracotta. Bayan tube covered with a membrane made of goat skin. Bayan has called syahi (a tuning components) mounted in the middle of it. Membrane stretched over the body will resonate when struck. In general, the resulting sound was rich in harmony, but when used appropriately then the syahi can produces much of parallels between tone harmonies. Parallels between the tone harmonies to produce a variety of timbre and various duration of attack-decay. Bayan tabla timbre here was defined as a shape, spectral, and duration of the attack-decay bayan generated from a particular blow technique.

According to Takari [5] dangdut music was a diverse archipelago of art that comes from the Malay ethnic art. Dangdut music contains elements of Indian, Arab, and Malay. The music was then developed by adopting elements of Western music like rock'n roll, rege, and rap. In subsequent developments dangdut music mingling with other ethnic archipelago, such as Javanese, Sundanese, Batak, and Minangkabau. Dangdut term that appears in the 1970's were from tabla drum sound which became characteristic of the music. According to Setiawan [5] tabla produces the sound 'nduut' that supposedly can provide a psychological effect, enhance erotic charm, and fun for the rhythm of the music itself. In addition to tabla, dangdut music accompaniment instrument were electric guitar, electric organ, and others.

According to Begault [20] auditory experiment was an experiment to find a causal relationship between physical parameters of auditory stimuli with subjective responses using quantitative measurements; pitch in Hertz (Hz), loudness with phones, but to attribute timbre has no scale particular measurement. Based from the assumption that the timbre has a multidimensional quality, then possibilities it can be distinguished by using adjectives, the measurement of timbre often use the semantic differential technique was a technique that uses scale, where an adjective and its opposite meaning of the word was placed on two poles extremely different. The use of the word pointer with the opposite meaning properties were assumed to give a clear difference in

the intensity of emotion in between each timbre and often referred to as Verbal Attribute Magnitude Estimation (VAME). According Hajda [10] can also be measured by timbre similarity scaling techniques, in which a number of comparable stimulus pairs were presented to the subject, then the subject gives the degree of similarities or differences in these stimuli on a scale. Related to experimental design, according to Pitt and Crowder [11] within subjects design can be used to compare the effect of each modification of timbre on each individual because each individual's response to a timbre can vary, plus measurement of the contribution of reaction time on each type of timbre modification. To avoid the effect of stimulus sequence on the within subjects model, the design of randomized-experiment that was well structured way random assignment of treatment sequence or order of the subjects who received each order of treatment [21] was assumed to eliminate this effect.

According to Scherer and Zentner [15] in addition to the structure, performance, and the context in which music was heard, the general factors that also need to be considered in the test response was characteristic of music listeners. Characteristics of listeners can be based on the identity of the listener on an individual and sociocultural; based on a characteristic that became symbolic of general agreement in a particular culture or subculture including the interpretation of a familiar pattern in a group or culture, for example; cultural expectations of certain music. This assumption was based on the fact that these factors can be related to the emotional side in memory of individuals as a result of associative conditioning and learning. Here the characteristics of music listeners were based on cultural expectations (preferences) of the dangdut music genre; these were fans, neutral, and haters to dangdut music.

## Materials and Methods

### The operational definition of dependent variable

The first dependent variable was the stimulus discrimination. Stimulus discrimination here was the bayan tabla sound color detection in the three of musics. Stimulus discrimination was measured by a score of 1, 2, or 3; 1 if all musics sounds the same, 2 if two music sounds the same but the other music that sounds different (1 and 2 were the same music but 3 was the diff or 1 and 3 were the same music but 2 was the diff or 2 and 3 were the same music but 1 was the diff), and score 3 if all musics that sounds different. The second dependent variable was the perception of music emotion. Perception of music emotion here was assessment of emotional intensity of strong-not strong, happy-not happy, fun-not fun, not erotic-erotic caused by bayan timbre stimulation in three of music. Perception of music emotion was measured by a score of 1-5; 1 if very not strong or very not happy or very not fun or very not erotic, 2 if not strong or not happy or not fun or not erotic, 3 if normal, 4 if strong or happy or fun or erotic, and the score 5 if very strong or very happy or very fun or very erotic. All scores obtained from the subject's behavior when choose three options of stimulus discrimination on a slide and five options of emotional perception in four slides which were all placed in the StimoV1.0 software of Toshiba Satellite series L-40 notebook. Subjects responded by using a mouse. StimoV1.0 also functions as the recording tool of response numbers and reaction time scores in seconds. StimoV1.0 made by adopting the formats that have been available from the Microsoft Visual Studio 2005 software.

