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Visual perception and recollection of pictures in packaging design

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Abstract

Continuing an ongoing study to analyze consumer reactions to packaging design, eye tracking test results that explore the visual perception and recollection of pictures in packaging design are presented. Particularly, the extent and reliability of human recollection of pictorial elements on packages that were seen only for a short period of time is discussed in detail. These results help to better understand the visual impact which pictures in packaging design have on consumers. The results suggest that consumers discern a great deal of graphical detail in pictures within a very short period of time, but that this recollection varies among users and is sometimes inaccurate. Furthermore, it could be shown that viewers in general describe coherent (albeit sometimes inaccurate) interpretations of visual stimuli instead of isolated details of visual design.

Keywords: packaging design, eye tracking, qualitative content analysis, visual perception, picture

1. Introduction

The design of packages in which products are presented to consumers at the point of purchase has long been understood to influence the attention, evaluation, and ultimately purchase decision of consumers (cf. Piqueras-Fiszman et al., 2013, p. 328). At a time when products have to compete with hundreds of others in the shelves (Munzinger and Musiol, 2009, p. 235), whose properties are becoming increasingly similar (cf. Hinz and Weller, 2011, p. 234), it becomes more and more important for packaging designers to understand those factors that influence the consumer's behavior, motivation and (buying) decisions (cf. Bittner and Schwarz, 2010, p. 18).

It is generally assumed that packaging design indeed does stimulate emotions, and that the emotional impact packaging design has on consumers is influenced by such factors as the size or shape of the packaging, graphic and surface design, color or typography (cf. Hinz and Weller, 2011, p. 236; Duchowski, 2007, p. 263). In particular, pictures are traditionally believed to have a high emotional impact on consumers (Munzinger and Musiol, 2009, p. 67), to add an emotional appeal to a product (Busch, 2007, p. 5) or to be better suited to catch the viewer's attention than text elements (Busch, 2007, p. 40). Designers trying to use pictorials in a purposeful and appropriate way need to understand how images are perceived and especially which of their visual components stay in mind and make an illustration the most efficacious.

In order to better understand the visual impact packaging design has on consumers, several of them have been analyzed in a series of eye tracking studies (Nikolaus and Lipfert, 2012; Nikolaus and Geissler, 2013). Among other interesting results clarifying the emotional impact of packaging designs or the importance of color, these previous studies also led to some astonishing results as to the relationship of text and images, respectively. In both studies, pictorial stimuli (such as product shots or a background image) consistently had a lower attentional impact and were also looked upon later than textual stimuli (particularly the product or brand name). This was unexpected, as chocolate boxes with richly illustrated, colorful designs were analyzed, that were supposed to have a higher tendency to attract attention (Wedel and Pieters, 2008, p. 50) than a text would have in the same place, which should have led to an increase in the average fixation duration (Piqueras-Fiszman et al., 2013, p. 331).

However, in post-test surveys, the test viewers nonetheless attributed a high emotional importance to the pictures on the packaging. This is an astonishing result, as it seems improbable that a visual element that is hardly looked at has a high impact on viewers. Familiarity aspects (the notion that pictures are largely ignored because the package was well-known to the viewer and therefore needs only a short gaze for recollection) could be ruled out (Nikolaus and Geissler, 2013).

One possible explanation, however, might be that processing or recollection of texts is significantly harder than that of images (an assumption also expressed by Busch, 2007, p. 39), and that therefore, the amount of attention paid to pictorials is often lower than the amount paid to text (cf. Duchowski, 2007, pp. 263–265).

Hence, the aim of this study was to better understand the perceptual impact pictorials have in packaging design and, more precisely, what and how much information test viewers can extract from a picture while looking at a package with only a cursory glance (as it is usually done at the point of purchase). If pictorials (both product shots and background images) are only fixated for a comparative short period of time, they may

well be noticed – but can their meaning be extracted accurately, completely and reproducibly?

In order to answer this question, test participants were asked to look at several unfamiliar packaging designs for only a short period of time. Immediately afterwards, they were asked to describe the images included therein as precisely as possible. Thus, it was to be determined what aspects of the images were remembered best, and if there were any differences in the statements that could be attributed to differences in the packaging design. Furthermore, these results were combined with eye tracking data in order to find out which correlations between the distribution of visual attention and the reliability or elaborateness of the statements could be identified.

