

Surprise as a design strategy

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Introduction

Imagine yourself queuing for the cashier's desk in a supermarket. Naturally, you have picked the wrong line, the one that does not seem to move at all. Soon, you get tired of waiting. Now, how would you feel if the cashier suddenly started to sing? Many of us would be surprised and, regardless of the cashier's singing abilities, feel amused. The preceding story is an example of how a surprise can transform something very normal, and maybe even boring, into a more pleasant experience. Analogously, a surprise in a product can overcome the habituation effect that is due to the fact that people encounter many similar products everyday. Colin Martindale describes this effect as 'the gradual loss of interest in repeated stimuli'.¹

A surprise reaction to a product can be beneficial to both a designer and a user. The designer benefits from a surprise reaction because it can capture attention to the product, leading to increased product recall and recognition, and increased word-of-mouth.² Or, as Jennifer Hudson puts it, the surprise element "elevates a piece beyond the banal".³ A surprise reaction has its origin in encountering an unexpected event. The product user benefits from the surprise, because it makes the product more interesting to interact with. In addition, it requires updating, extending or revising the knowledge the expectation was based on. This implies that a user can learn something new about a product or product aspect.

Designers already use various strategies to design surprises in their products. Making use of contrast, mixing design styles or functions, using new materials or new shapes, and using humor are just a few of these. The lamp 'Porca Miseria!' designed by Ingo Maurer that is shown in the left part of Figure 1 consists of broken pieces of expensive porcelain tableware, making it a lamp with a unique shape. The idea that another product had to be destroyed to make this lamp may inflict feelings of

puzzlement and amusement on someone who sees this lamp. The perfume 'Flowerbomb' (right part of Figure 1) designed by fashion designers Victor & Rolf is another example. The bottle is shaped like a hand grenade and it holds a sweet smelling, soft pink liquid. By combining conflicting elements in their perfume bottle, Victor & Rolf have succeeded in creating a perfume that attracts attention amidst the dozens of perfumes that line the walls of perfumeries.

Surprise is also used in product marketing as a positive quality of products or brands. Kia, a South-Korean car manufacturer, even uses surprise as the brand's major pay-off: 'Kia, the power to surprise'. Furthermore, Swatch, the famous Swiss watch manufacturer, claims that their brand is 'always surprising' (Figure 2).

This paper will outline the use of surprise in contemporary design. Based on an analysis of a set of surprising products and on discussions with the designers of some of these products, we will give insight into how and why designers create surprising products and what the effects of creating surprises are. We noticed that designers often make use of visual – tactual incongruities to create surprising products. For example, an analysis of designs in five issues of The International Design Yearbooks (IDY 1999-2003)⁴ showed that 1-6 % of these designs incorporate some form of visual – tactual incongruity. Therefore, we decided to focus our discussion of surprise in product design on this type of products.

Visual – tactual incongruities and surprise

Visual – tactual incongruities occur when people perceive incongruent information through vision and touch. Some object properties can be experienced through both vision and touch. People can, for example, both see and feel a texture or a shape. However, the information the two modalities provide is not always the same.

Sometimes, you feel something different from what you (thought you) saw. If you feel something unexpected, you will be surprised.

We studied 101 products with visual – tactual incongruities (63 found in the IDYs and 38 found at design fairs, on the Internet, and in shops) and distinguished two types of surprising products that have different mechanisms underlying the surprise reaction. We defined these two types of surprising products as ‘Visible Novelty’ (VN) and ‘Hidden Novelty’ (HN). The distinction between the two surprise types is based on the initial sensory expectations the user forms.

Expectations can be based on different sources of information. Oliver and Winer⁵ mention three sources for expectations as conceptualised by Tolman: ‘memories of actual experiences, perceptions of current stimuli, and inferences drawn from related experiences such as trial of other objects.’⁶ With respect to expectations about how a product will feel, taste, smell or sound this implies that a person’s visual impression of a product, his/her previous experiences with that product, or experiences with similar products can be the basis for the expectation.

An expectation involves uncertainty⁷, which depends on the source of the expectation. When the expectation is based on a memory of an actual experience, the level of uncertainty is likely to be lower than when it is based on inferences drawn from related experiences. In the latter case, the perceiver cannot be sure that the current experience is fully comparable to the related experiences and will thus be more uncertain about what to expect.

The sources for expectations and their uncertainty differ between the two surprise types. The VN surprise type consists of products that seem unfamiliar to the perceiver. Consequently, the perceiver is not able to form an expectation based on previous experiences with the product. The perceiver forms an expectation about how the

product will feel based on resemblances with other products in, for example, shape or material. A high degree of uncertainty will accompany this expectation. A surprise is experienced whenever the uncertain expectation is disconfirmed. A VN product can, for example, be made out of a new material that the perceiver vaguely associates with a material he/she knows. An expectation could then be based on experiences with the known material, but the new material can have very different tactual properties.

