

**Comparison study of differences for Asians and Westerners in Aesthetic Judgments and
emotions using ancient Chinese paintings**

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Table of Contents

ABSTRACT	3
INTRODUCTION.....	4
METHODOLOGY	10
DISCUSSION	20
REFERENCE LIST	26

Abstract

The aim of this thesis is to find out how people from Western and eastern differ in their aesthetic preferences/judgments, as well as perception on emotions in ancient Chinese paintings. This study would investigate the cultural effects as well as low-level image properties (e.g., spatial frequency) on both perceptions of emotions and aesthetic judgments in two exposure time length. The results indicated that Asian made aesthetic judgments and emotional perceptions of the images based on lower spatial frequency, emphasized more on the contextual information related with the background of the image in the task of 3s. The western participants prefer salient objects with detailed information, they made aesthetic and emotion judgments of the paintings based on median to high spatial frequency in the task of 3s. But in the short exposure time of tasks, both Asians and Westerners made aesthetic judgments based on median to high spatial frequency as well as low spatial frequency. For perception of emotions in short time exposure of task, Asians made emotions judgment based on low spatial frequency whereas Westerners perceived emotions base on a median to high spatial frequency.

Introduction

Aesthetic experiences, which relate to the evaluative reception of an image, object or any perceptual component (e.g., beauty or sense of happiness) in connection with one or more relevant ideas (Weigand & Jacobsen, 2021). These experiences are also positively related with individual well-being and Prosociality (Martínez-Martí et al., 2015; Weigand & Jacobsen, 2021). Experiences of aesthetic could be found everywhere in daily life. It contributes to the design of clothes, advertisements, websites, art works such as paintings, photography, and various types of packaging for products (e.g., notebook covers). Such designs all need to be attractive and favorable enough for the customers when purchasing behaviors need decision making based on the preferences of individuals. For instance, an aesthetic valuation on images or items (i.e., participate in aesthetic contemplation) and choose a decision about that (i.e., make an aesthetic judgment) (Weigand & Jacobsen, 2021). Consumers would compare what they like or dislike when decisions need to be made during daily shopping. Thus, aesthetic preferences play a vital role in decision making. This kind of decision is the aesthetic judgment which appears to be one of several elements of cognitive and emotional processing that are impacted by asymmetry brain structure (Chokron & De Agostini, 2000). As Palmer et al., (2013) mentioned, aesthetics is a study of human minds and emotions about the sense of beauty. As for artwork like paintings, there are various factors contributing to the aesthetic preference and aesthetic judgment from audiences. These factors could be the different emotions they perceived from artworks due to their cultural differences (e.g., Western versus Eastern), as well as cultural dissimilarities in taste of beauty and different perception influenced by the low-level image properties (e.g., spatial frequency, luminance, and orientations).

Visual images like traditional paintings might be difficult for people from another different cultural group to understand. In research by Lynn (2016), the debate of defining and

what constitutes “fine art” by the European and Chinese during the seventeenth and eighteenth centuries indicates cultural barriers and lack of communication in art across civilizations. The geographical distance and cultural dissimilarity had made the communication even harder, resulting in the inability to appreciate different values and thoughts about arts, in which we became prisoners in our own culture. During the seventeenth and eighteenth centuries, Europeans viewed Chinese paintings only as decorative art and they never should be as “fine art”, while Chinese people concluded that European paintings were visual illusion crafts that had used certain types of techniques, which are not their version of Legrand gout of grand taste. Their mutual enrichment did not occur until the 19th century, despite such limitations of taste and judgements that happened only on the peripheries of art rather than its core. In this senior, the aesthetic preferences and judgment for the western and eastern people could be very different.

Cultural effects are one of the most prominent factors that influence aesthetic preferences and judgment in arts. According to the cultural psychology, Asians and Westerners differ systematically in cognitive activity, including causation explanation, categorisation, and logical versus dialectical inference (Masuda et al., 2008). The cultural dissimilarities in Western arts and Eastern arts are significantly distinguishable with different religious and cultural contents. For instance, Chinese art includes lots of Taoism, Buddhism and Confucianism while Western (e.g., European) paintings usually includes Christian contents (Palmer et al., 2013; Hou, 2022). Their differences in aesthetic perceptions are supported by ideologies (Masuda et al., 2008). In general, East Asian ideologies (e.g., Buddhism, Taoism, and Confucianism) emphasise the concept that everything in the universe is interconnected (Masuda et al., 2008). Western ideologies, in contrast, generally emphasis how to manage discrete elements by paying closer attention to their features and the categories to which they belong (Masuda et al., 2008). Research had suggested that people from Asian cultures (e.g., China, Japan, Korea) pay more

attention on the contextual information in visual images, they would attend on the background and to relations in contexts. In the opposite, Westerners would pay more attention to the most salient objects and their properties (Masuda et al., 2008).

Low-level images properties also significantly contributed to the aesthetic preferences and aesthetic judgments in visual images. The low-level feature can be processed automatically and very fast by the human visual system, we would shift attention to the aesthetic processing of a stimuli unconsciously (Weigand & Jacobsen, 2021; Redies et al., 2020; Palmer et al., 2013). These allow humans to recognize the general meaning of scenes and to make an aesthetic judgement just in seconds (Redies et al., 2020; Oliva & Torralba, 2006). Low level image properties/features for instance could be the spatial frequency, luminance, edges, contrast, colours, and orientation of the images, can all impact visual perception and aesthetic preference (Fan et al., 2022; Willenbockel et al., 2010; Redies et al., 2020). As Stuit et al., (2021) mentioned, visual sensitivity depends on both the spatial frequencies and the orientations within an image. The low spatial frequencies express information about the global layout, whereas the high spatial frequency in contrast would convey information on fine details (Thielsch & Hirschfeld, 2010). Based on neurocognitive studies, the operation of human visual system includes two parallel pathways. One is a very fast magnocellular pathway, another is a slower parvocellular pathway (Thielsch & Hirschfeld, 2010). The magnocellular pathway expresses very rough information based on the low spatial frequencies while the parvocellular pathway delivers highly detailed information based on the high spatial frequencies. As Masuda et al., (2008) previously mentioned that Asian would pay more attention to the background and Westerners pay more attention to the details of salient objects. We could hypothesise that Asians prefer images with lower spatial frequencies and westerners prefer images with higher spatial frequencies.