2. Research methods

The study described in this paper consisted of two parts. In the first part, the viewer's reaction to various packaging designs was analyzed using eye tracking technology. In the second part of the test, the visual perception and recollection of the pictorial elements of the packaging design was tested by conducting structured interviews for each of the test participants. The research design was as follows:

Subjects: Twenty-two second and fourth-year students (15 males, 7 females) were recruited for the experiments. They had normal or corrected vision, and their age was 19 to 30 years, with 25 years on the average. Although all attended basic lectures on visual media design in their first year, none of them had special knowledge in packaging design. As the eye tracking part of the test was identical to the one already described by

Nikolaus and Geissler (2013), in total, forty test participants (25 males, 15 females; aged between 19 and 37 years with 26 years on the average) performed the first part of this test.

Stimuli: As the eye tracking system used for this test was computer-based, two-dimensional reproductions of the packages were shown to the test participants on a 17" LC display in random order. To use the screen resolution to its full capacity, all samples were in landscape format. All packages were reproduced photographically and then retouched using an image processing program to obtain a realistic recreation. All designs were then shown to the subjects on a dark background; one sample at a time, each display lasting five seconds. Using eye tracking technology, the overall distribution of attention was recorded for each participant and sample.



Figure 1: Overview of test samples used in the both parts of the test. In the eye tracking part, full reproductions of all chocolate boxes were used, whereas in the interview part, product shots and background images were covered by a monochromatic mask that had more or less the same color as the background, only a little lighter or darker. For the sake of clarity, in this figure outline renderings of the hidden images are added to give readers an impression of the images behind the masks.

All samples had previously been used for another eye tracking test (Nikolaus and Geissler, 2013) so that results could be compared directly. Again, seven chocolate box designs in landscape format were used that contained neither obtrusive discount markers nor transparencies, holograms, embossments or other effects (cf. Figure 1). These samples had been the seven most unknown designs out of a set of originally 24 designs in the previous test, and they were comparably unfamiliar to the participants of the actual test (which was tested in a post-test survey). The seven unknown samples were once again supplemented by two rather well-known designs. Only the unknown designs, however, were used for the interviews in the second part of the test.

Apparatus and procedure: The stimuli were presented on a monocular, desktop based NYAN 2 XT/EDGE eye tracking system produced by Interactive Minds, Dresden (Interactive Minds, 2013). A Samsung SyncMaster 17" TFT display with 1280 × 1024 pixel resolution was used at a sampling rate of 60 Hz rate and 0.45° accuracy. The samples were slightly enlarged in order to compensate for the lower resolution of computer screens.

User reactions were recorded and their visual scan paths analyzed. In order to assess the relative importance of the main visual components on the sample packages (brand name, logo, product name, product shot, etc.), Areas of Interest (AOI) were defined beforehand in order to compare fixation counts, the time to first fixation, gaze durations, etc.

Interviews: Immediately subsequent to the first part of the test, the packaging designs were shown to the test participants once again. This time, however, all pictorial

elements were covered (cf. Figure 1). The test participants were now asked for each of the seven unknown designs (one at a time) to describe the masked images (both product shots and background images) as accurately as possible. In order to help them to give a comparatively thorough picture, the keywords alignment, color, contrast, shape, size and texture were mentioned to them if they had not referred to them on their own. These keywords were chosen from a list of design elements compiled by Watson (Watson, 2003) from several art and design textbooks attempting to harmonize design terminology. From the seventeen components of design identified by Watson, some (like motion, sound, taste & smell or space (three-dimensionality)) were obviously not applicable here, whereas others (like balance, clarity, focus or unity) described design principles or design laws that are beneficial in the design process but less suited for image description. Thus the original list of seventeen components was narrowed down to the six visual features mentioned above. An audio recording was done for each interview.

For the analysis of the audio data, a structured content analysis (a variant of the qualitative content analysis method developed by Mayring (2000)), has been used. In compliance with this method, for each of the six visual components under analysis (alignment, color, contrast, shape, size and texture, respectively), a structured and comprehensive system of evaluation categories was inductively developed on the basis of the interview data. For each of the categories, characteristic criteria were defined and exemplary answers defined. This was done to both avoid assumed meanings in the data transcription and the following evaluation process and to allow for a numerical comparison of the recorded answers in order to obtain generalized conclusions.

Table 1: Extract of the coding agenda for the property “base color”. The example refers to a dark blue background image.

