

# Examination of Evaluation Method for Appearance Similarity of PTP Sheets

Yoshitaka Ootsuki<sup>1</sup>, Akira Izumiya<sup>1</sup>, Michiko Ohkura<sup>1</sup>, and Fumito Tsuchiya<sup>2</sup>

<sup>1</sup> Shibaura Institute of Technology

{105023,m708101,ohkura}@sic.shibaura-it.ac.jp

<sup>2</sup> Dental Hospital, Faculty of Dentistry, Tokyo Medical and Dental University  
ftdpha@tmd.ac.jp

**Abstract.** In recent years, many accidents concerned with medicine have been caused by the confusing design of pharmaceutical packages and displays. We concentrate on the appearance similarity of PTP sheets, which are most commonly used for wrapping tablets in Japan, to clarify the factors and the degrees of their effects on appearance similarity. This paper describes our experiments that examined evaluation methods of the appearance similarity of PTP sheets.

**Keywords:** appearance similarity, evaluation method, medical accident, PTP sheet.

## 1 Background and Objective

In recent years, many accidents concerned with medicine have been caused by the confusing design of pharmaceutical packages and displays [1]. The Japanese Ministry of Health, Labor and Welfare is now using a similar name search engine to ban new names for medicine that resemble existing names. However, no such action exists for appearance similarity.

We concentrate on the appearance similarity of PTP sheets, which are most commonly used for wrapping tablets in Japan, to clarify the factors and the degrees of their effects on appearance similarity. Our goal is to establish standards to evaluate appearance similarity. This paper describes our experiments that examined evaluation methods of the appearance similarity of PTP sheets.

## 2 PTP Sheets of Our Experiment

The design of the PTP sheets of “Starsis” from Astellas Pharma Inc. was changed in July, 2005, because pharmacists pointed out their appearance similarity to the PTP sheets of “Harnal D” of the same company. However, the appearance was changed again in April, 2006, because pharmacists still thought pointed their similarity to “Harnal D” was excessive. Since we believe that this is a good example to clarify the factors of the appearance similarity of PTP sheets, we performed experiments with them.

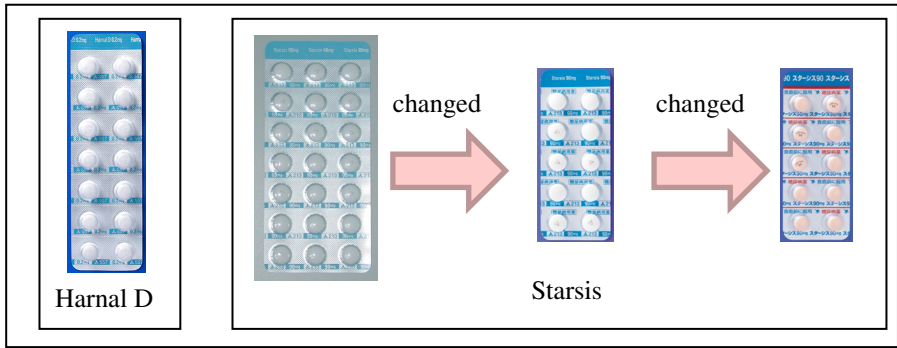


Fig. 1. Harnal D and Starsis

### 3 Experimental Method

In the experiment, the participants were shown pairs of PTP sheets and were instructed to evaluate their similarities one by one. Three kinds of PTP sheets were used (Fig. 2). The questionnaire used in the experiments was a seven-scale evaluation (Fig. 3).

