

# Scaling the Outdoor Environment

**John B Hutchings**  
6 Queens Road, Colmworth,  
Bedford MK44 2LA  
+44 1234 376768  
john.hutchings@physics.org

**M. Ronnier Luo**  
Colour, Imaging and Design Centre  
The University of Leeds  
LS2 9JT  
m.r.luo@leeds.ac.uk

## ABSTRACT

In this paper, we suggest a protocol for scaling the outdoor environment. This is based on total appearance techniques developed during a study of the food and drink indoor environment in which we related specific physical features to emotions and expectations generated in the viewer.

### Keywords

Colour, appearance, expectations, impact, outdoor environment

### General Terms

Measurement, performance, experimentation, human factors, theory

## 1. INTRODUCTION

Local government counsellors and officials are seeking to understand the town and city environment in order to optimise income by increasing tourist numbers. Visitors tend to be attracted to environments that appeal or are beautiful or pleasing or functionally appropriate. Money is spent and this attracts businesses which in turn contribute income to local authorities through the payment of taxes and rents. An understanding of how the many differing elements of an environment contribute and combine to create an appealing space is lacking. A start has been made on teasing out effects of different elements of the designed food and drink environment to the extent that we can examine the driving forces leading to the perception of expectations for the eating experience. That study was confined to visually perceived cues only and for which we are currently seeking a design partner [2]. This paper extends the approach to the external environment of the urban and rural scene.

## 2. THE OUTDOOR ENVIRONMENT

Study of visual cues of the eating and drinking environment is helped by the fact that the area in question is normally confined within four walls. The customer views such spaces in terms of identification expectations of *cleanness*, *comfort*, *privacy*, *elegance* and *quality*. These were deduced using conventional bipolar scales. The physical scene can also be analysed using bipolar scales describing the physical properties of the interior. All such images as well as impact images can be visually analysed. Using this approach we can deduce, for example, that the image of *elegance* can be increased by, among other factors, the use of soft but colourful colours, increase in surface texture variation and increase in visual appreciation of cleanness [1].

All our senses are involved in the appreciation of an outdoor environment. Areas can be characterised by the smells associated with them. Examples include the aromas of lemongrass, chilli, coconut, lime leaves, fish sauce, shallots and coriander of the Bangkok street. We may detect the smells of coffee or blocked drains or cigarette smoke or those caused by traffic pollution as we walk along the main street. Some intrusive pollution we can actually taste. Sound emanating from people, traffic, machinery, canned music and pedestrian crossings form a background to our walk and if it is too intense makes an unwelcome intrusion on our consciousness. The sense of touch is evoked when we are in a crowd, when the rain falls or when we trip over an unseen unevenness in the pavement or sidewalk. Although these senses may be vital to our total understanding of the scene, more than

90% of what we know about the scene arises from the visual sense. This paper restricts analysis to this visual sense.

The outdoor environment is complex and this paper seeks to address the difficulties. As with indoor studies the approach is based on the principles of total appearance. Scenes consist of physical properties as well as our psychophysical responses arising from inputs initiated by the physical properties. These are our inherited and learned responses to such sensations including our psychology, and the effects of our immediate personal environment such as medical needs, climate and the need for food.

We can divide our interaction with an outdoor scene in terms of four elements that directly relate to the physical properties of the environment. These comprise our perceptions of these physical properties, the psychophysical effects of our perceptions of the physical properties, that is expectations, the overall impact, and the psychological effects on us as individuals. Images relate to perception effects resulting from a view of the physical properties of the environment. For specific investigations regarding, for example the effects of some specific feature(s) of the environment, actual physical data can be factored in. Such physical features might be average traffic speed, actual ratio of natural features versus concrete in the area, and the actual ratio of lighted to unlighted areas. This general approach can be applied to any investigation including town and rural landscapes.

The physical properties of the outdoor environment fall into two parts – the static environment and features added to the static environment. For example, the urban environment consists of industrial buildings concerned separately with manufacture and offices, domestic dwellings, social buildings, such as shops, religious buildings, natural features such as trees, and routes through the area. These can be expressed in terms of proportions. Other properties include colour and surface texture variation, decorative quality, properties of the horizon and scene accents and elements such as street furniture including overhead electricity supply lines. All such properties can be scaled. Added to this static environment are scalable features such as the presence of animals and human beings in the scene, including age ranges, sexes and presentation (e.g. peaceful to threatening). Climate and weather includes warmth, closeness (humidity),

rainfall, visibility, and underfoot conditions including ice and snow. Within the scene there may be vehicular, pedestrian and animal movement. Illumination qualities can be scaled in terms of perceived proportion of areas illuminated, natural and artificial illumination sources, quality, intensity and distribution in terms of evenness and pattern. Colour is also an added feature with added decoration in terms of quantity and age. Permanent and temporary dirt, such as litter may also be perceived as environment features.

Expectations are the psychophysical effects of our perceptions of the environment and also comprise of two parts. The overall expectations are visually assessed safety, visually assessed identification, visually assessed usefulness, visually assessed pleasantness, and visually assessed satisfaction of the expected outcome of interaction with the space. For specific applications we can scale for specific expectations, such as degrees of sophistication, 'greenness', comfort or vibrancy. All expectations can be scaled.

The third property of the external environment is scene impact which can be summarised in terms of the general model comprising degrees of warm to cool and hard to soft. This concept was proposed initially to categorise colour and colour combinations but was later extended to objects and environments<sup>3</sup>. Use of this model can be extended from a summary of the whole scene to the separate elements of the scene. For example, it can be extended to the design elements (e.g. curves and angles), colours, materials, lighting, weather, and air movement within the scene, material movement within the scene (e.g. traffic), and human movement within the scene. The overall colour image can also be summarised using the Green-Armytage descriptors of the colour impact [4]. This Colour Zone

model has been successfully applied, for example, to summarising colour impact in the cityscapes of Stockholm, the art deco area of Miami, the traditional Spanish empire colours of Old San Juan in Puerto Rico, and city and townscapes in the UK [5].

The fourth property of the external scene comprises the psychological effects on us as individuals. Among the scales that may be appropriate for this are degrees of fear, loneliness and happiness.

## REFERENCES

- [1] John B Hutchings, 2003, Expectations and the food industry - the impact of color and appearance, New York, Kluwer/Plenum Publishers
- [2] John B Hutchings, M. Ronnier Luo, Li-Chen Ou, 2011, Quantification of scene appearance—A valid design tool?, paper accepted for Color Research and Application
- [3] Kobayashi, S., 1998, Colorist, a Practical Handbook for Personal and Professional Use, translated by Keiichi Ogata and Leza Lowitz, Kodansha International, Tokyo.
- [4] Paul Green-Armytage, Colour zones, explanatory diagram, colour names, and modifying adjectives, Proc Ninth AIC Congress, 2001 Rochester, editors Robert Chung, Allan Rodrigues (Washington, SPIE The International Society for Optical Engineering, 976-979, 2002)
- [5] John B Hutchings, Colour contrasts in advertising – façade colours of food and drink consumption venues, Proc Ninth AIC Congress, 2001 Rochester, editors Robert Chung, Allan Rodrigues, (Washington, SPIE The International Society for Optical Engineering 72-75, 2002).