Property “Base Color”	Definition	Example	Coding Rule
C1: Correct base color description given	Unambiguous specification of base color	“The main color was blue”	Base color must explicitly be named
C2: Partially correct color description given	Correct naming of base color, but incorrect or erroneous naming of shade or contrast	“Blue with shades of yellow” or “Blue, rather a medium blue”	Base color must be named correctly, additional statements may be incorrect or contradictory
C3: Incorrect color description given	Incorrect specification of base color	“Yellow with white highlights”	Description of base color is completely wrong
C4: Appropriate color reference used	Correct usage of a reference to describe the base color	“Midnight blue” or “Cornflower blue”	Reference must be unambiguous and verifiably associated to the base color
C5: Inappropriate color reference used	Incorrect usage of a reference to describe the base color	“Red like tulips”	Reference obviously refers to a different base color
C6: No base color statement given	No base color could be described	No statement	No statements concerning this property are made

Next, the answers of the interviewees were assigned to these categories and the definitions and examples were adjusted and refined, where necessary. In this refinement phase, the categories “shape” and “size” were merged, because statements as to the size were mostly done in combination with the shape (if there were any at all, because information about the size of objects could in general be derived from the size of the masking area visible on the test samples). Differences in contrast, on the other hand, were hardly ever described alone, but rather as different shades of a base color. Therefore, the

respective categories were renamed to “base color” and “color shade”. A new category “color references” was created, because it became apparent that many interviewees used references to previous viewing experience in order to describe a certain shade of color. All category definitions, definition examples and coding rules were then distilled down to a so-called coding agenda which provided the basis for a comprehensive, objective and impartial classification of the interview material (an extract of the coding agenda is shown in Table 1).

3. Results

3.1 Basic color, color shade and color reference

The test viewers were quite successful in remembering the main color for most of the designs. To memorize a particular shade, however, seems to be more difficult, as the number of participants that could remember no color shade for a certain pictorial was in general higher than the amount of test subjects that were able to describe it correctly (cf. Figure 2). Exceptionally good was the shade description of sample no. 1, where 15 out of 22 stated that the background image is of the same color as the plain blue background, only a little lighter. Unusually high (10 out of 22 participants) was the amount of incorrect statements as to the color shade for sample no. 4, where statements like “dark” (4 out of 22) or “dark brown” (6 out of 22), “red brown” (2 out of 22) or “coffee-colored” (1 out of 22) were used. This, however, rather describes the shade of

the background or the color mask, respectively, whereas both the background and the product shot are lighter and less red.

The two designs where the main color was most difficult to remember were samples no. 5 and no. 7 in Figure 1 (10 out of 22 participants had no color recollection for the first one; 5 out of 22 had a wrong and 4 out of 22 no recollection for the second one, respectively). Sample no. 5 is multi-colored, using white and two different shades of brown. These two colors, however, were only remembered by 9 and 12 out of 22 test participants; others only mentioned “several” colors (8 out of 22). 7 out of 22 thought that the products shots have the “same color as the background” – although this is only true for one of the four corners where the images are placed; whereas in the other three, contrasting colors are used. Only one test viewer was able to describe this correctly.