### The operational definition of independent variables

The independent variable was the bayan tabla timbre. Bayan tabla timbre here was the sound of tabla G#1 pitch which was conditioned

differently in the 3 stimulation of 'dangdut' music without the lyrics and in the Wave format. Here were stimulation of music with some bayan tabla timbre size specifications per stroke:

1. A dangdut music with natural bayan tabla timbre (M1) with the specification of bayan timbre per stroke by the total frequency at left output was 51.502 Hz and the pitch was G # 1-13 and by the total frequency at right output was 51.442 Hz and the pitch was G # 1-15 (Blackmann-Harris scale), the total duration of the tone was 0.487 seconds, the duration of the tone's attack was 0.403 seconds, the duration of the tone's decay was 0.085 seconds.
2. A dangdut music without any bayan tabla timbre (as a control or placebo) (M2).
3. A dangdut music with bayan tabla synthetic timbre (M3) with the specification of bayan timbre per stroke by the total frequency of 51.487 Hz at left output and by the pitch G # 1-14 and by the total frequency of 51.430 Hz at right output with the pitch G # 1-16 (Blackmann-Harris scale), the total duration of the tone was 0.487 seconds, the duration of the tone's attack was 0.085 seconds, the duration of the tone's decay was 0.403 seconds.

Stimulus modification technique was done by cutting the musical accompaniment midi format from 'SMS' song (Trio Macan band) with bars 2/4 and the long duration of 10 seconds taken from a midi file style Yamaha keyboard PSR-S series 2000. Pieces were converted into wave format using software Steinberg NUENDO 3.1.2 then the sound of tabla midi deleted. Replicated into 3 pieces by using the software Cool Edit Pro.2.0. The first piece (M1) plus a sampling of natural dayan-bayan timbre. The second piece (M2), plus a sampling of dayan timbre only, intended to test the effect of bayan tabla timbre. The third piece (M3) plus natural dayan and synthetic bayan timbre; created by inverting the position of attack-decay sampling bayan tabla natural timbre in M1 into decay-attack with a reverse technique effect refers to Berger and Erickson [12], intended to test the effect of changes in tone's attack-decay of bayan tabla. Spectral aspects of dayan tabla in the M1-M2-M3 controlled. Aspects of bayan tabla spectral shape in M1-M3 were controlled. Volume of bayan tabla timbre in M1 and M3 were positioned with a ratio of 1:2 of the volume of music. According Spintge [7] 60-80 beat per minute tempo was one aspect of relaxation music, the tempo of the music selected for all stimulation was 100 beat per minute with the assumption that to get more strong effect. In addition, the entire musical structure contained in these three musical stimulation; spectral, musical timbre, pitch sequence (melody), duration, tempo, shape the rhythm, and music volume be controlled. The process of making the entire stimulus was done with a Toshiba Satellite L-40 notebook.

### Subjects of research

Subjects of stimulus discrimination test consisted of 9 males and 9 females. In the experiment, subjects consisted of 9 males and 9 females dangdut music fans (KE), 9 males and 9 females who were neutral dangdut (KK1), and 9 males plus 9 female sswere dangdut music haters (KK2). Each subject KE, KK1 and KK2 inserted in one of 3 categories of treatment groups based on the lottery numbers were drawn. Treatment group 1 consisted of subjects with lottery numbers 1, 4, 7, 10, 13, 16, treatment group 2 consisted of subjects with lottery numbers 2, 5, 8, 11, 14, 17, and treatment group 3 consists of subjects with lottery numbers 3, 6, 9, 12, 15, 18. All the subjects were the students of under graduated and graduated of Social-Humanities and Veterinary Medicine sciences of Gadjah Mada University (UGM) in Yogyakarta with age 17-32 years

(Table 1 and Figure 1), but there was no theory about the effect of age on the preference of certain types of music.

