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The Influence of Colour on Observers Perception In Scenic Presentation

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Abstract: In ones everyday life, colour has a multiple meaning. In order to act, human must visualize the objects that surround him, and colour is one of the basic dimensions of the visual space. The energy is the factor which define the entire psychophysical experience of an observer, on which the observer defines its decision about observed colour relation as harmonious, agreeable and acceptable, or not. So the knowledge about how to act with colour, how to direct the specific energy of colour and contrasts that arises from the relationship of specific energies in creating the presentable environment in fashion presentation and expression, are essential in creation of a designer. Knowledge of influence of colours on observer's perception, the knowledge of colours energy relationships, recognition of scientific besides artistic nature of colour, is essential in artistic creation of an designer, either in creation of model itself or in creation of ambience for model presentation. Each element used in presentation of the object induces perceptive reaction of an observer: shape, texture, lightness, and each of them influence the appearance of colour and observer's experience of colour. Colour is the most important element of the design and is closely connected to a theme, contrast, balance and harmony. If one of these elements provokes the negative psychophysical reaction of an observer, the aim of positive reaction to a presented object would not be achieved.

1. INTRODUCTION

The great colour theoretician, Johaness Itten said: Colour is life; for a world without colours appears to us dead".

In ones everyday life, colour has a multiple meaning. In order to act, human must visualize the objects that surround him, and colour is one of the basic dimensions of the visual space.

First scientific researches in the field of psycho – physical colour experience were led by Aubert, Exner, Helmholtz, Hering and Land. They defined the basics of colour phenomena understanding. Colour is, by its definition, the phenomena of light. Objects modify the light in a way that dyestuffs and pigments in coloured surfaces selectively absorb certain wavelengths of incident light, while other reflects or transmit. The dominating wavelength in reflected part of incident light, observer visually experience as colour. Every colour from visual light spectrum that observer percept, regarding the frequency of associated wavelength has its own specific energy.

The energy is exactly the factor which define the entire psychophysical experience of an observer, on which the observer defines its decision about observed colour relation as harmonious, agreeable and acceptable, or not. So the knowledge about how to act with colour, how to direct the specific energy of colour and contrasts that arises from the relationship of specific energies in creating the presentable environment in fashion presentation and expression, are essential in creation of a designer.

2. THREDIMENTIONALITY OF COLOR

Regard the specific structure of visual system, the observer experience colour as three – dimensional through visualisation of hue, lightness and chroma separately.

The colour hue is defined with dominant wavelength in reflected part of incident light from the coloured surface, or to simplify, the colour hue can be defined as the impulse based on which the observer experience certain colour as red, green, blue, purple, etc.

On Figure 1, the example of blue coloured surface spectra is shown. It is shown that the dominant reflection is in blue part of visible spectrum.

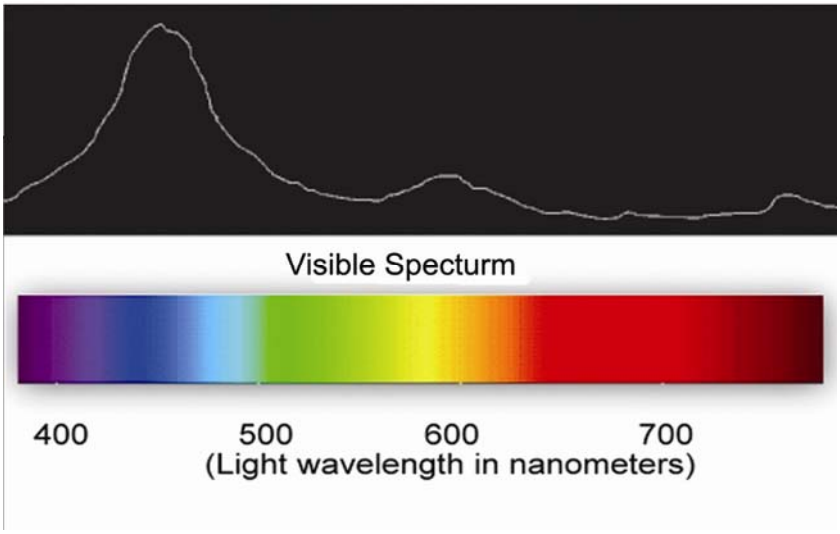

Figure 1. *Example of blue surface spectrum*

Chroma, that is saturation of colour, is definition of its purity, and lightness parameter is defined by the amount of light reflected from the observed surface. Human eye cannot distinguish numerous levels of chroma, but it is extremely sensitive for lightness parameter and can recognize numerous levels of lightness.

