Does Personality Type Affect People Preference for the Golden Ratio? An Mbti Personality Approach

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Abstract:
This study investigates whether personality type affects one's ratio preference by classifying people into different personality types based on the MBTI test from developmental psychology. 749 subjects were initially surveyed in this study. Of these subjects, 656 (270 designers and 386 novices) with a single personality type participated in an additional survey. 15 rectangle ratios were tested, including horizontal and vertical samples. Subjects were asked to evaluate their preferences for each rectangle using a Likert scale ranging from 1 to 5. The results were concluded that both personality type and educational background affect ratio preference. Moreover, T type is more inclined to prefer the nearly square rectangle, while F type is more able to accept the extreme proportions of rectangles.
Keywords: *golden ratio, MBTI, preference measures.*

1. INTRODUCTION

In the new product development, the brand personality and user experience will affect customer's satisfaction to the product (Rhiu, et al., 2016). It is means that a good product should meet the user's emotions. However, designers and users in response to the product's aesthetics and preferences are quite different. This study needs to understand the reasons to get a balance between these two groups in order to design a better product. In the design field, it is common that the gold ratio is applied in many well-known product shapes, for example, the Apple iMac computer, Juicy Salif, and New Beetle car.

Golden ratio (1.618), also called the golden section, philosophers have been deeply fascinated more than two thousand years, and scientists have studied it more than a century. Many people believe it is the basis of aesthetic nature, visual and auditory art, and has been used in architecture, painting, music, and industrial design (Friedenberg, 2012; Livio, 2003). It also appears in various forms in nature, including the geometry of the crystal, the proportion of stem in plant spacing, and the proportion of parts of the animal body, and facial feature sizes (Friedenberg, 2012; Livio, 2003). To coordinate the visual appearance of the product to attract consumer attention, designers focus on and apply well-conceived proportions in their creations (Avramović et al., 2013; Elam, 2001). Pittard et al. (2007) found that logos based on forms found in nature (e.g., flowers, waves) that were presented as a 1:1.618 ratios were the most preferred. However, with respect to artificially constructed logos (e.g., windows, boxes, circles), a 1:1 ratio was preferable. Moreover, the preference decreases as the ratios increase, that is, the more they exceed 1:1.618, the less preferable the ratio. This finding supports that of a previous study conducted by Friedenberg (2012) wherein a proportion of preferences are associated with shape. In addition, a packaging design that applies the golden ratio to the front and sides of the bag may attract the attention of consumers and enhance product value in the market (Nikolic et al., 2011).

However, many studies argue that the golden ratio does not exist. Schaik and Ling (2003) consider that the golden ratio is not suitable for web pages because of the poor results it yields with respect to information speed, accuracy, and display quality. Moreover, Godkewitsch (1976) questions whether the golden ratio is the average preference of the community and, therefore, posits that it does not reflect the personal favorite of consumers. Some studies support the conclusion that people prefer the square to the golden rectangle (Fechner, 1876; McManus, 1980). Thus, whether the golden ratio is the most aesthetically pleasing rectangle is still a matter of dispute. This study presumes that the influence of factors such as the different shapes and the age, gender, and cultural background of participants may have resulted in the inconsistencies with respect to aesthetic preferences. Is the golden rectangle, which is representative of the preferred ratio, associated with a particular personality type? This question requires further exploration and confirmation.

Currently, the MBTI, which is derived from Carl Jung's theory of personality, is the most well-known personality test, and it is widely used in the fields of education, care staff recruitment and training, leadership training, and personal development (Pittenger, 1993). Although most MBTI studies focus on learning efficiency, interpersonal skills, cognitive ability, and intelligence testing (Borg and Shapiro, 1996; Kern and Matta, 1987), Myers and McCaulley (1985) believe that MBTI personality patterns have a great impact on academic interests and preferences, such as mathematics, English, science, history, technology, music, and art. However, only a few studies have explored the relationship between the golden ratio and the degree of preference with respect to personality type. Based on this, this study attempts to use the MBTI personality test as a classification tool for personality type.

1.1 MBTI theory of personality types

Myers-Briggs Type Indicator (MBTI) is a personality test based on Jung's theory of personality types. Jung (1923, 1971) believed that people's personality type would not change, even if the different stages of life have different mental process. His personality theory has been widely recognized in psychology (Arnau et al., 2000). In the MBTI test, questionnaire format has 94 items self-administered forced-choices to measure individual preferences, thus it is one of the most commonly measurement for assessing personality (Dollinger

et al., 2004). In addition, about 75% of the participants agreed with their MBTI results, showing the results really reflect their personality (Myers and McCaulley, 1985). Therefore, MBTI is the most reliable and effective tool to measure individual personality types (Murray, 1990; Wiggins, 1989; Willis, 1984).

MBTI were classified by four aspects of eight different types, including: extraversion (E)/ introversion (I); sensing (S)/ intuition (N); feeling (F)/ thinking (T); and perceiving (P)/ judging (J) (Dollinger et al., 2004; Myers and Myers, 1980). People with preferences for E are those who take a broad-brush approach to life, are quick to act and are energized by people and things in the external world. In comparison, people with preferences for I are reflective and more energized by ideas in their inner world. The perceiving styles are divided into S, for those who have a preference for facts, details and reality, and N, for those who have a preference for ideas, implications, and possibilities. The decision making process for those with T preferences is objectively based on logic and analysis, while for those with a preference for F, there is a greater emphasis on personal values that involve societal and human factors. The fourth dimension – P/J - reflects a person's lifestyle attitude such that the judging preference focuses on planning, deciding, and looking for closure whereas the P preference is more orientated to change, possibilities and new developments (Hirsh and Hirsh 2007).

