

# Designing a Lighting with Pleasure

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**Abstract.** Lighting plays an important role in the enhancement of atmosphere in a house. It provides not only a luminous function, but also experiencing pleasure in the space. This study investigated the type of pleasure and its factors towards lighting. An interview was conducted to collect the responses of pleasurable feelings from 10 participants. From 250 images, 10 were extracted as stimuli for the interviews. Data analysis was used to group key sentences obtained from the responses and the results produced 7 factors which could be categorized into four types of pleasure: Appearance, Interactive, Reflective, and Novelty Pleasure. Among them, the responses related to appearance pleasure were mentioned most frequently and could elicit a consumer's pleasure, which also confirm Creusen's theory. The four pleasures can associate with Jordan and Norman's pleasure/ emotion. Particularly mentioned, novelty pleasure is distinguished from other two theories. Designer can utilize four types of pleasure in designing a lighting with pleasure as possible.

**Keywords:** Pleasure, Lighting design, Pleasurable product.

## 1 Introduction

Aristotle stated that more than anything else, men and women seek happiness. Seligman [1], the former President of the American Psychological Association (APA), has also claimed that, instead of studying only the ills of the human mind, as has been the case in past psychological research, we now should not neglect the role of happiness in human psychology and should be more aggressive in the study of positive emotions in order to help people pursue a happier life. His statement suggests the importance of happiness i.e. product pleasure in this thesis. To expend this concept to consumers, we believe that consumers should have right to seek a product, which can fulfill their desire, evoke pleasure and further bring happiness to their life. Being a designer, we should design a good product, which allows a user to have them with pleasure.

According to an article in *New York Times Good Health Magazine*, \$ 15.5 million was spent on light therapy experiments in the United States by the National Institute of mental Health in 1991. The result of the study demonstrated that color and light can affect people's mood positively [2]. The similar result also showed in an American psychological report. The study illustrated that a pleasurable working environment can

improve working performance, increase problem solving skill, and harmonize relationship among people. Extensively, it is believed that a pleasurable product should also increase the life quality in terms of pleasurable using experience, since users always have an intimate relationship with light and environment. But, what are the factors, which possible affect users' pleasure and can be utilized to design. The current study attempts to identify these factors and types of pleasure.

The Oxford English Dictionary defines pleasure as 'the condition of consciousness or sensation by the enjoyment or anticipation of what is felt or viewed as good or desirable; enjoyment, delight, gratification' [3]. Jordan stated that pleasure with products can be defined as: the emotion, hedonic and practical benefits associated with products' [4]. In this paper, a pleasurable lighting is defined as one that elicits a consumer's pleasure by just looking at its appearance. The results of the study hopefully could provide designers and market people a very basic understanding of designing lighting with pleasure.

## 2 Why We Need a Pleasurable Product/Lighting?

Traditional lighting design mainly focuses on users' basic needs including physical function, luminance quality and its appearance. Nowadays, designing a good product, a designer has not only to create a product with good function and ergonomic, but also to understand consumers' emotion responses in order to embed these pleasurable elements to the product for pleasing users.

Desmet and Overbeeke [5] believed that product with a positive emotion/ pleasure can add extra value to the product and further benefit users. To understand product emotion, Norman [6] has commented that people are emotional and social creatures and has mentioned the role of human emotions as an influencing factor in the way people deal with and relate to objects and artifacts. To design emotional products, Norman [6] suggested to think of three levels of product emotions: visceral, behavioral, and reflective. Indeed, consumers need the product with these emotion levels as possible. A good product can help users to accomplish many tasks in everyday life. To achieve these tasks, it requires a product with a good perform. But, it is often end up with a very bore working process. It is therefore how to increase a product emotion becomes a challenge to a designer, after product function and ergonomic were accomplished well.

From marketing point of view, Jordan [4] and Marzano [7] also agreed that a product with emotional benefit is very important [8]. Noted this trendy, manufactures tend to increase product value by adding emotion into the product. As Csikszentmihalyi and Rochberg-Halton [9] comments, 'household objects' are crucial for experiencing pleasure in the home. Lighting manufacturer/ designer should also realize that a good atmosphere space rely onto have a pleasurable light.

