GEOMETRICAL APPRECIATION OF HUMAN BODY FIGURE: WAIST-HIP-RATIO PREFERENCES

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DECLARATION

I declare that this thesis contains my original research work. Sources of findings reviewed herein have been duly acknowledged.

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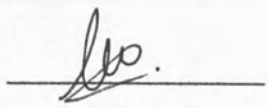

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APPRECIATION

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ABSTRACT

Human body figure can be divided into geometrical body proportion which follows the Golden Ratio. Waist-Hip-Ratio was found by many studies to be one of the indicators toward female attractiveness. This study examined the female WHR preferences. Two hundred participants from Universiti Malaysia Sabah (UMS) were asked to rate three sets of line drawing image of a female body figure. The three sets of picture consist of three levels of WHR (0.6, 0.7, and 0.8) and three categories of weight (underweight, normal weight, and overweight). The results showed that the participants prefer a WHR 0.7 with normal weight body figure. This indicates that WHR preference does not follows the Golden Ratio although object that follows the Golden Ratio are found to be more preferable. Female and male participant has the same WHR preferences. The results also showed that WHR preferences did not differ among different ethnics. Interaction between gender and ethnic towards female WHR preference does not exist. Considering attractiveness, healthiness and youthfulness as the aspect influences WHR preferences, the results showed a weak relationship between them.

ABSTRAK

Bentuk badan manusia boleh dibahagikan secara geometri mengikut nisbah badan. Nisbah badan didapati bersesuaian dengan Nisbah Emas. Banyak kajian mendapati Nisbah Pinggang-Pinggul boleh diambil sebagai penunjuk terhadap daya tarikan kaum wanita. Kajian ini mengkaji tentang kecenderungan dalam pemilihan nisbah pinggang-pinggul. Sebanyak dua ratus orang responden daripada Universiti Malaysia Sabah diminta untuk memberi markah terhadap tiga set gambar rajah bentuk badan wanita. Tiga set gambar rajah ini mengandungi tiga peringkat nisbah pinggang-pinggul (0.6, 0.7, dan 0.8) dan tiga kategori berat badan (ringan, biasa dan terlalu berat). Hasil kajian menunjukkan responden cenderung untuk memilih bentuk badan wanita dengan nisbah pinggang-pinggul 0.7 pada berat badan biasa. Ini menunjukkan bahawa pemilihan nisbah pinggang-pinggul tidak mengikuti Nisbah Emas, walaupun objek yang mengikuti Nisbah Emas selalunya didapati lebih cantik. Responden lelaki dan responden perempuan didapati mempunyai kecenderungan untuk memilih nisbah pinggan-pinggul wanita yang sama. Hasil kajian juga menunjukkan tidak terdapat perbezaan dalam pemilihan nisbah pinggan-pinggul diantara kaum yang berlainan. Kesan interaksi antara jantina dan kaum terhadap pemilihan nisbah pinggan-pinggul juga tidak wujud. Dengan mengambil daya tarikan, keremajaan dan kesihatan sebagai aspek yang mempengaruhi pemilihan nisbah pinggan-pinggul, kajian menunjukkan terdapat hubungan yang lemah di antaranya.

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Φ	Phi
ϕ	phi
H_0	Hypothesis Nul
H_1	Hypothesis Alternative
μ	Mean
$\sum$	Summation
k	Number of factor
n	Number of samples
F	F-ratio
$\hat{Y}$	Estimation of Y
$\overline{Y}$	Mean Y
SS	Sum of Square
MS	Mean Square
UMS	Universiti Malaysia Sabah
WHR	Waist-Hip-Ratio
BMI	Body Mass Index
SPSS	Statistical Package for Social Science

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CHAPTER 1

INTRODUCTION

1.1 HUMAN BEAUTY AND ATTRACTIVENESS

Physical attractiveness is the bigoted perception of an individual as physically beautiful by other people (www.nationmaster.com). Human beings are always attracted to things which are beautiful and attractive by appearance. Every one has their own view and level towards beauty and attractiveness. The ways of judging differ from one to another. Some people prefer things which are cute while others prefer thing which are unique in a way to them. There are studies that say a figure that follows the geometry pattern is the most beautiful. For example, people always prefer object with rectangle shape than other geometrical shape. Look around us, the shape of the doors, windows, pencil box and even the book are in rectangle shape. There are studies and research on the human face feature. They have even created a geometrical mask that represents the prefect human face. Whoever's face can fit the mask well, then the person is said to be beautiful. The mask had been tested on celebrities who are well recognized to be beautiful and attractive by the public. The result was the mask fitted them well.