**Procedures:** Preliminary tests performed as a stimulus standardization. When there were more than 50% of the subjects tested achieved a score of 2 or 3, then the size of M1, M2, M3 otherwise meet the standards to be used as a stimulus measure experimentally. Here were the steps in collecting the data: The researcher in charge of recruiting subjects, helping experimenter to prepare tools, manage processes, and overseeing the data collection process. Data collection was performed by a experimenter to avoid the influence of researcher's expectations. Prospective subjects were recruited investigators with two oral questions, first: "Do you ever hear dangdut music?" and second: "if you buff dangdut, neutral or hate it?". Subjects verbally invited to participate in experiments testing. For prospective subjects who were willing, when it was invited to the laboratory of experimental psychology. Subjects were welcome to fill the personal data with a pen to categorize the candidate subject to the KE, KK1, or KK2. After completing the biographical data, the subjects were invited one by one went into a laboratory-sized (7.5 × 2 × 3 m) which illuminated 8x40 watt fluorescent lamp. The subject may be seated in a chair as high as 50 cm facing toward notebook (active) located on the table area of 1 × ½ m high as 75 cm. On the right notebook provided a mouse. Based on the personal data, allowing experimenter took the paper from one of the lottery sweepstakes cans by category group that was KE, KK1, or KK2. After that, the experimenter insert name of subject, sex symbol (L 'male'/P 'female'), the symbol type of group (KE/KK1/KK2), lottery number of subjects, and the number of treatment types that was written on paper into StimoV1.0. After that, experimenter give instructions as follows: "Welcome. Thank you for participating in this study. Here you will be asked to hear three music with a headset by closed your eyes, please! Then, please answer the questions in the slide. All answers will correct and you should have a honest answer. Please use the mouse to start, continue, or to repeat. Maximum processing time is five minutes, if the alarm goes off then you should stop. Please start!" (the experimenter pressing Dinner Timer Lite software). After the subjects to click the option 'start', the experimenter would walked away 3 meters from the subject. The design of data collection for the stimulus discrimination was a randomized experiment between subjects and for the perception of emotion was a randomized experiment within subjects. The order of stimulus M1-M2-M3, M2-M3-M1, M3-M2-M1. Subjects play all stimulation in StimoV1.0 and listen to music through a Dynamic Bass Sound Sennheiser HD 418 headset series. The time

GROUP	Mean	N
KE (fans)	21.67	18
KK1 (neutral)	19.17	18
KK2 (haters)	19.39	18
Total	20.07	54

Table 1: Age of the subjects.

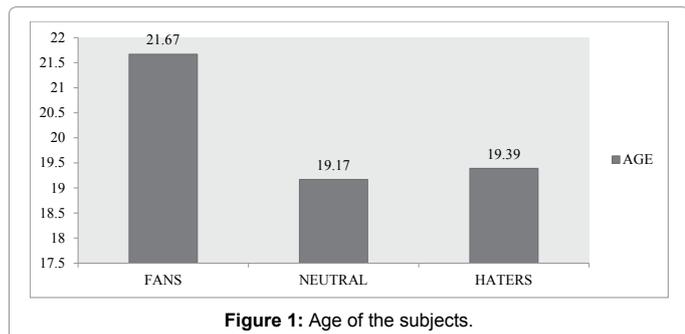


Figure 1: Age of the subjects.