Cultural effects could also be the most prominent factors that influence the perceptions of emotions. The topic about whether emotion is universal or cultural has been a recurring topic in the history of emotion research among psychologists. Some researchers think Emotion is a universal construct, and most of the emotional experiences are biologically based (Izard, 1994). In research from Lim, (2016) indicated that emotions could be influenced by the environment, and cultural differences in some aspects of emotion does exist (e.g., emotional arousal level). The arousal level of emotions has consistently observed differ across cultures. The high arousal emotions are valued and more promoted than the low arousal emotions in western cultures (e.g., individualist culture). Westerners are also more likely to experience and prefer to experience the high arousal emotions. In contrast, people in the East experience more and they would prefer to experience the low arousal emotions. The low arousal emotions are being valued more than that of the high arousal emotions in eastern cultures (e.g., collectivist cultures).

Aesthetic emotions are the emotions that represented, exhibited, or portrayed in the art works, through the emotional expressions of protagonists (Menninghaus et al., 2019). It is also one of the most important predictors of resultant liking or dislike of an art pieces from the audiences (Menninghaus et al., 2019). According to Prasanna et al., (2021), emotions are important and are studied in psychology and other related scientific fields, there was six basic emotions (e.g., fear, anger, sad, disgust, surprise and happy) that expressed by human based on situational events. They could be classified into two polarities which is Positive emotions and Negative emotions. As Ekman (1992) stated, positive emotions refer to happiness, joy, or enjoyment and surprise (Prasanna et al., 2021), while some models also included love into the positive emotions as well (Tracy & Randles, 2011; Shaver, Schwartz, Kirson, & O'Connor, 1987). Negative emotions include sadness which also labelled as GRIEF by Panksepp & Watt, (2011) and panic (Panksepp & Watt, 2011), as well as fear, anger, and disgust (Prasanna et al., 2021; Tracy & Randles, 2011). However, in a bipolar emotional valence space, many aesthetic

emotions are not solely positive. Rather, they contain significant negative components and thus have a mixed emotional effectiveness (Menninghaus et al., 2019). This is most likely due to the impact of negative emotions in making aesthetic experiences more expressive, variety, and memorable (Menninghaus et al., 2019). Emotions can also impact on many cognitive functions (e.g., cognitive control, attention, long-term memory and working memory) during aesthetic appreciations (Gokce et al., 2021), which related with increased attentional focus on visual information and a concentration of working memory space (Weigand & Jacobsen, 2021). In this scenario, mixed emotions frequently assist in the adoption of the powers of negative emotions for affectively positive and aesthetically pleasurable purposes since an image with solely positive emotion usually were perceived as boring (Menninghaus et al., 2019). In the many cases where mixed emotions are not associated with strict ambivalence and the need to make difficult decisions but show an overall prevalence of positive affect over negative affect, such as in nostalgia (Menninghaus et al., 2019).

This study selected Fourier magnitudes in terms of the spatial frequency as the feature we want to analyse. Spatial frequencies could describe the composition of visual information and the number of times a feature may be repeated in a unit of space (De Cesarei & Codispoti, 2013). According to Van Nes & Bouman (1967), the visual perceptions of humans are very insensitive to extreme low or high frequencies, and most sensitive to the contrast for the middle frequencies (5-10 cpd). The contrast sensitivity of the human eye to variations in sinusoidal illuminance was examined as a function of spatial frequency (Van Nes & Bouman, 1967). Low spatial frequencies (LSFs) describe global image features, whereas high spatial frequencies (HSFs) explain details that occupy limited sections of the image (local details) (De Cesarei & Codispoti, 2013). The rate at which a feature varies in space was described by the spatial frequency component, the spatial frequency content of visual stimuli is most likely to have a significant influence on visual perception (Delplanque et al., 2007). Stimulus with features that are slower

in space changing would have more energy in lower frequencies whereas stimulus with precise detail (e.g, sharp edges) would have more energy in higher spatial frequencies (Delplanque et al., 2007).

According to Stuit, Kootstra, et al., (2021), the Fourier Magnitude Spectrum can estimate the spatial frequency information, but the magnitude spectrum is not informative about the spatial position of a particular contrast. The visualisations of Fourier magnitude spectra throughout the manuscript are rotated 90 degrees so that magnitudes along the vertical axis reflect contrast energy in vertically oriented edges (Stuit, Kootstra, et al., 2021). Meanwhile, the Fourier maps are rotated 90° such that they all have vertical edge contrasts along the vertical axes, and horizontal edge contrasts along the horizontal axes (Stuit, Kootstra, et al., 2021). The spatial frequency analysis for the Fourier magnitude we have in the figure focuses on global contrast differences between categories (Stuit, Paffen, et al., 2021; Stuit et al., 2021). Contrast sensitivity is a function of spatial frequency: contrast detection sensitivity showed a peak sensitivity around 1 degree per visual angle, with sensitivity dropping for both higher and lower spatial frequencies. The Fourier magnitude here shows how much each feature matters for the two groups (Asian and Western). The Colours on the Fourier magnitude spectrum reflect the weights of the features, which in turn reflect their average associated machine learning performance (as percentage correct). The luminance intensity indicates the relative strength of the contrast for the corresponding regions of the map from black to white. Both the lighter colour and darker region indicate the most significant features that matter. The spatial frequency would increase from the centre to the edges of the magnitude map. The t-test tests if there is a difference in how much the features matter between the two groups.

