The impact of relevancy and unexpectedness on the communication effect of design

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Abstract: When the human brain receives information that contradicts preconceived ideas and concepts, the new information would be compared with the preconceived knowledge, during which a schema would be used as a framework to determine the relevancy of the new information. Based on the cognitive framework schema, Stafford and Walker (1996) conducted a study on the interplay between schema and consistently inconsistent information. They found that information of moderate inconsistency tends to trigger the interest of information receivers, and in turn, has better communication effect. The definition of moderate inconsistency is that the overall representation of a design is inconsistent with the receiver's schema or unexpected to the receiver, yet the constituent elements of the design are relevant.

In the pursuit of a design that has good communication effect, this study first conducted a "preliminary survey", which required 11 subjects to determine moderately inconsistent design samples that possessed the characteristics of "unexpectedness" and "relevancy" from some award-winning design artworks. Afterwards, these sample artworks were placed into three categories: high, medium, and low groups of relevancy, as based on the relevancy of these artworks' design elements (products, graphics, verbal descriptions, etc.). Then, a survey on communication effect was conducted to probe into the impact of relevancy on communication effect. A total of 120 subjects participated. The questionnaire content included five scales: comprehension, interest, impression, affection, and novelty. The measurement was based on a 5-point Likert scale (Likert, 1932).

The results indicated that there is a corresponding relationship between the unexpectedness of the overall design that constitutes moderate inconsistency and relevancy, which is a constituent element of designs. Moreover, a higher relevancy of constituent elements, such as graphics, verbal descriptions, and products, means a better effect in enhancing a design's comprehensibility. Meanwhile, a comprehensible design can better facilitate the design's communication effects. In

brief, emphasizing on the unexpectedness of a design and having a good command of the relevancy between a design's constituent elements helps to produce a comprehensible, interesting, and memorable communication effect.

Keywords:relevancy, communication effect, graphic design.

1. INTRODUCTION

Through experience and study, information receivers establish a relevant knowledge classification structure, which is called a schema in the Schema Theory. Schema, a knowledge and cognitive structure, is the basic mode for humans to understand things and acquire knowledge and experience. Therefore, it is the fundamental element of information processing. One schema refers to a kind of information structure, while schemata refer to a string information structure. According to the basis of the Schema Theory, when faced with external stimulus or information, information receivers will develop the cognitive schemata processing mode and have relevant emotional evaluation reaction pursuant to the results of the mode.

According to the Schema Theory, everyone has an original cognitive structure in mind, and when external information enters and is compared with all original existing knowledge, information consistency, inconsistency, relevancy, and irrelevancy will be created. Goodman (1980) explained the conformity between cognitive schema and theme by means of relevancy and expectancy. By relevancy, the researcher defined that the conveyed information is relevant to the theme, and the constituent elements of the information can clearly reflect the theme. Expectancy was defined as the degree that the information, which possesses the previously existing knowledge structure, is evoked after cognitive processing (Note 1).

Mandler (1982) suggested that cognitive structure, as a kind of schema, comes from the previous experience of the information receivers, and is the result of the interaction of all types of stimulus in the environment. Moreover, the inner cognitive structure of the information receivers was explained as a kind of experience organization. The cognitive structure will influence the behaviors and ideas of the information receivers. Every time the information receivers receive new information stimulus, they will verify it according to the schema of common points, and recognize and evoke the expectations and standards of the information. Novel stimulating information will cause information receivers have more motivation to process the information and try to solve the conflict between the information stimulus and cognitive schema. However, if the inconsistency degree between the information and the cognitive schema structure is too great or too small, the reaction evaluation of the information by the information receivers will not be enhanced. Only when the two are moderately inconsistent can the information receivers' evaluation and emotion towards information processing achieve the highest level. Mandler (1982) indicated that the relationship between the consistency of the schema and emotional evaluation is in Inverted U type. "The relationship between the consistency of the schema and emotional evaluation is in Inverted U type, i.e. when conveyed information is moderately inconsistent with the cognition schema, positive emotional reaction is triggered" (Note 2).