How about the human body figure? How do people say that a body figure is beautiful and attractive? According to Leonardo da Vinci, the human body figure can be divided into parts that follow the body proportion. If we take measurements from a part in the body and divide it with another measurement of the other body part it will follow the golden ratio. Waist-hip-ratio (WHR) is used by modern researchers to judge attractiveness of a human body figure. Since WHR is used to determine beauty and attractiveness of human body figure, does it follow the golden ratio?

Many researches on human beauty and attractiveness based on different aspects have been done. Most of these researches are based on Western people's point of view. For example, the WHR researches that have been done are mostly based on Western people's body figure. How about the Eastern people's body figure? The Eastern people's body shape is different from Western people. Western people have bigger size and are taller while Eastern people are smaller in size and shorter. This might causes difference when considering WHR measurement and also preferences.

Besides that, Malaysia is a multiple racial country. Different ethnics have different believes, lifestyle, and cultures. These might causes effect when determining WHR preferences. There are studies conducted on ethnic differences (Freedman *et al.*, 2004; Furnham *et al.*, 2002). The result showed that WHR preferences differ for different ethnics. Since there are many different ethnics in Malaysia, it would be interesting to see whether different ethnics have the same preference for WHR when judging beauty and attractiveness for Malaysian peoples.

1.2 GEOMETRY AND THE HUMAN BODY

The human body is geometrically related because human body figure follows the golden ratio and golden ratio is geometry. The golden ratio is also called the golden mean, the golden section, the golden proportion, the divine proportion, the phi ratio, or, simply, phi. If we take the measurement of a certain body part and divide it with a measurement of another body part, we will find that the ratio that we get follows the golden mean. There are two forms of golden mean:

$$\Phi = 1.61803398875... \qquad \text{and} \qquad \phi = 0.61803398875...$$

ϕ is a reciprocal of Φ. The relationships between them are:

$$\frac{1}{\Phi} = \frac{1}{1.61803398875...} = 0.61803398875... = \phi \tag{1.1}$$

This relationship is accurate to no matter how many decimal places one cares to carry it.

The golden proportions in the average human of the human body are:

i. the distance between the finger tip and the elbow / distance between the wrist and the elbow;

ii. the distance between the shoulder line and the top of the head / head length;

iii. the distance between the navel and the top of the head / the distance between the shoulder line and the top of the head;

iv. the distance between the navel and knee / distance between the knee and the end of the foot and other (Harun Yahya).

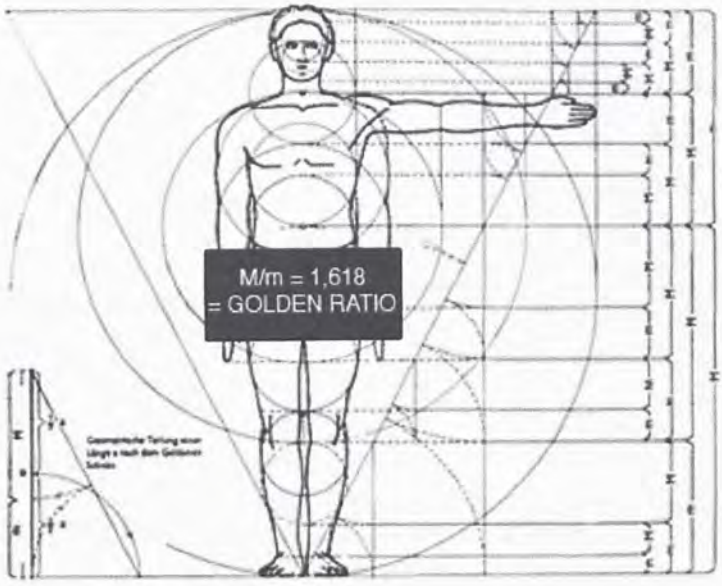

Figure1.1 Human body proportion

(Source: http://www.harunhayha.com)