provided to a subject includes the duration of the hearing three stimuli per slide (3 × 10 seconds) + duration of decision making and giving a response in 5 Stimo.v1 slides (5 × 30 seconds), so the total duration was 300 seconds (5 minutes). Dinner Timer Lite software will issue an alarm signal if the test time was over 5 minutes (already out). Reaction time was calculated when the subject to click 'start' to click 'finished'. All subjects received treatment from the same tool was intended to avoid the effect of different tools. The use of headsets were intended to minimize environmental noise around and the subject was asked to close the eye was intended to increase concentration. During the experiment conducted then the laboratory door tightly closed to avoid noise interference. Room's Air Conditioner was positioned 16°C and the air temperature estimates obtained was 28°C so that estimate of the sound speed about 348.02 m/s [22]. The stimulus was presented on the intensity of normal conversation at 55 dBA SPL [12]. Camera Logitech Quickcam E 2500 and I. Internal Screen Recorder 7.0 installed to document the subject's behavior. Once the experiment was completed then the experimenter would utter the phrase: "Thank you for participation. As a token of thanks, pleased to receive this snack". After receiving a snack, the subjects were welcome to come out of the laboratory.

## Results and Discussion

### Preliminary tests

From the 18 subjects found in 11.1% (2 subjects) received a score of 1, 38.9% (7 subjects) received a score of 2, and 50.0% (9 subjects) received a score of 3. So there was a 88.9% (16 subjects) who received a score of 2-3, then the size of M1, M2 and M3 meet the standards of more than 50% to be used as stimulation in the experiment.

### Stimulus discrimination

The contribution factor type listener groups (KE, KK1, KK2) was ( $p=0.211$ ), means no difference in bayan timbre effect on stimulus discrimination between groups of fans, neutral, and do not like to dangdut music. The contribution of gender factors were also not found ( $p=0.059$ ) means the ability to discriminate timbre was not controlled by the sex factor (Table 2 and Figure 2). These results support the findings of [14] that the ability of timbre discrimination between men and women were equal.

### Perception of Music Emotion

#### Perception of strong emotion

The average score of the M1 in the KE (4.17), KK1 (4.17), KK2 (4.11) and the average score of the M1 in the KE, KK1, KK2 each higher than M2 ( $p=0.000$ ). The average score in KK2 M1 was higher than the M3 ( $p=0.014$ ). Not found the contribution of gender factors in KE ( $p=0.284$ ), KK1 ( $p=0.175$ ), and KK2 ( $p=1.000$ ). These results show the effect of bayan timbre (in M1) on perception of strong emotion but the bayan timbre (in M3) had no effect (Tables 3-5 and Figures 3-5). These results support Wigram et al. that the timbre of music can have the strong effect. It was shown by the change in attackdecay of bayan between M1 and M3, which effect the  $M1 > M3$  in the group do not like music dangdut (KK2) shows that here the slower attack of bayan timbre (in M1) was still more potential to give effect higher on the perception of strong emotion than the faster attack of bayan timbre (in M3).

#### Perception of happy emotion

The average score of the M1 in the KE (4.33) and higher than M2 ( $p=0.001$ ). The average score on the M1 in KK1 (4.22) and higher than

GROUP	Sex	Mean	N
KE (fans)	Male	2.56	9
	Female	2.44	9
	Total	2.50	18
KK1 (neutral)	Male	3.00	9
	Female	2.11	9
	Total	2.56	18
KK2 (haters)	Male	2.22	9
	Female	2.11	9
	Total	2.17	18
Total	Male	2.59	27
	Female	2.22	27
	Total	2.41	54

Table 2: Stimulus discrimination of sex factor.

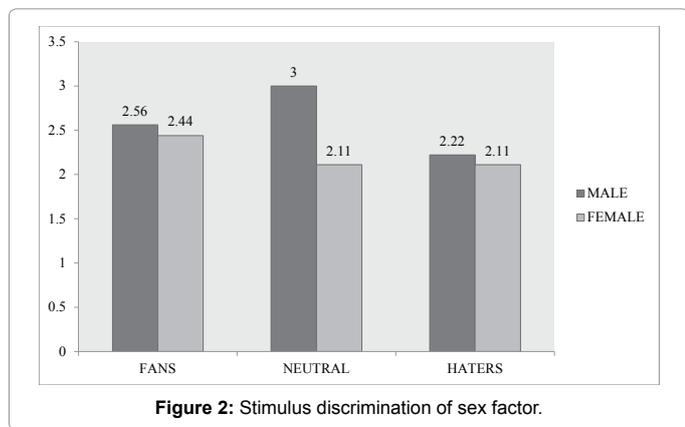


Figure 2: Stimulus discrimination of sex factor.