The Inconsistency Theory, with the Schema Theory as the basis, was applied earliest in the social cognition field. Stafford and Walker (1996) put forward the definition and illustration of consistency and inconsistency of schema, as based on the above research results, and shown in Table 1:

Table 1: Consistency and inconsistency of schema

Name	Illustration
Consistent	Expected and relevant
Moderately inconsistent	**Unexpected but relevant**
Extremely inconsistent	Neither expected nor relevant

Their study pointed out that, moderate inconsistency between design theme and schema tends to trigger the interest of information receivers, and in turn, has better communication effect. As indicated by the above table, moderate inconsistency is defined as unexpected but relevant. In short, the constituent elements of designed graphics, verbal descriptions, brands, etc., are relevant, or the subject and theme is relevant, but the overall representation of a design is inconsistent with the cognitive schema. The design is presented in an unusual, unique, and unexpected fashion.

Heckler and Childers (1992) developed a comprehensive definition of inconsistency on the basis of the two dimensions (relevancy and expectancy) of Goodman's definition, as well as the concept of information evaluation. Moreover, by means of the three dimensions, they explored the impact of the consistency of graphics and verbal descriptions on the memory effect (Note 3).

2. PRELIMINARY SURVEY

Based on relevant research results, this study further explores the relationship between the two dimensions of relevancy and unexpectedness, as well as the impact of the relationship on the communication effect of moderately inconsistent design, by means of the three constituent elements, as proposed by Pieters and Wedel(2004), picture element, text element, and brand element(Note 4). Therefore, a preliminary survey regarding unexpectedness and relevancy is conducted first, in which researchers must first determine moderately inconsistent design samples that possess the characteristics of unexpectedness and relevancy, which are mainly the representative award-winning artworks of Times Advertising Awards, Chinese Advertising Awards, and print ads of foreign ARCHIVE magazines, within 5 years.

The questionnaire includes three parts. Part 1 surveys the relevance between graphics, verbal descriptions, and brands, covering three sections, namely the relationships between graphics and verbal descriptions, between brands and verbal descriptions, and between graphics and brands. Part 2 is the survey on the unexpectedness of the advertisements. Part 3 focuses on the comprehension degree of the advertisements. The above items are evaluated based on a 5-point Likert scale (Likert, 1932), which is the interval scale comprising of number 1 (disagree very much), 2 (disagree), 3 (no opinion), 4 (agree), and 5 (agree very much).

In the results of the preliminary survey, the samples were placed into three categories: high relevancy (samples 4, 6, 3, 5), medium relevancy (samples 12, 11, 7, 10), and low relevancy (samples 13, 9, 14, 2, 8), as based on the compound average of the three sections of "graphics and verbal descriptions", "brands and verbal descriptions", and "graphics and brands", in Part 1. The divided samples will serve as the classification evidence in the effect survey of the next stage. In addition, according to the survey results of the unexpectedness degree of Part 2, the scores of

samples 1 and 15 are not higher than 0, which indicates expectancy. This does not conform to the unexpectedness in moderately inconsistency, thus, the two samples will be deleted in the following study. Statistics analysis is conducted on the 13 moderately inconsistent designs, from 2 to 14, as shown in Table 2.

Table 2: Average value of unexpectedness and relevancy of each sample

Sample	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Unexpectedness	1.09	0.36	0.27	0.82	0.27	0.36	0.18	1.09	0.55	0.09	0.55	0.73	0.55
Relevancy	0.30	1.36	1.79	1.33	1.73	1.06	0.24	0.58	0.97	1.12	1.18	0.70	0.48

According to the above results, the samples are divided into three groups by means of the relationship between relevancy and unexpectedness, as shown below. It can be concluded that, among the above moderately inconsistent designs, those whose relevancy is higher than unexpectedness outnumber those otherwise.

Relevancy higher than unexpectedness: samples 6, 4, 11, 7, 3, 12, 5, and 10.

Relevancy equal to unexpectedness: samples 8, 13, and 14.

Relevancy lower than unexpectedness: samples 2 and 9.