That is why the lightness parameter exactly is leading dimension in creating emphasised contrasts and in accenting those elements of scene which ought to be instantly noticeable.

3. COMPLEMENTARITY

Also, of great importance for achieving balance in multicoloured scene is complementary contrast. As it was already said, because of the absorption and reflection on certain wavelengths, an observer will visually experience the colour. Absorption and reflection of particular wavelengths occur on principles of complementary contrast and that is the reason why observer's sense of balance is associated to a complementary contrast. But, as much as the complementary colours are always in balance, putting in the third colour alongside the complementary colours can cause certain disharmony.

For example, in complementary pair of yellow and violet – blue, the yellow is the colour of extreme self energy and strong lightness of its own, so it would be the first to induce the visual reaction of an observer. But, because of the congenital need for complementary balance, the observers visual system will, immediately after noticing the yellow accents react on complementary colour to yellow and that is violet – blue, or it will seek for the nearest colour to violet – blue to satisfy the need for balance.

So in multi coloured scene where the complementary pairs exists, the human eye will primarily notice this complementarities, while the rest of the elements would stay unperceived. Also, because of that need for complementarities, the observer will, if there is no satisfactory complementary balance in a scene; create the sensation of complementarities (simultaneous contrast). Respectively, if on multi – coloured scene dominate the red hues and if the elements of green that is complementary colour to red are not included to create the satisfactory balance, the observer's visual system will create the sensation of green and all other colours surrounding the reds will appear greenish.

4. COLOUR RELATIONS IN SCENIC PRESENTATION

Designer that is willing to accept such nature of colour and have knowledge of basic elements of colour phenomena is capable to create, not only the form of his creation acceptable to an observer, but also the ambience which will, by its form an colour emphasize the basic idea.

On Figure 2, the example of colour used as conceptual tool in presentation of fashion creations, is shown.

Figure 2a: *Example of correct relationship of chromatic hues of objects and achromatic hues of surrounding*
Figures 2b, 2c and 2d. *Examples of incorrect presentations of models with various colour characteristics.*

In situation showed on Figure 1, since the human eye is most sensitive on lightness impulses in yellow and yellow – green area, because of the inert ion of the human eye, the observer will percept the object that reflects exactly in range of yellow to yellow – green colours. In general, as it was already mentioned, yellows and yellow – greens are characterized by its own energy. Such colours are used for contrasts in which exactly the elements in those colours must be emphasized.

So it is not recommended to join such colours with other chromatic colours in scene. It is much more effectively to present such objects independently on backgrounds of grey scale which emphasize the lightness dimension of yellows and yellow – greens. Thus the risk of "visual competitive effect" is avoided. The effect of "visual competitive" appears when there are two or more objects of approximately same chroma and accented reflection (accented lightness) characteristic in visual area, which attract the observer's attention with similar intensity. In such conditions the observer's visual reaction will be confused and none of the objects would be percept completely.

The aim is not achieved, and the aim was to present the object and to attract the observer's attention.

If we observe only the red object on Figure 2 (red suit), it would be the example of correct relationship of chromatic intensive colour with achromatic, dark grey surrounding (dark grey – the achromatic colour of low lightness and low energy).

In such scene the human eye will react on higher energy intensity, which is red colour showed. Achromatic surrounding, additionally emphasize the presented object. The observer's attention is focused only on presented object.

As opposed to red coloured suit on Figure 2, the red colour of object shown on Figure 2a is of lower chroma and it is not in satisfactory contrast to achromatic hues of surrounding. The object is of lower energy in compare to same object showed on Figure 2, and insufficiently excites the perception of an observer, so the experience of presented object is not satisfactory.
On Figure 2b the grey suit with grey tie are presented on achromatic, dark grey – black background so the human eye percept only the changes in lightness level, which means that percept only the changes in energy. Because of absence of specific hue the object looses its notability. With addition of chromatic detail – red tie (Figure 2c), the observer's attention is again directed to object. It can also be explained with the inert ion of the human eye which reacts on most intensive impulse.

