Colour emotions in larger and smaller scale

Beata STAHRE,* Maud HÅRLEMAN,† and Monica BILLGER*
* School of Architecture, Chalmers University of Technology, Sweden
† School of Architecture, Royal Institute of Technology, Sweden

ABSTRACT

It is well known that a colour's appearance can differ between a small colour chip and the same colour applied to a real room. The impression of the colour changes between these circumstances; e.g. on the chip it can be subdued, while it is perceived as striking in the room. In this paper, we compare the results of a colour chip study, colour emotion, to Hårleman's full-scale room study.

In the first study, textile chips were viewed against a grey background in a viewing cabinet. In the other study, two rooms were painted in 12 hues in two different nuances: NCS 1010 and NCS 1030. They correspond well to the hue areas and to two of the nuance categories used in the chip study. Semantic scaling was used in both studies. The two studies show a distinct difference between words associated to colours of the same nuance and colour category. A clear pattern could be seen. In the room, the colours were perceived as more distinct, stronger and they arouse much stronger emotions. Generally, a colour chip had to be much more colourful to give comparable associations.

1. INTRODUCTION

How does the context affect our associations towards colour? It is a well-known fact that the colour experience differs, depending on whether it is applied to a small surface or to a whole room. In this text, two studies will be compared. One is Maud Hårleman's investigation into the colour experience in painted rooms, lit by daylight in north- and south facing direction (Hårleman 2001, 2004). The other study is the Swedish part of the international project Colour Emotion Research and Application (Billger, Stahre and Konradsson 2002).

The aim is to describe differences and similarities in the way we perceive colours, on the basis of the context's significance and the size of the colour field. In this text, only the results from the north facing room in Hårleman's study will be compared with the colour samples of the colour emotion-study, due to the fact that this is the light best resembling neutral light.

2. METHODS

2.1 Hårleman's room-study

In her investigations, Hårleman has conducted studies in two full-scale rooms with similar colour schemes, observed in light from the north and south. Her question is whether the rooms get a different character through the differences in colour the light creates. Additionally six hues in two nuances were used for painting the rooms; 3 light pink, 3 pink, 2 light green and 3 green paints, and a yellow and a blue. 90 observers carried out a total of 118 studies.

Semantic differential scales, graded from one to six, have been used to describe the character of the rooms, complemented with oral interviews. The meanings of the different

significant variables on the differential scales have over the years been tested by many researchers (Kunishima and Yanase 1985, Küller 1980, 1991, Sivik and Taft 1992). It has been determined that they sort under different factors for different research fields, like colour in room-model, exterior-colour, single colours and colour combinations. Hogg et al. (1979) discovered five factors which concern colour in room-models. In Hårleman's room study, four of these have been used to sort the different variables of experience. These factors are: *temperature* (cold, warm); *spatial quality* (small, clear, open, dry, hard); *dynamism* (tranquil, lively) and *emotional tone* (gloomy, cheerful, nice, formal, sunny). In addition, two untested variables of experience have been added (surrounding and elevating). These sort under the factor *emotional tone*.

2.2 The colour emotion-study

During the spring of 2002, the Swedish part of the international colour emotion-study was carried out at Chalmers, which aimed to investigate how people from different countries and cultures associate towards colours. The study was led by Tetsuya Sato of the Kyoto Institute of Technology and Jim Nobbs of the University of Leeds. In all of the countries 114 colour chips, in 10-12 nuances of 10 hues, were used along with 6 achromatic samples. The colour samples were observed against a neutral grey background in a viewing cabinet with simulated (D65). In the Swedish part of the study 60 observers participated, with equal numbers of men and women.

A semantic 2-point method was used for the assessment, which meant that the observers chose which word in a word-pair corresponded most with the colour. The translation of the Japanese words was done in each country. In Sweden a translation was done based upon both Japanese and English. Twelve word-pairs were used in the study: Deep-Pale, Dynamic-Passive, Distinct-Vague, Gaudy-Plain, Heavy-Light, Light-Dark, Soft-Hard, Striking-Subdued, Strong-Weak, Transparent-Turbid, Vivid-Dull and Warm-Cold.

2.3 Comparison of the two studies

How can the different studies be compared? The colour emotion-study (CE) has more adjectives describing each colour, while the room study focuses more on the feelings and experiences of the room. Often we cannot compare the studies word for word, however we can translate the words to reasonably correlate with the other study and thus gain a picture of how the colours were perceived in the different situations. Also if we gather the descriptive adjectives from each study, we get a collection of impressions which together provide us with a clearer picture for comparison.

