Verification of Stereotype on Women Observing Gender Difference on UX of Wearable Device

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Abstract. There has been contending views on women and men as a consumer, and we believe that it is necessary to analyze and verify who will be the upcoming consuming subject in next 10 years. Herein, using adjectives of AttrackDiff2 which analyze how people perceive the product using hedonic quality and pragmatic quality, we have conducted FGI (Focus Group Interview) on 20–25 female and male group respectively, analyzing how major consumers in 10 years perceive about current trend over the world, wearable devices. As a result of the study, we find that women tend to perceive pragmatic quality as important as men in respect of UX of wearable devices. Instead of the difference between two gender groups, there were greater gap between the individuals. Here, we suggest that stereotype on women that they are an impulsive consumer should be adjusted.

Keywords: Gender · Women · UX · Gender gap · Wearable device

1 Introduction

It is undeniable that creating positive UX (User eXperience) has become one of the crucial factors these days. Thus, in order to maximize the experience of the individuals, developers initiated to focus more on specified targets, such as gender.

1.1 Gender Difference

Gender difference is an interdisciplinary research area which has been studied in various fields, such as in psychology, women's study, anthropology and medical science. According to Charness et al. [1] who researched on risk taking, dominant traditional perception play a crucial role on decision making regardless of nationality or age. Some argue that maternal affection, smoothness and risk avoiding characteristic of 'female' is driven by biological factors, meaning that these characteristics would not change although there will be social or environmental changes [2]. On the other hand, others such as Butler, J. contend that even sex differentiation between men and women is categorized by socio-cultural factor, being as a result of repetitive training on the role of gender that has been carried out for a long time [3]. For instance, Musuo is one of

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the minor ethnic groups that have matrilineal society. In this society, the role of gender is completely opposite compared to the common world, acting as a supporting ground for the argument that social and economic circumstances is a decisive factor on the role and characteristics of gender [4]. According to Huffman et al. [5], as people become more educated, the role of gender diminishes in the aspect of technological self-efficacy. Indeed, in Northeast Asia, such as Japan, South Korea, and Taiwan, patriarchy which tended to be dominant till the end of 20th century diminished alongside with the increase in education level [6]. Likewise, although there are researches which tend to explain the reason for gender differentiation in biological perspective, we particularly focus on social and anthropological reasoning to contend our argument.

1.2 Female as Consumer

Through our experience, we can easily know that there is difference over the preference as a male or female consumer. Indeed, women in particular took more central stage on shopping rather than men since they are perceived to be more impulsive shopper than men [7]. Indeed, a study found out that women have greater brand commitment, impulse buying and hedonic consumption level compared to men [8]. Other than that, there are various investigations which tend to classify male as reasonable consumer while female as emotional consumer. On contrast, researches such as Badgaiyan et al. argue that gender does not play meaningful role on the relationship between impulsive buying and intrinsic variable [9]. Hence, it is significant to research if the gender difference will still play similar role on the consumer's behavior in 10 years.

1.3 Research Abstract

Due to the influence of the education, we hypothesized that the stereotype on women that women tend to be more emotional compared to rational men would not work on 20–25 years old young women due to equal education (see Fig. 1). Herein, we observe 20–25 years old male and female group in technical field to analyze how these two gender groups perceive and treat about the hedonic quality and pragmatic quality of the wearable devices. Since wearable device constitute both technical factor and aesthetic

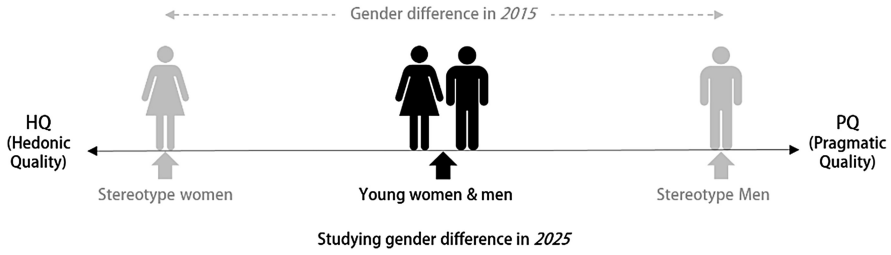

Fig. 1. Brief introduction for the study

and emotional needs [10], we believe that it can act as one of the major variables to compare how consumers in two gender groups react to the product.