The aim of this thesis is to find out how people from Western and eastern differ in their aesthetic preferences/judgments as well as perception on emotions in ancient Chinese paintings. We would also want to know what western and Asians people would use to make decisions on

aesthetic judgement and aesthetic emotions. To be more specific, the first objective of this study is to find out if people from western and eastern would perceive differently in their aesthetic preferences (like/dislike) and aesthetic emotions (positive/negative) from images in two presentation time length conditions (e.g., long presentation time of 3s vs short presentation time of 0.5s). The second objective is to find out what did Westerners and Asians use to make aesthetic judgments, and what did they use to perceive aesthetic emotions in two different stimulus presentation times conditions. We hypothesise that the different presentation time of images as well as low level images properties like spatial frequencies would influence their perception on aesthetic judgments and aesthetic emotions. Here we will introduce the following methodology below.

Methodology

The data was collected via Gorilla online experiment with recruitment via social media (WeChat, WhatsApp, and Instagram). Results were analysed by MATLAB for aesthetic judgment and perception of emotions in images in relation to their spatial frequency in long and short presentation time lengths. The tool of Protosc would visualise the features of the most relevant, which provide a simple method for describing the variations in stimuli that have a predictive value for their category.

Participants

Valid Participants (N=70), there were 58 Asians (Females N=48; Males N=12) and 10 Westerners (Females N=5; Males N=5). All had normal or corrected-to-normal visual acuity and colour vision.

Materials & Stimuli

The images presented to participants were ancient masterpieces of Chinese paintings (Year 550 -1900) with high resolutions downloaded from the Baidu share docs link

(https://pan.baidu.com/s/1yEbH6c44jZ_s2uGOahvnSA) purchased on Taobao online store in masterpiece collections. Each image is circled with a mask to show only part of the centre of the paintings. The demographic questionnaire includes Age, Gender (Female, Male, Other and please specify), Question on if they identified themselves more a Western or Asian, and what is their cultural background. As well as how much they are familiar with traditional Chinese arts with rating scale 0-10. After the demographic questionnaire is the screen calibration zone, which asks participants to calibrate their monitor and permitting stimuli to be presented in either Centimetres (CM) or Visual Angle (degrees). The Protosc version we are using for images analysis is the version 1.04 Of Protosc which downloaded from page (<https://osf.io/f6nbu/files/osfstorage>) the Protosc Open Science Framework (OSF).

Procedure

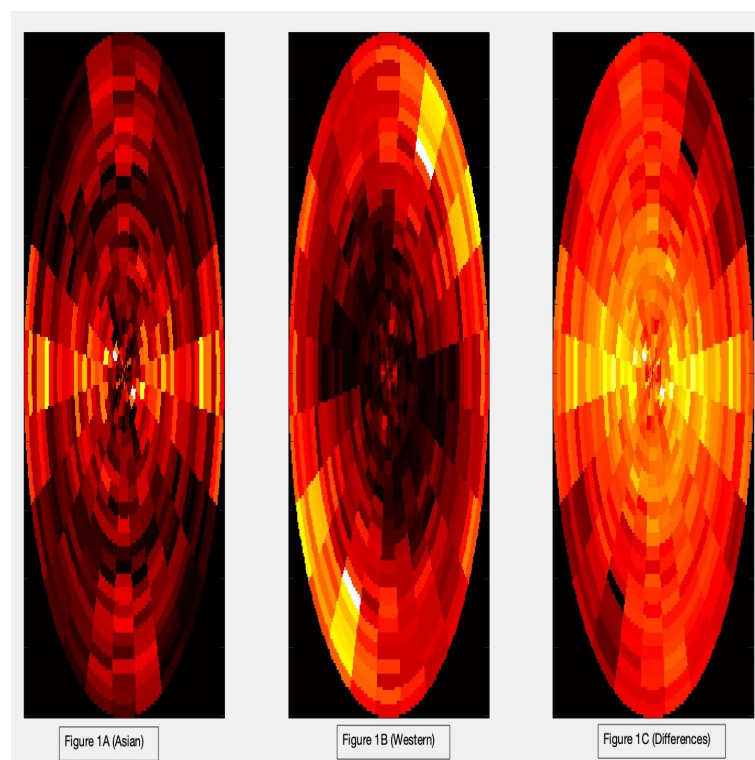
We first used Gorilla as a tool for building an online experiment which contains a demographic questionnaire and two different time lengths of tasks. The two tasks included a short exposure (0.5s) to test the visual properties people like and how low-level image features will influence our decision. Another task is a long exposure image presentation (3s) to test if people like the same thing when the cognition is involved. The two tasks presented 100 images for participants randomly selected from a total of 936 ancient Chinese paintings. The 936 images had divided into 9 trials with a balanced randomiser. We have a total of 18 trials of the task with two of the 9 trials being the same but in different orders.

The data was collected using the link generated from Gorilla by posting on social media (WeChat, WhatsApp, and Instagram). We had set a requirement that only tablets, or laptops can access the link; participants were instructed that using the phone would be blocked. The study starts with a short introduction of the study and consent form for participants to agree with or disagree and early exit the study. After they select the agree button for the consent form, there is a demographic questionnaire and the screen calibration zone adjustment. There is always a

practice trial before the real experiment begins. Each trial would have the same number of participants presented with a short exposure time (0.5s) and a long exposure time of (3s) on a computer screen which was presented with 50 images in each exposure time condition. Participants would be asked to judge like/dislike and feelings of positive/negative on a binary scale. Results would be analysed and compared within two groups (western and Eastern people).

