KANSEI EVALUATION ON THE VISUAL AND HEARING IMAGE OF INTERFACE DESIGN

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ABSTRACT

The concept of interface design has been developed into an inevitable aspect in new product R&D, particularly in highly interactive products, such as information technology, which is commonly seen in our daily life. Hence, design should be better understood and explored from more plural product application aspects. This study aimed to explore the correlation of interactive visual/hearing interface with users' emotion. Based on Kansei Engineering approach, this study probed into the relationship between visual/hearing operation interface and emotion. The research process consisted of four parts: collection of interactive interface design samples and adjective phrases, selection of representative interactive interface design samples and adjective phrases, establishment of relationships between key characteristics of interactive visual/hearing interface design and users' emotion, and analysis of experimental results.

Research results showed that: 1) Among the six items, Menu Structure, Menu Contents, and Feedback Sound had high Biased Correlation Coefficient values against all of the nine Kansei phrases, which meant they were key items in the visual/hearing interface design; 2) In the item Menu Contents, Biased Corr" had the highest score followed by "Symbol + Text", and "Text" came last on all of the nine Kansei words, which meant "Icon + Text" had the advantages in the images of "Intuitive", "Easy to use", "Interactive", "Pleasant", "Emotional", "Gorgeous", "Fine", "Friendly" and "Artistic"; 3) In the item Feedback Sound, "MP3 sound" had the highest score on hInteractive" followed by "Chord", "Single note" and "None" respectively, which was very different from our common perception. Further fine-tuning on the sounds effect needs to be arranged to clear the findings.

Keywords: Interface design, Visual image, Hearing image, Kansei Engineering

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1. INTRODUCTION

Interface design has been an inevitable aspect in new product R&D, particularly in highly interactive products, such as IT appliances, which are commonly seen in our daily life. Hence, design should be better understood and explored from more plural aspects. According to Shedroff (1999), interface design is an integration of three design disciplines, including: Information Design, Interaction Design and Perception Design. Simon (1985) suggested that development of three emerging academic sciences, namely Design, Psychology, and Informatics, would rejuvenate engineering science, thus advocated the developing of Humanity Science. As a result, how to translate consumers emotion into design factors is becoming a topic to be clarified by designers, and the interaction between users and IT products has become focus of design research nowadays.

Kansei Engineering is a technology that "translates people expected feelings or impressions into design elements" (Nagamachi, 1995). Besides helping clarify human emotional preferences, it can be well applied in design practice. Human sense organs are responsible for information transmission and communication, aiding people in information perception, transmission and application in environment. Studies on perception suggested that, about 65% of mankind experiences come from vision; 25% come from hearing; 10% come from touch. Therefore, Kansei preference research on visual and hearing images is very important. The research results not only can help clarify users visual/hearing emotional appeals and preferences, but also serve as a basis of cross reference for other perception aspects of users. Moreover, they can complement the comprehensive compound Kansei based R&D system. Therefore, by employing Kansei Engineering approach, this study aimed to explore the relationships of interactive visual/hearing interface design with users corresponding Kansei preference.

2. RESEARCH METHOD

To identify the correlation between human visual/hearing Kansei and the corresponding interfaces, this study chose 3C electronic consumer products as research objects.

