

Visual - tactual incongruities: Surprises in products

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Introduction

We experience products with all our senses. We use olfaction to perceive the odour of a product and we use vision to perceive its colour. However, at certain times we perceive the same property of a product through more than one modality. We can, for example, perceive the shape of a product through both vision and touch. But do we really retrieve the same information through both senses? The present research is aimed at determining users' reactions to the perception of incongruent information in a product through vision and touch. Some of the properties of a product's material can be both seen and felt, which makes it an important variable in this research.

Perceiving a product through vision can create an expectation on what will be perceived through touch. The tactual information perceived consecutively may disconfirm the expectation, resulting in a surprise reaction. Designing products that can elicit a surprise reaction can be beneficial to designers and producers because it can attract attention to the product (Vanhamme, 2003). At the same time, the user of the surprising product can benefit because it is interesting to interact with.

Surprise reactions to products incorporating visual – tactual incongruities do not only occur when products are deliberately designed to evoke these reactions. According to Manzini (1989) more and more surprising products have gradually occurred on the market due to a 'loss of recognition' since the introduction of plastics. Many new plastic materials possess unknown material characteristics. Upon touching the materials people may be surprised by their feel. For example, the much lighter weight of many plastics combined with their strength relative to previously known materials like steel and wood surprised many people when plastics were first introduced. Further and faster developments of materials maintain this mechanism of surprise in products up to a point where designers start to create tactual surprises in their products deliberately.

Exploratory studies

In order to use surprises correctly and beneficially, it is important to understand how surprises can be evoked and what users' reactions to and evaluations of the surprises can be. Therefore, we conducted exploratory studies of surprises elicited by products incorporating visual-tactual incongruities (see Ludden, Schifferstein and Hekkert 2004).

Proposal of surprise types

We examined five issues of The International Design Yearbook (de Lucchi & Hudson, 2001; Lovegrove & Hudson, 2002; Maurer & Andrew, 2000; Morrison, Horsham, & Hudson, 1999; Rashid, 2003) to determine the use of visual-tactual incongruities in recent product design. These products revealed two surprise types, called 'Visible Novelty' (VN) and 'Hidden Novelty' (HN). These types differ in the degree of certainty with which a user holds a sensory expectation.

HN products are products that seem familiar to the perceiver. An expectation about how the product feels can be based on previous experiences with a similar product. Consequently, the perceiver will be quite certain about his / her expectation. However, a surprise is elicited because the initial expectation is disconfirmed by touching the product: the product feels different from expected.

VN products are products that seem unfamiliar to the perceiver. Consequently, the perceiver will have to depend on resemblances with other products in, for example, shape or material to develop an expectation about how the product feels. This expectation is accompanied by uncertainty. A surprise is experienced when the uncertain expectation is disconfirmed. Table 1 shows an overview of the most important properties defined for the surprise types.

| | VN | HN | NN |
|-------------|----------------|-------|-------|
| Familiarity | small | large | large |
| Uncertainty | large | small | small |
| Surprise | normal – large | large | small |

Table 1. Properties of surprise types.

Validation of types

We selected 12 products (one for each surprise type in 6 product categories: vase, lamp, tablecloth, bench, cup, and tile) with visual - tactual incongruities. We added 6 products

without visual - tactual incongruities (type No Novelty, NN) as controls. We used these products as stimuli for an experiment in which we validated the surprise types and tested whether these products indeed belonged to the type they were selected for. In the experiment, we separated responses based on vision alone ('see' condition) and responses based on both vision and touch ('see and feel' condition). 60 respondents participated in the experiment, who all judged 6 products in the 'see' and 6 products in the 'see and feel' condition.

We used two different questionnaires to which respondents answered on nine point scales ranging from 'do not agree at all' to 'agree completely'. In the questionnaire for the 'see' condition, we measured familiarity (3 items, e.g. "This product looks familiar") and certainty (3 items, e.g. "I am certain about how it feels"). In the questionnaire for the 'see and feel' condition, we measured certainty (2 items, e.g. "When I saw it, I was certain about how it would feel") and surprise (3 items, e.g. "I am surprised about how it feels").