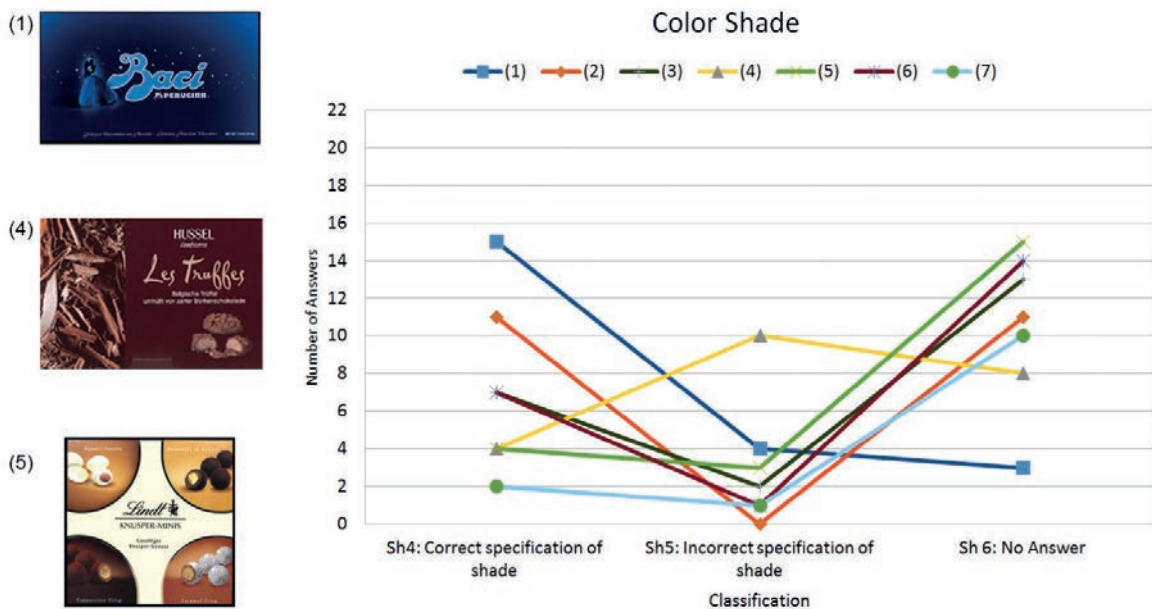


Figure 2: Sample results of the structured content analysis, visualizing the recollection of color shades. The recollection is best for sample no. 1, where the shade of the image is similar to the one of the background. Answers are often incorrect for sample no. 4, where the shade is substantially lighter than the background. The number of missing answers is highest for sample no. 5, which uses many different shades of white, yellow and brown.

Sample no. 7, on the other hand, uses colors that are quite unusual for chocolate boxes (yellow and purple, respectively), and is designed in an unusual comic style. Here, some test subjects mistakenly believed to see “red lips”, “bright, neon colors” or “high-contrast, gaudy colors” that are “flashing” (one statement each). The purple color was remembered by 12 and the yellow by 8 out of 22 test subjects; others thought they had seen the colors “red” (5), “blue” (4) and “green” (2), although the only additional color values used are black (remembered by 2) and white (by 1).

A sample with an unusually high number of mistakes whilst describing the base color (6 out of 22) was sample no. 2. This box of mint chocolates shows several dark brown, round pieces; some of them in golden or light green wrappings. However, only 4 of the test subjects were able to name three different colors at all – and in each case, one of them was wrong (black/brown/white was mentioned twice; black/gold/green and brown/green/“light-colored” once each). Ten other participants at least mentioned two colors, 8 of them correct ones. Among the colors mentioned most often were “brown” (16) and “green” (11). “Gold” was mentioned 4 times, “something light” twice and “yellow” once. Again, some colors that were *not* used in the pictorials were named repeatedly, particularly “dark green” (4; this is the background color), black (4) and white (3). For design no. 2, many color references were used by the interviewees. Such references were also used elsewhere; mostly to describe color shades (“cappuccino-”, “coffee-”, “salmon-colored” and so on). Sample no. 2, however, was once described as resembling “Beck’s crown caps” (Beck’s is a German brewery that uses a tall ship with light green sails in its commercials and sells its products in light green beer bottles – although both labels and crown caps are silver) and repeatedly as being “similar to After Eight” (5 out of 22). Although package no. 2 does indeed contain mint chocolates, the analogy in design is *de facto* lower than assumed by the interviewees: the background of sample (2) is mostly black rather than green, the chocolate pieces are round instead of rectangular, the wrappings are gold and light green and not black with a golden clock, and on some “After Eight” packages, a white mint filling is visible that is absent from the design in the test (although 3 out of 22 test viewers thought they had seen something white here).

3.2 Shape and size

Apart from color recollection, form recollection was tested as well. In general, it can be stated that the form of products was remembered more reliably than that of background images (although almost all products were either round or oval, which made guessing considerably easier). The highest number of erroneous statements (5 and 4 out of 22) and missing statements alike (13 and 8 out of 22) could be found for samples no. 4 and no. 6,

respectively. The most common mistakes for sample no. 4, which features flat oval truffles covered with milk chocolate shavings that give them a somewhat irregular appearance, was that the pieces were simply described as “round” (4) or “rectangular” (1).

A very detailed background image is visible on sample no. 3, which shows a row of paper flowers with two leaves on each side and truffles instead of blossoms. These paper flowers are standing on a geometric pattern consisting of semicircles with a little hole in the middle, faintly resembling ribbon embroidery. Although many test viewers were able to describe one aspect or another, no one remembered both: 10 out of 22 interviewees described the flowers and three the embroidery; two thought they had seen a picket fence, and one each an alley of trees, musical notes or truffles on a stick.