The golden ratio in human body figure follows Φ. In this study, we consider the golden mean (ϕ) in WHR. This is because according to research, the standard WHR for women lies between 0.67 and 0.80, whilst for men the ratio typically lies between 0.85 and 0.95 (Henss, 2000). Our hypothesis is that there might be a connection between WHR and ϕ.

1.3 WAIST-HIP-RATIO (WHR)

WHR is one of the methods for quantifying body type or shape (Freedman *et al.*, 2004). WHR is also a quantification of the fat distribution in body due to sex hormone.

Scientists have discovered that the waist-hip-ratio is a significant factor in judging the attractiveness of a body figure. WHR is a ratio based on the two body dimensions (measurements) namely, the waist (portion between the ribs and the iliac crest) and the hip (at the greatest protrusion of the buttocks) (Furnham *et al.*, 2004). In Western countries, females with WHR of 0.7 is said to be more attractive and preferable by men than other WHR.

1.4 RESEARCH OBJECTIVES

The objectives of this research are:

i) To determine WHR preferences among gender.

ii) To determine WHR preferences among different ethnics.

iii) To determine factors that affect judging towards beauty beside WHR.

1.5 RESEARCH SCOPE

The research scope in this study is the students within the Universiti Malaysia Sabah (UMS). Questionnaire on WHR preference will be distributed to among the students in UMS. Participants were asked to fill in the demographic details and rate the score for the picture displayed in the questionnaire. We have categorized the ethnic into four categories which is Malay, Chinese, Indian, and others. For analyzing purpose, each category of ethnic we only take 50 students.

CHAPTER 2

LITERATURE REVIEW

2.1 BEAUTY

Beauty is always a popular topic in human life. Everyday we can see many beautiful things and human in our surroundings such as real human, in magazine, from television and other sources. Henns (1995) stated: "Human beauty has always been a central theme for philosophers, artists, writer, and the ordinary man and woman in the street." Human has many ways of judging beauty. From a very tiny object until a huge thing, we can start criticizing from morning till dawn. When different opinions on the same topic existed, that particular topic can be repeated over and over again just to argue whose opinion was the best and correct one.

Human beings always judge a person by physical appearance when they first meet. Physical attractiveness has been regarded as an indicator of mate value since a long time ago (Henns, 1995; 2000). Usually facial attractiveness is what comes first in mind when we talk about physical appearance. That is why many studies have been carried out relating facial characteristics and little variation of preferences has been found across cultures (Henss, 1995). Facial characteristics provide reliable evidence for judging mate preferences such as reproductive success. But attention has also been

shifted to include bodily characteristics, such as weight, waist-hip-ratio, ratio of upper-to-lower body torso and breast size (Furnham *et al.*, 2002).

2.2 WAIST-HIP-RATIO (WHR)

Female waist-hip-ratio (WHR) is one of the important factors proposed by evolutionary biologist in mate preference context (Wetsman and Marlowe, 1999). Various studies have been conducted, some come out with the same conclusion yet others come up with a different result. WHR in female indicates reproductive potential. WHR are similar for boys and girls during puberty. When reaches adolescence, the effect of active male and female sex hormone affected the distribution of body fat. Body fat distribution is measures by WHR and it shows a conspicuous sexual dimorphism (Furnham *et al.*, 2002; Henns, 2000; Wetsman and Marlowe, 1999). Testosterone (male sex hormone) stimulates fat distribution on their upper body and intra-abdominally, hence creating a masculine or android shape (Furnham, n.d.). Estrogen inhibits fat distribution in abdominal region and stimulates fat deposits in the gluteofemoral region (such as thighs and buttock) (Furnham, n.d.; Furnham, Lavancy and McClelland, 2001; Henns, 2000; Wetsman and Marlowe, 1999). For healthy and reproductively capable women, the WHR lies between 0.67 and 0.80, while the ratio of healthy men lies in the range of 0.85 to 0.95 (Henss, 1995, 2000; Furnham, Lavancy and McClelland, 2001). After menopause, the female WHR will be similar with the male. Most of the research that has come across was mostly focus on female WHR. There were research done on male WHR but the number was quite few compared to the researches on female WHR.