3. SURVEY ON COMMUNICATION EFFECT

The survey on communication effect is aimed at verifying the impact of relevancy and unexpectedness on communication effect. There are 120 subjects, divided into two groups of designers and common people. The survey items fall into five groups of comprehension, interest, impression, affection, and novelty. The above items are evaluated based on a 5-point Likert scale (Likert, 1932). The samples are divided into three groups for comparison and exploration, which relevancy is respectively higher than, equal to, and lower than, unexpectedness, according to the results of the preliminary survey. Then, the samples are divided into three groups of high, medium, and low relevancy. The new samples are numbered and placed into the three groups, and compared with the original samples, as shown in Table 3.

Table 3. Comparison table of original and new samples

Number of Original Samples												
4	6	3	5	12	11	7	10	13	9	14	2	8
Number of New Samples												
High relevancy				Medium relevancy				Low relevancy				
1	2	3	4	5	6	7	8	9	10	11	12	13

The results of the communication effect survey indicate that the average value of every item of the above has moderately inconsistent design, with the exception of sample 13, which impression

value is -1.98 and affection value is -1.93, which are above 0 and belong to the positive appraisal. This result conforms to the relationship (Inverted U type) between the consistency of the cognitive schema and the emotional value reaction, as stated in Mandler (1982), i.e. when conveyed information is moderately inconsistent with the cognitive schema, positive emotional and value reactions are triggered.

The average value of the evaluated items of all the samples is as shown in Table 4. Sample 1 (0.81) has the highest comprehensive assessment and relevancy. Sample 13 (0.09) has the lowest comprehensive assessment and relevancy. Among the five evaluated items, the three with the highest average values are sequentially, sample 1 (0.81), sample 2 (0.75), and sample 9 (0.75); and the three with the lowest are sample 13 (0.09), sample 5 (0.28), and sample 12 (0.28).

Table 4: Average value of each item of all samples (common people(C) and designers(D))

Sample		Comprehension		Interest		Impression		Affection		Novelty		Average value	
		D	C	D	C	D	C	D	C	D	C	D	C
High relevancy	1	1.26	1.12	0.81	1.10	0.73	0.98	0.40	0.64	0.39	0.72	0.72	0.91
	2	1.35	0.95	0.79	0.55	0.90	0.76	0.68	0.52	0.63	0.36	0.87	0.63
	3	1.16	0.90	0.82	0.47	0.92	0.60	0.79	0.41	0.71	0.21	0.88	0.52
	4	1.10	1.00	0.82	0.67	0.61	0.69	0.57	0.22	0.58	0.52	0.74	0.62
Medium relevancy	5	0.63	0.55	0.29	0.10	0.34	0.17	0.26	-1.93	0.31	0.17	0.36	0.19
	6	1.03	1.24	0.50	0.79	0.50	0.97	0.21	0.64	0.34	0.72	0.52	0.87
	7	0.89	0.88	0.53	0.78	0.24	0.74	0.13	0.29	0.40	0.72	0.44	0.68
	8	0.98	1.02	0.61	0.57	0.42	0.69	0.21	0.19	0.26	0.64	0.50	0.62
Low relevancy	9	1.23	1.00	0.84	0.71	0.77	0.74	0.47	0.45	0.66	0.64	0.79	0.71
	10	0.87	0.81	0.58	0.57	0.52	0.66	0.40	0.48	0.44	0.50	0.56	0.60
	11	1.05	0.59	0.92	0.53	0.63	0.45	0.77	0.53	0.55	0.19	0.78	0.46
	12	**0.63**	**-1.97**	**0.61**	**0.45**	**0.31**	**0.12**	**0.13**	**-1.88**	**0.26**	**0.38**	**0.39**	**0.16**
	13	0.27	0.14	0.32	0.17	-1.97	-1.98	-1.97	-1.90	0.10	0.02	0.13	0.04

The one with the red background denotes the highest average value in each item, while the yellow one denotes the lowest.

Later, the two groups of subjects respectively explored the evaluation of the five items, and obtained different results of the samples with the highest and lowest assessment. For example, designers deem the sample with the highest comprehensive assessment is Sample 3(0.88), while that of the common people is Sample 1(0.91). However, these two samples both have high relevancy. Both the designers and common people think the sample with the lowest assessment is Sample 13(0.09), which is regarded as having the lowest relevancy.

