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Research Article

Art Appreciation Based on Different Educational Background Using Neuroaesthetic Instruments

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Abstract

The use of art as a therapy for various neurological and mental illnesses continues to grow. Based on the literature, there are differences in studies in assessing artworks between individuals, which are influenced by insights related to many things. An instrument is needed to measure the ability to assess each work of art based on a certain population, before providing art interventions for therapy. We compiled an instrument consisting of 383 images. As a first step in validation, we conducted tests on 137 medical students and 137 art and design faculty students. There was an increase in mood at the end of the test.

Keywords

Education, Neuroaesthetic, Appreciation, Medical, Art.

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Introduction

Neuroaesthetics is a new field that combines art and cognitive neuroscience. This field has developed rapidly since 2012. This field studies the brain's response to activities when viewing works of art and/or performing artistic activities (Chatterjee and Vartanian, 2016, Christensen and Gomila, 2018, Coles et al., 2019, Fish, 2019, Iigaya et al., 2020, Kandel, 2013, Magsamen, 2019, Milovanović and Medić-Simić, 2021, Nadal and Skov, 2013, Nadal and Skov, 2015, Nalbantian, 2013). There have been many reports of significant effects of clinical improvement in the various treated subjects. Neuroaesthetics develops in art, poetry, music, and movement/dance. 2-dimensional art (calligraphy) and painting, as well as 3-dimensional art in the form of making sculptures (Brattico and Pearce, 2013, Brattico and Varankaitė, 2019, Chatterjee, 2006, Iigaya et al., 2020, Jacobs, 2017, P.Kirsch et al., 2013, Trojanoa et al., 2009, Wassiliwizky et al., 2017, Zaidel, 2017) We are currently focusing on 2D art in relation to neuroaesthetics. In neuroaesthetics related to 2 dimensions, various studies have been carried out using electroencephalography, to functional MRI (Boccia et al., 2015, Chatterjee and Vartanian, 2016, Trojanoa et al., 2009). Based on a meta-analysis study, it has been known with certainty the areas of the brain that are activated when someone makes an assessment of 2-dimensional works of art. The brain areas that are active are the occipital cortex, supratemporal gyrus, parietal cortex, ventromedial prefrontal cortex, and motor areas. The reward circuit is activated leading to a sense of pleasure (Boccia et al., 2015, Chatterjee and Vartanian, 2016, Chatterjee, 2006). This pleasure is used to treat various diseases such as depression, post-traumatic stress disorder, Parkinson's, and to improve the quality of life of cancer patients (Brattico and Pearce, 2013, Brattico and Varankaitė, 2019, Cattaneo, 2018, Iigaya et al., 2020, Jiang et al., 2020, Trojanoa et al., 2009 , Wassiliwizky et al., 2017, Zaidel, 2017). Neuroaesthetics is not only developing in the field of therapy, but also developing in new understanding in assessing human behavior. There is evidence that the part of the brain that is activated when assessing the beauty of behavior is the same part that is activated when assessing human faces. This opens the possibility for neuroaesthetic research to be associated with destructive behavior/terrorism (Wang et al., 2015). This makes neuroaesthetics more interesting to study. In the field of business and economics, neuroaesthetics occupies an important position. Various factories such as mobile phone manufacturers, household appliances, interior design and image design use neuroaesthetics to influence the consumer's brain (Sun et al., 2020). There is a need for large-scale population studies of neuroaesthetics in the future.

Research Methods

Research Design

We compiled the instrument in the form of a pictorial selection of 383 images. Our pictures are taken from the internet and also pictures that we make ourselves. Our respondents were asked to choose a reason why the image is considered beautiful. Each image can have more than one reason. Before working on the questions, respondents were asked to write down their mood level in the form of the Ontario Mood Scale. After working on the questions, the respondents were also asked to choose a value on the mood scale. Questions are formed in the form of a google form and distributed through the whatsapp application.

Population and Sample

Subjects were recruited through a WhatsApp group coordinated by a third party. The subjects came from students of the Faculty of Medicine, UPN Veterans Jakarta and students of the Faculty of Fine Arts and Design, Maranatha University, Bandung (N = 137).

Data Collecting Instrument

The instrument consists of 383 images. Each picture is accompanied by the question of the reason why the picture is called beautiful. The answer choices consist of:

1. Harmony
2. Rhytm

3. Movement
4. Pattern
5. Contrast
6. Balance
7. Proportion
8. Variety

Each question can have more than one answer. Score is calculated based on correct answers. The total score of correct answers is 3,126. Each question is solved in 10 seconds. The instrument is equipped with an Ontario Mood Scale which the respondent must choose before and after working on the questions. The instrument was prepared with the aim of knowing the basic abilities and insights of the respondents towards arts related to multi-culture, customs, races and religions.