1.2 Design and MBTI personality studies

Myers and McCaulley (1985) noted that the character-oriented classifications are associated with educational achievement and include aptitude, application, and interest. In particular, the coordination of interests and personality has an important effect on academic achievement. Thus, the learning strategies, methods and achievements, all of which affect the formation of student knowledge and their knowledge of aesthetics differ according to personality type. Their perspective, which is similar to that of the present study, guided them as they investigated people of different personality types both with and without design education and determined that their responses to aesthetic sensitivity and feelings are different.

Cheng et al. (2010) pointed that there are many relationships between creativity and MBTI personality. For example, the high creative people both have E and I types (Eysenck, 1995; Myers and McCaulley, 1985). The psychodramatists are extroverted (Buchanan and Bandy, 1984; Buchanan and Taylor, 1986), but the scientists and artists are introverted, independent, and sensitive (Roy, 1996; Helson, 1965; Feist, 1999), which suggested that the creative people clearly demonstrated the pattern of behavior contradictory. That is the creative people can simultaneously show two behavior patterns of introverted and outgoing personalities. Moreover, the people with N personality type is highly related to creativity, such as professional artists (Hartzell, 2000), creative managers (Agor, 1991), and good interpreters (Burley and Handler, 1997). They have intuitive thinking, instinctive character, and ingenious behavior. Moreover, it is unclear whether F and T types do not affect creativity. Most creative managers generally have a rational character (Jacobson, 1993), while the psychodramatists tend to be sensual types (Buchanan and Taylor, 1986). It remains to be further clarified that the high creative people would tend to F or T character. Perhaps in terms of design, there are different results. In addition, many studies have found that both P and J types are related to creativity, such as psychodramatists (Buchanan and Bandy, 1984; Buchanan and Taylor, 1986) and architects (Hall, 1969).

Based on the apparent correlation between design and character, there is potential relevance between the different personality types and design creativity. Thus, the question: In the field of product design, does personality type impact the designer's aesthetic preferences? The purpose of the present study is to examine how the different personality types and educational backgrounds of participants affect the degree of preference to different rectangle ratios. In the present study, the participants were first administered the MBTI test and then classified according to personality type. The participants' preferences with respect to rectangles of fifteen different proportions were subsequently evaluated, and the potential impact of personality type on their preferences was subsequently determined.

2. METHODS

2.1 Participants

The study administered a personality survey to 749 participants. Among them, 93 participants exhibited more than one personality type. Kroeger and Thuesen (1988) noted that as the tendencies for varied personality traits are unlimited, a person exhibiting more than one personality type is normal. The remaining 656 participants (344 male, 312 female; mean age=31 years, SD=3.3 years) were of a single personality type, and thus, they were selected to participate in the survey on preferences for rectangles with different ratios. The sample was comprised of 270 designers (134 male, 136 female; mean age=32 years, SD=3.3 years) with design training background and 386 novices (210 male, 176 female; mean age=30 years, SD=3.1 years) without design training background.

2.2 Procedure

2.2.1 MBTI personality assessment

Before taking the personality test, the participants were asked to complete several questions regarding personal information, such as sex, age, and professional background. This study utilized Visual Basic programming to enter the content for the MBTI personality test. The personality test consisted of70 questions (see Appendix) (Keirsey, 1998). There were ten E/I personality questions, and 20 questions each for the other three domains – S/N, F/T, and P/J. The participants were informed that there were no right or wrong answers

and that they should respond to the questions based on their personal nature or behavior. The test took between 30 and 45 minutes to complete.

Each question on the MBTI personality test contained paired choices. The subject was required to select from one of the two options - "a" or "b" - the one that best described him/her, as shown in Figure 1. For example, #1: When the phone rings do you (a) hurry to get to it first or (b) hope that someone else will answer? The total number of "a" responses were then added and the number was placed in the box at the bottom of the column. The same procedure was followed for "b" responses. The letter below/associated with the larger number for each pair was then circled as that letter corresponded to the subject's personality type. The sample for personality type on the answer sheet was ISFP (E=2/I=8, S=13/N=7, T=7/F=13, and J=9/P=11).

2.2.2 Measurement on preferred rectangle ratios

The subjects' preferences for rectangle ratios followed the completion of the personality test. Adopted from the experiment conducted by (Godkewitsch, 1974), the 15 ratios of rectangles (side 1/side 2) tested included 1, 1.07, 1.15, 1.23, 1.32, 1.41, 1.51, 1.62, 1.74, 1.86, 1.99, 2.14, 2.30, 2.46, and 2.64. The tested samples consisted of horizontal and vertical sets where the length of the horizontal rectangle, marked as H, was equal to or larger than its height or where the vertical rectangle, marked as V, was the reverse of H. As each set contained 15 rectangles, a total of 30 rectangles were tested, as shown in Figure 2. The ratio of rectangles H8 and V8 was the golden ratio. The actual size of the tested samples as measured on the screen was 2 cm for the ratio 1, i.e., the size of 2 cm x 2 cm for the squares (H1 and V1); the size of 2 cm x 5.28 cm for the 1:2.64 rectangles (H15 and V15), and so on. All tested samples were presented to each participant one-by-one in random order. Participants were asked to report their preference for each rectangle by using an assessment scale that ranged from 1 (least favorite) to 5 (most favorite). Upon completion of the experiment, the "testing questionnaire.txt" file was automatically generated from the MBTI experimental vehicle system for further analysis.