2.1. Research process and steps

The experimental design consisted of four parts: (1) collection of interactive interface design samples and adjective phrases, (2) selection of representative interactive interface design samples and adjective phrases, (3) establishment of relationships between key characteristics of interactive visual/hearing interface design and users' emotion, and (4) analysis of experimental results.
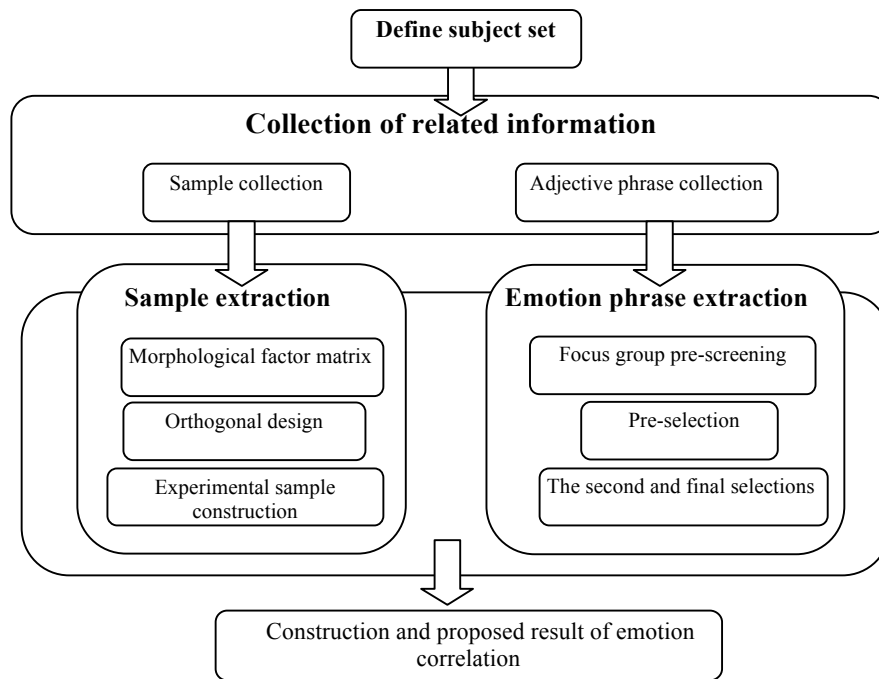
Figure 1: Research process and steps

2.2. Collection of product samples and adjective phrases

2.2.1 Collection of interactive interface samples

Based on visual/hearing operation interface related products mentioned in magazines and websites of two major channel distributors in Taiwan, samples of mobile phones, GPS, translation machine, game consoles, DC, DV, LCD TV, and MP3/MP4, totally 126 pieces of 3C products were images collected. The details are shown in Table 1. The samples were organized for use by the focus group.

Table 1: Collection of visual/hearing operation interface related products

Type	Product item	Quantity
Mobile communication product	Mobile phone (30), GPS (10)	40
Information recreational product	Translation machine (8), game consoles (4) *excluding PC and NB	12
Home video product	DC(25), DV(16), LCD TV(15), MP3/MP4(18)	74
	Total	126

2.3. Product sample construction and adjective phrase screening

2.3.1 To construct representative samples

Focus Group method and morphological analysis were used. Four designers with over 5 years of experience in interface design were invited to conduct focus group discussion, and generalize visual/hearing operation interface elements and factors. The table of morphological factor analysis (Belaziz, Bouras et al. 2000) is shown in Table 2.

Table 2: Visual/hearing operation interface morphological factor analysis

Item			Categories
Visual	Shape vision	Menu framework	Hierarchical menu(1), Matrix menu (2), Page up/down menu(3), List menu(4)
		Menu graphics content	Text(1), Icon + Text(2), Symbol + Text(3)
	Color vision	Background	Mono color(1), Texture(2), Pale image(3)
		Color number	<4, 4~5, >5
		Tone	Cool color series (1), Warm color series (2), Neutral color series (3)
	Mobile vision	Feedback before clicking	Static, dynamic
		Feedback after clicking	Static(1), Dynamic(2)
Hearing	Sound effect	Feedback sound	No sound (1), Mono sound (2), Harmony sound (3), MP3 stereo sound (4)

Visual/hearing operation interface can be summarized into 8 items, among which, "Color number" in color vision and "Feedback before clicking" in mobile vision are still disputed in definition, plus subsequent sample design problem, these two items were removed and there remained totally 6 items and 19 categories in this study. Considering the subjects' loading, orthogonal design procedure was used to reduce excessive combinations into the most critical combinations, which not only can decrease experiment runs, but also obtain interaction data. Thus, this study employed SPSS Ver.17 orthogonal design procedure to generate orthogonal array with 25 combinations.