This research is significant because first, it validates how women are being treated in UX today and second, it allows to foresee what factors should be considered or changed in order to maximize the women's UX in the future.

2 Study

2.1 Method

In this study, we aim to find how gender difference influences the UX of the wearable devices. We particularly focus on 20–25 age group since we found out that the result among this age group showed significant result through the pilot study. They are the age group who are most likely to be the consumer of the wearable devices, the group who will be familiar with the devices. For the in depth study, that allows participants to share their expectations, opinions and ideas on a given discussion topic, we chose to conduct FGI (focus group interview) [11]. In order to draw the result that we want to discuss with, we mainly considered about the times that the participants discuss about the quality of the devices. Since the interview is designated in a way that they can discuss about what factor is crucial on the topic that they are discussing with, talking about a particular characteristics will mean that the participant consider the particular factor to be important for them. In order to find how their comment is related to which quality, we used adjectives of AttrackDiff2. There are 28 word-pairs of the adjectives, which is categorized in to 4 dimensions [12, 13, 15].

- *PQ* (*pragmatic quality*): The pragmatic quality measures useful and usable features of certain products.
- *HQ-I* (*hedonic quality – identity*): People concern the product's ability to help them represent their 'identity' to the others. This quality includes how stylish they are and how open the product is to the people.
- *HQ-S* (*hedonic quality – stimulation*): This dimension motivates user to use that product because it 'stimulates' users with inspiring, novel and interesting features.
- *ATT* (*attractiveness*): Attractiveness describes the overall ability to give a 'good' impression of product to user.

Indeed, AttrackDiff2 is commonly used to get the information to know which aspect need to be improved on the particular product that has already developed [12]. Travisan, B. also revealed that it is possible to identify how two different gender groups perceive differently using Attrakdiff [13].

As these four dimensions are commonly used to assess the quality value of the product, we perceived that these dimensions could also be used as a method to see what kind of quality the people expect from the particular product. Thus, although this method is originally used by implementing seven-point Likert scale, in this study, we note that we did not used the particular tool as it is designated to be, but use the adjectives that are outlined because these words are well organized to categorize particular characteristics of the quality of the product among consumer (Table 1).

Table 1. Word-Pairs for four Dimensions of AttrackDiff2

PQ	HQ-I
technical - human	isolating – connnective
complicated – simple	unprofessional – professional
impractical – practical	tacky – stylish
cumbersome – straightforward	cheap – premium
unpredictable – predictable	alienating – intergrating
confusing – clearly structured	separates me – brings me closer
unruly – manageable	unpresentable – presentable
ATT	**HQ-S**
unpleasant – pleasant	conventional – inventive
ugly – attractive	unimaginative – creative
disagreeable – likeable	cautious – bold
rejecting – inviting	conservative – innovative
bad – good	dull – captivating
repelling – appealing	undemanding – challening
discouraging - motivating	ordinary – novel

2.2 Participants

The focus group was conducted among nine South Korean participants, where five were male and four were female. The ages ranged from 20 to 25, and average age is 21.8 for female group and 20.2 for male group. (see Table 2). All of them either graduated university or university students, and on average, they had 3.5 IT devices. All of them were either studying or working in technology-related field.

Table 2. General information of male and female group particiapants

	Name	Age	Educational level	IT devices possessing
Male group	M1	20	University Student	PC, laptop, smart phone, tablet PC, MP3
	M2	20	University Student	Laptop, smart phone
	M3	20	University Student	Laptop, smart phone, tablet PC, smart watch
	M4	21	University Student	PC, laptop, smart phone, tablet PC
	M5	20	University Student	PC, laptop, smart phone
Female group	F1	22	University Student	Laptop, smart phone, MP3
	F2	20	University Student	Laptop, smart phone
	F3	25	Graduated Student	PC, laptop, smart phone
	F4	20	University Student	Laptop, smart phone, tablet PC, MP3

2.3 Procedure

The FGI consisted of 4 stages, designated in a way that the participants can discuss about various dimensions of the wearable devices (see Table 3).