2.3 Data analysis

A statistical analysis of the assessment results for rectangle preferences was two stages. Repeated measure ANOVA analysis was first conducted for the rectangular ratio (1, 1.07, 1.15, 1.23, 1.32, 1.41, 1.51, 1.62, 1.74, 1.86, 1.99, 2.14, 2.30, 2.46, and 2.64), educational background (designers and novices), and "personality" (E/I; S/N; FT; and P/J). The Greenhouse-Geisser correction for non-sphericity was applied as appropriate. A secondary one-way ANOVA analysis was conducted to check for any significant effects of the condition factor.

3. Results

3.1 Personality distribution - different educational backgrounds

Table 1 shows the distribution of the number of MBTI personality types. The overall means for the four paired personalities in compared proportions were E>I, S>N, F>T, and P<J. The proportions for personality types between designers and novices were slightly different as the novices had a large distribution difference between P and J characteristics.

For comparison and discussion purposes, this study selected two recent studies (Chien and Lien, 2010; Beyoğlu and Per, 2011) whose participants were college students with art/design backgrounds. They were also of similar to the participants in this study. When comparing the results of this study with the results for the students with art/design backgrounds, significant differences were noted between this study and Chien and Lien's (2010) study with respect to extraversion (58% to 42%) E/I (17% to 83%), respectively. Moreover, when comparing the results from this study with those of Beyoğlu and Per (2011), the proportions for F (59% to 41%)/T (7% to 93%), respectively, were significantly different.

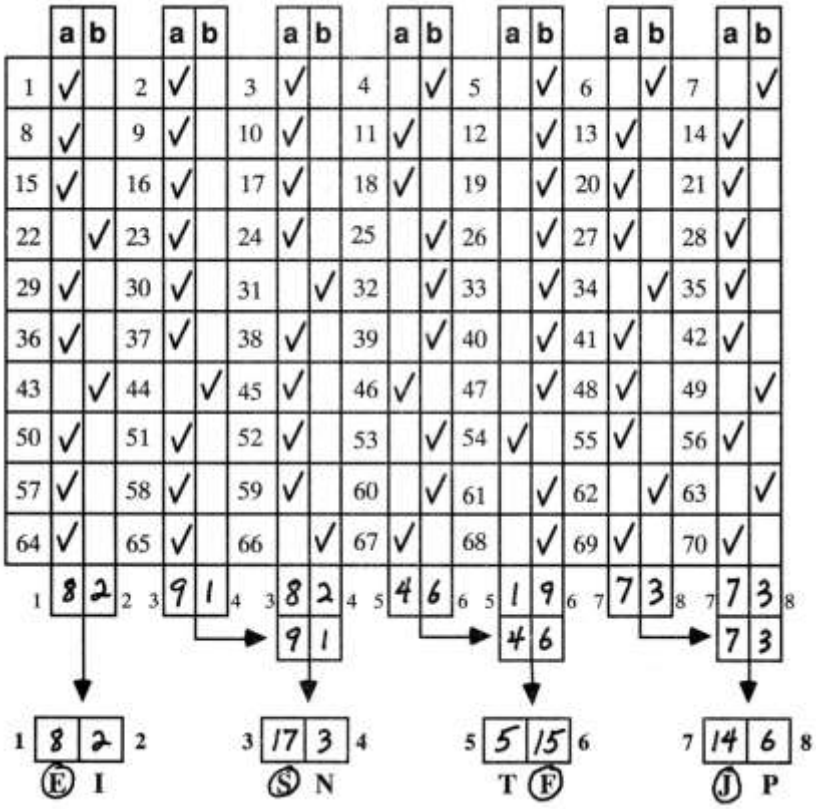

Figure 1. Myers-Briggs Personality Test: Select either "a" or "b" and place a check mark in the proper column on the answer sheet (Keirsey, 1998)

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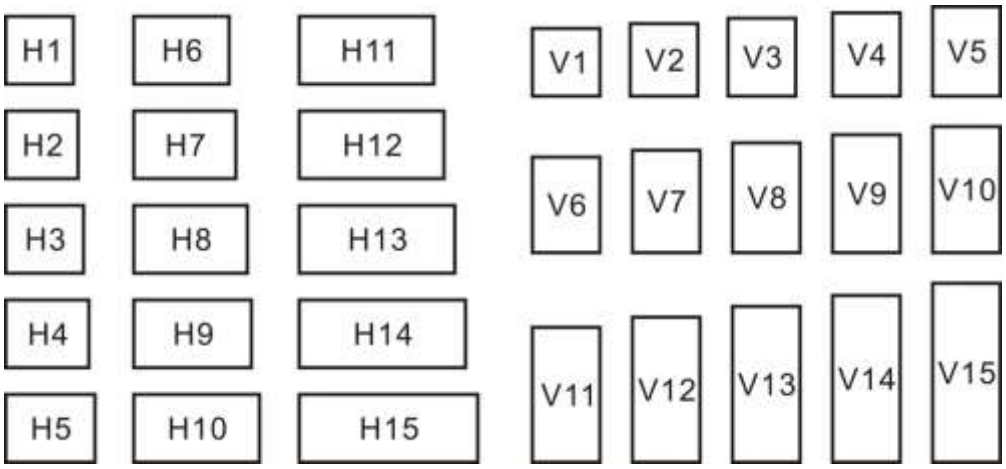

Figure 2. Tested samples of horizontal and vertical rectangles with 15 ratios.