MUSIC	SEX	Mean				N
		STRONG	HAPPY	FUN	EROTIC	
M1	Male	4.11	3.56	2.89	3.56	9
	Female	4.11	4.11	3.44	3.33	9
	Total	4.11	3.83	3.17	3.44	18
M2	Male	2.89	2.78	2.44	2.44	9
	Female	3.00	3.22	3.11	2.78	9
	Total	2.94	3.00	2.78	2.61	18
M3	Male	3.56	3.67	2.78	3.33	9
	Female	3.44	3.67	3.00	3.22	9
	Total	3.50	3.67	2.89	3.28	18

Table 5: Perception of music emotion in haters group (kk2).

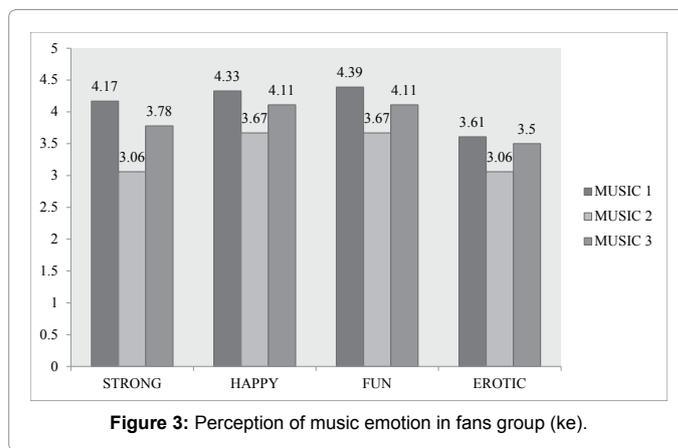


Figure 3: Perception of music emotion in fans group (ke).

MUSIC	SEX	Mean				N
		STRONG	HAPPY	FUN	EROTIC	
M1	Male	4.22	4.33	4.56	3.78	9
	Female	4.11	4.33	4.22	3.44	9
	Total	4.17	4.33	4.39	3.61	18
M2	Male	3.00	3.44	3.44	3.22	9
	Female	3.11	3.89	3.89	2.89	9
	Total	3.06	3.67	3.67	3.06	18
M3	Male	4.11	4.22	4.33	3.67	9
	Female	3.44	4.00	3.89	3.33	9
	Total	3.78	4.11	4.11	3.50	18

Table 3: Perception of music emotion in fans group (ke).

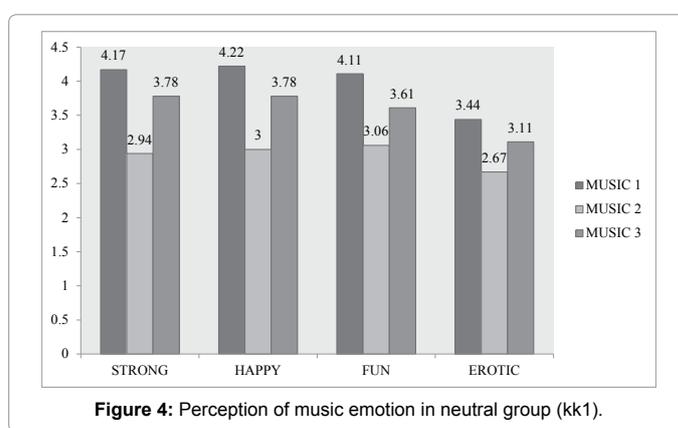


Figure 4: Perception of music emotion in neutral group (kk1).

MUSIC	SEX	Mean				N
		STRONG	HAPPY	FUN	EROTIC	
M1	Male	4.11	4.11	4.11	3.56	9
	Female	4.22	4.33	4.11	3.33	9
	Total	4.17	4.22	4.11	3.44	18
M2	Male	2.78	3.00	2.78	2.78	9
	Female	3.11	3.00	3.33	2.56	9
	Total	2.94	3.00	3.06	2.67	18
M3	Male	3.56	3.44	3.67	3.22	9
	Female	4.00	4.11	3.56	3.00	9
	Total	3.78	3.78	3.61	3.11	18

Table 4: Perception of music emotion in neutral group (kk1).