Table 3: Orthogonal array of design conditions for 25 representative samples

No.	Menu framework	Menu type	Background	Tone	After clicking (feedback)	Feedback sound
1	List menu	Symbol + Text	Mono color	Cool color series	Dynamic	No sound
2	Hierarchical menu	Icon + Text	Mono color	Cool color series	Static	MP3 stereo sound
3	Page up/down menu	Symbol + Text	Pale image	Warm color series	Static	MP3 stereo sound
4	List menu	Icon + Text	Pale image	Cool color series	Dynamic	Mono sound
5	Hierarchical menu	Text	Texture	Warm color series	Dynamic	No sound
6	Hierarchical menu	Icon + Text	Texture	Cool color series	Static	Mono sound
7	List menu	Text	Texture	Neutral color series	Static	MP3 stereo sound
8	Matrix menu	Symbol + Text	Texture	Cool color series	Static	Harmony sound
9	Hierarchical menu	Text	Texture	Cool color series	Dynamic	MP3 stereo sound
10	Hierarchical menu	Text	Pale image	Warm color series	Static	No sound
11	Hierarchical menu	Symbol + Text	Mono color	Neutral color series	Dynamic	No sound
12	Page up/down menu	Text	Texture	Cool color series	Dynamic	Harmony sound
13	Hierarchical menu	Icon + Text	Pale image	Neutral color series	Dynamic	Harmony sound
14	Matrix menu	Icon + Text	Mono color	Warm color series	Dynamic	MP3 stereo sound
15	Page up/down menu	Text	Mono color	Neutral color series	Static	Mono sound
16	Page up/down menu	Icon + Text	Mono color	Cool color series	Static	No sound
17	Matrix menu	Icon + Text	Texture	Neutral color series	Static	No sound
18	Hierarchical menu	Icon + Text	Mono color	Warm color series	Static	Harmony sound
19	Hierarchical menu	Symbol + Text	Texture	Warm color series	Static	Mono sound
20	Page up/down menu	Icon + Text	Texture	Warm color series	Dynamic	No sound
21	Hierarchical menu	Text	Mono color	Cool color series	Static	No sound
22	Matrix menu	Text	Mono color	Warm color series	Dynamic	Mono sound
23	List menu	Icon + Text	Texture	Warm color series	Static	No sound
24	Matrix menu	Text	Pale image	Cool color series	Static	No sound
25	List menu	Text	Mono color	Warm color series	Static	Harmony sound

2.3.2. Collection of adjective phrases

1. Acquisition of Kansei phrases

From feature coverage on 3C products or assessment content and related reports in magazines and websites, popular phrases and user psychological feelings were extracted. Coupled with Kansei phrases suitable for design image, this study gathered adjective phrases. The gathered semantic content was transformed into Kansei phrases that express psychological feeling and style tendency, then, the opposite phrases were paired, the unpaired part was discussed before deciding their opponents. A total of 78 pairs of Kansei phrases were obtained in this study.

2. Kansei phrase pre-selection

To reduce subject loading, Kansei phrase screening was carried out. After focus group discussion, a total of 42 pairs of Kansei phrases suitable for visual/hearing image interface design were selected, as shown in Table 4.

3. The second selection of Kansei phrases

To select Kansei phrases more objectively, the pre-selected 42 pairs of Kansei phrases were made into questionnaire for 20 subjects to check. According to understanding and impression of visual/hearing image interface, each subject selected 20 pairs of Kansei phrases regarded to be the most suitable for evaluating or describing interactive interface. After summary operation, the top 20 groups of selected Kansei phrases checked were listed as final phrases for experimental analysis, as phrases with (*) in Table 4.
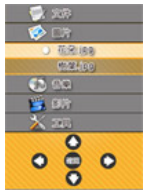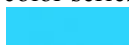
Table 4: Summary of pre-selected and the secondly selected Kansei phrases

No.	Adjective phrase	No.	Adjective phrase	No.	Adjective phrase
1	Pleasant-Unpleasant (*)	15	Stereo-Planar	29	Imaginary-Parochial
2	Satisfied-Dissatisfied (*)	16	Organic-Geometric	30	Avant-garde-Ordinary
3	Safe-Unsafe	17	Friendly-Alienated (*)	31	Acute-Obtuse
4	Stable-Unstable	18	Intuitional-Thinking (*)	32	Excessive-Insufficient (*)
5	Attractive-Unattractive	19	Consistent-Conflicting (*)	33	Steady-Frivolous
6	Graceful-Disgraceful (*)	20	Explicit-Equivocal (*)	34	Internal-External
7	Free-Handicapped	21	Single-Plural	35	Bright-Dark
8	Rational-Emotional (*)	22	Orderly-Confused (*)	36	Lively-Tedious (*)
9	Modern-Traditional (*)	23	Symmetric-Casual	37	Movable-Fixed
10	Generous-Stingy	24	Usable-Unusable (*)	38	Gorgeous-Plain (*)
11	Elegant-Vulgar (*)	25	Simple-Complicated	39	Proper-Improper (*)
12	Fine-Coarse (*)	26	Soft-Intense	40	Real-Virtual
13	Rhythmic-Chaotic	27	Decorative-Functional (*)	41	Interactive-Unilateral (*)
14	Flexible-Rigid	28	Smooth-Hindered (*)	42	Efficient-Inefficient