Table 3. The structure of FGI questionnaire

Stage	Question	
Warm-up stage	– Introduction and the rules of the interview	
Bridge stage	– Concern over the new devices – Perception on wearable devices – Consumption standard of the product and wearable devices	
Main stage	– Explanation on wearable devices – Factors that influence on consumption of wearable devices – Which wearable devices would be the most useful to use among smart shoes, smart band, smart watch, smart shirt, smart glass – Who, when and why will the wearable device will be used	(1) (2) (3)
Ending stage	– Factors that are necessary for future wearable devices	(4)

3 Results

In this session, result of FGI is presented in a way that it was discussed above. Through FGI, we grouped the related comments from participants into 4 groups of AttrackDiff2, ATT, HQ-S, HQ-I and PQ, and grouped other meaningful statements into etc. group. Table 4 shows the examples of comments of the participants with its matching quality. Issues on durability, performance, healthfulness, and security issues are categorized on etc. group.

Utterance Frequency Analysis. The result of this timeline analysis of female group and male group are outlined on Figs. 2 and 3. Based on the study above which classified the comments into the category, the amount of time that the participants dealt with the particular issue on the quality of the wearable devices was outlined using different colors. The horizontal-axis refers to the timeline, while the vertical axis represent quality dimension. When we take a look at these two graphs, the most frequent quality that was dealt with was PQ for both male and female. Indeed, female in general discussed with various factors of qualities in general. For instance, compared to female group who moves on the next quality after discussing about an issue for enough time, male group discussed about the qualities that each individuals want to talk about.

Taking 10 s as a single unit, we sum up the amount of time that each participant discussed about a certain qualities of AttrackDiff 2 model (see Table 5). Considering

Table 4. Comments matched with the adjectives in each dimension

AttrackDiff2	Example	Word
ATT	– I do not think that I would use it if it looks ugly	attractive
HQ-S	– It is fun and exciting to see new technology – I would use it if advanced technology like hologram is applied	inventive innovative
HQ-I	– Something that a lot of people use, and something that is presentable to the other people – Since it is presented to the others, it functions as a kid of fashion item	presentable stylish
PQ	– Something that works even if I do not touch it with my hand – If it is really usable and practical – It must be connected with other devices without any problem	straightforward practical manageable
ETC.	– Something that does not break up, and have good A/S – Wish it has fast signaling speed and does not heat up – Wonder it smart glasses does no harm to our eyes – Privacy or security issues would be crucial	durability efficiency health security

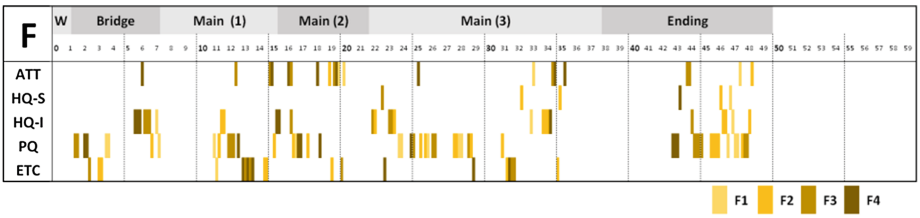

Fig. 2. Timeline analysis of the focus group interview with female group

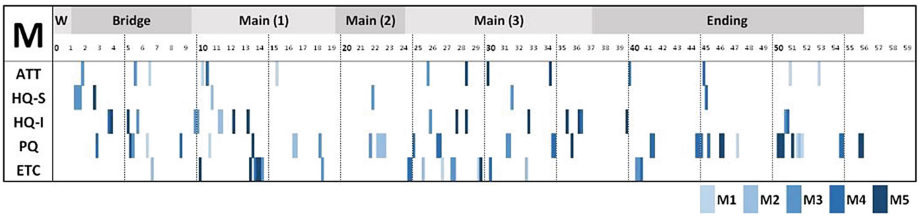

Fig. 3. Timeline analysis of the focus group interview with male group

Table 5. Frequency table that compares how long did each groups disscussed about each qualities of AttrackDiff2 (unit: 10 s)