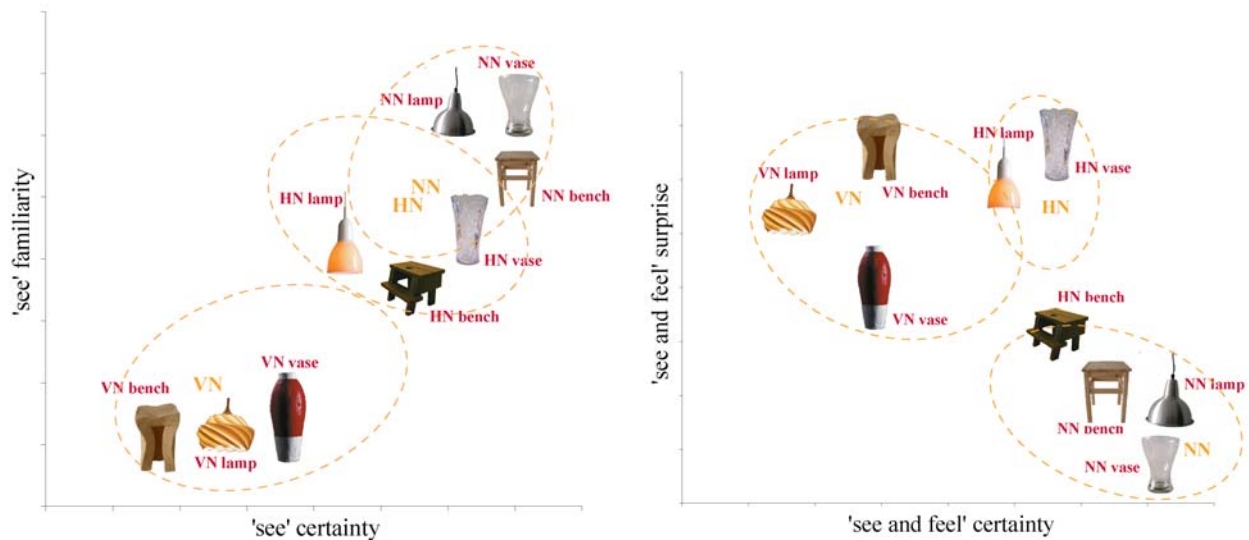


Figure 1. Summary of results; products and surprise types related to familiarity, certainty and surprise.

Figure 1 shows two graphs that summarize the results of the experiment for nine products. The results of our experiment suggest that the surprise types we proposed indeed exist. The two graphs show the ideal placement of the three different surprise types (marked VN, HN and NN) as well as the actual placement of the VN, HN and NN products in the categories lamp, vase and bench. The dotted circles represent the larger group of products in the surprise types. Most of the products we selected indeed belong to the surprise type they were selected

for. However, bench HN seems to fit better in the NN group. In the remainder of this paper, all analyses refer to the categories for which all three products were correctly classified as VN, HN and NN: lamp, vase, and tablecloth.

The role of materials

To assess the role of the material on the surprise reaction, we asked respondents to identify the material of the product before touching it. As expected, respondents were less accurate in identifying the materials for VN and HN products than for NN products. Most incorrect answers (93%) were given for HN products. Probably respondents are misled because the materials of these products strongly resemble other materials. For VN products, 72% of the answers were incorrect. For VN products, the finding that respondents were often unable to identify the material may be related to the uncertainty respondents experience with respect to the actual characteristics. For NN products, only 9% of the answers were incorrect.

Respondents' comments

We asked respondents to give their opinion in their own words on every product they experienced during the experiment. Respondents used the word 'funny' (Dutch: 'grappig') 2 times for HN and 8 times for VN products. They did not use this word for NN products. Overall, more associations were reported for HN (59 for all three products in the 'see' and 'see and feel' conditions) and VN (42) products than for NN (36) products. For all three surprise types, respondents used associations with 'other materials', 'other products', 'people who would use the product', 'interior in which the product could be placed' and 'brands or producers'. However, the number and type of reported associations differed between surprise types and conditions.

Between the six groups (three surprise types combined with two conditions), we found significant differences in the number of associations to 'other materials', 'people who would use the product' and 'brand or producer' (χ^2 test, $p < 0.001$). The differences in the number of associations with 'other materials' and with 'people who would use the product' originated from a high number of associations for HN products. The highest number of associations with 'other materials' occurred in the 'see and feel' condition (21 where most ranged from 1 to 5). This could be explained by the fact that these products are designed to look like they are made out of a different material. When a respondent feels such a product, he or she will know what material the product is made of, but will still have an association with the expected material. The highest number of associations with 'people who would use the

product' was found in the 'see' condition (16). For the HN vase, which looks like a crystal vase but is actually made out of plastic, respondents appear to associate the vase upon seeing with elderly people ('grandmother'), whereas this association is no longer made when they feel the actual material of this product. A similar mechanism may occur for the other HN products.

The most frequent associations for 'brand or producer' were found for NN products (5 in 'see' and 6 in 'see and feel' as opposed to 0 or 1 in other groups). Probably, because people are familiar with NN products, they are more likely to associate them with a brand or producer they know.

Discussion

The use of unknown materials can contribute to surprises in products. The development and use of new materials can be seen as an interesting and promising design strategy to create products that users find more interesting to interact with. The fact that respondents used the word 'funny' to describe the surprising products may indicate that they felt positive about the surprises. However, negative comments on the surprises were made as well. More insight into users' evaluation of surprises is needed to be able to use surprises in product design in the right way. User responses to different surprise types may differ strongly. For example, products of the VN type may be appreciated because they offer the opportunity to explore and to discover something new, whereas products in the HN type may cause disappointment because the user feels misled.

Surprise type and sensory experience (conditions 'see' and 'see and feel') both seem to have an effect on the type of associations people have with products. Therefore, reported associations might be a useful instrument in further research. However, some differences in associations reported in the present study could be due to product differences in, for example, aesthetics. Therefore, to be able to generalize the present results, replication with other products is necessary.

More insight into designers' motivations and strategies for designing surprising products can be useful in finding ways to use surprises beneficially. Preliminary results from interviews with designers of surprising products indicate that designers aim at creating VN type products. They do not like the HN type, because they do not want to fool people. Rather, they want to let them experience something new. To explore the possibilities of new materials in creating more interesting products further, we want to create our own surprising products in future research.

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