Procedures

After the respondents were collected through the whatsapp group, the respondents were asked to fill out questions in the google form. The google form explains how to fill out the questionnaire. First, the subject was asked for his consent to participate in the study, the subject was welcome to leave the google form if he did not wish to continue as a research subject, the subject was guaranteed the confidentiality of the data. Subjects are also allowed to resign at any time even though they are willing to complete filling out the questionnaire to completion. Subjects were asked to agree to participate in the study not under compulsion, as compensation the subject was allowed free consultation related to health and neuroaesthetic discussions with the research coordinator. After giving consent, subjects were asked to fill out the Ontario Mood Scale and fill out a questionnaire with 10 seconds of each question.

Results and Discussion

Data Analysis

The results of the study are as follows:

Table 1
Comparing the value of art appreciation skills related to neuroaesthetics in art students and medical students (non-arts)

	Art Student (n=137)	Non-art student (n=137)	Score p
Percentile 1	639,3	11,9	
Percentile 3	698,6	19,12	
Percentile 5	781,5	30,8	
Percentile 25	961,5	117,0	
Median	1.119,0	384,0	
Percentile 75	1.369,5	480,5	
Percentile 95	1.697,3	1029,5	
Percentile 97	1.923,5	1160,8	
Percentile 100	2.391,0	1443,0	

Mann-Whitney test: mean art student ranking 200.7; the average ranking of non-art students is 74.3 It appears that the average value of the art appreciation level of the Fine Arts and Design students is higher than the students of the Faculty of Medicine in various percentiles.

Table 2
Comparison table of initial and final mood in art students and medical students before and after conducting neuroaesthetic-related art assessments

Group		Mood1	Mood2	Delta	Score	Information
Art Student (n=137)	Percentile 1	4	8	1	<0,00 1	Increase 137
	Percentile 3	4	8	1,1		Fixed 0
	Percentile 5	4	8	2		Decrease 10
	Percentile 25	5	8	3		
	Median	5	9	3		
	Percentile 75	6	9	4		
	Percentile 95	7	10	5		
	Percentile 97	7	10	5		
	Percentile 100	7	10	5		
Non-art student (n=137)	Percentile 1	2	5,8	0,4	<0,00 1	Increase 136
	Percentile 3	3	7	2,1		Fixed 0
	Percentile 5	3	7	3		Decrease 0
	Percentile 25	3,5	8	4		
	Median	4	9	5		
	Percentile 75	5	9	5		
	Percentile 95	6	10	6		
	Percentile 97	6	10	6		
	Percentile 100	6	10	6		

It appears that the increase in mood scores for students of Fine Arts and Design is higher than that of students of the Faculty of Medicine when using this instrument as an intervention tool.

Discussion

The purpose of this study was to obtain an overview of the value related to neuroaesthetics in assessing 2-dimensional works of art. This research is also the first step in validating the instrument that we have compiled. In this study we prove, based on populations of different backgrounds, that this instrument can distinguish levels of appreciation of the arts. Based on literature studies, the assessment of works of art is influenced by 2 things, namely the basic ability to recognize something called beautiful, namely concepts related to symmetry (balance), rhythm, and variation. Also, the purpose of the study is to score the level of art appreciation, so that one's initial level is known before in this case. Furthermore, the type of art therapy can be determined according to the level. Not everyone has the same ability to judge art. In addition, the ability to appreciate is also influenced by various insights related to art. We prove that educational background is influential in judging a work of art. Students of the Faculty of Fine Arts and Design, Maranatha University, Bandung, are exposed to various studies on works of art every day, they seem to have a higher value in detecting the characteristics in a work of art so that it can be called beautiful. Also in their enthusiasm for assessing works of art, students of the Faculty of Fine Arts and Design seemed more enthusiastic, which was reflected in the average score for the increase in mood before compared to after filling out the questionnaire in the instrument. Apart from being a diagnostic tool, we also use the instrument as an intervention tool for mood. We compiled 383 questions in the form of pictures that research subjects had to answer, the reasons why the pictures were beautiful. We collect 383 images that we take from the internet that do not contain copyright & images that we design. We try to structure the images in such a way as to detect the basic ability to judge art. In the literature, the emphasis is mainly on symmetry. Theoretically in the field of art, something is called beautiful if it has/bears the principles of art as seen in Figure 1, that is :

Rhythm

Rhythm is defined as an element of movement in a work of art. Rhythm is formed by the variation and repetition of elements in a work of art that create a visual tempo/beat.