	Female group						Male group						
	F1	F2	F3	F4	Total	(%)	M1	M2	M3	M4	M5	Total	(%)
ATT	4	2	7	8	21	**16.4**	5	0	3	3	3	14	**13.2**
HQ-S	1	3	1	1	6	**4.7**	0	1	5	1	1	8	**7.6**
HQ-I	3	10	8	6	27	**21.1**	0	2	5	3	10	20	**18.9**
PQ	13	16	15	10	54	**42.2**	5	7	5	15	11	43	**40.6**
ETC.	1	7	6	6	20	**15.6**	2	3	6	5	5	21	**19.8**

the amount of times that each individuals discussed with each qualities, both female and male group considered PQ > HQ-I > ATT > HQ-S to be important. Taking total number of discussion time of each quality into the percentage, women more preferred PQ, ATT and HQ-I than male, while male only preferred HQ-S more than female.

At the same time, individual preference over a certain quality is also differentiated among the same gender group as well. For instance, male participants who frequently mentioned about the hedonic quality were M3 and M5 only. Like the total female group, M4 was most interested on HQ-I, and like the total male group, F2 had greater interest on ATT than HQ-S quality.

Contents of Answer. Table 6 contains the summary of answers of each gender group. First, the 'cost' factor that is hard to connect with AttrackDiff2 quality appears as a main factor of consumption for both gender groups. Then, when we asked groups to choose the most usable wearable devices, women liked smart band and disliked smart glasses based on usability and hedonic reasoning. On the other hand, male chose smart glass as the most usable wearable devices since they thought that it is a device that is convenient to get information in fast manner.

When we asked how wearable devices would be used in the future, female perceived that it should be widely used among the society like smartphone these days,

Table 6. Summary of FGI question answers

		Female Group	Male Group
(1)	**Factors influencing consumption of the devices**	Price	Price
(2)	**The most usable wearable devices**	Smart band (hedonic)	Smart glass (functionality)
(3)	**Who, when, how it would be used.**	All	Soldiers, patients and athletes
(4)	**Top 3 important factor**	Practical > attractive > straightforward	Straightforward > cheap > practical
	Other notable comments	Perception of the others, using with the others	Something fun and new

while male perceived that it would be used among the users who need them for particular purpose, such as soldiers, patient and athletes, the ones who should be instantly be informed with health-related data.

From the last question of the FGI, female ranked practical (PQ), attractive (ATT) and straightforward (PQ) factor to the most promising quality that is necessary for the development while male ranked straightforward (PQ), cheap (HQ-I), practical (PQ) factor to be crucial. This ranking matched with the frequency that they commented on these issues.

Among the content of the discussion that is particularly different from each groups, women kept discussed about the social factors, such as how people perceive about the device or how it is used with the others. On the other hand, although this social factor was discussed among male group, they were more concerned with something that satisfies themselves, such as fun, innovative, emotional and human-like factors.

4 Discussion

With the various results that were extracted from FGI above, there are some notable findings through the analysis.

4.1 Gender Differences

When we observed the discussion contents or the frequency of the comments on particular issues, male tend to me more influenced by HQ-S, such as on interesting and innovative ideas, and female were more concerned about ATT quality, such as identifying themselves in the society. However, since these difference wear rated below 3 %, it is difficult to say that these difference is as critical. This kind of difference appears among the individual participants regardless of gender difference, implying that there is lower credibility on this result. This is noticeable point in this research because traditionally, the researches tend to show significant difference between two gender groups. Similar to the result of the study which tested the usability of internet among Junior-high school students in Taiwan [14], this study also argue that the gender gap between female and male consumer on technical products would diminish in the future society.

4.2 Social Factors for Women, Individual Factors for Men

The result shows that female group tended to take social factor to be crucial, and this may influenced HQ-I and ATT quality. There is greater interrelationship between their look and the social factor. On the other hand, male tend to be more interested on the individual factors that can motivate themselves, related to HQ-S quality.

Overall, female tend to consider various kinds of quality in wider spectrum, being more interested on how the other think about their possession. Comparatively, male were interested on fewer kinds of quality. Female tend to comment and compared various factors of hedonic and pragmatic quality.

These two results suggest two main findings. First, the study that the women are more risk-aversive is applicable in this study [1]. They tend to consider the social perspective and stability compared to male, and this may be driven by more strict social pressure on women in the society. Second, this study which found out that female tend to consider more various factors compared to male supports our hypothesis that the women are not an impulsive consumer who are reliant on their emotion [7].