Result

Figure 1. Differences for Asians and Westerners in perceptions of emotions in images (3s)



The test for figure 1 aim to find out differences for eastern and western in perceiving positive and negative images in long presentation time. The Fourier magnitude spectrum shown in Figure 1 indicates how much each feature matters for Asian and Western participants in perceiving positive and negative images in ancient Chinese paintings when they attend the long presentation time of 3s. Figure 1A shows the important features for Asian, Figure 1B is for the Western participants. Figure 1C is the difference between two groups. Asian participants tend to

make decisions on a vertical line for a low to a median spatial frequency while the western tend to make decision based on a high spatial frequency on the edges of the images along the diagonal 45 degrees from the centre, as well as a low to median spatial frequency around and near to the centre. The Result from t-test indicated that there was a significant difference in the scores for Asian ($M=0.075$, $SD=0.0833$) and Western participants ($M=0.096$, $SD=0.1603$) in perceiving positive and negative images in the long presentation time of the task; $t(188560) = -36.591, p < .001$.

Figure 2. Differences for Asians and Westerners in perceptions of emotions in images (3s)

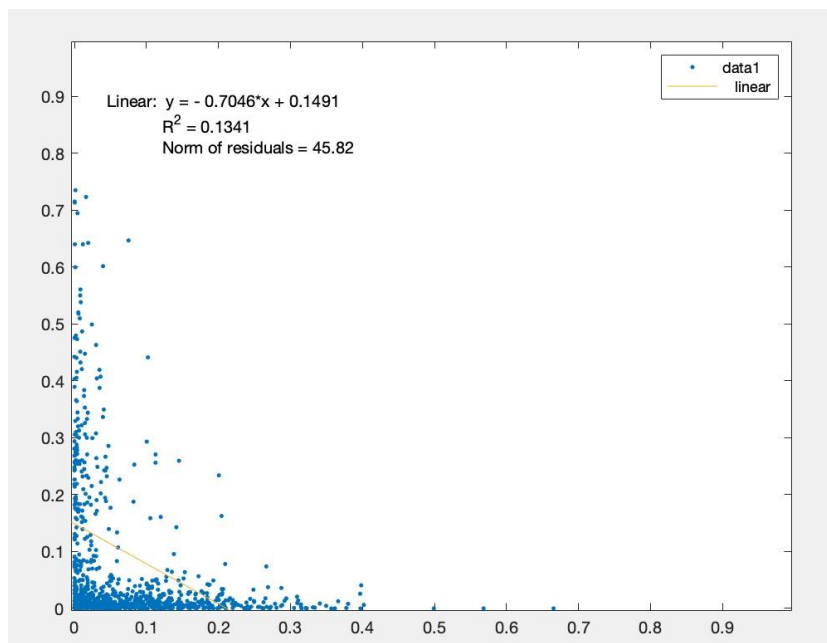


Figure 2 is the linear correlation of the differences for eastern and western in perceiving Positive and Negative emotions in the long presentation time of task (3s). The result indicates a moderate negative correlation between the eastern and western people in perceiving positive and negative emotions in the long exposure time task of ancient Chinese art with $a = -0.7046 < 0$, $R = -0.3661$, $P = .001834$. Which is statistically significant with a $p < .05$.

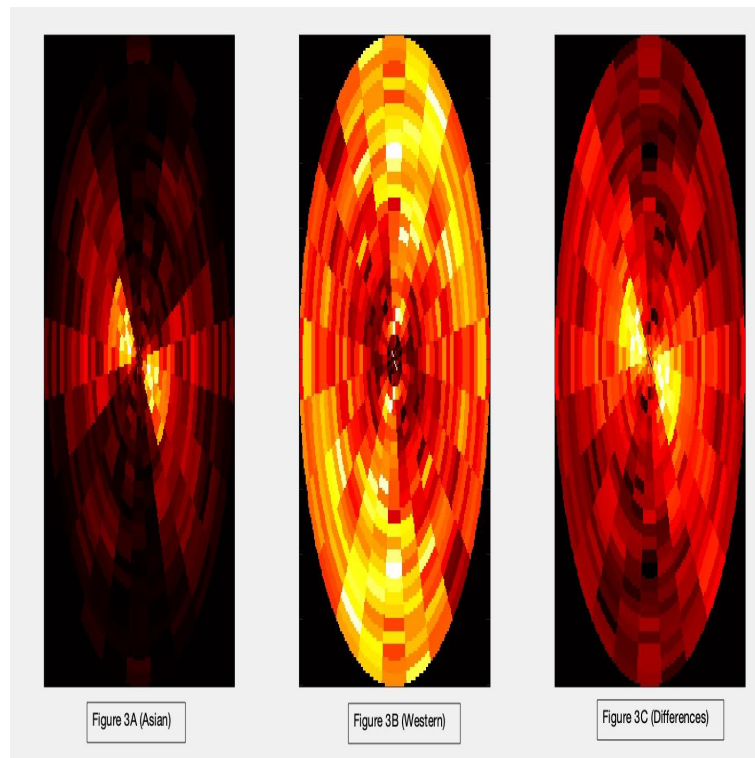
Summary

The emotions Westerners and Asians perceived from the images are significantly differ negatively correlated. Asian participants prefer to make judgment on emotions based on a low to

median spatial frequency while Westerners prefer to use higher spatial frequencies to perceived emotions from images.