Table 1. The number of personality types of students with different educational backgrounds.

*personality research	educational background	E-I	S-N	F-T	P-J
This study (N=1272)	College of Design	58%-42%	57%-43%	59%-41%	47%-53%
	other	52%-48%	62%-38%	62%-38%	27%-73%
Chien and Lien (2010) (N=744)	College of Engineering	28%-72%	53%-47%	62%-38%	61%-39%
	College of Science	28%-72%	53%-47%	63%-37%	55%-45%
	College of Business	36%-64%	40%-60%	64%-36%	39%-61%
	College of Management	39%-61%	62%-38%	55%-45%	39%-61%
	College of Humanity and Social Science	36%-64%	46%-54%	72%-28%	56%-44%
	College of Education	35%-65%	59%-41%	81%-19%	45%-55%
	College of Art	17%-83%	67%-33%	71%-29%	33%-63%
Beyoğlu and Per (2011) (N=219)	Department of Language Teaching	44%-56%	77%-23%	20%-80%	34%-66%
	Department of Math Teaching	45%-55%	83%-17%	20%-80%	32%-68%
	Department of Fine Arts Teaching	63%-37%	53%-47%	7%-93%	51%-49%

* extraversion (E)/ introversion (I); sensing (S)/ intuition (N); feeling (F)/ thinking (T); and perceiving (P)/ judging (J)

3.2 Preference for different rectangle ratios

Figure 3 presents the preferences of all participants for horizontal and vertical rectangles based on15 ratios. All participants most preferred the ratio of a square, as evidenced by the preference (solid line) decreasing as the ratio increases. A preference for the golden ratio (HR8 and VR8) is not obvious, however. Regarding the relationship between to preferences and educational background, designers (dotted line) and novices (dashed line) both prefer the ratio of a square, while their preference for the golden ratio is neutral. However, designers' and novices' preferences are distinctly different. For ratios smaller than the golden ratio (HR1~HR6 and VR1~VR4), designers exhibited a more noticeable dislike than did novices. On the contrary, for ratios greater than the golden ratio (HR/VR 10~HR/VR15), novices demonstrated a more evident dislike than did designers. In summary, the preference for horizontal and vertical rectangles can be divided into three trends. HR/VR1~HR/VR5 are preferred (M=3.33 and 3.36, respectively); HR/VR6~HR/VR9 are neutral (M=2.96 and 3.07, respectively); HR/VR10~HR/VR15 are disliked (M=2.763 and 2.74, respectively). The golden ratio seems to be the line of distinction between like and dislike.

The global repeated measures ANOVA applied to the assessments of horizontal and vertical rectangles revealed a significant main effect of rectangular ratio ($F[14, 8764]= 32.43$, $p < .001$ and $F[14,8764]=25.07$, $p<.001$, respectively). Furthermore, its interaction with educational background was significant ($F[14, 8764]=14.09$, $p<.001$ and $F[14, 8764]=21.22$, $p<.001$, respectively). A secondary one-way ANOVA for different educational backgrounds showed that there were significant differences for horizontal rectangles with HR4, HR5, HR6, HR11, HR13, and HR15 with ratios ($F[1, 654]=8.22$, $p<.01$; $F[1, 654]=10.56$, $p<.001$; $F[1, 654]=39.94$, $p<.001$; $F[1, 654]=9.63$, $p<.01$; $F[1, 654]=16.15$, $p<.001$; $F[1, 654]=8.37$, $p<.01$, respectively). Moreover, there were significant differences for vertical rectangles with VR2, VR3, VR4, VR5, VR10, VR11, VR12, VR13, VR14, and VR15 with ratios ($F[1, 654]=8.06$, $p<.01$; $F[1, 654]=35.96$, $p<.001$; $F[1, 654]=61.99$, $p<.001$; $F[1, 654]=26.34$, $p<.001$; $F[1, 654]=26.34$, $p<.001$; $F[1, 654]=7.30$, $p<.01$; $F[1, 654]=19.50$, $p<.001$; $F[1, 654]=26.03$, $p<.001$; $F[1, 654]=26.88$, $p<.001$; $F[1, 654]=25.98$, $p<.001$, respectively). These findings suggest that educational background is an influencing factor in the preference for rectangular ratios.

3.3 Potential impact of personality type on rectangle ratio preferences

To what degree is personality type an influencing factor on rectangle ratio preference? A MANOVA for horizontal rectangular ratios showed that only the "rectangular ratio" x "educational background" x 'F/T personality" revealed a significant interaction ($F[14, 8764]=4.66$, $p<.001$). However, there were no significant differences for the other three types of personalities. In addition, another MANOVA for vertical rectangular ratios revealed that there were no significant differences for any of the conditions.