4.3 Greater Individual Difference Than the Gender Difference

The result of the study shows that there are many similarities on quality factors that each gender group considers to be important. Instead, there was greater difference between the individuals within the same gender group. This may be resulted because this study was conducted among the people who have similar age, ranging from 20–25, and have similar education level. Herein, we support the argument that the gender difference may be driven from cultural and environmental factors, such as education instead of biological factor. Thus, in the future society both gender groups are equally educated, we believe that it would not be as simplistic to find characteristically difference based on gender.

5 Conclusion

In conclusion, this research found out what factors should be considered and reconsidered for women in UX. This research is significant on developing UX of women since research of women in UX will continuously be important in the future because women are influential consumers who will continuously integrate with UX.

As the limitation of this study, first, the participants were asked to discuss about the wearable device through the detailed explanation of the authors. Dominant number of participants has never used the wearable device before. Second, this study was conducted among South Koreans, meaning to say that this study is not applicable to the other cultures. Here, we suggest that the cross-cultural experiment can be conducted on different countries.

Although we cannot generalize our study, we argue that the gender gap will be narrowed down when they have similar education level in relation to the UX of wearable devices. As for the future work, the other factors that influence the hedonic and pragmatic quality of each individual apart from the gender can be researched.

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References

1. Charness, G., Gneezy, U.: Strong evidence for gender differences in risk taking. J. Econ. Behav. Organ. **83**(1), 50–58 (2012)

2. Fausto-Sterling, A.: The problem with sex/gender and nature/nurture. In: Williams, S., Birke, L., Bendelow, G. (eds.) Debating Biology, pp. 123–132. Routledge, New York (2003)
3. Butler, J.: Gender Trouble. Routledge, New York (2002)
4. Gong, B., Yan, H., Yang, C.-L.: Gender differences in the dictator experiment: evidence from the matrilineal Mosuo and the patriarchal Yi, Experimental Economics (2014)
5. Huffman, A.H., Whetten, J., Huffman, W.H.: Using technology in higher education: the influence of gender roles on technology self-efficacy. Comput. Hum. Behav. **29**(4), 1779–1786 (2013)
6. Bhopal, K.: Gender 'Race' and Patriarchy: A Study of South Asian Women. Ashgate, Aldershot (1997)
7. Lucas, M., Koff, E.: The role of impulsivity and of self-perceived attractiveness in impulse buying in women. Pers. Individ. Differ. **56**, 111–115 (2014)
8. Tifferet, S., Herstein, R.: Gender differences in brand commitment, impulse buying, and hedonic consumption. J. Prod. Brand Manag. **21**(3), 176–182 (2012)
9. Badgaiyan, A.J., Verma, A.: Intrinsic factors affecting impulsive buying behaviour—Evidence from India. J. Retail. Consum. Serv. **21**(4), 537–549 (2014)
10. Miner, C.S., Chan, D.M., Campbell, C.: Digital jewelry: wearable technology for everyday life. In: CHI 2001 Extended Abstracts on Human Factors in Computing Systems, pp. 45–46. ACM, Seattle, Washington (2001)
11. Morgan, D.L.: Focus groups as qualitative research. Planning (2013). doi:10.4135/9781412984287.n4
12. Hassenzahl, M., Burmester, M., Koller, F.: AttrakDiff: Ein Fragebogen zur Messung wahrgenommener hedonischer and pragmatischer Qualität. In: Szwillus, G., Ziegler, J. (eds.) Mensch & Computer 2003, pp. 187–196. Springer, Verlag (2003)
13. Trevisan, B., Willach, A., Jakobs, E.-M., Schmitt, R.: Gender-specific kansei engineering: using AttrakDiff2. In: Szomszor, M., Kostkova, P. (eds.) e-Health. LNICST, vol. 69, pp. 167–174. Springer, Heidelberg (2011)
14. Tsai, M.-J., Tsai, C.-C.: Junior high school students' Internet usage and self-efficacy: a re-examination of the gender gap. Comput. Educ. **54**(4), 1182–1192 (2010)
15. Rauche, T.: Summative usability evaluation: Hedonic and pragmatic quality of a mobile device application