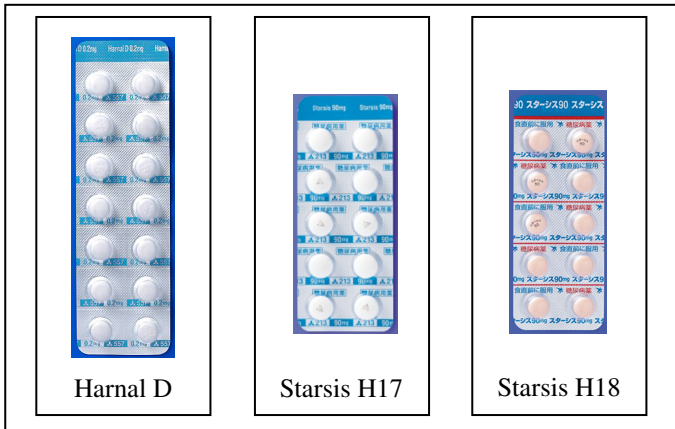


Fig. 2. Three kinds of PTP sheets

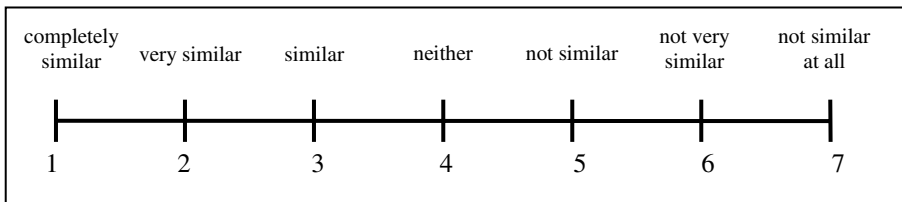


Fig. 3. Questionnaire to evaluate similarity

The experiments were performed three times. The conditions of each experiment are described in Table 1.

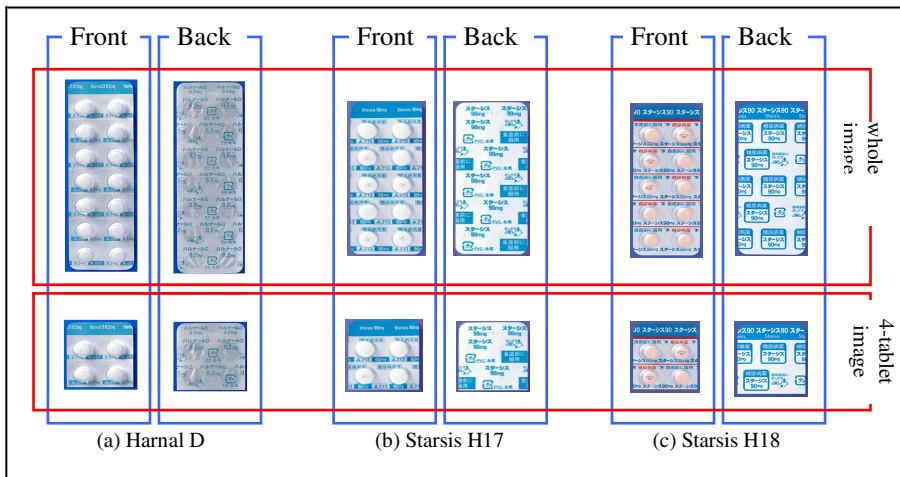
**Table 1.** Conditions of experiments

Factors	Presented images	Participants	Presentation methods
Experiment 1	whole images	students	simultaneous presentation
	4-tablet images		
Experiment 2	whole images and 4-tablet images	students	simultaneous presentation
		pharmacists	
Experiment 3	whole image (front image only)	students	non-simultaneous presentation

Each experiment is described in detail as follows.

1. Experiment 1: difference of presented images

We examined whether any differences exist between the evaluation scores when showing the whole and 4-tablet images. The images used for Experiment 1 are shown in Fig. 4.



**Fig. 4.** Presented images in Experiment 1

2. Experiment 2: difference of participants

We examined whether any differences exist between the evaluation scores of students, who may become patients, and pharmacists who are responsible for preparing medicine.

### 3. Experiment 3: difference of presentation methods

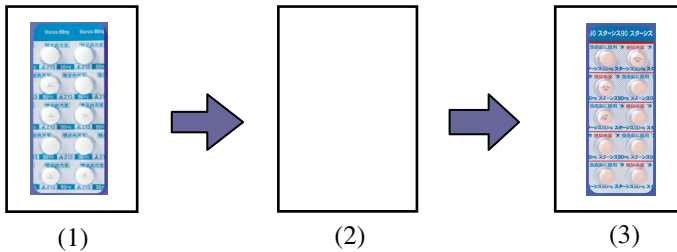
We employed simultaneous presentation in Experiments 1 and 2 and non-simultaneous presentation in Experiment 3. These two presentation methods are described in detail as follows:

- simultaneous presentation (Experiments 1 and 2)
  1. Two images simultaneously presented.



**Fig. 5.** Simultaneous presentation

- non-simultaneous presentation (Experiment 3)
  1. Presented first image.
  2. Presented the time remaining for the next image.
  3. Presented second image.