Independent sample t testing is conducted, with the different specialty backgrounds of the two groups of subjects as the grouping variable, and the five evaluated items as the test variables. According to the results, the t values for the two groups of subjects in the five items, comprehension, interest, impression, affection, and novelty are 2.254, 1.011, -0.676, 0.856, and 0.856, respectively. The P value for the comprehension item is lower than 0.05, which reaches a significant level. In other words, the two groups of subjects, designers and common people, show differences in their evaluations of the comprehension items regarding the moderately inconsistent design. The difference is significantly below the 95% confidence level.

Later, the researcher examines the co-variations between two or more continuous variables, and analyzes the correlation coefficient of the evaluated items. The correlation coefficient of the five items, as evaluated by the 120 subjects, is analyzed by means of Pearson product moment correlation. The results are as shown in Table 5. When the significance level is 0.01, the five items are in significant correlation, and the correlation coefficient are all positive numbers, which indicates that all the variables are in positive correlation to each other.

Table 5: Correlation coefficient between all evaluated items

Evaluated Items	Item with the Highest Relevancy	Correlation Coefficient
Comprehension	Impression	0.464
Interest	Affection	0.839
Impression	Interest	0.756
Affection	Interest	0.839
Novelty	Affection	0.778

The correlation coefficient results suggest that, four of the five evaluated items are in high correlation to each other and show significant relevancy. In other words, a moderately inconsistent design with a high comprehension level contributes to leaving a deep impression. The design with a high interest level cannot only leave a deep impression, but can also enhance the affection level. The improvement of the novelty level of the design can contribute to elevating the affection level.

The relationship between consistency and unexpectedness in the moderately inconsistent design is analyzed by means of Repeated Measures ANOVA. Among the three groups, which relevancy is higher than, equal to, or lower than unexpectedness and the one with the best communication effect is as shown in Table 6.

Table 6: Multiple comparison analysis of relevancy and unexpectedness

(I) factor	(J) factor	Average Difference (I-J)	Standard Error	Significance
Relevancy＞ unexpectedness	unexpectedness＞Relevancy	.199*	.057	.001
	Relevancy = unexpectedness	.141*	.043	.001

Relevancy = unexpectedness	Relevancy＞unexpectedness	-.141*	.043	.001
	unexpectedness＞Relevancy	.059	.059	.322
Relevancy< unexpectedness	Relevancy＞unexpectedness	-.199*	.057	.001
	Relevancy = unexpectedness	-.059	.059	.322

*. When the significance level is 0.05, the average value shows significant difference.

The multiple comparison analysis results of the above three groups indicate that, when the significance level is 0.05, the average value of the group which relevancy is higher than unexpectedness is higher than the other two groups, and shows significant difference. However, the average values of the other two groups have no significant difference. This study found that in moderately inconsistent design, better communication effect can be achieved when the relevancy of the constituent elements is higher than the unexpectedness.

4. CONCLUSION AND SUGGESTION

4.1. Conclusions

]This study explored the relationship between unexpectedness and relevancy in design, as well as its impact on the communication effect of moderately inconsistent design. The research results of the above preliminary survey and communication effect survey are as follows:

1. The average values of the above moderately inconsistent design samples are all above 0, and thus, belong to a positive appraisal. This result conforms to the relationship (Inverted U type) between the consistency of cognition schema and emotional value reaction, as stated in Mandler (1982), i.e. when conveyed information is moderately inconsistent with the cognition schema, positive emotional and value reactions are triggered. This study again confirms that positive emotion reaction can be produced when the design theme is moderately inconsistent with the cognition schema.

2. Evaluated Items

The important evaluated items for moderately inconsistent designs are sequentially, comprehension, interest, and impression. In other words, moderately inconsistent design is characterized by easy comprehension, interest, and deep impression. Among the items, comprehension is evaluated with the highest average value. Moreover, it is the item with the highest values for most samples. The conclusion is, as follows. Since the samples used in this study are all relevant and unexpected moderately inconsistent designs, comprehension is relatively high, and comprehension is the item that should be given top priority for moderately inconsistent design. Therefore, enhancing the comprehension level of the design is the basic effect of mastering moderately inconsistent design.