2.3.3. Construction of experiment samples

Operation interface design is based on portrait screen (W 320 pixels *H 480 pixels), Adobe Photoshop CS3 and Flash CS3 were employed to design 25 dynamic simulation representative samples as per design condition, where, general multimedia design was done according to multimedia principle proposed by Mayer and Heiser (2001), and verified by 4 professional interface designers, as shown in Table 5. As to function menu in sound part, mono sound, harmony sound and MP3 stereo sound were extracted from functional menu sound of commercial 3C products, from which similar audio frequency was chosen as design material. In terms of operation, mouse instead of finger was used to push or click. What subject must complete is graphic function in main function menu, among which, "Flower.jpg" file would be opened.

Table 5: Operation interface design morphology classification

Item	Categories			
Menu framework	Hierarchical menu (1)	Matrix menu (2)	Page up/down menu (3)	List menu (4)
Menu graphics content	Text (5) 圖片	Icon + Text (6) 文件		Symbol + Text (7) 圖片
Background	Mono color (8)	Texture (9)		Pale image (10)
Tone	Cool color series (11)	Warm color series (12)		Neutral color series (13)
Feedback after clicking	Static (14)		Dynamic (15)	
Feedback sound	No sound (16)	Mono sound (17)	Harmony sound (18)	MP3 sound (19)

2.3.4. Design of experiment

To construct correlation of visual/hearing operation interface morphological factor with final Kansei phrases, the experimental procedures of this study are as follows: let 20 subjects gain actual experience after completing operation task, then fill out the 5-level Method of Semantic Differential (SD method) Scale made of the secondly selected Kansei phrases. Normal experiment is in 5 steps, detailed in Table 6. Experiment scenario was shown in Figure 1.

Table 6: Normal experiment is divided into six steps

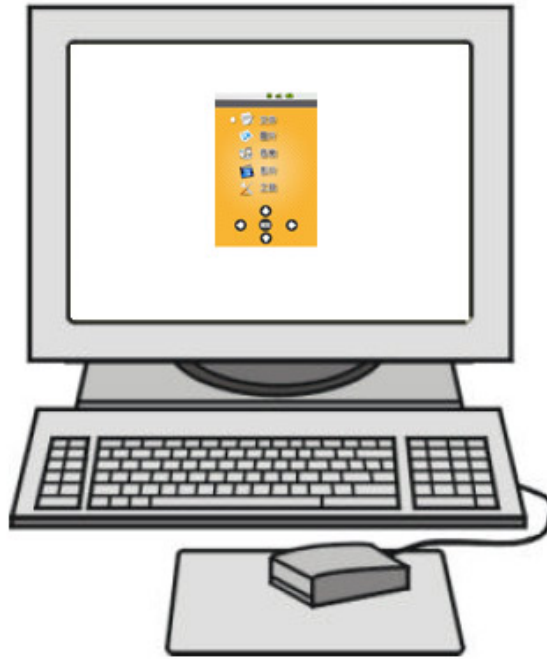| Step	Item	Activity content
1	About experiment	To play experiment example files with verbal narration, let subjects know experiment detail and task execution method.
2	Environment adjustment	Help subject adjust chair height, indoor temperature and so on, let subject feel the most comfortable environment.
3	Run experiment	The subject runs 25 representative samples in sequence (receive same operation task for each test sample), once running a test sample and finishing task, the subject will fill out the semantic difference (SD) Scale made of final Kansei phrases, score 1-5 from left to right respectively, repeat 25 runs.
4	Data confirmation	Verify if missing any data or not
5	Data sorting and analysis	

Figure 2: Experiment equipment and related scenario

3. RESULTS AND DISCUSSION

3.1. Construction of emotion correlation

Average the subjective ratings of 20 subjects obtained and build emotion rating matrix for later data analysis and treatment The results are shown in Table 7.