**Fig. 6.** Non-simultaneous presentation

Comparing the results of these experiments, we examined whether any differences exist between the evaluation scores for the two types of presentation methods.

Each experimental procedure is described in detail as follows.

- Experiment 1 and 2
  1. Simultaneously presented two of three images for one second.
  2. Similarity evaluated by questionnaire.
  3. (1) and (2) repeated 36 times.

- Experiment 3

1. First image presented for one second.
2. Present the time remaining for the next image (for five seconds).
3. Second image presented for one second.
4. Similarity evaluated by questionnaire.
5. (1) to (4) repeated three times.

## 4 Experimental Results

1. Difference of shown images

Experiment 1 was performed with nine students who did not know its purpose.

Fig. 7 shows the averaged scores of the similarity evaluation for the front sides of Harnal D and Starsis H17 in Experiment 1. The t-test result showed that the difference of the scores between the whole and 4-tablet images was significant at 1%. The difference of the presented images affected the difference of the appearance similarity scores [2].

Figure 8 also shows the averaged scores of the similarity evaluations between Harnal D and Starsis H17 and Harnal D and Starsis H18 both for the front and back sides. The t-test result shows that the difference of the scores was significant at 1% for the front side. The appearance similarity of the front side between Harnal D and Starsis was greatly improved by the design change to Starsis H18. On the other hand, there was no such significant difference for the back side. However, both scores averaged more than six, revealing that no appearance similarity exists for the back sides of Harnal D and Starsis. The appearance similarity problem of this example was considered to be the front side, not the back.

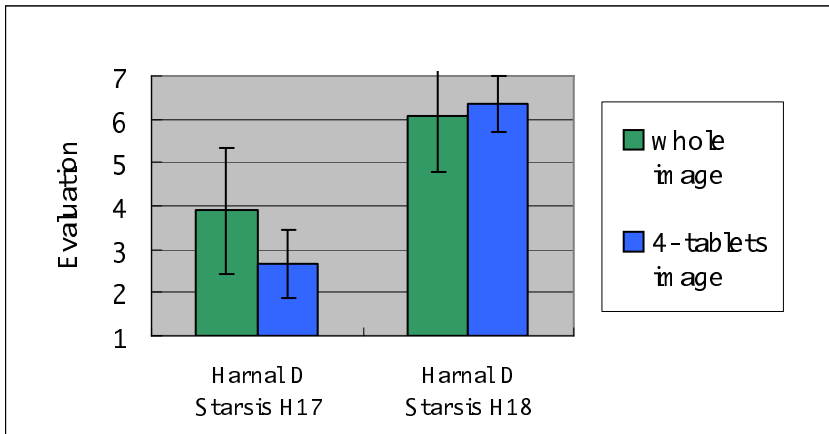


Fig. 7. Difference of presented images

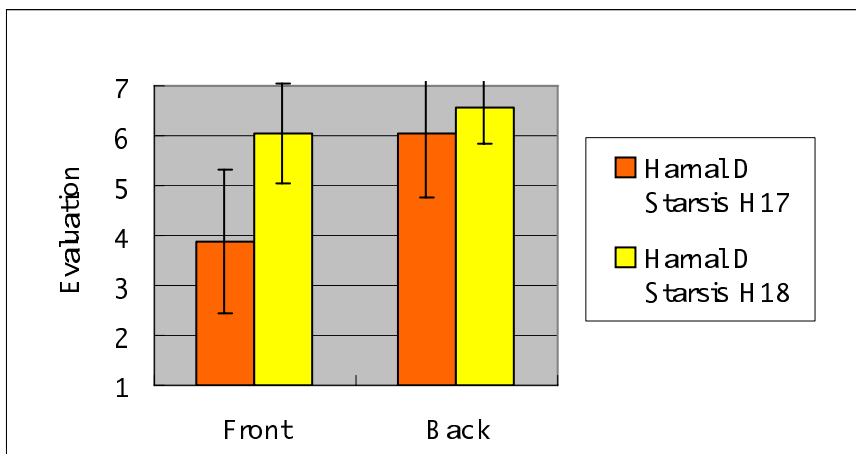


Fig. 8. Difference between from front and back sides

## 2. Difference of participants

Experiment 2 was performed with six students and six pharmacists who did not know its purpose.

