An Approach of Translation
from Kansei to Product Design of Cosmetic Puffs

Yumi Imai
Shinshu University
3-15-1 Tokida, Ueda, Nagano 386-8567 J apan
E-mail: yumi.imai@inoac.co.jp
INOAC CORPORATION
2-13-4 Meieki-minami, Nakamura, Nagoya, Aichi 450-8691 J apan

Masayuki Takatera
Shinshu University
3-15-1 Tokida, Ueda, Nagano 386-8567 J apan
E-mail: takatera@shinshu-u.ac.jp

Yoshio Shimizu
Shinshu University
3-15-1 Tokida, Ueda, Nagano 386-8567 J apan
E-mail: shimizu@shinshu-u.ac.jp

Abstract: The purpose of this study is to examine the model for the evaluating cosmetic puffs. The model is examined by the view of KANSEI engineering. Foundation of cosmetic is not evaluated only itself. Also it takes the complex evaluation with cosmetic puffs. In this study, I collect the characteristic KANSEI words from the cosmetic fields and the data of the physical test. The paired comparison of sensory evaluation is used for analyzing KANSEI. The aim is to make solution between KANSEI and physical data from measurement of the real evaluation model by the machine.

1. Introduction

The Japanese women are well known throughout the world for their beautiful skin. It might come from ethnic characteristics, but one of the reasons is the achievement of cosmetics. In particular, Japanese women commonly use foundation of makeup cosmetically. Almost all foundations are portable cake type in Japan. Consequently, they need goods to catch up the foundation for putting it on the skin. The compatibility between foundations and the goods like cosmetic puffs is very important. There is a less obvious problem if the puffs are not selected well. The goods infrequently will make color of foundation dull or cause some other bad influence.

Cosmetics are said to be the KANSEI products. Almost all designers at cosmetic companies choose the puffs based on their feelings, atmosphere and KANSEI. How can they convey their KANSEI to technicians when they make them into a product? If they have something to measure their KANSEI, they can tell their KANSEI more appropriately.

2. Object

Cosmetics are evaluated when a person uses them. The evaluation of cosmetics takes not only physical data that is measured by measurement machine but also sensory evaluation. The evaluation of skincare is the two-dimension evaluation of cosmetics and skin. On the other hand, the evaluation of makeup cosmetic, in particular, powder cosmetic like foundation comes under the big influence not only cosmetics and skin but also painting goods like cosmetic puffs. The goods will create a big difference in the potential of the compatibility with cosmetics, skin and goods. For this reason, the make up cosmetics need a complex evaluation as three dimensions of skin, cosmetics and painting goods like figure 1.

Cosmetic puffs are the representative painting goods for powder cosmetics. When cosmetic manufacturers produce new cosmetics, they choose suitable cosmetic puffs for each cosmetic type based on the evaluation by them however they don’t originally have a concrete guiding principle for their decision and they have to make a choice from samples that are made by cosmetic puff producer. It causes difficulty
This study aims at building a model for the evaluation of cosmetic products with applying goods. I examined which physical data have a strong relationship with the KANSEI data based on my previous study. The model aims at making three improvements. The first is the simplification and acceleration of the development process at a cosmetic manufacturer. The second is to develop the recording technique of KANSEI on how to choose it. The third is to make a common standard of the cosmetic evaluation, which could be used by anyone with different positions.

There are some important points to remember when we make the evaluation model. First, a value on the scale should be sensed by anybody who wants to use it. Second, the model is as close to the product distribution as possible. Third, the model is similar to the actual cosmetic market.

Our aim to this research is building the model, which can be taken along the actual product development. Therefore, it is important that each person can recognize the difference on each scale by the sensory test.

3. Method

First of all, we compared the KANSEI data with physical data on our study. [1] The KANSEI data were made from sensory evaluation by the method of pair comparison of Shepard as same as figure 2. The example of the data is figure 2. The evaluation words were corrected from some evaluators from 6 big cosmetic manufacturers. Testing machines along with Japanese Indication Standards made the physical data. Then, we adopted two characteristics of the cosmetic puffs, cell size and hardness, and prepared to nominate the evaluation models. In this study, we try to set a suitable value of these for building the evaluation model. We use latex sponge puff that is most popular in the cosmetic market.