Some product shot/background interdependencies could be identified for sample no. 6, which features a detailed background image showing a line drawing of a historic square. This picture was described by some interviewees as “agitated”, “cluttered” (2), “detailed”, “difficult to interpret”, “distracting” or “interesting” (one each unless otherwise specified). Here, 12 out of 22 test viewers were unable to describe the product form correctly (4) or to remember anything about the product shot at all (8) – whereas 20 participants made descriptions of the background image (14 of them without fault).

A lot of confusion was also caused by the unusual, comic-style background in sample no. 7, which was described by the viewers as “abstract”, “arty”, “candy-like”, “chaotic”, “crowded”, “distorted”, “overburdening” or “a little weird” (one each). Here, a young woman with gloves amidst purplish bubbles in various sizes is shown – but this drawing was, amongst others, interpreted as “a clown”, “a cat”, “a figure with a purple hat”, “mice”, “something like Pluto or Mickey Mouse”, or “a boy wearing a base cap” (one each). Much higher, in contrast, was the degree of consensus for a small fair-trade logo in the upper right corner of the design: it was described by 10 of the 22 viewers.

Each and every test participant (22 out of 22) was able to describe the form of the background image of sample no. 1 – showing a young man and a woman standing close together; the only instance of a depiction of human forms apart from the comic character on sample no. 7. The wide skirt of the woman was remembered by 9 out of 22, as was the relative position of the couple (by 16 out of 22) – although several (18) stated that the couple was “dancing” instead of “kissing” (the real meaning can be derived from the brand name “baci”, which means “kisses” in Italian). Some even used explicit references (e.g. “looks like Beauty and the Beast”; 4 out of 22).

Another interesting result is that the coat of arms that is visible above the brand name on sample no. 2, albeit no image in the narrower sense, was not mentioned by anyone of the test viewers – neither the form, meaning, color nor position.

3.3 *Texture*

The texture of products was hardly ever remembered. Only for the samples no. 2, no. 3, no. 4 and no. 5 a mentionable number of texture references (i.e. more than one or two) was made. The highest number of erroneous statements could be found for sample no. 2, where only one correct (albeit very short) answer but five faulty answers were made. The latter correctly described that the pieces in this box are not smooth, but assumed that the chocolates are covered with “chopped” or “slivered” nuts, with “coconut flakes” or “chocolate sprinkles” (in reality, however, the pieces either have a ribbed texture or an engraving of the brand name on top). Other references (6 and 8 out of 22, respectively) as to the texture were found for samples no. 3 and no. 5 that both contain an assortment of truffles with varying appearance. Although the number of faults was considerably lower here, it is worth mentioning that none of the test viewers making statements about the texture described more than two different ones, although the pieces in sample no. 3, for instance, have five different forms of decoration.

Same associations (6 out of 22) as to the texture were also made for sample no. 4, where the chocolate flakes texture was mistaken for chopped nuts in two cases (another participant used a reference to Ferrero Rocher, which has an irregular surface as well, but is also covered with nuts).

3.4 *Alignment and position*

Another interesting result for the sample no. 4 was that several participants confused the position of the back-

ground image showing chocolate flakes (left-hand side) with that of the product shot (right-hand side). Of the 16 test viewers that described alignment and number for this sample at all, 15 described these properties for the truffles, but only 7 for the chocolate shavings. Six of them thought they had seen truffles on both sides of the design, and three mixed up the position of the flakes and the products. Detailed descriptions of the products were given by 8 interviewees, the form of the background image, however, was only mentioned by 4 – and there was only 1 participant that gave a detailed description for both pictorials.

In general, statements as to the alignment and the position of the products were highly inaccurate and had a great variety. Sample no. 5, for instance, featured three entire and one sliced chocolate pieces in each of the four corners, hence 16 in sum. Six of the test subjects, however, thought that they saw 1 piece in each corner, one 1–2, four 2–3, one 2–4, two 3, two 3–4, one 3–5, one 4–5 in each corner, whereas one thought he saw 2–3 and one 3 pieces on the whole. Similar results could be found for sample no. 3, featuring three paper flowers and seven flowers with truffles instead of blossoms. Again, the answers of the test participants varied considerably: some thought that they had seen 5 flowers (three viewers), two thought they had seen 5–6, two 6–7, two 7, four 8 and two 8–9, whereas others gave the numbers 4–5, more than 5, 5–8, 6 or 6–8 (one mention each for the latter).