## 3 Jordan's Theory

A Canadian anthropologist, Tiger [10] identified four types of pleasure: physio-pleasure, socio-pleasure, psycho-pleasure, and ideo-pleasure. Extensively, Jordan [4],

based on Tiger's framework classified a products' pleasure into four categories. The first category contains products with 'physio-pleasure' which involved sensations, for example, touching or seeing something. The second contains products with 'socio-pleasure'. In this category, products can facilitate social interaction such as chatting with friends. For instance, a mobile phone can provide socio-pleasure by using it to chat with friends anywhere, anytime. The third is 'psycho-pleasure'. In terms of products, this relates to the cognitive demands and emotional reactions engendered through experiencing the product. For instance, a good icon interface on computer screen allows users to understand its meaning easily, in which evokes their psycho-pleasure when using it. The fourth is 'ideo-pleasure' which in the context of products relates to the aesthetic nature of a product and the values that it embodies. For instance, a product made with recycled material can evoke a user's ideo-pleasure, if she/he agrees with the importance of environmental issues. In general, these pleasures are mixed within the products. Users can perceive one or two, maybe more types of pleasure at once. For instance, a person's physio-pleasure may be evoked directly through perceiving a product with an elegant shape and glamorous material, as with the iMAC computer. By sharing this modern and professional-looking product with friends, the person maybe intends to show off his or her good taste and value. During this process, he or she experiences both physio- and socio-pleasure. Like many consumer products, a light product is very important to embed pleasurable elements into design in order to provide a great atmosphere for the improvement of users' living quality.

#### **4 Norman's Theory**

To design emotional products, Norman [6] stated that there are three levels of emotional response: the visceral level, the behavioral level, and the reflective level. Regarding product design, the 'visceral level' is about the initial impact of a product; its appearance, touch and feel. The 'behavioral level' is about use and experience with a product. The 'reflective level' is about the interpretation, understanding and reasoning of a product in terms of self-image, personal satisfaction and memory [6]. These three levels of product emotions basically cover whole product emotions, possibly happened to the consumers. It is therefore these three levels of emotions were applied to the data analysis as reference.

#### **5 Research Aim**

The aim of this study purposes to identify factors through designing a pleasurable light and to explore how users perceive lighting.

#### **6 Methods**

In the experiment, lighting image was used as a sample to study its pleasure. The empirical test covers an interview to collect un/pleasurable factors and questionnaire

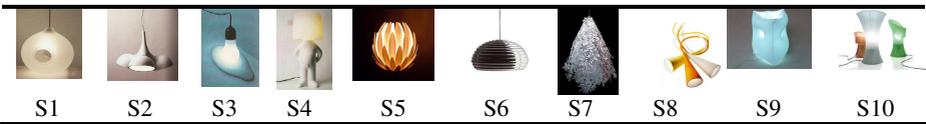
survey to confirm users’ perception to the lighting. The analysis, synthesis and discussion were made as follows.

**6.1 Interview**

*Stimuli*

The stimuli chosen were limited on lighting, which include desk lighting and ceiling lighting. 250 images were collected from variety of resources such as design competition awards, magazines, catalogues, and website. They were outputted on 3x5 inch photo paper. To reduce the sample size, two designers were firstly asked to sort them and withdraw 74 images with similar or repeated style. 76 images were used later in the test. Upon commencement, the Oxford English Dictionary and Jordan’s definition of ‘pleasure’ towards product mentioned at introduction was explained to 10 participants (i.e. four professional designers and six graduate students). To identify the representative product images, they were asked to group them into three categories: ‘pleasure’, ‘displeasure’ and ‘neutral’ after looking at all 76 product images. The top ten images from pleasure group were selected as stimuli for next interview and questionnaire survey (see Table 1).

**Table 1.** 10 pieces of pleasurable lights



*Procedures*

An interview was conducted to collect data regarding to un/pleasure response. Ten participants, who involve the sorting work were attended the interview. In the interview, they were asked to observe ten lighting pictures one by one and then describe among the lighting samples “what are the factors which you think the easiest to evoke your pleasure?” The responses were obtained and analyzed in order to group pleasurable factors shown in Table 2.

*Interview Data Analysis- Data grouping*

Data collected from the interviews were transcribed into a word processing program. Data grouping is a procedure to group the key sentences having similar contents from responses. The key sentences describing the same stimulus and judged to be of the similar content were first sorted into the same group shown in column three (see Table 2). This step involved repeated and carefully reading of the transcribed data in order to have a clear understanding of the content of each response.

*Secondary level labeling*

Secondary level labeling is a procedure to label the group which has been identified from the last step. In order to label the group, the key word representing key sentences was first identified from each sentence and highlighted with bold text shown in column three. For instance, key words that described a product with ‘round and curved

*shape*, *‘shape with simplicity’*, and *‘repeated pattern’* were refined to shape. Hence, the secondary level label was named as *‘delightful shape’* to represent the key words in the same group. The labeled names were thus identified as pleasurable factors of lighting shown in column two (see Table 2).