Result 2

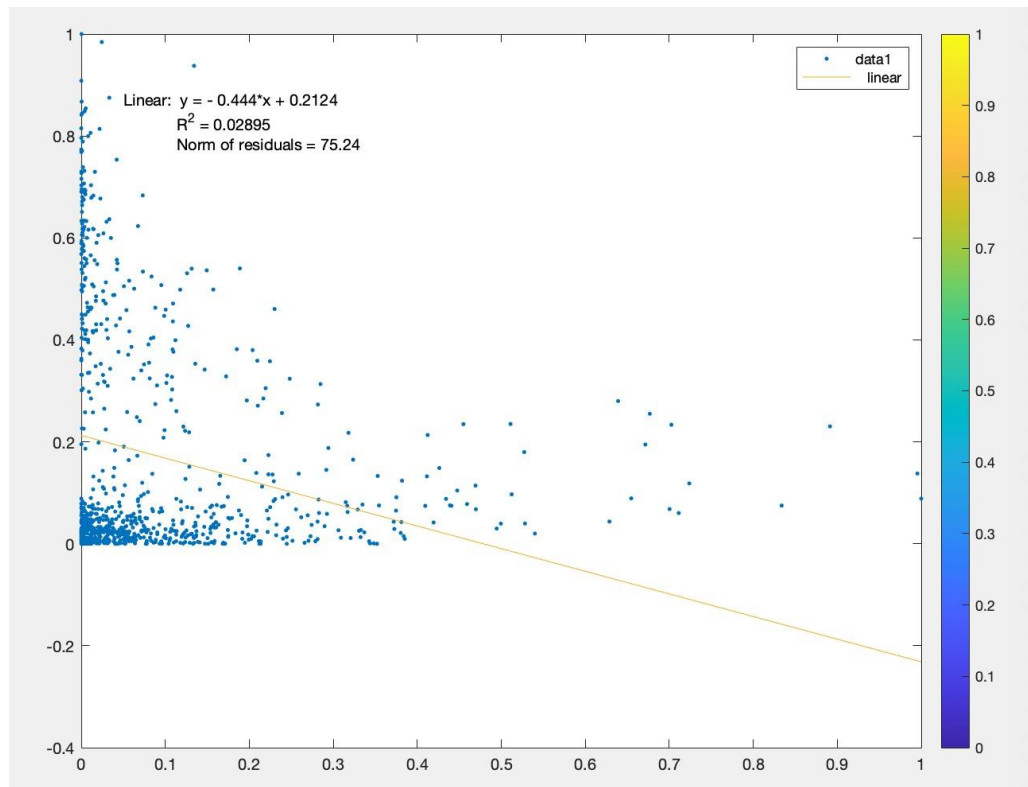
Figure 3. Differences for Asian and western people in aesthetic judgments (3s)



The test for figure 3 aim to find out differences for Asians and Westerns in aesthetic judgments in a long presentation time of task. The Fourier magnitude spectrum shown in Figure 3 indicates how much each feature matters for Asian and Western participants in choosing like and dislike images in ancient Chinese paintings in 3s. The lighter region in Figure 3A that close to the centre of the map indicates that Asian participants make decisions based on a low spatial frequency along the diagonal 45 degrees from the centre. Figure 3B indicated that Western participants made their decision more using a median to high spatial frequency on the horizontal. Figure 1C is the difference between two groups in what matters in choosing like and dislike images, indicating that the low spatial frequency around the centre matters in the differences for Westerners and Asians in aesthetic judgments. The Result from t-test indicated that there was a

significant difference in the scores for Asian ($M=0.060$, $SD= 0.095$) and Western participants ($M=0.186$, $SD= 0.249$) in choosing like and dislike images in the long presentation time of the task; $t(188560) = -145.637$, $p<.001$.

Figure 4. The Linear correlation Result 2



Differences for Asian and western people in aesthetic judgments (3s)

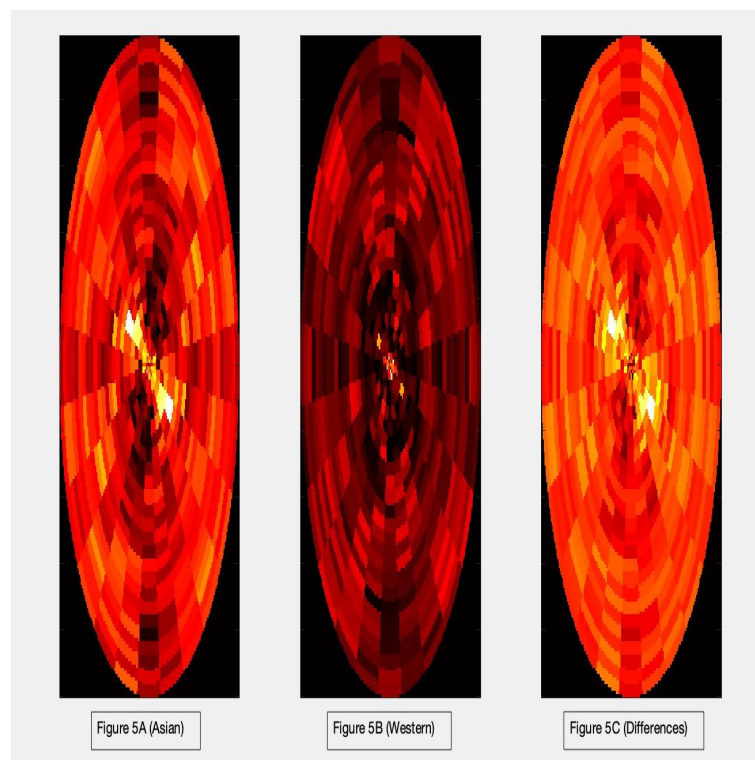
There is an insignificant result of a weak negative correlation between the differences for eastern and western people in perceiving like and dislike in the long exposure time of ancient Chinese art tasks with $a=-0.444 < 0$, $R= -0.17014 < 0.3$, with $p = .159$ which larger than .05.

Summary

Asians and Westerners significantly differ and negatively correlated in their aesthetic judgments (3s). Asian participants prefer to make aesthetic judgments based on low to median spatial frequency while Westerners prefer to make aesthetic judgments on median to high spatial frequencies.