Some interviews even contained obvious contradictions that were not even noticed by the participants: One interviewee, for instance, stated that both the man and the woman in the background image in sample no. 1 were standing in front of each other; another thought that the total number of chocolate pieces visible in sample no. 5 was four, and that in each corner of the package, one whole and one sliced piece of chocolate was to be seen (in reality, the number of visible pieces was sixteen).

4. Discussion

The results show that viewers do indeed remember a lot of details of the covered pictorial elements, even if these stimuli are only looked at for a short period of time. However, their recollection is often diffuse and, in some cases, inaccurate. The level of detail and the specifics remembered differed widely amongst test participants, possibly dependent of the viewers' level of interest or their likes and dislikes in the context of certain chocolate flavors. In two cases, at least, interviewees had an extraordinary detailed recollection of a design that they referred to as “spirited” or “the most beautiful of all”, whereas two other viewers had almost no recollection of a design that they considered to be “failed” or of a

product they thought to be “unaffordable”. This influence of emotional affordance on image understanding has also been mentioned in (Busch, 2007, p. 29) or (Wedel and Pieters, 2008, p. 38).

In general, it was quite difficult for the interviewees to remember discrete categories like size, the number of elements, color and so on. The wording of most statements suggests that, instead of discrete design elements, they rather remembered more complex, interlinked interpretations of what they had seen. These interpretations may in some cases even contain obvious contradictions (two persons both standing in front, one whole

and one sliced piece of chocolate in each of the four corners add up to four chocolate pieces in sum) that were not remarked by participants. This is in accordance with results stating that people's visual scan of an image is often not exhaustive (Duchowski, 2007, p. 263), that their information extraction is very selective (Hayhoe and Ballard, 2011, p. 610) and that objects are often only partially recognized (Findlay and Gilchrist, 2009, p. 136). van der Lans, Pieters and Wedel (2008, p. 929) state that consumers use only one or two basic features of an image at the same time when trying to find a brand rapidly and accurately.

The notion that perceived graphic entities are bound together to form a coherent representation in the viewer's mind can also be found in several studies (e.g. Treisman and Gelade, 1980, p. 97; Hayhoe and Ballard, 2011, p. 610, or Hochpöchlner et al., 2013, p. 1108). This internal model might also play an important role in image recollection (see below). This combination of only a limited number of perceptually outstanding visual features into a coherent visual representation allows for an efficient information processing and a quick recognition and comprehension of the basic meaning of an image, but is less suited for a complete and reliable identification of visual details (cf. Stiller, 2000, pp. 65–68).

A comparison of the respective visual components showed that the recollection of the *base color* of a design was more reliable for monochromatic designs than for polychromatic ones, where it was even difficult for some test subjects to name any color at all. The recollection of main colors was in general better than the recollection of shades. Similarly, statements describing the basic *form* of a depiction were often more accurate than those concerning minor details or the texture of the respective objects. Generally speaking, the recollection of color and shape was more reliable than that of other visual components – which matches results from van der Lans, Pieters and Wedel (2008, p. 54) stating that colors and edges have strong effects on both localization and identification of brands on shelves.

One of the more difficult tasks for the test participants obviously was the recollection of the *alignment*, the *position* or the precise *number* of chocolate pieces shown on the more complex designs. The higher the level of detail of a given pictorial, the higher was the number of erroneous statements. In the majority of cases, the recollection of the test participants tended to be less complex than the original: instead of three different colors in sample no. 2 or five different textures in sample no. 3, most viewers described not more than two, respectively; instead of sixteen chocolate pieces in sample no. 5, they believed to see 8 to 9 on average. Similar objects tended to be interpreted as a group, and properties tended to be generalized. For instance, all chocolate pieces of sample no. 2 or no. 3 were said to be round (although some

of them were rectangular); in sample no. 4 and no. 5, several viewers thought they had seen only *one* truffle in the product shot areas, although there were two and four, respectively. Apparently, participants prefer to focus on only a small number of objects. If there are, for instance, two pictures on a package (cf. sample no. 4 or no. 6), test viewers tended to remember only one of them, but seldom both.

Thus, the amount of visual complexity of the stimuli seems to play a crucial role in image understanding. Although it has already been stated (e.g. in Geisler and Cormack, 2011, pp. 440–441), that the complexity of selected stimuli may exceed the capacity of selected neural processing and can make a perfect performance impossible, it is nonetheless remarkable how low this threshold really is.