**Table 2.** Pleasurable types and factors of lighting

Types of pleasure	Factors	Data grouping
Appearance Pleasure (Visceral level)	Delightful shape	The <b>round and curved shape</b> make me feel relax. A <b>shape with simplicity</b> can make me feel comfortable. The form with <b>repeated pattern</b> looks beauty. The <b>flow and dynamic form</b> make me feel soothing. <b>Form with light and flow style</b> provides a pleasant feeling. <b>Natural and organic form</b> make me pleasure. The <b>cute shape</b> demonstrates a feeling of pleasant. The <b>familiar form</b> makes me feel comfortable. <b>Warm and soft line</b> elements deliver a warm feeling which somehow evokes pleasure. <b>Bionic and natural pattern</b> looks soothing, which make me, feel great. An <b>interested form</b> catches my eye attention, which feels good. I feel much closed to the object, because of the <b>familiar with the shape</b> of light design such as liquid pattern or some geometry. The <b>shape of light</b> is familiar with me.
	Smart Material/Texture	<b>Soft material</b> like inflatable material provides a good touch feeling. The <b>smooth surface</b> provides a tangible and comfortable feeling.
	Attractive Color	I like <b>bright colors</b> . <b>Light color</b> is great. The <b>color with light and flow</b> sense evokes pleasure. An <b>interested color</b> make light look pleasant. Somehow, <b>bright and primitive color</b> makes me feel good. I think <b>white color</b> is pure and pleasant.
Interactive Pleasure (Behavioral level)	Interaction	The <b>interaction with light</b> can evoke pleasure. A <b>playful</b> design looks fun.
	Feedback	An <b>interested feedback</b> may evoke pleasure.
Reflective Pleasure	Meaning	The light provides a <b>great memory</b> of pass. The <b>light with humor</b> make me pleasure.
Novelty Pleasure	Innovation	I am <b>curious</b> about the shape of light.

*Primary level labeling*

Primary level labeling is a procedure of doing cluster groups according to similarity of secondary level labels, gradually reducing the data to a higher order concept, and creating a primary level label. In this case, the primary level label was indicated a name representing the secondary level labels with similarity. The labeled names were thus identified as types of pleasurable lighting. For instance, the term, smart material/texture, attractive color and delightful shape traits at secondary level label were associated with appearance. Thus, the *‘appearance pleasure’* was identified at primary level label shown in column one. The same grouping and labeled process were identified and shown in Table 2. They are four types of pleasure: appearance, interactive,

reflective and novelty pleasure. Among four types of pleasure, seven factors were concluded and they are delightful shape, smart material/ texture, attractive color, interaction, feedback, meaning, and innovation.

## 6.2 Experiment

### *Participants*

60 participants from Chang Gung University attended experiment. The ages range from 18-22 years.

### *Formulating questionnaire*

Questionnaire was constructed with 19 item questionnaire which includes 17 pair adjective items and two extra questions. These two items are item 18, 'Please indicate the degree of your pleasurable response to the lightings?' and item 19, 'do you have a preference to this lighting?' 17 adjective pairs are reliable/doubtable, practical/ unpractical, humor/ serious, fun/ mature, warm/ cool, interactive/ non-interactive, high profile/ low profile, plentiful/ bore, bionic/ non-bionic, relax/ nerve, abstract/ concrete, geometry/ flow, simple/ complex, novelty/ conservative, bright/ dime, delicate/rough, slim/ bulky. Each item was indicated with 7 Liker-scale from strongly agree i.e. 7 to strongly disagree i.e. 1.

### *Procedures*

Participants were asked to answer a 19 item questionnaire while watching each picture attached on the top of each questionnaire sheet. Participants allowed to check each item with a proper time. The data were collected and ran through SPSS statistic software.

### *Paired-Sample T Test*

Data was analyzed by Compare Means, Paired-Samples T Test. Analyses were performed separately for each pair of items: pleasure vs. preference (Q18 vs. Q19,  $p > .05$ ), pleasure vs. novelty (Q18 vs. Q14,  $p > .05$ ), pleasure vs. bionics (Q18 vs. Q9,  $p > .05$ ), and pleasure vs. warm (Q18 vs. Q5,  $p > .05$ ). The results are shown in Table 3.