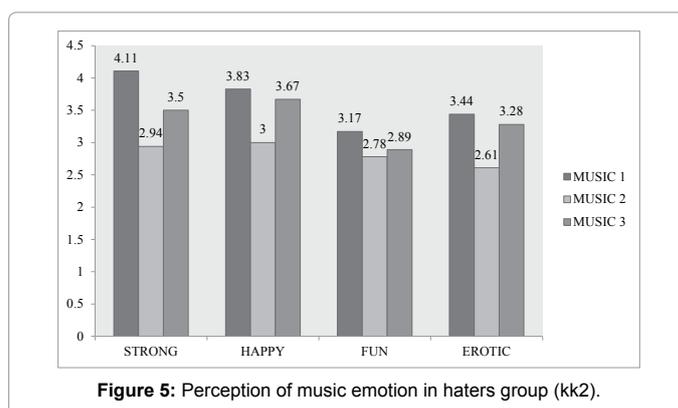


Figure 5: Perception of music emotion in haters group (kk2).

M2 ( $p=0.000$ ). The average score of M3 in the KE (4.11) but not better than M2 ( $p=0.098$ ) and M1 ( $p=0.343$ ). All the average total score of M1, M2, M3 in KK2 below 4. Not found the contribution of gender factors in KE ( $p=0.690$ ) and KK1 ( $p=0.229$ ). These results indicate that only in the neutral groups and dangdut music fans course there was

the effect of bayan timbre (in M1) on the perception of happy emotion but bayan timbre (in M3) had no effect. These results indicate that the slower attack of bayan timbre (in M1) was still more potential to give effect higher on the perception of happy emotion than the faster attack of bayan timbre (in M3) (Tables 3-5 and Figures 3-5). These results do not support the findings of Kotlyar and Morozov [2,15].

### Perception of fun emotion

The average score of the M1 in the KE (4.39) higher than M2 ( $p=0.006$ ). The average score on the M1 in KK1 (4.11) and higher than M2 ( $p=0.000$ ) and higher than M3 ( $p=0.040$ ). Average score M3 in the KE (4.11) but not better than M2 ( $p=0.118$ ) and M1 ( $p=0.302$ ). All the average total score of M1, M2, M3 in KK2 below 4. Not found the contribution of gender factors in KE ( $p=0.555$ ) and KK1 ( $p=0.570$ ). These results indicate that only in the neutral groups and dangdut music fans course there was the effect of bayan timbre (in M1) on the perception of fun emotion but bayan timbre (in M3) had no effect (Tables 3-5 and Figures 3-5). These results support the theory of Setiawan [14] that the bayan timbre (the sound of 'nduut') on dangdut music can affect the fun. It was shown by the change in attack-decay tabla bayan between M1 and M3, which effect the  $M1 > M3$  in the neutral dangdut (KK1) shows that the slower attack of bayan timbre (in M1) was still more potential to give effect higher on the perception of fun emotion than the faster attack of bayan timbre (in M3).

### Perception of erotic emotion

All the average total score of M1, M2, M3 in all kinds of groups of listeners (KE, KK1, KK2) was below than 4. These results indicate that there were no effect of bayan timbre (both in M1 and M3) on perception of erotic emotion in the group of fans, neutral, and haters to dangdut music, then here bayan timbre was not sufficient to give effect to erotic taste (Tables 3-5 and Figures 3-5). Thereby these results do not support the theory of Setiawan [5]. Thus these experiments found the effect of bayan tabla timbre (especially in M1) on the perception of strong emotion, joy, and fun. It was found that the pattern of bayan timbre effect (both in M1 and M3) on emotional perception aspects among dangdut fans, neutral, and haters groups were not the same, means that the perception of emotional responses to musical timbre here involved were controlled by factors like, neutral, or dislike of a certain type of music (genre). These results support the findings of [3] that the effect of timbre on the perceived musical emotion also controlled by factors of genres (music types). But no found gender factors contributing to the perception of music emotion in all aspects because all ( $p > 0.05$ ), then these results do not support the findings of [3] that the factor of gender (sex) can control the emotional response to musical timbre.