Harmony

Harmony means elements, each work of art looks like a single unit, not monotonous but also not chaotic.

Balance

In balance there is a stable uniqueness of the elements. Symmetry and asymmetry are manifestations of balance.

Pattern

The combination of elements.

Proportion

Proportion is the relationship between one element to another

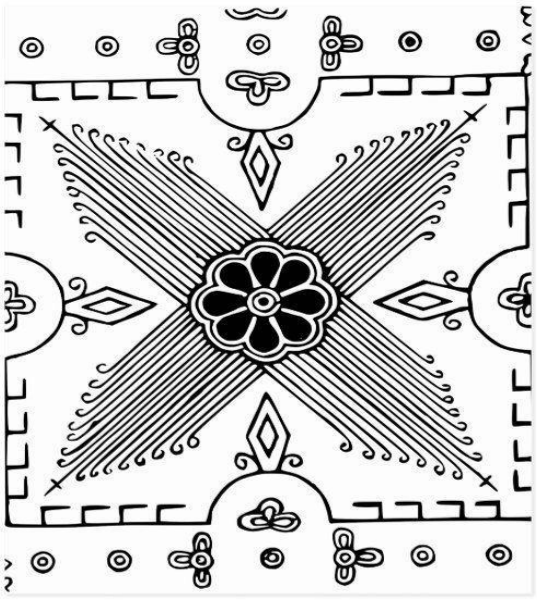
Variety

Variations related to the use of different colors, sizes, shapes in a work of art

Contrast

The brain prefers sharp contrasts

Through 383 questions in the form of pictures, we observed the consistency of respondents in answering questions, besides that, at the same time, they also carried out mood-improvement interventions. The ability to assess symmetry or balance is highly considered by experts as the main thing related to neuroaesthetics. Based on research, it appears that the part of the brain involved in evaluating symmetry is the same part that is involved in assessing the beauty of behavior. Of course this is a very interesting finding to be investigated further.



Check If Any

- ☑ A. Harmony
- ☑ B. Rhytm
- ☑ C. Movement
- ☑ D. Pattern
- ☑ E. Contrast
- ☑ F. Balance
- ☑ G. Proportion
- ☑ H. Variety

Figure 1. Example of images used in the instrument to assess basic abilities in evaluating works of art

We also take into account factors related to involvement in terms of various insights in developing the instrument. We observed and then included in the questionnaire pictures to test the subject's insight into various works of art from various parts of the world. Indonesia, especially Java and Bali, is well known to the world for its beautiful 2-dimensional works of art, which we show in Figure 2, 3 and Figure 4, for example, as follows:

Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

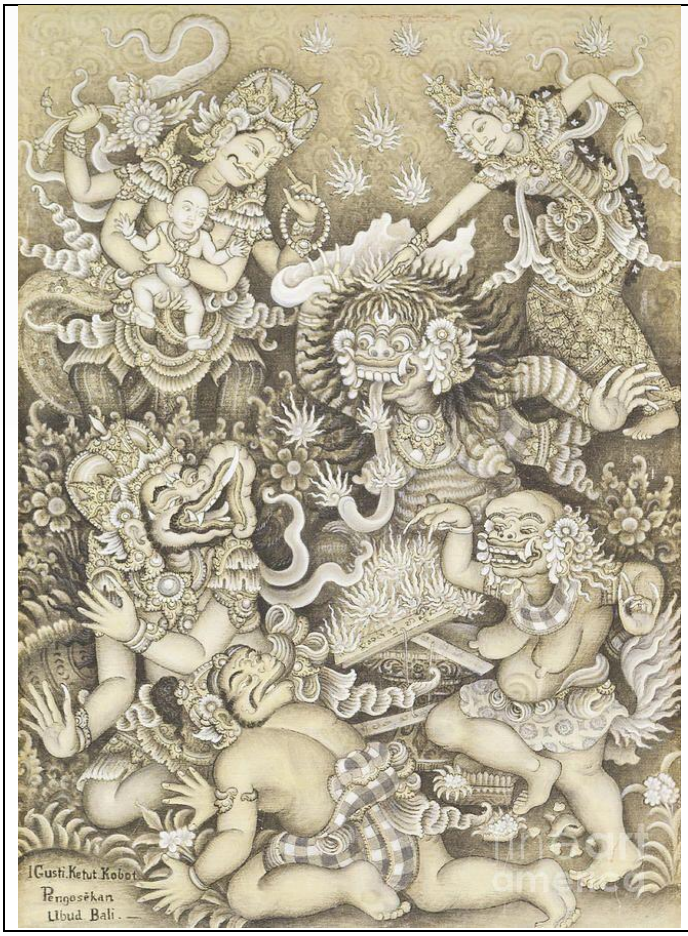
☑ E. Contrast

☑ F. Balance

☑ G. Proportion

☑ H. Variety

Figure 2. Example of images used in the instrument to assess basic abilities in evaluating works of art



Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

☑ E. Contrast

☑ F. Balance

☑ G. Proportion

☑ H. Variety

Figure 3. Example of images used in the instrument to assess basic abilities in evaluating works of art

Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

☑ E. Contrast

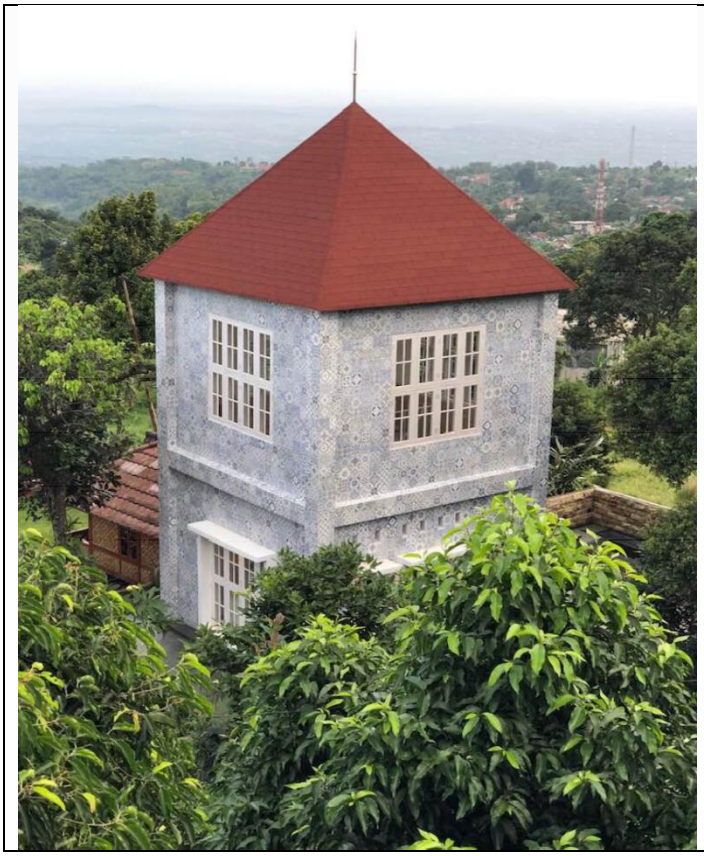
☑ F. Balance

☑ G. Proportion

☑ H. Variety

Figure 4. Example of images used in the instrument to assess basic abilities in evaluating works of art

We also present in the questionnaire European Art works to test the subject's insight through Figure 5 and Figure 6, for example as follows:



Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

☑ E. Contrast

☑ F. Balance

☑ G. Proportion

☑ H. Variety

Figure 5. Example of images used in the instrument to assess basic abilities in evaluating works of art

Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

☑ E. Contrast

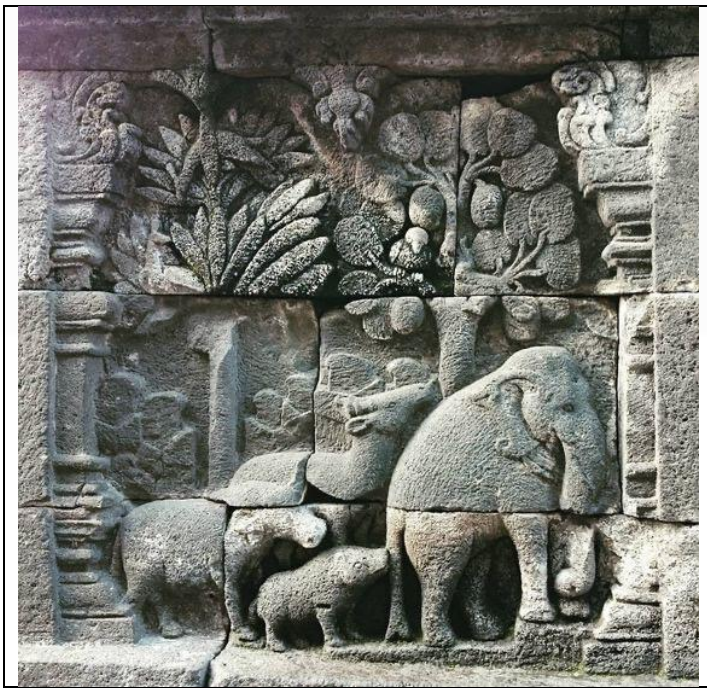
☑ F. Balance

☑ G. Proportion

☑ H. Variety

Figure 6. Example of images used in the instrument to assess basic abilities in evaluating works of art