After the compiling all the average values, it can be clearly seen that, the three samples with the highest average values for each evaluated item all have high relevancy, the three with the lowest values belong to medium relevancy, and low relevancy groups and have low relevancy. Thus, it can be concluded that the high relevancy between constituent elements of design is conductive to enhancing the communication effect.

3. Relevancy and Unexpectedness

Relevancy and unexpectedness, which constitute the moderately inconsistent design, show

different features and are in binary relation to each other. For example, the high relevancy between constituent elements contributes to enhancing comprehension of the design. However, high comprehension will relatively lower the unexpectedness level. On the contrary, low relevancy means a low comprehension level, which elevates the unexpectedness level.

In moderately inconsistent samples, better communication effect can be created when the relevancy of constituent elements is higher than the unexpectedness. The high relevancy between constituent elements of design (graphics, verbal descriptions, brands) contributes to enhancing the comprehension of design, thus, elevating the other communication effect of the design.

The difference in relevancy between constituent elements influences the communication effect of the design. For example, in moderately inconsistent design with high relevancy, the comprehension effect outperforms the other four evaluated items. In designs with medium relevancy, the affection effect outperforms the novelty. In designs with low relevancy, the interest effect outperforms the impression, and the impression and novelty effects outperform affection.

4. Subject

The two groups of subjects, namely, designers and common people, have differences in cognition of comprehension regarding moderately inconsistent designs; however, the two groups of subjects show some common ground. The samples with the highest evaluation by both groups have high relevancy, while the lowest evaluation has low relevancy. Meanwhile, the samples with the lowest values in comprehension, as evaluated by designers, are all evaluated by common people as the lowest in impression, affection, and novelty. The samples with the highest values in comprehension, as evaluated by designers, are all evaluated by common people as the highest in interest, impression, affection, and novelty.

At the same time, the correlation coefficients of the values for each item evaluated by common people are all in positive correlation to each other. Among these, the correlation coefficient between interest and affection, impression and interest, and novelty and affection, are all in high-positive correlation to each other, while that between comprehension and impression is in moderate positive correlation. Moreover, for common people, a moderately inconsistent design with a high comprehension level easily leaves a deep impression. A design with a high interest level easily leaves deep impressions and enhances the affection level. Elevated novelty can also enhance the affection level. Comparatively speaking, the correlation coefficient between interest and affection, impression and interest, and novelty and affection, are all in high-positive correlation to each other, while that between comprehension and impression is in moderate positive correlation. For the designers, a moderately inconsistent design with high comprehension level easily creates interest. The design with high interest level easily leaves a deep impression and enhances affection and novelty levels.

4.2. Suggestions

Based on the above empirical survey, this study clarified the communication effect of moderately inconsistent design from the perspective of relevancy, the constituent element, and unexpectedness of the overall design. The purpose is to elevate the communication effect of the design by making flexible use of relevancy and unexpectedness. This paper proposes some suggestions upon the effective application of relevancy and unexpectedness in design, as reference for the designers in developing design strategies and creative ideas.

1. Constituent elements, graphics, verbal descriptions, and brands, are the elements used to interpret design information. The high relevancy between the three can easily cause the information receivers to have association, thus, enhancing the comprehension of the design, and elevating the communication effect. Therefore, designers should put forward relevant graphics and titles pursuant to the theme appeal of the brands, and emphasize the relevancy between the three elements, in order to enhance comprehension of the design and elevate the communication effect.

2. Relevancy and unexpectedness, which constitute a moderately inconsistent design, show different features and are in binary relation to each other. For example, the high relevancy between constituent elements contributes to enhancing the comprehension of design. However, a high comprehension level will lower the unexpectedness level relatively. Moreover, good communication effect can be achieved when the relevancy ratio is higher than the unexpectedness ratio. Therefore, in designing, it is suggested to first consider the comprehension element and emphasize the relevancy between graphics, verbal descriptions, and brands, before considering how to exhibit design performance, such as novelty and features.

3.To make works conform to moderately inconsistent design, it is suggested that they possess the features of easy comprehension, interest, and deep impression. In other words, if designers can effectively master the relevancy between constituent elements and emphasize unexpectedness, they can produce comprehensible, interesting, and memorable communication effects.

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