Result 3

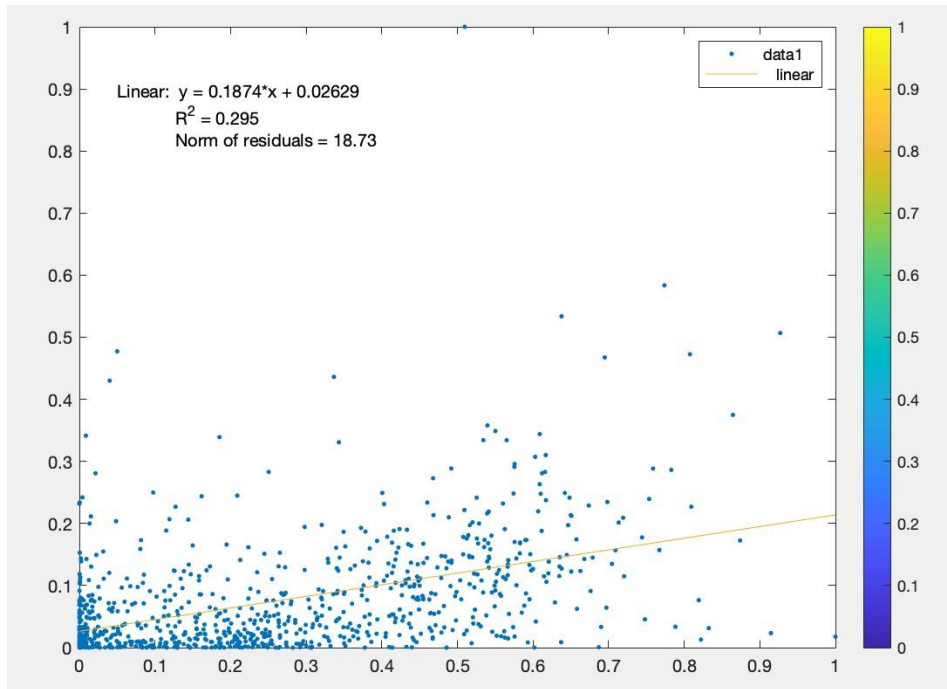
Figure 5. Differences for Asians and Westerners in perceptions of emotions in images (0.5s)



The test for figure 5 aim to find out differences for Asians and Westerns in perceptions of emotions in images in short presentation time of task (0.5s). The Fourier magnitude spectrum shown in Figure 5 indicates how feature matters for Asian and Western participants in perceiving positive and negative images in ancient Chinese paintings. The darker region in Figure 5A indicated Asian participants tend to make decisions on the horizontal line start from the centre with a low to meridian spatial frequency. Meanwhile, the lighter region close to the centre of the map indicated that Asian also make decisions based on a low spatial frequency along the diagonal 45 degrees from the centre. Figure 5B indicated that Western participants made their decision more on the median spatial frequency which closer to the centre and on high spatial frequency that closer to the edges on both horizontal and vertical line. Figure 5C indicated the significant differences between two groups are based on a low spatial frequency that closer to the centre along the 45 degrees along the diagonal. The Result from t-test indicated

that there was a significant difference in the scores for Asian ($M = 0.263$, $SD = 0.211$) and Western participants ($M = 0.076$, $SD = 0.073$) in perceiving positive and negative images in the short presentation time of tasks; $t(188560) = 257.792$, $p < .001$.

Figure 6. The Linear correlation Result 3



Differences for Asians and Westerners in perceptions of emotions in images (0.5s)

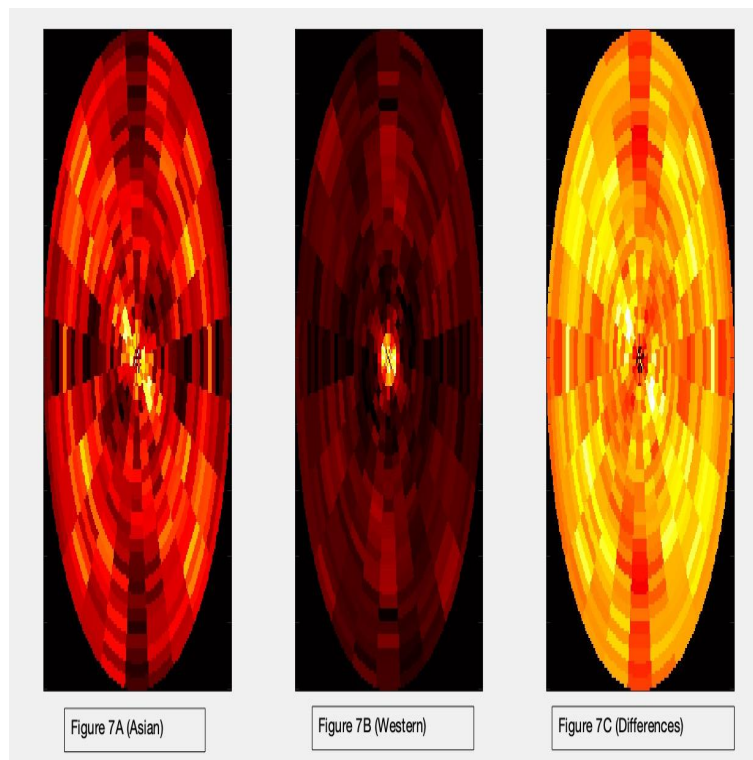
There is a moderate positive correlation between the differences for eastern and western people in perceiving positive and negative in the short exposure time of ancient Chinese art tasks. The result is significant with $a = 0.1874 > 0$, $R = 0.5431$, and $p < .00001$.

Summary

Asians and Westerners significantly differ but positively correlated in their perceptions of emotions in images (3s). Asian participants prefer to make aesthetic judgments based on low to median spatial frequency while Westerners prefer to make aesthetic judgments on median to high spatial frequencies.