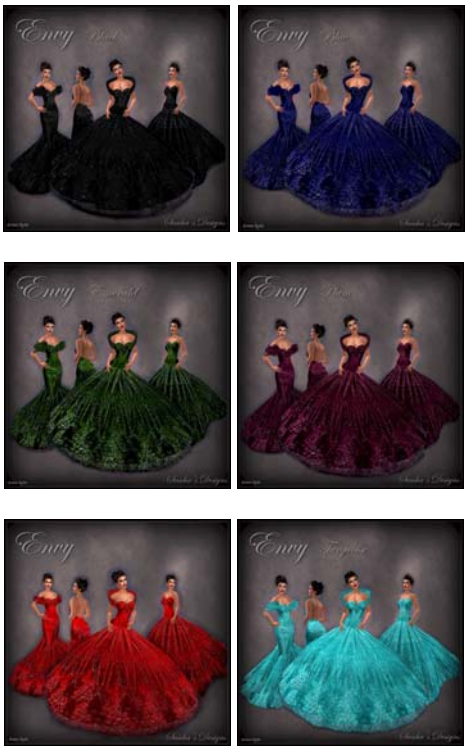

Figure 3. Example of the same object in various colours on identical – achromatic (grey) background.

Although is showed on example on Figure 2, that the presentation of chromatic coloured objects on achromatic backgrounds is correct, the differences in lightness levels must be respected (Figure 3). The colour hue is the psychological experience through which the observer defines the colour according to dominate wavelength of incident light. For colours of lower chroma of dominate hue, the influence of background and surrounding on observer is emphasized. So in examples of achromatic black and deep dark blue, green and violet (Figure 3), the apparent fusion of background and object colours occurred. So the visual experience of an observer will be attracting to elements of highest intensity, which is on examples mentioned, the colour of the skin. The object again stays unnoticed.

In presentation of red object the contrast is more emphasized, while in presentation of turquoise object of high intensity the proper, dramatic contrast which direct the observer's perception strictly to presented object, is achieved. This also confirms that energy of colour, respectively the lightness of colour is the key element of visual perception.

It was showed that in presentation of created model, in general, because of the psychological experience of an observer, it is important to conceive the suitable surrounding. The observer bring the judgement of acceptance or rejection the object, not only based on experience of colour and texture of the object itself, but also based on the ambient context in which the model is presented (intensity of light, the colour of light, the colour and shape of background). Colour, shape and texture are complements to each other and dependent on each other when it comes to visual experience of certain design.

Also, for the purpose of product presentation, designer aims to broadcast the message and to achieve the maximal communication towards the observers. So, the designer must consider all the mentioned and must use those elements of design which will serve for emphasizing certain product while creating the ambience or scene for his product (model), and that is firstly the choice of colours which will assure the sensation of harmony and balance in observer's experience.

Figure 4. Example of correct usage of hues near to achromatic area and their contrast.

Equable colours near to achromatic area guide the visual experience and emphasize the surface appearance and texture. On Figure 4, the example of correct usage of contrast of hues near to achromatic area is shown.
Model of low lightness, of achromatic dark brown hue, is presented in bright ambience of high lightness, but still wasn't used white. White is the colour of exceptional energy and brightness which would take over the domination in such scene. So the beige surrounding of reflection lower in compare to white was used, which ensures the complete experience of presented model. Model is not in colour of dominating hue but, with correct choice of neutral ambience, the texture and form of model are emphasized.

5a 5b 5c

Figure 5a, 5b and 5c. Examples of high lightness hues near to achromatic area combinations.

On Figures 5a, 5b and 5c, the examples of correct and incorrect usage of hues near to achromatic area with minimal part of chromatic hue, is showed. At such hues the lightness parameter is most responsible for achieving satisfactory contrast which will guide the observer in desired direction that is on presented model.
On Figures 5a and 5b, because of the usage of similar shades of ambience and presented object, with similar lightness intensity, the apparent fusion of surrounding and object colours occurred. On Figure 5b is showed the example of usage of not only the similar colour of surrounding and object, but also the similar pattern, which cause the perception of entire scene with equal intensity which is not the aim. The aim is to draw the observer's attention to presented model itself. On Figure 5c, the example of correct combination of colours of objects and surroundings is shown. White, which is characterized with high level of reflection on highest lightness level, draws the observer's attention. Presented on neutral grey background of lower energy intensity the brightness of white is even more emphasized.

