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A model to link different modes and different aspects of appearance

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Abstract

The model presented here is a conceptual framework for a better appreciation of appearances. It links different modes of appearance – illuminant, surface and volume – and different aspects of appearance – colour, texture, gloss, lustre and transparency.

1. Common visual experience

The complexity of appearances, as multi-dimensional visual phenomena, has been a deterrent to progress in theoretical development of the subject. David Katz (1935/1911) was the first to provide a systematic account of different ‘modes of appearance’. His focus was colour but his approach can be extended to include other aspects of appearance: texture, gloss, lustre and transparency, topics I have touched on before (Green-Armytage 1991, 1993). The model presented here links different modes and different aspects of appearance. However, no model can encompass the full experience of seeing the world in space and time. This was acknowledged by the members of the Committee on Colorimetry of the Optical Society of America (1953: 145) when they referred to “the infinite variety of textures and settings with which colors are perceived in common visual experience.” While much has been learned in ‘laboratory conditions’, with standardized lighting, uniform surfaces and isolated samples, this has been study of what is essentially an artificial world. In common visual experience colour cannot be separated from other aspects of appearance, nor can it be insulated from context. The critical role of context for perception is stressed by Steven Shevell and Frederick Kingdom (2008). And part of any context is the light by which things are seen, its coherence, colour and intensity, and the way it varies from place to place and over time.

2. Contrast and context

Between 1985 and 2001 I had many discussions with Western Australian artist Howard Taylor. Taylor objected to my work with colour chips. In one of his letters to me, quoted by Gary Dufour (2003: 19), Taylor wrote: “An isolated colour or other element is a specimen only – an I.D. card”. In that letter he stressed the importance of contrast as it applies to all pictorial elements. Contrast is an essential feature of common visual experience just as it is for the pictorial elements in a work of art. Contrast with neighbouring colours influences the appearance of colours and without contrast there can be no appearance of texture, gloss, lustre or transparency.

The complexity of common visual experience is the concern of Juliet Albany (2009). In a session at AIC 2009 she presented a series of observations that were the fruits of her efforts to grasp the totality of what she sees around her, especially the influence of the changing natural light on local appearances in and around the place where she lives, her namesake city of Albany on the south coast of Western Australia. One year later, members of the Colour Society of Australia joined her in Albany for a series of workshops to explore her ideas. A major aim of the workshops was to find ways of describing visual phenomena that could help members of a community to become more sensitive to the particular visual qualities of their surroundings.

3. Describing objects and arranging objects ‘in order’

In one study a collection of objects, that exemplified different modes of appearance and that exhibited a wide variety of appearance characteristics, was assembled as a ‘still life’ (Figure 1). The room was lit by light from the windows and this was supplemented by a spot-light that was focused on the display so that clear shadows were cast. There were two illuminants in the display: the tail light of a motor-car and a candle flame. The wine and the milk in glasses were examples of colour in the volume mode. In the surface mode, objects were smooth, textured, glossy, lustrous, transparent and opaque.



Figure 1. Still life display for studying different aspects of appearance

The task in the still life exercise was to write down words for describing each object. Many found the task difficult because there was so much variety and because they could not find words to describe some of the particular qualities they saw. One of the simplest objects to describe was a billiard ball. While some were content with ‘red’ and ‘glossy’ or ‘shiny’, one person wrote: “glossy, white highlights, bright red, deep red, curved shadows.” Such close observation and detailed description were common.

In a follow-up exercise, participants worked with sets of similar objects and were asked to ‘arrange them in order’. The results are shown in figure 2.

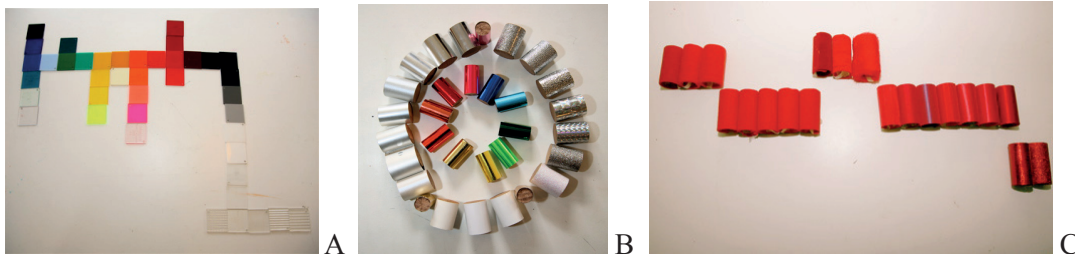


Figure 2. Sets of objects arranged ‘in order’