The HN surprise type includes products that seem familiar to the perceiver, but have unexpected tactual properties. In this case, the expectation about how the product feels is based on previous experiences with a similar product. The perceiver is quite certain about his/her expectation. A surprise is elicited, because the apparent familiarity is evidently proven wrong by touching the product, disconfirming the expectation: the visual perception is misleading or the product has hidden characteristics that prohibit the perceiver from forming a correct expectation. An example of a HN product is a plastic bowl that looks like a crystal bowl. Upon seeing this product, the perceiver thinks that the product will be heavy. When the product is touched and lifted, however, the perceiver is surprised about the much lower weight of the bowl.

Design strategies

Designers seem to create products in the HN and VN type by making use of several different design strategies. We identified six different design strategies (DS): 'new material with unknown characteristics', 'new material that looks like familiar material', 'new appearance for known product or material', 'combination with transparent material', 'hidden material characteristics', and 'visual illusion'.

In all six strategies, a combination of two opposites is used: something new is used ('Newness') and a reference to something familiar is made ('Familiarity'). The combination of new and familiar elements is likely to result in surprise. The familiar element of the product forms the basis for an expectation about other elements. Subsequently, the new element will disconfirm this expectation. New and/or familiar elements can be used in the visual domain in the appearance of the product (e.g., in shape, material, or type of product), and/or in the tactual domain in the material properties of the product (e.g., in weight, flexibility, or balance).

The newness of a product is likely to be relative. According to Daniel Berlyne, it is highly unlikely that someone encounters an absolutely novel stimulus, a stimulus unlike anything that individual has met before.⁸ Probably, what someone perceives as new, will consist of previously experienced elements in a different combination, or will resemble familiar stimuli. This is what Berlyne describes as relative novelty. Paul Hekkert et al. found that people prefer products with an optimal combination of typicality and novelty.⁹ Their findings are consistent with the design principle called MAYA (most advanced, yet acceptable) by designer Raymond Loewy.¹⁰ Analogously, people will prefer products that have a combination of both familiar (i.e., typical) and new (i.e., novel) elements.

The next sections discuss how these two elements are present in each design strategy. In addition, we present examples of products that could have been designed following that strategy. The design strategies can result in the two different types of surprising products discussed. Four strategies can lead to a product in the VN type. One of these strategies can also lead to a product in the HN type and the two other strategies can only lead to a product in the HN type. Figure 3 illustrates the

relationship between the six design strategies, newness and familiarity, and the two types of surprising products.

Insert Figure 3 about here

Design Strategies 1 and 2: New materials

New materials are likely to have new and unknown characteristics that can lead to new visual and/or tactual experiences. According to Ezio Manzini more and more surprising products have gradually occurred on the market due to a ‘loss of recognition’ since the introduction of plastics.¹¹ Many new plastic materials possess unknown material characteristics. Upon seeing these materials, people experience uncertainty about their feel characteristics because they do not know them. Upon touching the materials they might 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.

The development of smart(er) materials also offer wide opportunities for designers to explore new sensory experiences.¹² An example of the use of a smart material is a water kettle made out of a thermochromic material that changes colour when its temperature rises. Through this material, the kettle ‘warns’ the user when it is hot. Several companies and institutes, such as Material Connexion, Materia and Innovathèque assist designers in their search for new and innovative materials.

When observing a new material, a perceiver will form a feel expectation based on resemblances with familiar materials. When the new material looks exactly like a known material, these expectations can be certain. If not, they will be uncertain. These

two cases yield very different design approaches and are, therefore, discussed as two separate design strategies.

Design Strategy 1: New material with unknown characteristics

The foam developed for Prada depicted on the left in Figure 4 is a structure with large holes, which make it look like it is flexible. However, when seen in a large construction, it also resembles hard plastic because it seems to hold a certain weight. Someone who sees this foam may not be certain about how it feels. The same holds for the cloth depicted on the right in Figure 4: it looks like flexible plastic but reflects the light slightly differently, leading to an uncertain expectation. In reality, the cloth has feel characteristics different from plastic: it feels soft, very similar to silk. A new material with unknown characteristics will lead to a product in the VN type, because someone who sees the material is uncertain about how it will feel.

Insert Figure 4 about here

Design Strategy 2: New material that looks like familiar material

If someone sees a new material and is, nevertheless, certain about how it will feel, he or she can be surprised upon touching the product. Apparently, he or she had incorrectly identified the new material as a familiar material and is surprised that this material feels different. Designers often deliberately use this effect when they create a generally well-known product out of another material. This design strategy always leads to products in the HN type. After all, for a surprise to occur the product must look exactly like a familiar product. Examples of products that are in correspondence with this strategy can be found in Figure 5.