Figure 6. *Gloss as element of visual perception*

One of the key element of visual perception is, also, gloss. Gloss contributes to amount of light reflected from the surface which additionally stimulates the observer's visual experience. On Figure 6, the models in shades of similar energy intensity and high level of gloss are shown. The models are presented in ambience of unsatisfactory contrast (background is in similar shades and similar characteristics of lightness and gloss as the presented models), which resulting in inability of observer to distinguish the colours of objects from surrounding and background colours. The problems in details perception occur (golden, glancing – middle model). Observer percept the scene completely without drawing the observer's attention directly to model or detail.

As opposite to example on Figure 6, on Figure 7 the example of satisfactory contrast is showed.

Figure 7. *Example of satisfactory contrast for surfaces of high gloss level.*

From psychological point of view, the inert ion of human eye for deeper blue shades is significant. But using the ambience of high lightness without dominating hue, the satisfactory contrast can be achieved and observer percept the presented model. Additionally, because of the enhanced light reflection from the surfaces of high gloss, the visual reaction is additionally stimulated.

With such relations, the positive contrast of object and ambience is created and the visual experience of an observer is hierarchically set to assure the primary perception of presented object and then the colours of surrounding and background.

In fashion performances another element must be respected and that is the movement of the body. (Figure 8). Model created in patterned material together with motion creates one rhythmic unity which draws the attention of an observer.

Figure 8. *The examples of objects on rhythm ic background.*

So it is preferable, in such scenes, usage of clear ambience, because the usage of rhythmic backgrounds additionally burden the inert human eye which does not have the right perception because of the sudden changes of energy levels. So the complete experience of presented model is not achieved.

Figure 9. *Examples of absolute contrast of black and white.*

Because of the emphasized contrast of white ambience and prevailing black on presented models, every detail of presented pattern is expressed, as well as the texture of the materials (Figure 9).

Figure 10. Problem of usage the elements of emphasized reflection.

Figure 10 shows the possible problems while positioning the objects in luminance, titrating ambience, which is not advisable because the human eye always firstly react on rhythmic elements of high lightness and energy.

If there are elements of higher reflection in compare to presented object in the scene, the human eye will be excited with those elements exactly and will percept first the elements of surrounding and then the aimed object.

4. CONCLUSION

In this paper certain confirmation of thoughts of one of the greatest colour theoreticians, John Ruskin, can be found and he says: "The colour is the secret element of visual perception. The colour energy influences the psychological as well as physiological processes of human being".

And Mahnke says: "Colour is the vital form of communication since the beginning of time. It is one of the most important tools for emotions and psychological states expressions in all living creatures that possess the visual ability".

Knowledge of influence of colours on observer's perception, the knowledge of colours energy relationships, recognition of scientific besides artistic nature of colour, is essential in artistic creation of an designer, either in creation of model itself or in creation of ambience for model presentation.

Each element used in presentation of the object induces perceptive reaction of an observer: shape, texture, lightness, and each of them influence the appearance of colour and observer's experience of colour. Colour is the most important element of the design and is closely connected to a theme, contrast, balance and harmony. If one of these elements provokes the negative psychophysical reaction of an observer, the aim of positive reaction to a presented object would not be achieved.

The problems can arise from the presentation of model on background which has the irritating effect n observer, because in this case the background first draws the observer's attention and not the presented object.

REFERENCES

Itten, J. (2001). *The Elements of Colour*, (John Wiley & Sons (Ed.)), published by John Wiley & Sons Inc., Germany: ISBN:0-471-28929-9

Malacar, D. (2002). *Color Vision and Colorimetry: Theory and Applications*, published by SPIE Press, USA, ISBN: 0-8194-4228-3

Nassau, K. (1998). *Colour for Science, Art and Technology*, (K. Nassau (Ed)), Published by Elsevier Science, Netherlands, ISBN: 0 444 89846 8

Parac – Osterman, Dj. (2007). *Basics of Colour and Colour Order System*, (Z. Dragčević (Ed)), Faculty of Textile Technology, University of Zagreb, Zagreb, ISBN: 978-953-7105-11-2