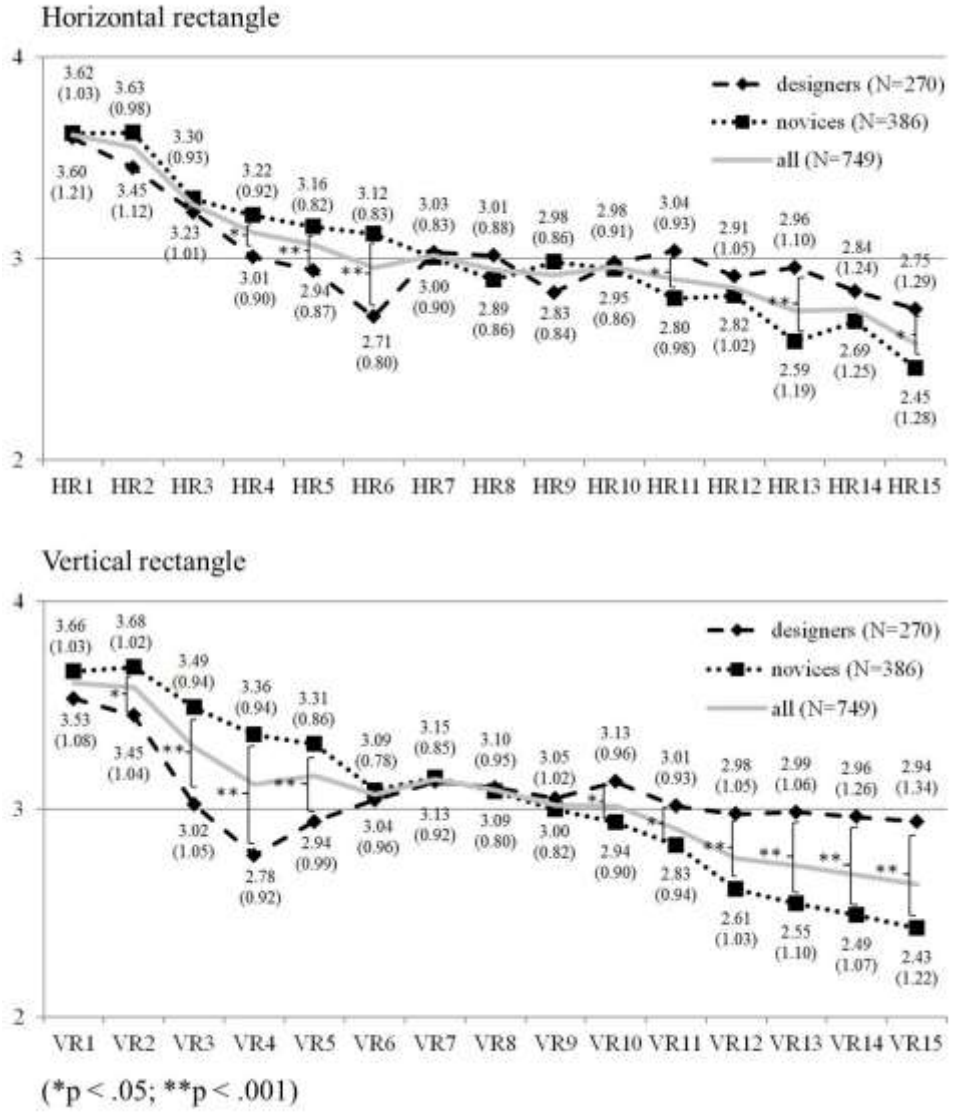

Figure 3. The ratio for the average preference of scores for the horizontal and vertical rectangular ratios for all participants (standard deviation of the mean in parentheses).

Figure 4 shows the preference for different rectangle ratios between the F/T personality types. A secondary one-way ANOVA analyses for horizontal rectangles revealed that all F personality types exhibited significant differences for HR6, HR7, HR8, HR11, HR12, HR13, and HR15 ratios ($F[1, 396]=10.61$, $p<.001$; $F[1, 396]=16.99$, $p<.001$; $F[1, 396]=4.69$, $p<.05$; $F[1, 396]=9.50$, $p<.01$; $F[1, 396]=10.87$, $p<.001$; $F[1, 396]=6.11$, $p<.05$; $F[1, 396]=0.13$, $p<.01$, respectively). In addition, all T personality types exhibited significant differences for HR4, HR5, HR6, HR7, HR9, HR12, and HR13 ratios ($F[1,256]=30.38$, $p<.001$; $F[1,256]=15.02$, $p<.001$; $F[1,256]=35.38$, $p<.001$; $F[1,256]=23.33$, $p<.001$; $F[1,256]=13.18$, $p<.001$; $F[1,256]=4.63$, $p<.05$; $F[1,256]=10.67$, $p<.001$, respectively). These findings indicate that the F designers can accept larger rectangle ratios than the novices, and moreover, T novices prefer the rectangle ratio closest to that of a square and also prefer the golden ratio more so than do designers.