The two studies are based upon two different colour order systems. In the room-study the NCS-system was used and the CE-study used the system SCOTDIC PLUS 2000, which is based on Munsell's colour order system and adjusted to textile samples. To make the comparison between the two studies correct, we have visually translated the textile chips into the NCS-system (see Figure 1).

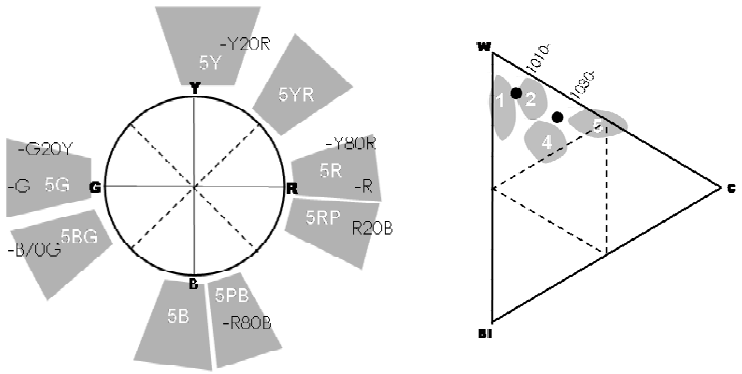

Figure 1. Left: The grey areas with white text are the hue areas in CE. The black text shows the hues of the room study. Right: Nuance areas in CE with white text. Black text and mark for the room study.

3. RESULTS

In Hårleman's room-study it was the *pink* and *green* colours that caused the strongest experiences. These experiences were distinctly different and associated to different aspects. The green rooms were experienced as open, tranquil and lacking cheerfulness, as well as more formal and hard. The light green rooms were experienced to be cooler and more open, while the green rooms were relatively warmer and more surrounding. The blue-green room however, was experienced to be the coldest. The pink rooms were perceived to be neither formal nor tranquil and gave a cheerful impression. They gave a surrounding and lively feel and were also the colours which the observers reacted strongest to in the study. All of the pink rooms were described as warm, except for the bluish pink, which was described as cold. The light pink and the pink rooms offered a similar experience, while the light green and the green rooms differed.

The differences between the pink colours in the room-study and the samples closest to them in the CE-study are striking. The light pink CE-samples are more colourful than the colours in the room-study, but were experienced as weak, subdued, fairly passive and calm. Half of the observers also described it as a cold colour. The pink hues correspond in the CE-study to three colour chips, of which one is somewhat greyer and the two others a lot more colourful. What is interesting is that the more colourful samples correspond a lot better to the room-study. They were perceived as dynamic, striking, vivid, strong, soft and gaudy. The same inherent colour[1] on a small textile sample was thus experienced as a weaker colour, which did not cause as strong reactions as the corresponding colours in the room-study. In the CE-study also more colourfulness in the samples was needed for the reddish colours to be experienced as warm. The lighter nuance 1010- was experienced as colder than the nuance 1030- in the room-study. This corresponds to that whitish colours were in general experienced as colder than the more colourful samples in the CE-study. Of the textile samples we here refer to, only the colourful pink was experienced as warm in the CE-study.

In the room-study both the light green and the green colours were considered tranquil, with the light green rooms more formal and tranquil than the green ones. The tendency towards less tranquillity with enhanced colourfulness agrees with the results of the CE-study. This effect however seems to demand a higher colourfulness in the green room than on the textile samples. Most observers thought that the textile samples equivalent to the paint in the room were striking and gaudy, and more than half thought they were vivid.

[1] *Inherent colour* is defined as the colour property of the material that does not change due to viewing and lighting conditions. Here it is used for the NCS-code of the paints and the Munsell-code of the textile chips.

On the other hand the resemblances are significant between the light green rooms and the colour samples closest to them in the CE-study. The rooms were experienced as open, tranquil and enhancing the boring character of the test-room. This correspond to the CE-study, were the light green textile samples were described as passive, subdued, weak and calm.

In general, the pink rooms were experienced as soft while the green rooms were neither soft nor hard. In the colour emotion-study neither the pink nor the green colour chips were experienced as clearly hard or soft.

4. CONCLUSION

In the colour emotion-study, its grey frame and the viewing cabinet as well as the room surround the colour chip in general. The colours appear more subdued than in the room-study. In a room you are surrounded by colour, you are inside it. The colour reflections of the room enhance both the colour and the colour experience. The displacement of colour in the room-study makes them stronger in colourfulness and blackness, and will hence correspond to a different CE-sample. To compare the experience of a room-colour and a colour in the CE-study, the CE-sample must be from a significantly stronger nuance.

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Address: Beata Stahre, Design and Media, Architecture
Chalmers University of Technology, S- 41296 Göteborg, Sweden
E-mails: bea@arch.chalmers.se, maudh@arch.kth.se, billger@arch.chalmers.se