Devandra Singh was one of the first researchers to investigate the relationship between the distributions of fat (WHR) and attractiveness of an individual. This has inspired a considerable research on attractiveness of human body figure (e.g Henss, 1995, 2000; Furnham, n.d.; Furnham, Moutafi and Baguma, 2002; Furnham, Lavancy and McClelland, 2001; Furnham, Mistry and McClelland, 2004; Rozmus-Wrzesinska and Pawlowski, 2005; Schützwohl, 2005; Singh, 1995; Swani and Tovée, 2005; Wetsman and Marlowe, 1999). The results from the researches mostly indicate a WHR near 0.7 as the most attractive in Western societies for female.

But there are researches that have a different conclusion. According to the research done by Freedman *et al.* (2004) on ethnic differences in preference for female weight and WHR, they found that African-American men were more likely to choose heavier figure as ideal than White Americans. It also shows that weight were more important than WHR. Research on Hazda of Tanzania done by Wetsman and Marlowe (1999) found that Hazda men did not consider WHR but weight in expressing preferences for mates. Foraging lifestyle in Tanzania means that surplus food is rarely available. It means there may be enough food to live but not enough to support healthy fertility in a woman. That's why they prefer female with heavier weight and WHR than those with lesser weight and WHR.

A cross cultural study done by Furnham, Moutafi and Baguma (2002) showed that Ugandans people had a preference for the 0.5 WHR and the heavy weight category. Their prediction that small waist and hip size would be preferred over large waist and hip size was also confirmed at the end of the study. It seems that countries or ethnics that are less exposed to Western cultural influences have a different

preference for female WHR. They do not see WHR as the main factor. Weight was seen as a more important factor.

Weight was taken as body mass index (BMI). According to Swani and Tovee (2005) who did cross cultural research of female physical attractiveness in Britain and Malaysia, the result showed that BMI was the primary determinant of female attractiveness, whereas WHR failed to emerge as a significant predictor. In some other research (Freedman *et al.*, 2004; Furnham *et al.*, 2002; Henns, 1995; Wetsman and Marlowe, 1999), weight factor is need in the stimuli or picture in assessing female attractiveness.

Malaysia has undergone socio-economic transformation in recent decades. People's preferences towards attractiveness and beauty might also have changed. In different parts of Malaysia, people live in industrialized, semi-industrialized and rural environment, and this allows us to explore the effect of industrialization on standards of female attractiveness (Swami and Tovee, 2005). Malaysia is a multi racial country which means that different races might have different mate preferences due to their own culture. Besides that, Malaysia is getting a lot of influence from Western cultures through international trade and multimedia. This might influence the mate preferences in our nation.

CHAPTER 3

METHODOLOGY

3.1 PARTICIPANTS

The participants in this research were the student in UMS. A number of 100 questionnaires were distributed randomly to students in the UMS compound. There are four parts in the questionnaire. Participants were asked to fill in all the required details and write down the rating score for the pictures showed in the questionnaire. The data was then analyzed using SPSS ® 12.0.

3.2 STIMULI

In this research, Adobe Photoshop® 7.0 was used to justify the photos that were displayed in the questionnaire for rating. The pictures displayed in the questionnaire were obtained from the research paper done by Ronal Henns(1995). We have done some modification on the picture obtained to meet the requirement in our research. Participants were shown with three sets of photos of a human figure in three category of weight and three level of WHR. Set 1 consisted photos that varies by three level of WHR (0.6, 0.7, and 0.8) which are in the underweight category. Set 2 consist of three photos of the normal weight human body figure in three levels of WHR. Set 3

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