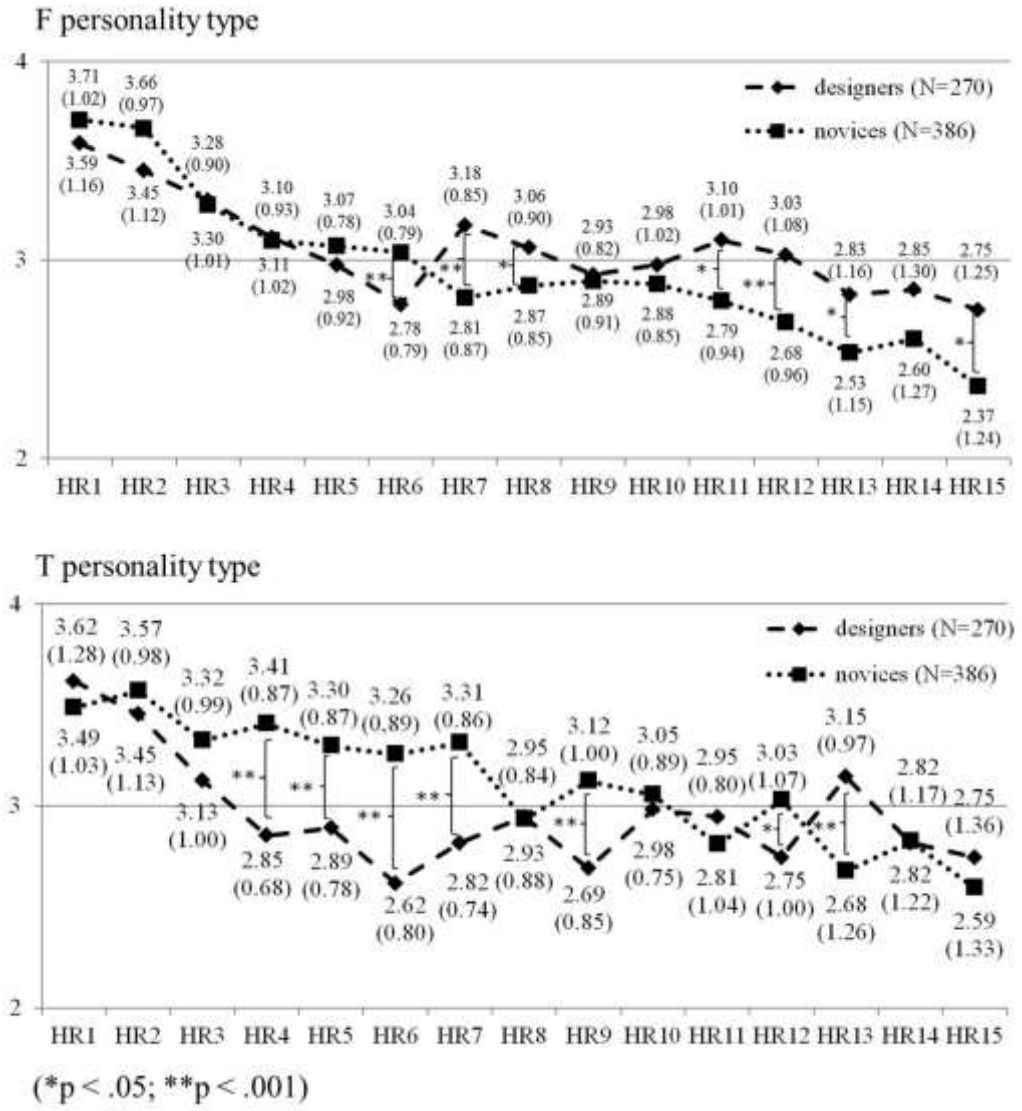

Figure 4. The ratio for the average preference of scores for the horizontal and vertical rectangular ratios for F/ T personality (standard deviation of the mean in parentheses).

4. Discussion

This study classified participants' personality types using the MBTI personality scale and explored the impact of personality type and educational background on personal preferences for different rectangle ratios. The results of the ratio preferences indicated that there are three trends. (1) People prefer the rectangle ratio that most closely approaches a square. (2) The golden ratio is only slightly preferred over other ratios. (3) The degree of preference decreases as the ratio increases. This is consistent with the findings of Friedenberg (2012) and Pittard et al. (2007). While most people generally accept the golden rectangle, it is not their favorite. The results of this study indicate that both education and personality type impact ratio preferences.

4.1 Preferred rectangle ratios

Golden rectangles, no matter whether they are horizontally or vertically oriented, are only slightly preferred by designers and novices, while the square is the most preferred among both groups. This result is consistent with the studies of Fechner (1876), Berlyne (1970), and McManus (1980). Based on Berlyne's (1970) conservative theory, the Japanese prefer the square because it is more visually stable. Westerners, however, in general, tend to prefer rectangles. Speculation regarding the differences in preference suggests that the square gives the observer a sense of harmony, regularity, and stability.

4.2 Educational background differences in ratio preferences

Different educational backgrounds also affect ratio preference. People without a background in design demonstrate a preference for rectangular ratios that are logical and easy to deduce. Their preferences for ratios with increasing proportion present an orderly decreasing trend. On the other hand, people who having professional design training demonstrate a preference for rectangular ratios that are difficult to predict. For ratios larger than the golden ratio, designer preferences reveal a flat trend, indicating that they accept, to some degree, the extreme ratios. In general, all of the participants display a neutral preference for the golden ration. This suggests that the golden ratio does exist and that there is an inference factor regarding aesthetic perception regardless of whether people have had design training.