### Reaction time

The average reaction time KE (200.61), KK1 (181.11), KK2 (193.83). The contribution of reaction time in all kinds of groups of listeners (KE, KK1, KK2) was not significant ( $p=0.665$ ) and gender factors contributing to the reaction time was also not significant ( $p=0.849$ ) (Table 6 and Figure 6).

For all listeners of Indonesian music in general (because all subjects were Indonesian), including all fans, neutral, and who does not like dangdut music, timbre with low-pitch and slow attack (such as bayan tabla timbre in M1) can be used as a means to create the perception of strong emotion than fast attack (like bayan tabla timbre in M3). Specifically for fans and neutral dangdut music, timbre with low-pitch and slow attack (such as bayan tabla timbre in M1) can be used as a means to create the perception of strong emotion, happy, and fun

GROUP	SEX	Mean	N
KE	Male	199.44	9
	Female	201.78	9
	Total	200.61	18
KK1	Male	182.44	9
	Female	179.78	9
	Total	181.11	18
KK2	Male	198.78	9
	Female	188.89	9
	Total	193.83	18
Total	Male	193.56	27
	Female	190.15	27
	Total	191.85	54

Table 6: Reaction time of gender factors.

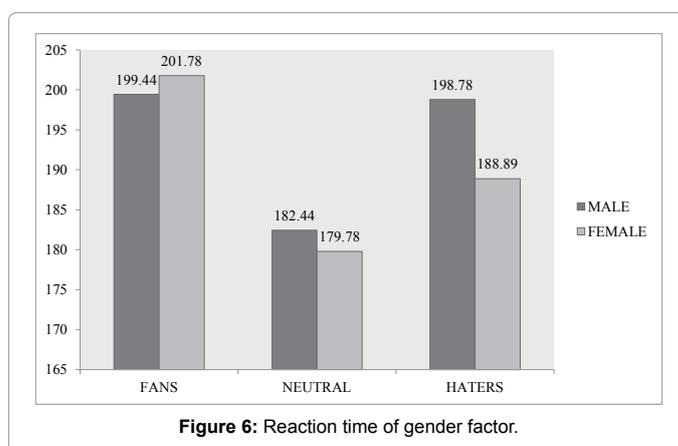


Figure 6: Reaction time of gender factor.

than fast attack (like bayan tabla timbre in M3). The use of music in psychotherapy practices and in education need to consider factors as like, neutral, and dislike to a certain type of music because of these factors can affect the emotional response of musical timbre.

### Conclusion

In general, the results of this study indicate that the effect of musical timbre on stimulus discrimination is controlled by a factor of acoustic instruments (including attack-decay) and was not controlled by factors like, neutral, or do not like to type of music (genre). But the effect of musical timbre on perception of music emotion is controlled by factors like, neutral, or do not like to type of music (genre).

### Statistical Methods

All data were analyzed with SPSS 15.0 statistical software. The average stimulus discrimination score difference of KE, KK1, KK2 and gender factors contributing to stimulus discrimination scores were analyzed by two ways-ANOVA. After scoring each aspect of emotional perception (strong-not strong, happy-not happy, fun-not fun, erotic, not erotic), then sorted back of the pattern of the effect of stimulus randomization sequence M1, M2, M3 with the contribution factor of gender to each aspects of emotional perception in the KE, KK1, KK2 analyzed by repeated measure two ways-ANOVA. The reaction time contribution to KE, KK1, KK2, and the contribution of gender factors on reaction time were analyzed by two ways-ANOVA.

### Ethics

All experimental subjects willing to participate voluntarily. This research was allowed by Dr. Magda Bhinety Esteem on behalf as institutional review board (IRB) in using Experimental Psychology Research Laboratory at Gadjah Mada University Indonesia.

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