Table 7: Scores of Emotion Rating Matrix

Sample No.	Pleasant-Unpleasant	Satisfied-Dissatisfied	Graceful-Disgraceful	Rational-Emotional	Modern-Traditional	Elegant-Vulgar	Fine-Coarse	Friendly-Alienated	Intuitional-Thinking	Consistent-Conflicting	Explicit-Equivocal	Orderly-Confused	Usable-Unusable	Decorative-Functional	Smooth-Hindered	Excessive-Insufficient	Lively-Tedious	Proper-Improper	Gorgeous-Plain	Interactive-Unilateral
1	3.00	2.20	2.85	3.75	2.75	3.10	2.95	2.60	3.85	3.75	4.00	4.10	3.60	1.95	2.10	2.55	2.60	3.30	2.70	1.65
2	3.75	2.80	3.80	2.20	3.95	3.80	4.00	4.30	4.10	3.80	3.95	4.00	3.95	3.50	3.75	2.90	3.80	3.80	3.50	3.00
3	2.30	2.55	3.20	3.25	3.00	3.45	3.60	3.20	2.40	2.40	2.15	2.25	2.35	3.95	2.45	3.35	3.85	2.35	4.05	2.30
4	3.60	3.20	3.60	2.55	1.70	3.65	2.95	3.00	3.40	3.90	3.85	2.70	3.70	2.20	2.95	2.55	3.85	3.25	3.85	4.00
5	3.75	3.65	3.20	3.50	3.15	3.45	2.80	3.05	3.10	3.25	3.60	3.70	3.45	1.90	3.20	2.05	1.90	3.00	2.50	2.25
6	3.65	3.50	4.15	2.50	4.10	3.65	3.70	3.90	3.90	3.85	4.00	3.90	4.05	3.95	3.55	2.95	3.35	3.35	3.60	3.85
7	2.45	2.10	2.35	4.25	1.50	1.55	1.40	2.05	4.25	2.40	3.85	3.95	3.50	1.40	3.35	1.80	1.65	2.45	1.25	2.30
8	2.00	2.00	3.75	3.15	2.35	2.85	3.15	2.60	2.25	2.35	2.30	3.10	2.25	2.85	2.35	3.35	2.55	1.60	2.90	3.00
9	3.15	3.05	2.65	2.35	2.60	2.25	2.20	2.90	3.70	3.65	3.85	3.80	3.35	2.15	3.70	2.70	2.05	2.90	1.40	3.45
10	2.60	2.65	2.70	3.50	2.40	2.35	2.45	2.40	2.90	3.75	2.65	2.80	2.70	2.30	2.45	2.45	1.65	2.55	2.05	1.35
11	2.55	2.50	2.60	3.25	2.40	2.30	2.60	2.70	3.35	2.85	2.90	2.75	2.60	3.20	2.55	2.60	2.20	2.90	2.15	2.85
12	2.15	1.90	1.70	3.35	2.55	1.80	2.30	1.95	2.30	2.80	2.65	2.75	2.70	2.40	3.50	3.20	2.20	2.20	2.90	4.00
13	3.50	3.70	3.90	2.35	4.15	3.75	3.90	3.70	4.05	3.95	4.10	3.95	3.95	3.55	3.80	3.15	3.50	3.75	3.60	3.80
14	3.55	3.50	3.75	2.85	3.30	3.15	3.30	3.65	3.75	3.60	3.15	3.70	3.70	3.45	3.35	3.05	3.00	2.95	3.45	4.00
15	3.05	3.00	2.95	4.65	1.50	1.30	1.25	2.30	1.65	2.00	1.35	1.35	1.95	2.80	2.10	1.80	1.85	2.05	1.30	2.00
16	1.55	2.55	4.25	3.65	2.20	3.70	3.20	3.05	3.15	3.05	2.30	3.90	3.25	3.80	1.70	2.80	3.05	2.45	3.05	1.25
17	2.10	2.35	2.65	3.10	2.85	2.55	2.75	1.95	3.30	3.30	2.35	2.95	2.50	3.60	2.55	2.75	2.80	2.40	2.70	2.25
18	3.00	2.90	3.45	3.20	2.55	2.60	3.10	3.15	3.35	3.85	3.95	3.95	3.75	2.20	3.15	2.75	2.90	3.20	2.30	2.25
19	3.25	3.40	3.35	3.65	2.20	3.25	3.10	3.30	3.25	2.70	3.25	3.00	3.85	3.10	2.70	2.75	3.00	2.80	2.40	2.85
20	3.20	3.25	3.50	2.35	4.00	3.70	3.10	3.05	3.00	2.25	2.30	2.95	3.10	4.05	3.15	2.50	3.05	2.25	3.25	3.30
21	1.65	1.70	1.80	4.25	1.90	1.55	1.45	1.65	3.05	3.05	1.55	3.15	1.40	1.55	1.55	1.30	1.40	2.15	1.45	1.60
22	2.55	1.95	1.95	4.30	1.35	1.70	1.75	2.50	3.00	2.95	3.35	3.10	2.20	1.65	2.65	2.45	1.80	2.15	2.30	2.50
23	2.60	2.80	4.05	2.85	2.65	3.50	2.60	2.75	3.05	2.05	3.35	2.15	3.20	3.55	2.20	2.05	2.55	2.45	2.20	1.80
24	1.95	1.85	1.95	4.30	1.80	2.50	1.70	2.00	2.00	3.30	1.60	1.10	1.55	1.55	3.10	2.10	1.60	2.05	2.25	1.95
25	2.90	3.35	3.00	4.60	1.90	1.25	2.60	2.75	2.20	2.90	2.85	3.70	3.55	1.50	2.65	2.40	2.00	1.65	1.65	2.45