4.3 Distribution differences in personality types

The participants in this study represent a distribution of personality types. The reasons for the differences in the proportions of personality types are based on culture (Cheng et al, 2010), age (Myers and McCaulley, 1985; Tseng and Kou, 2012), and the urban-rural gap (Kelgeri and Phadnis, 1989; Srivastava, 1982). Cheng et al. (2010) has found that cultural differences exist between creativity and personality type, a finding that aligns somewhat with the focus of this study, which is to emphasize the distinction between design and non-design backgrounds. As novices are integrated throughout all the average results for all backgrounds, there is no specific background that requires extenuating consideration.

In this study, the proportion of novices and designers possessing E or I characteristics is relatively the same, though the number of extraverts E is slightly higher than the number of introverts I. This finding differs from the results of Chien and Lien (2010), however. According to Myers and McCaulley's (1985) theory, people with strong processing and thinking skills tend to exhibit I characteristics. This suggests that the people with introversion characteristics are more sensitive and internalize the thinking process as they view and evaluate external information, while the judgments and decisions of the more extroverted E individuals are more easily influenced by external factors. However, there is no clear evidence to indicate what personality types are considered the most creative – a contentious issue that has been the subject of debate among researchers over the past several years (Buchanan and Bandy, 1984; Buchanan and Taylor, 1986; Carne and Kirton, 1982; Feist, 1999; Hammond and Edelmann, 1991; Ohnmacht, 1970). Eysenck's (1995) perspective, that both E and I are creative personality types, most closely aligns with the findings of this study.

Moreover, the designers participating in this study are primarily F or J personality types, both of which outnumber the number of T and P types, a finding that is consistent with Chien and Lien's (2010) results of personality types among students in Taiwan. Nonetheless, a large number of studies have indicated that the degree of creativity among N and perception P types is higher than it is among S and J types (Buchanan and Bandy, 1984; Buchanan and Taylor, 1986; Carter et al., 1983; Fisher and Scheib, 1971; Hall, 1969; Myers and McCaulley, 1985; Richter and Winter, 1966). The reasons for these differences, however, include not only cultural differences (Cheng et al., 2010) but also environmental differences as the educational environment in a school of design may affect the students' thinking with respect to design. Bostrom et al. (1988) noted that an individual's internal and external environmental factors affect the learning process, including the teaching and learning environment, teacher characteristics, classmates, and training methods.

4.4 The relationship between ratio preferences and personality types

The study found that the ratio preferences of F designers and T novices are significantly different. For example, designers identified as T novices are more accepting of rectangles with extreme proportions and square - or nearly square - ratios. This, to some degree, conflicts with Myers and McCaulley (1985) who contend that personality type - F or T does not affect creativity. However, Jacobson (1993) posits that T personality type is most frequently found among creative managers. For people in the field of design, however, the results should be different. According to the results of this study, it can be inferred that designers with a sensibility F type personality have a preference for extreme proportions and have a greater degree of tolerance and flexibility for such extremes, which can contribute to creative thinking and result in different perspectives.

According to Myers and McCaulley (1985) theory, personality traits related to the dimensions of F and T are reflected in individual preferences. Thus, it is necessary to explore the differences between people who possess one of the other of these two traits. People with a rational T personality are more logical, objective, and impartial as they analyze and make decisions, tending to negate their personal thoughts and feelings. On the other hand, people defined as having F personality tend to make decisions based on the value of the individual, thus their decisions are more subjective. Designers who participated in aesthetic and design trainings often encounter new concepts, so they are accustomed to unusual designs and therefore do not feel uncomfortable or regard such designs as strange. Furthermore, as designers have a tendency toward a S type personality, they can more easily select their favorite forms based on felling. By contrast, people who have not received training in design and aesthetics exhibit opposite behaviors. Novices with S type personalities are punctual and behave in a more predictable and conservative manner. As defined in Berlyne's (1970) conservative theory, novices are more inclined to choose safe, stable forms.

5. Conclusions

Differences in the proportion of degrees of preference are indeed influenced by the differences in personality types. The majority of people fall within the normal range, similar to that of the golden rectangle. Many designers believe that applying the golden ratio to

product design will attract the attention of consumers (Elam, 2001; Avramović et al., 2013). They argue that the golden ratio has been regarded as a good aesthetic form for hundreds of years, and as such, it has become solidly entrenched in product designs over generations. Today, it applies to modern products as well, such as 3C technology products. While the golden ratio rule may not directly and specifically affect a product's aesthetics, it can be used as a tool to enhance the aesthetics of the product. People may gradually acclimate to the form of the golden ratio and its proportional changes in 3C products. As the use of the golden ratio rule does not guarantee that the consumer groups will receive products of the highest aesthetic evaluation, designers must have good insight into the potential product users. Such knowledge will allow designers to develop different forms of a product for different personality types, such as rational or emotional goods. In addition, the proportions of aesthetic preferences for different design instructions have statistically significant effects. This study concludes that people who have experience in design preferences also have broader ratio preferences and can universally accept more extreme rectangles.