Result 4

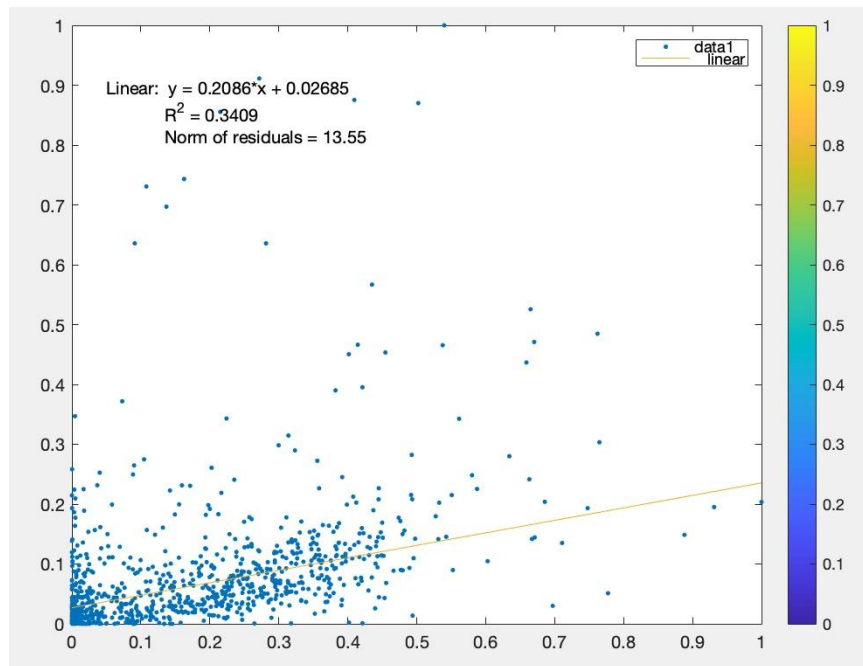
Figure 7. Differences for Asian and western people in aesthetic judgments (0.5s)



The test for figure 5 aim to find out differences for Asians and Westerns in aesthetic judgments in short presentation time of task (0.5s). The Fourier magnitude spectrum shown in Figure 7 indicates how much each feature matters for Asian and Western participants in choosing like and dislike images in ancient Chinese paintings in 0.5s. The darker regions in Figure 7A indicated Asians made decisions based on a median and high spatial frequency in vertical line and close to the edges in horizontal line. The lighter region close to the centre of the map indicates that Asian participants also considered low spatial frequency along the diagonal 45 degrees close to the centre vertically. Figure 7B indicated that Western participants made their decision more on the vertical line (darker region) with median to high spatial frequencies and the centre of the map (lighter region) with a very small spatial frequency. Figure 1C is the difference between two groups in what matters in choosing like and dislike images indicating their differences are on the centre of the map (darker region) as well as the 45-degree diagonal

line in both two directions from low to high spatial frequency (lighter region). The Result from t-test indicated that there was a significant difference in the scores for Asian ($M = 0.177$, $SD = 0.152$) and Western participants ($M = 0.064$, $SD = 0.054$) in choosing like and dislike images in the short presentation time of the task; $t(188560) = 215.11$, $p < .001$.

Figure 8. The Linear correlation Result 4



Differences for Asian and western people in aesthetic judgments (0.5s)

A moderate positive correlation between the differences for eastern and western people in perceiving like and dislike in the short exposure time of ancient Chinese art tasks. The result is significant with $a = 0.2086 > 0$, $R = 0.5838$, $p < .00001$.

Summary

Asians and Westerners significantly differ but positively correlated in their aesthetic judgments in images (0.5s). Asian participants prefer to make aesthetic judgments based on both low to median and median to high spatial frequency while Westerners prefer to make aesthetic judgments on median to high and small spatial frequencies.

Discussion

In summary, there is significant differences for westerns and Asians in their aesthetic preferences and perceptions of emotions. There is a negative correlation in making aesthetic judgments on Like/Dislike images for Western and Asian participants in the long exposure time of the task (3s). There is also a negative correlation for the two groups in perceiving aesthetic emotions of Positive/Negative images in the long exposure time of the task (3s). According to the results from the Fourier magnitude spectrum (long exposure time), Asian participants make emotion judgments based on a low to a median spatial frequency in emotion perception of the images on the vertical line. They tend to make aesthetic judgments based on a horizontal line for low to a median spatial frequency and a low spatial frequency along the diagonal 45 degrees from the centre. Western participants tend to make the emotion judgments of images based on a low to middle frequency near the centre, as well as a high spatial frequency on the edges along the diagonal 45 degrees. They made their aesthetic judgments more on a median to high spatial frequency on the horizontal line.

But in the short exposure time (0.5s) of the task there is a significant result of a moderate positive correlation for two groups in both aesthetic judgement and emotions judgments. The results indicated that in the short exposure time of the task, differences for Westerners and Asians in perceptions of emotions are positively correlated. Aesthetic judgments from Westerners and Asians in the short exposure time of tasks are also positively correlated. Asian participants tend to make judgments on emotions they perceive on a horizontal line with a low to meridian spatial frequency and a low spatial frequency along the diagonal of 45 degrees. Western participants made judgments in emotion they perceived based on a median and a high spatial frequency on both horizontal and vertical lines.

In the short exposure time of tasks, both Asians and Westerners made aesthetic judgments based on median to high spatial frequency as well as low spatial frequency. But for perception of emotions in short time exposure of task, Asians made emotions judgment based on low spatial frequency whereas Westerners perceived emotions base on a median to high spatial frequency. The reasons why the short presentation time of task (0.5s) differ with that of the long presentation time of task (3s) could be the limited time of 0.5s would only allow a gist perception on the paintings which mainly impacted by the low-level images features rather than its contexts.

Consistent with our hypothesise that the different presentation time of images influence their perception on aesthetic judgments and aesthetic emotions. According to Khaw et al., (2019), the changes in aesthetic judgments throughout the task are positively correlated with the cumulative viewing time. The cultural dissimilarity plays a significant role in the results of long exposure time of task since the contextual information are involved in the cognition process in this 3s. As previously mentioned, the ideology of western and eastern cultures is opposite in many ways of their aesthetic preference and perceptions of emotions. The results from the two long exposure time of tasks and only the aesthetic judgment from short presentation time of task in our study are consistent with the past research. According to Hou (2022), Chinese artists emphasise more on the atmosphere of the paintings. Asian participants in our study tend to make aesthetic judgments and emotional perceptions of the images based on a lower spatial frequency in the long exposure time of tasks, consistent with the study from Masuda et al., (2008), their judgments emphasis more on the contextual information related with the background of the image. High spatial frequencies convey information on fine details, whereas low spatial frequencies convey information about the global layout (Thielsch & Hirschfeld, 2010). Meanwhile, Hou (2022) mentioned that the Western artist would usually want to show as many details as possible and restore the history or scene. Consistent with the results from Masuda et

al., (2008), the western participants in our study tend to make both aesthetic and emotion judgments of the paintings based on a median to high spatial frequency in general, they prefer salient objects with detailed information.