3.2. Selection of final Kansei phrase

Factor analysis was performed on scores of emotion rating matrix in Table 7. A total of 4 common factors, with eigenvalue over 1, were selected. Factors, emotion and phrase factor loading are shown in Table 8. Kansei phrases are sorted according to factor loading, the higher the factor loading, the more correlated the phrase is with factor. As shown in Table 8, four factors can interpret 82.1% variance, and their cumulative contributions are 52.6%,

67.9%, 75.3%, 82.1%, respectively, and their contribution rates, 53%, 15%, 7%, 7%, are about in 5: 2: 1: 1, which can serve as reference for selecting final of 20 pairs Kansei phrases in this study.

Table 8: Factor analysis of 20 pairs of adjectives

	Component 1	Component 2	Component 3	Component 4
Friendly-Alienated	.904	-.057	.095	.196
Fine-Coarse	.892	-.315	.109	-.135
Rational-Emotional	-.834	.144	.185	.121
Lively-Tedious	.826	-.396	.038	-.090
Usable-Unusable	.821	.364	.172	.162
Modern-Traditional	.803	-.179	-.066	-.037
Elegant-Vulgar	.800	-.357	.239	-.054
Proper-Improper	.795	.368	.131	-.126
Graceful-Disgraceful	.741	-.324	.396	.271
Gorgeous-Plain	.731	-.482	-.136	-.247
Pleasant-Unpleasant	.714	.363	-.117	.494
Explicit- Equivocal	.686	.610	.064	-.069
Satisfied-Dissatisfied	.686	.092	.053	.643
Intuitional-Thinking	.640	.519	.236	-.285
Excessive-Insufficient	.623	-.385	-.328	-.324
Orderly-Confused	.544	.508	.277	-.280
Consistent-Conflicting	.520	.468	-.013	-.385
Decorative-Functional	.591	-.676	.086	.056
Interactive-Unilateral	.589	.058	-.709	.088
Smooth-hindered	.586	.380	-.610	.075
Contribution	52.588	15.289	7.419	6.762
Cumulative contribution	52.588	67.876	75.296	82.058

To select Kansei phrases more objectively, cluster analysis was performed on 20 pairs of Kansei phrases in Table 8 with respect to factor loadings of 4 factors. According to cluster dendrogram obtained, Kansei phrases were divided into 9 clusters; according to factor contribution ratio, 5: 2: 1: 1, 5 pairs of higher factor loading Kansei phrases were selected at factor I, and such 5 pairs of Kansei phrases came from the same cluster in cluster dendrogram; pro rata, 2 pairs of higher factor loading Kansei phrases were selected at factor II; 1 pair of higher factor loading Kansei phrases were selected each at factor III and factor IV, totally 9 groups of final Kansei phrases were selected: Intuitional-Thinking, Usable-Unusable, Interactive-Unilateral, Pleasant-Unpleasant, Rational-Emotional, Gorgeous-Plain, Fine-Coarse, Friendly-Alienated, Graceful-Disgraceful. Then correlation analysis was performed.