Insert Figure 5 about here

The vase on the left looks like a crystal vase. Its shape and the decorations on the surface are highly similar to those used for traditional crystal vases. However, this vase is made out of plastic, which results in entirely different feel characteristics: this vase is much lighter than the crystal vase it resembles. The lamp on the right looks like it is made out of matt glass. Again, it resembles typical glass lamps in shape and surface texture. This lamp is actually made out of flexible polyurethane rubber and it feels much more flexible than a lamp made out of glass.

Design Strategy 3: New appearance for known product or material

Using a new appearance for a familiar product or material can lead to an uncertain, incorrect feel expectation. If the new appearance resembles another well-known product or material, a designer creates a deliberate reference to a familiar thing. Since the new appearance is immediately visible, this leads to an uncertain feel expectation and thus to a VN type product.

The tiles on the left in Figure 6 are made out of ceramics like most tiles. However, using a new shape (resembling the shape of a softer material) for this product results in the uncertain expectation that these tiles may feel soft. The tiles actually feel hard, like other ceramic tiles.

Alternative or new production techniques can also be used to create new shapes for known materials. The lamp on the right in Figure 6 is made using a 3D printing technique, creating a new shape for a lamp and for the material, polyamide. The lamp looks like it is made out of cloth or paper and may be expected to feel light and flexible. However, it feels solid, heavy and not flexible.

Insert Figure 6 about here

Design Strategy 4: Combination with transparent material

A new combination of a familiar material with an (also familiar) transparent material can produce conflicting information about feel characteristics, leading to an uncertain feel expectation. A combination with a transparent material can, therefore, lead to a product in the VN type.

The benches on the left in Figure 7 are made of a combination of soft foamy cushions and a hard plastic cover. The cushions are associated with softness, leading to the expectation that the cover is soft too, and that the cushions will be felt when sitting down. However, the hard cover makes the bank feel completely rigid.

The natural acrylics range of Pyrasied Xtreme Acrylic¹³ is another example of a new combination of materials. In this range of acrylics, natural materials are combined with transparent plastic (see picture on the right in Figure 7). Someone who sees this material may not be sure whether or not the natural material, in this case bamboo, can be felt. In reality, only a smooth plastic surface can be felt.

Insert Figure 7 about here

Design Strategy 5: Hidden material characteristics

Some of the materials used in a product may be hidden. By hiding these materials, relevant feel characteristics cannot be observed. The feel expectation is based only on the visible materials, thus leading to an incorrect feel expectation. This expectation can be either uncertain or certain, depending on how familiar the product looks.

Consequently, this strategy can lead to either a product in the VN type (see first example) or in the HN type (see second example).

The chair on the left in Figure 8 looks like it is made out of paper, which is uncommon for a chair. This appearance may lead to the uncertain expectation that this chair is very light. However, beneath the paper there is wood, a much heavier and more rigid material.

The bench on the right in Figure 8 is from Bisazza's 'Soft Mosaic Collection'. The bench looks like it is made out of glass tiles. Someone who sees this bench will probably be certain that it feels hard and rigid. However, beneath the small tiles, there is a soft foam-type underlay. The bench, therefore, yields when sat upon.

Insert Figure 8 about here

Design Strategy 6: Visual illusion

Visual illusions can be used to form a misleading appearance. Artists have used visual illusions like trompe l'oeils for a long time. Applied in product design, similar techniques can lead to certain, but false feel expectations.

The cupboard on the left in Figure 9 has a printed laminate that makes it look like there is a cove in the cupboard, which in reality does not exist. The glass bowls on the right in Figure 9, named 'Solid, solid+liquid and liquid' look like they are all hollow shapes when viewed from above. However, some of the bowls actually have an almost flat upper surface.

It must be noted that a visual illusion is often solvable by using vision only, mostly by changing viewing position. However, when a visual illusion is solved by touching the product, a visual – tactual incongruity is perceived.

Insert Figure 9 about here

Surprise as a design strategy?

Considering the frequent use of visual – tactual incongruities in product design and the variety of strategies that designers seem to use to create them, one might conclude that designers think of creating surprises as an effective strategy to create interesting and original products. However, from discussions designers, some of whom designed products we used to illustrate the design strategies, we learned that this was not always the case. The surprises they had created were sometimes only the by-product of other aims, like searching for new experiences, using new materials or techniques, or creating conflict within a product. This illustrates that designers were not always aware that they were creating surprises.