4. Construction of the model

It was found that two physical data have a strong relationship with KANSEI data. These physical data are hardness and roughness of cosmetic sponges, and used on the vertical and horizontal axis of the model. In this KANSEI evaluation model, we can recognize the quadrant: (rough/hard), (rough/soft), (fine texture/hard) and (fine texture/soft).

We think that these characteristics are desirable for the KANSEI measurement as they can be recognized by anybody as a sense or feeling – not physical for the effective selection of puffs. When we think about the necessary condition of samples to build the evaluation model, we need most extreme four kinds including hardness and roughness.

The model is not just a computerized one but also an actual sample you can try. We need an actual figure when evaluating complex and changing phenomenon like cosmetics because cosmetics evolve constantly and a person’s skin is hyperventilating over constantly, too.

Cosmetic puffs are made by latex rubber that is like liquid rubber. When they are made, air is put in them and vulcanized after mixing. This process is called physical frothing foaming process against chemical foaming process like polyurethane. The puffs have special character of density. If the puffs were made soft, they have low density because they have a lot of air in them and the appearance of cell size is rough and big. If the puffs are made hard, they have high density because they have a little air in them and the appearance of cell size is fine and small. The distribution of products is shown in Figure 3.
Figure 1: cosmetic evaluation

Figure 2: cosmetic puff’s sensory evaluation
5. Research

5.1. Hardness

We researched the awareness of the difference of hardness of the cosmetic puffs by sensory test. The test method is a sensory test by two point profiling. The condition is indoors, normal temperature and under the strip lighting. The respondents' choices for the answer are: same, harder, and softer.

The experimental subjects are 15 women of age 20-50 and 3 men of age 30-50. The puffs are difference of hardness, 0, +3, +5, +7, +10, +15 ° as hardness meter was prepared for the test subjects. The hardness meter is HF durometer by KOBUNSHI KEISOKUKI. The result is optimized in Table 1. In the table, we put -1 if the subject felt softer. We put 0 if the subject could not feel the difference. And we put +1 if the subject felt harder.

5.2. Roughness

We diverted the roughness scale that we used for anticipatory research. It is epitomized in Figure 4.

5.3. The center of the markets

This model should be built similarly to the actual cosmetic market. Setting the center carries great weight to this model. We researched 100 kinds of cosmetic puffs from the actual cosmetic market.

6. Result

As a result of this sensory test about hardness, most people could sense the difference when the difference of the hardness was over 10. The standard deviation is 0 in perfection when the difference is over 10°.

We measured 100 kinds of cosmetic puffs from the actual cosmetic market. The result mean value of hardness was 60.30° and the mean of roughness was 0.21 in our scale as Fig.3.

7. Concluson

We adopt 60° for the mean of this model because the hardness meter cannot measure decimal result and adopt ±0 on the roughness measure because it is difficult to exactly tune in such a visible measure. We constructed model for the evaluation of cosmetic puff on this study that made by quadrant.

We got several positive effects of using this model:

* The designers, planners and technicians who make puffs were able to communicate more effectively by using the actual samples like this model rather than converting their own feelings to words.

* They were able to take linguistic communication easier than before by using the model.

* They definitely resolved the time lag before planning and development by sharing this model.

* The number of evaluation times was decreased because they made replacement from sensuous words to actual samples or numerical values in the model.

* It was not possible to make the model in Figure 5 with a conventional technique. The process made a breakthrough on the technique of making cosmetic puffs from latex.

This research contends with building an evaluation model for cosmetic puffs on the view of KANSEI engineering. Cosmetic puffs are industry goods that are parts of cosmetic products even though the finished products are consumer products. The industry is just the passing point on the development however it handles much more items than finished goods. It is truly important to make sure KANSEI to each planner, technician and designer during the operation. If they have a measure of each KANSEI, it will make a strategic improvement in planning various kinds of unique and appealing products.
Reference


Figure 3: The product distribution image

Figure 4: The roughness scale image
Table 1: Research result

<table>
<thead>
<tr>
<th>Difference</th>
<th>+3</th>
<th>+5</th>
<th>0</th>
<th>+7</th>
<th>+10</th>
<th>+15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average of data</td>
<td>-0.39</td>
<td>-0.11</td>
<td>-0.33</td>
<td>0.11</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.78</td>
<td>0.76</td>
<td>0.69</td>
<td>0.83</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Harder</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>As same as</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Softer</td>
<td>10</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Correct percentage</td>
<td>17%</td>
<td>22%</td>
<td>11%</td>
<td>39%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig. 5: The evaluation model portfolio