3.3. Quantification Theory Type I Analysis

Although the subject referenced overall form when evaluating in sample questionnaire, operation interface entity consists of morphologies individually designed. When subjects are evaluating, we cannot ignore potential impact of individual design factor morphology on subject, thus the correlation of individual design factor with the entity has to be calculated. This study utilized sample questionnaire and adjective survey to get data, aiming at predicting relationship between design factor morphology category and adjective, which belongs to quantifying qualitative data, hence, this study adopted "Quantification Theory Type I" to analyze.

To understand relationship between hearing operation interface morphological factor and final Kansei phrase, and find which morphological factors have more impact on which Kansei phrase. This study took morphological factors of 25 representative samples as independent variables, and took average of each of final 9 groups of Kansei phrases as dependent variable respectively to run Quantification Theory Type I analysis, the result was shown in Table 9.

Table 9: Quantification Theory Type I Analysis Result

Item	Category	Intuitional-Thinking Category score	Usable-Unusable category score	Interactive-Unilateral category score	Pleasant-Unpleasant category score	Rational-Emotional category score	Gorgeous-Plain category score	Fine-Coarse category score	Friendly-Alienated category score	Graceful-Disgraceful category score
Menu framework	Hierarchical menu	0.358	0.269	0.121	0.313	-0.293	-0.078	0.219	0.292	0.066
	Matrix menu	-0.257	-0.596	0.136	-0.343	0.172	0.147	-0.181	-0.273	-0.284
	Page up/down menu	-0.691	-0.418	-0.215	-0.420	0.180	0.251	-0.047	-0.130	0.074
	List menu	0.233	0.474	-0.164	0.138	0.232	-0.243	-0.211	-0.183	0.076
	Partial correlation coefficient	**0.815**	**0.758**	0.405	**0.658**	**0.749**	0.490	0.530	**0.638**	0.338
Menu graphics content	Text	-0.302	-0.401	-0.219	-0.152	0.537	-0.668	-0.721	-0.458	-0.669
	Icon + Text	0.388	0.479	0.346	0.278	-0.608	0.577	0.549	0.437	0.616
	Symbol + Text	-0.171	-0.158	-0.255	-0.251	0.140	0.181	0.343	0.040	0.104
	Partial correlation coefficient	**0.740**	**0.740**	**0.629**	0.533	**0.925**	**0.875**	**0.892**	**0.807**	**0.825**
Background	Mono color	0.028	-0.041	-0.249	-0.017	0.302	-0.188	-0.091	0.052	-0.054
	Texture	0.093	0.159	0.301	0.058	-0.263	-0.063	-0.001	-0.063	0.041
	Pale image	-0.241	-0.238	-0.105	-0.081	-0.080	0.501	0.183	0.020	0.024
	Partial correlation coefficient	0.387	0.375	0.585	0.142	**0.770**	**0.630**	0.313	0.176	0.111
Tone	Cool color series	0.053	-0.056	0.171	-0.128	-0.163	0.187	0.049	-0.018	-0.044
	Warm color series	-0.154	0.123	-0.190	0.149	0.086	-0.001	0.116	0.154	0.145
	Neutral color series	0.203	-0.136	0.036	-0.042	0.152	-0.373	-0.331	-0.273	-0.204

	Partial correlation coefficient	0.425	0.276	0.420	0.325	0.537	0.548	0.488	0.469	0.316
Feedback after clicking	Static	-0.161	-0.114	-0.400	-0.216	0.215	-0.190	-0.058	-0.060	0.105
	Dynamic	0.205	0.146	0.509	0.275	-0.274	0.242	0.074	0.076	-0.134
	Partial correlation coefficient	0.515	0.328	**0.787**	0.549	**0.749**	0.558	0.211	0.222	0.286
Feedback sound	No sound	-0.042	-0.301	-0.579	-0.277	0.082	-0.143	-0.151	-0.293	-0.139
	Mono sound	-0.077	0.114	0.436	0.448	0.162	0.117	-0.161	0.187	0.106
	Harmony sound	-0.287	0.204	0.496	-0.062	-0.038	0.097	0.299	0.017	0.066
	MP3 sound	0.449	0.282	0.225	0.170	-0.290	0.071	0.163	0.380	0.104
	Partial correlation coefficient	**0.636**	0.566	**0.809**	**0.608**	0.595	0.352	0.542	**0.668**	0.277
Constant term		3.132	3.046	2.640	2.792	3.348	2.590	2.716	2.818	3.084
		R=0.903 R2=0.816	R=0.878 R2=0.770	R=0.910 R2=0.829	R=0.830 R2=0.690	R=0.958 R2=0.916	R=0.922 R2=0.850	R=0.917 R2=0.841	R=0.890 R2=0.792	R=0.845 R2=0.715