We also present insights related to culture and religion in the questionnaire to test the subject's insights in Figure 7, 8 and Figure 9, for example as follows:



Check If Any

☑ A. Harmony

☑ B. Rhytm

☑ C. Movement

☑ D. Pattern

☑ E. Contrast

☑ F. Balance

☑ G. Proportion

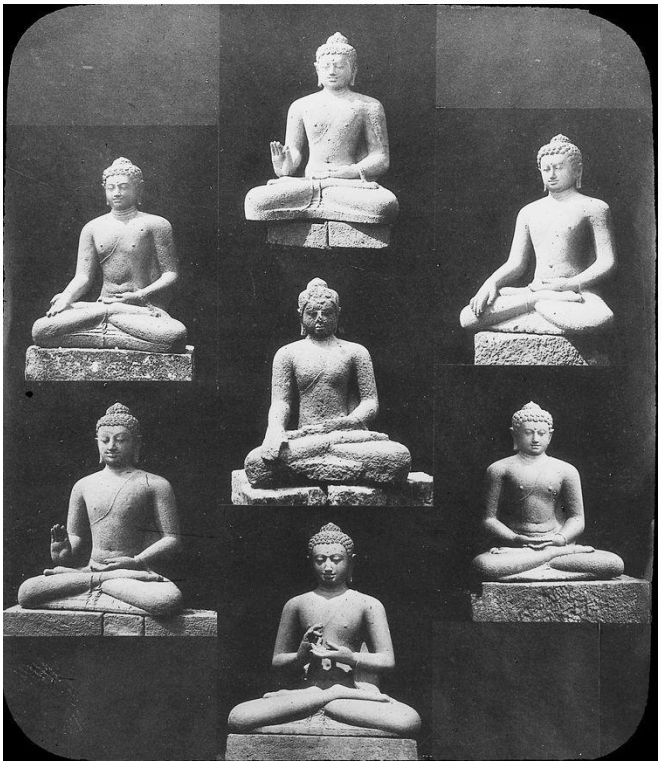
☑ H. Variety

Figure 7. Example of images used in the instrument to assess basic abilities in evaluating works of art

Check If Any

- ☑ A. Harmony
- ☑ B. Rhytm
- ☑ C. Movement
- ☑ D. Pattern
- ☑ E. Contrast
- ☑ F. Balance
- ☑ G. Proportion
- ☑ H. Variety

Figure 8. Example of images used in the instrument to assess basic abilities in evaluating works of art



Check If Any

- ☑ A. Harmony
- ☑ B. Rhytm
- ☑ C. Movement
- ☑ D. Pattern
- ☑ E. Contrast
- ☑ F. Balance
- ☑ G. Proportion
- ☑ H. Variety

Figure 9. Example of images used in the instrument to assess basic abilities in evaluating works of art

What concerns us is that there are sects in certain religions that restrict humans from drawing and judging 2-dimensional and 3-dimensional works of art. This sect forbids its adherents to paint living things such as animals and humans. Of course, we consider this will reduce the human ability to use art for therapy. Facts in society that there is still debate regarding this teaching because an increasingly modern world cannot be separated from the elements of images/photos of humans and animals as well as the use of statues. The research of Wang et al, can be used as the basis for developing this instrument (Wang et al., 2015). In the future, it is possible that the instrument will be used to clarify the relationship between evaluating works of art and the ability to judge good behavior. Through data collection from respondents of criminal acts. The implication of this study is that before performing an art intervention, a person must first be tested for basic skills in assessing art based on neuroaesthetic instruments. In the future, it is hoped that this instrument can be used in various research centers, along with the increasing number of data on the value of art appreciation scores in various populations with different backgrounds.

Conclusion

This instrument can be used to differentiate the ability to judge different population-based artworks. Cooperation in the field involving neurologists and art experts in Indonesia is very limited, this is due to the lack of understanding related to neuroaesthetics among neurologists in Indonesia. This research is the first or initial pilot and has many shortcomings that must be improved, thus it still needs a lot of studies and research in the future in other context or different population setting.

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