This study revealed the importance of making a clear distinction between physical properties and visual phenomena. Objects can be seen clearly through transparent samples but not through translucent samples. Translucent samples allow light to pass through but opaque samples do not. However, it was not always possible to make these distinctions when the samples in set A were laid out on the table. Transparency and translucency, as visual phenomena, depend on contrast with adjacent colours. In fact it is possible to perceive as transparent something that is physically opaque, an ‘illusion’ illustrated by Augusto Garau (1993). The objects in sets B and C exhibited a range of textures and degrees of gloss and lustre. Texture was revealed by the contrast between the small elements that constituted the texture. The cylindrical shape of the objects meant that, for each object, there was also the contrast between highlights and shadows that is characteristic of gloss and lustre. Gloss and lustre are defined here in terms of the colour of the highlights: highlights on a glossy surface are the colour of the illuminant; on a lustrous surface highlights are of the same hue as that which is perceived as ‘belonging’ to the surface.

4. A model for appearances

In each of the three sets it was difficult to arrange the objects in a single linear sequence. Some objects were the starting point for more than one sequence: the matte white cylinder in set B could connect with cylinders of increasing gloss in one direction and increasing lustre in another. The observation that one kind of appearance could connect with different kinds of appearance suggested the possibility of a model for appearances: a three-dimensional network of appearance sequences, linked through ‘primary sensation nodes’ which are the reference points for the model presented here (Figure 3).

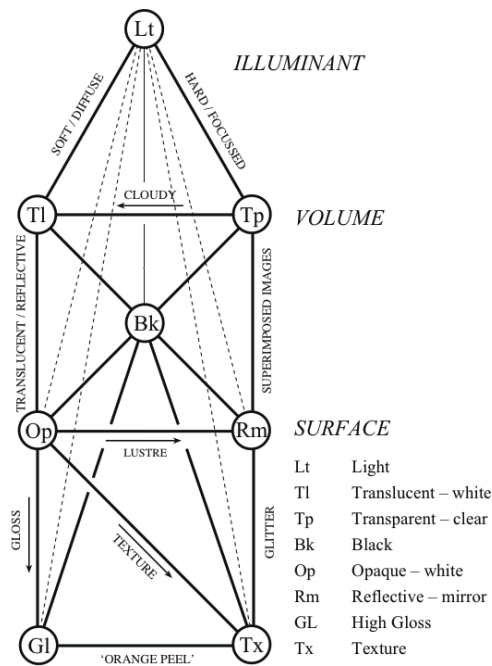


Figure 3. Diagram showing relationships between aspects of appearance and illumination

represented on the diagram. ‘Hard’ light, as from direct sunlight and under which objects cast clearly defined shadows, is represented on the line Tp to Lt; ‘soft’ light, as from a heavily overcast sky and under which no shadows are cast, is represented on the line Tl to Lt. The billiard ball in the still life display (Figure 1), that appeared glossy under the hard light, could appear almost matte under soft light, an effect pointed out by Ralph Evans (1948: 53).

Evans (1974: 99–102) has also identified a threshold between coloured surfaces that appear to reflect light and those that appear self-luminous; in connection with this threshold he emphasises the role of contrast between a coloured area and its surround. Crossing this threshold would mean a change in mode of appearance from surface to illuminant. The dotted lines which converge at Lt on the diagram are to suggest scales of increasing apparent luminance beyond this threshold. Modes of appearance depend on the context but they are generally quite stable. However, a change in context can lead to a change in mode of appearance. Several examples of how a change in context can lead to a change in mode are described by The Committee on Colorimetry of the Optical Society of America (1953: 146–150). A three-dimensional model for texture, with dimensions of density, linearity and size, has been proposed by César Jannello (1963). Jannello’s model, like the models for colour, can also be linked to the diagram, with the line Op – Tx as Jannello’s scale for size, but there are some qualities of texture that are not captured in Jannello’s model.

5. Limitations and conclusion

The model described here does allow for a form of scaling but it is strictly a model for perceived appearances. Any measurement must depend on the judgements of observers. The model does take account of contrast and context, as they influence appearances, but it can only deal with parts of an object, or elements in a scene, one at a time; it cannot represent the object or scene as a whole. Also, there are textures and surface qualities for which additional descriptive words are needed. Words used by participants in the still life exercise included: rough, soft, furry, silky, waxy, grainy, dimpled, and speckled. Geologists in the field use a number of words, including 'silky' and 'waxy', to describe what they find as a first step towards identification (Whitten and Brooks 1972). A follow-up study is needed to develop a vocabulary of descriptive terms, with agreed meanings in relation to appearances, that could be used in conjunction with the model. While the model has limitations, and needs to be complemented with additional descriptive terms, it can represent different modes of appearance and the relationships between colour, texture, gloss, lustre and transparency. I hope it can lead to a fuller appreciation of the richness and complexity of common visual experience.

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