As shown in Table 9, among 6 morphology items, Menu Framework(0.815), Menu Graphics Content (0.740) and Feedback Sound (0.636) have more correlation with "Intuitional-Thinking" Kansei phrase, while partial correlation coefficients of Background (0.387), Tone (0.425) and Feedback after clicking (0.515) are less than 0.6, the correlation level is lower. In addition, Menu Framework (0.758) and Menu Graphics Content (0.740) have higher correlation with "Usable-Unusable" Kansei phrase, while partial correlation coefficients of Background (0.375), Tone (0.276), Feedback after clicking (0.328) and Feedback Sound (0.566) are less than 0.6, thus the correlation level is low, and pro rata. As to "Menu Graphics Content" item, except Kansei phrase "Pleasant-Unpleasant" (0.533), partial correlation coefficients of emotion phrases are all above 0.6, indicating that "Menu Graphics Content" item has greater emotional impact on visual/hearing operation interface. Secondly, as to "Menu Framework" item, its partial correlation coefficients with respect to Kansei phrases such as Intuitional-Thinking, Usable-Unusable, Pleasant-Unpleasant, Rational-Emotional and Friendly-Alienated are all above 0.6, indicating that "Menu Framework" item has remarkable emotional impact on visual/hearing operation interface. For "Tone" item, its partial correlation coefficients with respect to 9 groups of Kansei phrases are all below 0.6, indicating that "Tone" item has lower emotional impact on visual/hearing operation interface. For another example, in terms of "Graceful-Disgraceful" phrase, its scores in "Menu Graphics Content" item are Text(-0.669), Icon + Text(0.616), Symbol + Text(0.104), indicating that relation of "Text" and "Icon + Text" feature element variation with image intensity is higher than "Symbol + Text", and "Text" is negatively correlated with "Graceful-Disgraceful" Kansei phrase; "Icon + Text" is positively correlated with "Graceful-Disgraceful" Kansei phrase; pro rata for other Kansei phrases with respect to item and category.

4. CONCLUSIONS

Main purpose of this study is to study correlation of visual/hearing image with operation interface emotional appeal, Kansei Engineering approach and Quantification Theory Type I were employed to construct correlation between visual/hearing operation interface morphological factor and Kansei phrase. The conclusions were described separately as follows:

Among six morphology items, three items, Menu Framework, Menu Graphics Content, and Feedback Sound have higher correlation with Kansei phrases.

Among six morphology items, Menu Framework, Menu Graphics Content and Feedback Sound have higher correlation with "Intuitional-Thinking" Kansei phrase, while Background, Tone and Feedback after clicking have lower correlation.

For Menu Graphics Content in 9 groups of Kansei phrases, "Icon + Text" is the best, followed by "Symbol + Text", and "Text". Therefore, people have intuitional, usable, interactive, pleasant, emotional, gorgeous, fine, friendly and graceful images of "Icon + Text".

For Feedback Sound, it is more correlated with Kansei phrases such as "Intuitional-Thinking", "Interactive-Unilateral", "Pleasant-Unpleasant", "Friendly-Alienated".

For Feedback Sound in "Interactive-Unilateral" Kansei phrase image, "MP3 Sound" is the best, followed by "Harmony Sound", "Mono Sound" follows, and "No Sound". This "MP3 Sound" result differs greatly from what people know, maybe sound material is improperly selected, this has to further verified.

Compared with other items, "Tone" has lower emotional impact on visual/hearing operation interface with 9 groups of Kansei phrases.

This is the pilot study of visual/hearing operation interface image, the study process or result may have imperfection or negligence; the next stage will make further discussion based on the study, so as to construct ideal research model.

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