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Acknowledgments

The MBTI personality test includes 70 questions. Each question contains two options. Decide on answer “a” or “b” and place a check mark in the proper column of the answer sheet in Figure 1. Scoring directions are provided. There is no right or wrong answer as approximately one-half of the population agrees with “a” and the other half agree with “b”.

questions 1 to 35	**questions 36 to 70**
(1) When the phone rings do you (a) Hurry to answer it first (b) Hope someone will answer it	(36) Do you think of yourself as (a) An outgoing person (b) A private person
(2) Are you more (a) Observant than introspective (b) Introspective than observant	(37) Are you more frequently (a) A practical sort of person (b) A fanciful sort of person
(3) Is it worse to (a) Have your head in the clouds (b) Be in a rut	(38) Do you speak more in (a) Particulars than generalities (b) Generalities than particulars
(4) With people you are usually more (a) Firm than gentle (b) Gentle than firm	(39) Which is more of a compliment (a) “There’s a logical person” (b) “There’s a sentimental person”
(5) Are you more comfortable making (a) Critical judgements (b) Value judgements	(40) Which rules you more (a) Your thoughts (b) Your feelings

(6) Is clutter in the workplace something you (a) Take time to straighten up (b) Tolerate pretty well	(41) When finishing a job, do you like to (a) Tie up all loose ends (b) Move onto something else
(7) Is it your way to (a) Make up your mind fairly quickly (b) Pick and choose at some length	(42) Do you prefer to work (a) Toward deadlines (b) Just whenever
(8) Waiting in line do you (a) Chat with others (b) Stick to business	(43) Are you the kind of person who (a) Is rather talkative (b) Doesn't miss much
(9) Are you more (a) Sensible than ideational (b) Ideational than sensible	(44) Are you inclined to take what is said (a) More literally (b) More figuratively
(10) Are you more interested in (a) What is actual (b) What is possible	(45) Do you more often see (a) What is right in front of you (b) What can only be imagined
(11) When making up your mind are you more likely to go by (a) Data (b) Desires	(46) Is it worse to be (a) Soft and caring (b) Hard-nosed
(12) In sizing up others do you tend to be (a) Objective and impersonal (b) Friendly and personal	(47) In trying circumstances are you sometimes (a) Too unsympathetic (b) Too sympathetic
(13) Do you prefer contracts to be (a) Signed, sealed and delivered (b) Settled on a handshake	(48) Do you tend to choose (a) Rather carefully (b) Somewhat impulsively
(14) Are you more satisfied with (a) A finished product (b) A work in progress	(49) Are you inclined to be more (a) Hurried than leisurely (b) Leisurely than hurried
(15) At a party do you (a) Interact with many, even strangers (b) Interact with a few friends	(50) At work do you tend to (a) Be sociable with your colleagues (b) Keep more to yourself
(16) Do you tend to be more (a) Factual than speculative (b) Speculative than factual	(51) Are you more likely to trust (a) Your experiences (b) Your conceptions
(17) Do you like writers who (a) Say what they mean (b) Use metaphors and symbolism	(52) Are you more inclined to feel (a) Down to earth (b) Somewhat removed
(18) Which appeals to you more (a) Consistency of thought (b) Harmonious relationships	(53) Do you think of yourself as a (a) Tough-minded person (b) Tender-hearted person
(19) If you must disappoint someone are you usually (a) Frank and straight forward (b) Warm and considerate	(54) Do you value yourself more that you are (a) Reasonable (b) Devoted
(20) On the job do you want activities (a) scheduled (b) unscheduled	(55) Do you usually want things (a) Settled and decided (b) Just penciled in
(21) Do you more often prefer (a) Final unalterable statements (b) Tentative preliminary statements	(56) Would you say you are more (a) serious and determined (b) Easy going
(22) Does talking with strangers (a) Energize you (b) Tax your reserves	(57) Do you consider yourself (a) A good conversationalist (b) A good listener
(23) Facts (a) Speak for themselves (b) Illustrate principles	(58) Do you prize in yourself (a) A strong hold on reality (b) A vivid imagination
(24) Do you find visionaries and theorists (a) Somewhat annoying (b) Rather fascinating	(59) Are you drawn more to (a) Fundamentals (b) Overtones

(25) In a heated discussion do you (a) Refuse to compromise (b) Look for common ground	(60) Which seems the greater fault (a) To be too compassionate (b) To be too dispassionate
(26) Is it better to be (a) Just (b) Merciful	(61) Are you swayed more by (a) Convincing evidence (b) A touching appeal
(27) At work is it more natural for you to (a) Point out mistakes (b) Try to please others	(62) Do you feel better about (a) Coming to closure (b) Keeping your options open
(28) Are you more comfortable (a) Before a decision (b) After a decision	(63) Is it more preferable to (a) Make sure things are arranged (b) Just let things happen naturally
(29) Do you tend to (a) Say what is on your mind (b) Keep your ears open	(64) Are you inclined to be (a) Easy to approach (b) Somewhat reserved
(30) Common sense is (a) Usually reliable (b) Frequently questionable	(65) In stories do you prefer (a) Action and adventure (b) Fantasy and heroism
(31) Children often do not (a) Make themselves useful enough (b) Exercise their imaginations enough	(66) Is it easier for you to (a) Put others to good use (b) Identify with others
(32) When in charge of others you tend to be (a) Firm and unbending (b) Forgiving and lenient	(67) Which do you wish for more for yourself (a) Strength of will (b) Strength of emotion
33) Are you more often (a) A cool-headed person (b) A warm-hearted person	(68) Do you see yourself as basically (a) Thick-skinned (b) Thin-skinned
(34) Are you prone to (a) Nailing things down (b) Exploring possibilities	(69) Do you tend to notice (a) Disorderliness (b) Opportunities for change