**Table 3.** Pairs comparison of pleasure vs. preference, pleasure vs. novelty, pleasure vs. bionics, and pleasure vs. warm. (n=60)

		Mean	SD	Significance (p)
Q18 vs.Q19	Pleasure vs.	4.36	1.44	.309
	Preference	4.31	1.51	
Q18 vs.Q14	Pleasure vs.	4.36	1.44	.409
	Novelty	4.42	1.49	
Q18 vs. Q9	Pleasure vs.	4.36	1.44	.076
	Bionic	4.50	1.63	
Q18 vs. Q5	Pleasure vs.	4.36	1.44	.942
	Warm	4.36	1.45	

P > .05

## 7 Results and Discussions

The discussions cover the issues of types of pleasure, pleasurable factors, consumers' preference and how product shapes affects users' pleasure feeling. It is hopefully that this research results can provide designers a reference when designing lighting for the enhancement of pleasure.

The final result from interview produced seven pleasurable factors from which four types of pleasurable were classified: Appearance Pleasure, Interactive Pleasure, Reflective Pleasure, and Novelty Pleasure (see Table 2).

Among the responses, there are more key sentences in describing pleasure evoked from appearance related factors, compared with other factors. The result implies the important of appearance of lighting design. It seems product appearance has a tendency to catch consumers' first eye attention, to invite them to explore a product function then and further to decide to purchase the product or not. This result confirms Creusen's [11] research. He commented that consumers paid more attention on product hedonic scale when evaluating the product and more focus on the product form attributes, when describing it. With this in mind, designer should note that product appearance can affect consumer's purchasing decision and need to have more effort in design.

In this study, 'appearance pleasure' pertains with pleasure derived from lighting appearance including delightful shape, smart material/ texture and attractive color factors. This pleasure is associated with physio-pleasure, which deals with sensory pleasure. 'Interactive pleasure' pertains with pleasure derived from the interaction with lighting. It can be the active process with lighting such as turn on the light, which in turn is fun to do so. 'Reflective pleasure' has to do with a product content or meaning behind the lighting. They often associate with users' pass memory or the understanding of things. These memory or special things remind them something meaningful again, which make them feel happy. At this point, to embed reflective pleasure into a lighting design, it is suggested to make a product with ability to tell a story. The story should be able to inspire users' memory and pass history. Particularly, the cultural elements are useful and meaningful to many users. However, these four types of pleasure evoked from a lighting can also associated with Norman's [6] product emotion theory. Where appearance pleasure vs. visceral level emotion, Interactive pleasure vs. behavioral level emotion, reflective pleasure vs. reflective level emotion, while novelty pleasure has a distinguished from Norman's, which led to a new interested research issue to be explore in the future.

Beside prior three pleasures (i.e. appearance, interactive and reflective) in this study, 'Novelty pleasure' deals with something new, which surprise users unexpectedly. It seems to be distinguished from both Jordan's and Norman's theories. It is maybe because that novelty is very based on user's personal experience and knowledge to the product when perceiving it. Hence, the emotion/ pleasure response is very depend on the understanding of a product. For instance, if, at the first time users see a product, they may claim that the product is new in terms of novelty at the moment. But, maybe right on the next second, the same product becomes old respectively, because it is not new anymore to the users. But, for another person, the same product may still novel for them. The key point is the timing, rather than content. In this case, it is hard to define the pleasure individually.

In describing delightful shape under appearance pleasure, the key words, 'being familiar with the shape' were revealed for a few times. Participants claimed that the 'familiar shape' make them feel 'closed to the object', light in this case. For instance, the liquid pattern used at light base appears in daily life. It seems to be easier to connect with our empathic bounds to the shape of water, which evokes pleasure. To this particular comment, it seems to have a conflict to the novelty pleasure, which tends to be evoked by an unfamiliar object. However, it is an interested issue and suggested to have further study on novelty and familiar towards pleasure.

In Table 3, by using paired t Tests, it was found that the degree of a participant's pleasurable response (Q18) have no significant different from his or her preference (Q19), novelty image (Q14), bionic image (Q9) and warm image (Q5). The results indicate that participants' pleasures evoked by lighting have a positive relationship to their preference, novelty, bionic image and warm image consistently. It means that participants agree that lighting with novel, bionic, warm image has an intensity to evoke their pleasurable response better. The result also demonstrates that a user's preference to lighting has a connection to his or her pleasure response positively. It implies that participants have a preference to own a pleasurable product. This result seems also can refer to the consumer behavior in current market. Understanding the four types of pleasure and seven factors, designers should try to embed these pleasure elements into a lighting design as possible.

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