Apparently, product shots generally get more attention than background images – but detailed images got more attention than simple ones, and might even withdraw attention from other design elements. Only very few participants, for instance, were able to correctly recollect the color, form and number of chocolates pieces visible on sample no. 6 with its very fine-grained background image. Likewise, there were several mix-ups between product shot and background image properties while describing the sample no. 4. This is consistent with recommendations from Duchowski (2007, p. 274) and Wedel and Pieters (2008, p. 28), advocating a clearer or less heterogeneous background in the context of print advertising.

Furthermore, the viewer's recollection seems to be influenced by the environment in which the pictorial elements were placed – an assumption that can also be found in (Treisman and Gelade, 1980, p. 98). Many viewers, for instance, thought that the product shots on sample no. 4 showed dark brown pieces made of bitter-sweet chocolate. In reality, however, the chocolate pieces were light brown and made of milk chocolate (the background, however, had the dark brown color that the viewers described). In another case (sample no. 5), chocolate pieces were also said to be “of the same color as the background” – although this was only true for one of the four corners where the images were placed, whereas in the other three, contrasting colors had been used. Likewise, textual product descriptions on the package seemed to influence the statements, as well as the brand name: the term “symphony” on sample no. 3, for instance, led one interviewee to believe that he had seen musical notes. Another one believed that sample no. 7 showed a cat after he read the label “Mitzi blue” (possibly because of the similarity to “Mieze”, which means “kitty” in German).

Unusual designs that were rather atypical for chocolate boxes seemed to be comparatively more difficult

to remember than middle-of-the-road ones. Stylized paper flowers on sample no. 3 were mistaken for alleys or picket fences, the comic drawing on sample no. 7 for a clown, mice, or a boy wearing a base cap. On the other hand, well-known graphical symbols like logos or ecological seals were frequently remembered.

Equally interesting is the fact that participants used a lot of references to previous viewing experiences. For instance, a kissing couple was said to look like a scene from the animated film “The Beauty and the Beast”, or a box of mint chocolates was often described as

5. Conclusions

The image recollection of the test participants is varying, but in sum rather detailed, albeit often inaccurate. The properties of these images are, in general, only remembered fragmentary. The higher the “visual clutter” (i.e. the number of visual elements that compete for the attention of the test viewers), the higher becomes the danger that elements are remembered incorrectly or that details are completely forgotten. Therefore, the number of graphical elements on a package should not be too high, because viewers can only focus their attention on a rather small set of visual elements. Visual elements that are supposed to be background elements should not be too big, too colorful or too detailed so as not to withdraw attention from more important elements such as, for instance, product shots. Here, it seems to be important to carefully choose the right level of detail, a sensible, limited number of visual elements and to find a well-balanced equilibrium so that no visual element may capture the viewer’s attention at the expense of others.

As for the packaging designs, too unorthodox designs tend to irritate the viewers and lead to a poor recollection or even to a mix-up of product categories (candy instead of truffles). It seems that a certain similarity to competing products is preferable, because this eases recollection. Too much similarity, on the other hand, is prone to threaten product differentiation, thus making a product indistinguishable from its competitors (for a more detailed discussion of this aspect, see van der Lans, Pieters and Wedel (2008)). The chal-

lenge seems to be to create a design that is in line with the expectations of customers without losing its individuality.

As for the obvious differences in text and image processing that have already been discussed in Nikolaus and Lipfert (2012) and Nikolaus and Geissler (2013), it can now be stated that text and graphics play fundamentally different roles in visual perception and recollection – a statement also to be found in Hochpöchlner et al. (2013, p. 1120). This is consistent with results from Piqueras-Fiszman et al. (2013, p. 332), stating that the substitution of a text with a photo on a jam jar design had highly significant effects on the attention paid to the respective elements. In the context of print advertising, Duchowsky (2007, pp. 265–267) also found that viewers spent much more time viewing text than viewing pictures in these ads, deducing that consumers may be paying much more attention to text than previously thought.

Further research could investigate this text-image relationship in the context of packaging design in greater detail, especially with regard to the interplay of text and graphics in getting the viewer’s attention, improving the product differentiation and influencing buying decisions. Apart from a mere examination of packaging design stimuli and their corresponding visual components, the influence of emotional responses and their impact on the perception and recollection of packaging designs might be analyzed as well.

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