We would like to stress that understanding the mechanism of surprise and being aware of the impact a surprising product may have is useful for designers. After all, if designers understand how a surprise can be brought about, they will be able both to avoid surprise when they do not want to evoke them and to effectively use surprises to their benefit in other cases. This is important because using surprise as a strategy to create interesting and original products may not always have the desired effect.

Although most designers who make use of surprise think that people appreciate the surprises their products evoke, by its nature, using surprise can be dangerous too. Besides evoking pleasant and/or new experiences, unexpected events can also lead to disappointment and users may even feel misled or fooled upon experiencing a surprise. In addition, some designers remarked that they were disappointed because the surprise seemed to distract potential users from another message they wanted the product to communicate. Furthermore, although discovering a surprise in a product

may initially be experienced as pleasant, the effect of this surprise may be negligible or even unpleasant in the long term.

So far, knowledge about people's reactions (both on the short and the long term) to surprising products is limited. In general, in marketing research, surprise was found to be positively related to satisfaction with the product.¹⁴ More specifically, our research on surprising products suggests differences in people's reactions to VN and HN products.¹⁵ People tended to use more exploratory behavior while interacting with VN products, possibly because they enjoyed exploring these products or because they wanted to discover the exact material properties of these products. It is possible that they needed more time in order to understand the origins of their surprise reaction. On the other hand, for HN products, it seems that the experienced surprise upon touching the product is immediately understood and further exploration or cognitive effort is unnecessary. This may partly explain why people experienced VN products as more interesting than HN products.

Apparently, using different design strategies can lead to surprises that are appreciated differently. It should be noted that it is also possible to use a combination of design strategies in one product. For example, the bench in Figure 10 seems to comprise elements from DS 5, hidden material characteristics and DS 3, new material that looks like familiar material. The bench is made out of polystyrene, which is covered in knitted cloth and then vacuumed and hardened with wax. As a result, the polystyrene is completely hidden. The combination of materials with the new shape makes the bench look like it is made out of a familiar soft material, like foam rubber. In reality, the bench feels hard.

Insert Figure 10 about here

The type of product in which a surprise is created also seems to influence people's appreciation of the surprise.¹⁶ In products with a complicated functionality that requires full attention from the user, a surprise will probably not be appreciated. However, in products that people can use without any cognitive effort, for example a vase, a surprise may be welcomed by the user.

Further research into people's appreciation of surprises in products has to provide more definitive conclusions on how and when surprise can effectively be used as a design strategy. This research has to be aimed at providing detailed knowledge into what causes a positive or negative surprise. For example, the relative pleasantness of the expected and the actual feel characteristics, as well as the product attribute the surprise is experienced in (e.g., weight, flexibility), may both affect the evaluation of the surprise. Future research in these directions can help in understanding how to use surprise in product design more effectively.

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Figure Captions.

Figure 1. Lamp 'Porca Miseria!' designed by Ingo Maurer. Photo Tom Vack.

Courtesy of designer. Perfume 'Flowerbomb' designed by Victor & Rolf.

Figure 2. Logo of Kia with pay-off: 'The power to surprise'. Courtesy of Kia.

Advertisement of Swatch with claim 'Always surprising'. Courtesy of Swatch.

Figure 3. Relationships between design strategies, their underlying dimensions and resulting types of surprising products.

Figure 4. Examples of products corresponding with DS1, new material with unknown characteristics. Foam for Prada, designed by OMA. Polyamide/ viscose cloth, designer unknown.

Figure 5. Examples of products corresponding with DS2, new material that looks like familiar material. Polycarbonate vase, designer unknown. Lamp 'Flexlamp', designed by Sam Hecht. Courtesy of designer.

Figure 6. Examples of products corresponding with DS3, new shape or product for known material. Tiles 'Tactiles', designed by Baukje Trenning. Courtesy of Koninklijke Tichelaar Makkum. Lamp 'Konko', designed by Willeke Evenhuis & Alex Gabriel. Courtesy of designers.

Figure 7. Examples of products corresponding with DS4, new combination of materials. Tables 'Apple', designed by Ilaria Marelli. Courtesy of designer. Natural Acrylic, designed by Pyrasied Xtreme Acrylic. Courtesy of designer.

Figure 8. Examples of products corresponding with DS5, hidden material characteristics. Chair 'Bastian', designed by Robert Wettstein. Courtesy of designer. Bench from Bisazza's 'Soft Mosaic Collection', designed by Jürgen Mayer. Courtesy of Bisazza.

Figure 9. Examples of products corresponding with DS6, visual illusion. Cupboard 'Yourside', designed by Markus Benesch (Money for Milan). Courtesy of designer. Bowls 'Solid, solid+liquid and liquid', designed by Monique Borsboom. Courtesy of designer.

Figure 10. Bench 'Shrunken furniture', designed by Bertjan Pot.





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