Emotions and aesthetic judgments are also related to each other. Images that evoke both negative and positive emotions are regularly perceived as more emotionally moving and arousing, more fascinating, more intensive, and profound, less likely to become boring (Menninghaus et al., 2019). Meanwhile, negative emotions are especially strong in evoking significant emotional arousal, attracting attention and greater accessibility to and recovery from memory (Menninghaus et al., 2019). Thus, people would perceive some of the negative images as even more beautiful than the artworks which only evoke positive emotions. However, the cultural differences of the western and Asian in perception of emotions could result in opposite results in previous studies if they include Asians participants (e.g., Menninghaus et al., 2019). Even though similar emotions that are generated from similar experiences of situations (e.g., basic emotions) would cross cultures, the preferences of emotion experiences are different across cultures. Consider the differences for individualism (Western) and Collectivism (Asian), high arousal emotions (e.g., excited, happy, angry, tense etc) are valued and are preferable for the westerners to experience, whereas Asian people enjoy low arousal emotions such as a sense of peace, calm relaxing atmosphere (Lim, 2016). The cultural differences in emotional arousal level between the East and the West had explained why there is a significant negative correlation between westerners and Asians in the judgments of emotions they perceive from the images in the long exposure time of the task.

According to the result of a comparative study of Western oil paintings and Chinese ink paintings on composition by Fan et al., (2022), there are similarities in their composition designs in terms of the visual balance and their tendency of composing along the two diagonal lines.

Since the Renaissance, western artists have preferred a geometrically correct evocation of historical events and real scenes. To create a precise spatial layout, they would follow mathematical rules that meet the criteria in visual displays to organise spaces and objects. Both oil and ink paintings are visually light in their upper parts most of the time. They tend to put objects on the bottom horizontally that divide lines by the rule of golden mean, painting the sky and clouds in the upper part of the canvas and foreground objects such as rivers, trees, or people in the lower part of the painting. However, Chinese ink paintings do not follow the same rules, instead of a geometrically correct representation, they tend to emphasise more on the dynamic structure of spatial and contextual information (Fan et al., 2022). Current research in psychology discovers that the layout guideline, the rule of thirds, plays only a minimal role in big collections of high-quality images and artworks (e.g., photography, paintings). However, under the rule of thirds and the golden mean, oil paintings prefer to position items towards the bottom dividing lines, but Chinese ink paintings do not follow these two laws and instead tend to compose along diagonals. For instance, to bring viewers a sense of dynamics and change, Chinese artists would create a strong contrast by placing main objects on one side of the diagonal canvas, composing along two vertical dividing lines, and using white space to represent the sky or cloud in the upper part.

There are some confounding factors that might influence the result. According to Joshi et al., (2011), emotional and aesthetic impact of art and visual imagery is also linked to the emotional state of the viewers. It could be better if we also included their emotions state. Besides, the spatial frequency information of a visual image perceived by an observer is also impacted by the distance of the observer from the presented image (Delplanque et al., 2007). Since our study is online, the distance between the observer and presented images cannot be measured. Also, the platform we post our experiment link was mostly used by Asians, and we

only collected data from 10 western participants but 60 eastern participants. The results could be different or more significant if we had collected a fair number of participants for each group.

Future study on how colour distribution influence aesthetic preferences and aesthetic emotions between Asians and Westerners are worth exploring. The perceptions of emotions and preference for colour might also various across cultures. According to Redies et al., (2020), the low-level images features that has most prominent impact on the aesthetic preferences are colour, spatial frequency as well as image brightness. The colour destitutions of an image could also have significant impact on the perceptions of beauty and emotions. One of the low-level image features that could affect emotions is the colour which includes Hue, Saturation, and brightness (Wilms & Oberfeld, 2017). In research from Wilms and Oberfeld (2017), which presented a three-dimensional space of chromatic colours in a factorial design by independently varying saturation (low, medium, high), brightness (dark, medium, bright) and hues (blue, green, red). Colour stimuli have an impact on the emotional state of the observers, and indeed these effects are influenced not just by a hue of the colour, as is commonly assumed, but by all three colour dimensions together with their interactions (Wilms & Oberfeld, 2017). According to Hou (2022), Chinese Artists believed that “The colour of the painting can fascinate the eyes but not the mind”, there are said to be five shades that include heavy and light, dry, and thirsty as well as white (emptiness). These five shades cover all colours in nature, creating the atmosphere and sense of feeling that mostly are in a low arousal of emotions (Hou, 2022).

Future study could also study on how visual order, especially the symmetry would influence aesthetic preferences across cultures. Gestalt psychologists expect aesthetic preference will increase with symmetry such as regularity, order, and simplicity in terms of homogeneity and coherence in the organisation of form or pattern (Fan et al., 2022). According to Fan & Zhang (2020), visual order is a multifaceted concept that could be referred to different dimensions including colour, orientation, shape, size, spatial composition. Previous research on

Chinese ink Paintings found that the visual order is one of the vital factors influencing aesthetic judgements, and the visual order would increase linearly with local symmetry in the ink paintings (Fan & Zhang, 2020; Fan et al., 2022). Aesthetic preferences would increase linearly with the symmetry and regularities (Tinio & Leder, 2009; Jacobsen & Höfel, 2003; Jacobsen & Höfel, 2001). While another study found that symmetry is not a universal law of beauty, results of the study indicated that non-art experts found symmetrical and complex stimuli most beautiful while the Art experts found asymmetrical and simple stimuli to be most beautiful (Leder et al., 2018).

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