Fig. 9 shows the averaged scores of the similarity evaluation for the front sides between Hamal D and Starsis H17 of Experiment 2. The t-test result indicates that the difference of scores between the whole and 4-tablet images was significant at 5% for the students. However, the difference of scores between the whole and 4-tablet images was not significant for the pharmacists, implying that different participants perceived appearance similarity differently [3].

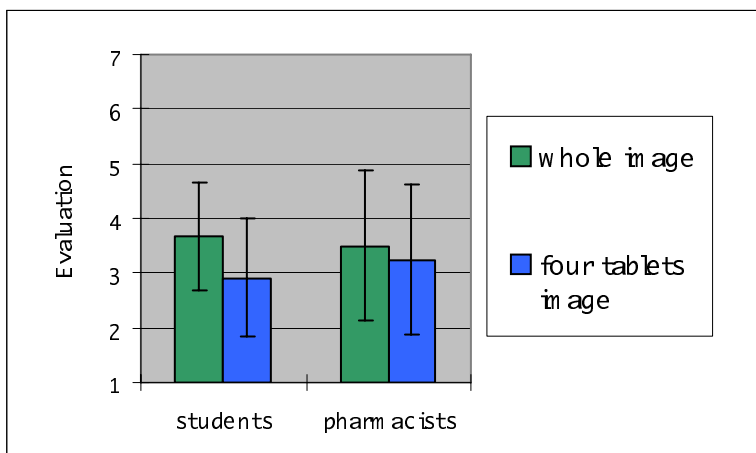


Fig. 9. Difference of participants

### 3. Different presentation methods

Experiment 3 was performed with six students who did not know its purpose.

Fig. 10 shows the averaged scores of the similarity evaluation for the front sides of Harnal D and Starsis H17 for the students of Experiments 2 and 3. The t-test result shows that different scores between the simultaneous and non-simultaneous presentation was not significant. Different presentation methods did not affect the appearance similarity scores [4].

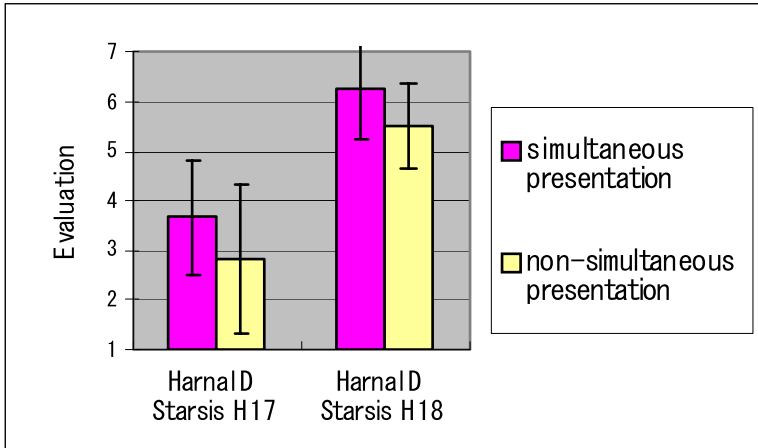


Fig. 10. Different presentation methods

## 5 Conclusion

To examine evaluation methods for appearance similarity, we focused on PTP sheets and experimentally clarified the factors and their degrees of effect on appearance similarity. The results confirmed that the evaluation scores of appearance similarity differed due to the presented images and different participants. In addition, simultaneous and non-simultaneous presentation had no effect on the evaluation scores of appearance similarity. The establishment of an evaluation method of appearance similarity by more experiments and analyzes will be our future work.

**Acknowledgement.** We received generous support from Prof. Murayama, the director of the Showa University Hospital.

## References

1. Tsuchiya, F.: Malpractice prevention and ideal way of packaging of medical products and display. *Pharm Tech Japan* 19(11), 27–37 (2003) (in Japanese)
2. Ootsuki, Y.: Examination of method of displaying medicine to prevent human error (10). *The Japanese Journal of Ergonomics* 44, 76–77 (2008) (in Japanese)

3. Ootsuki, Y.: Examination of method of displaying medicine to prevent human error (12). The Journal of Japanese Society for Quality and Safety in Healthcare, Enlargement 3, 215 (2008) (in Japanese)
4. Ootsuki, Y.: Examination of method of displaying medicine to prevent human error (13). In: Proceedings of the 2009 IEICE General Conference, ESS (2009) (in press) (in Japanese)