The use of ‘neutral colours’ in the retouching of large losses in wall paintings

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ABSTRACT: As the aesthetics of a work of art is determined by its ‘unity of form’, I analyse the disturbance produced by losses, according to the principles of Gestalt psychology focusing on wall paintings, which are included in an architectonical context. After a brief overview of different kinds of losses and techniques of retouching, I concentrate on the use of ‘neutral colours’ in the retouching of large losses unsuitable for reconstruction. A ‘neutral colour’ might be an appropriate solution for filling an interrupted image, without reconstructing it. However, we should focus on the term ‘neutral’ because the subjective perception of each colour is always determined by its context. In addition, having stated that the artistic style of each age and scientific discoveries have affected restoration, I go on to propose some perceptual surveys which might help us to evaluate the influence of perception on the development of theories of restoration. It would also be useful to compare the results of these surveys with theoretical predictions to understand better the choices made by restorers.

1. INTRODUCTION: Restoration refers to all the procedures aimed at improving the appearance of a work of art. It is the moment in which the artefact is recognised in its material, aesthetic and historical aspects; however, restoration deals only with the material of the work of art. The removal of a work of art from its original place can only be motivated by its conservation, in fact the atmosphere and the light of the environment in which it is located are also part of it. In addition, restoration should be reversible and kept at a minimal level, to avoid any reduction of authenticity of the artefact [1].

2. THE PERCEPTION OF LOSSES IN RELATION TO THE ‘FORMAL UNITY’ OF A WORK OF ART: Applying the principles of Gestalt psychology, Cesare Brandi’s Theory of Restoration (1963), stated that the aesthetics of a work of art is determined by the unity of form as a whole. The purpose of restoration is to achieve its potential formal unity, which continues to exist within the fragments [2]. Gestalt psychology deals with the form-forming ability of our perception, and concerns with the visual recognition of figures and whole forms rather than just collections of elements (according to the ‘principle of totality’ whereby experience must be considered globally). The concept of form is summarised in the ‘law of prägnanz’: among geometric features, the simpler ones are perceived as a form [3]. In addition, there are two ways to complete an image: through a ‘bottom up’ process, which is called primary (involving stimuli); or through a ‘top down’ process called secondary (involving cognition). ‘Amodal perception’ is the term used to describe a structure partially present in the visual stimulus but perceived as complete [4] (e.g. an object partially covered by another one, will be perceived as a entire although only part of it is visible).

The aim of repainting lost areas is to minimise the disturbance caused by losses (or lacunae), while respecting the authenticity of the work of art, as an artistic creation and a historical document. Referring again to Gestalt psychology, Brandi stated that losses in a painting are disturbing since they tend to form a pattern. Because of this ‘new shape’, the image slides into the background while lacunae place themselves in the foreground, destroying the aesthetic unity of the work of art [5].

The mechanisms of perception facilitate a rapid understanding of what we see in order to perceive shapes. The visual system must separate the permanent from the
transient, to monitor changes in the environment [6]. Figure-ground perception delimits the parts of the visual field considered as figures. The face-vase drawing by Rubin [7] (Fig.1) is a striking example of reversible figures: depending on whether the white or black colour is seen as figure, or background, we will interpret the picture as two different images; however, it will be impossible to perceive both meaningful images simultaneously [8].

Fig.1 Face-vase figure (after Rubin, 1915)

We might wonder whether a loss is perceived as a figure or as a hole. A hole is an ‘absent’ or ‘negative’ form, it has a shape but it does not have the internal cohesion of a figure [9; 10]. In the restoration of wall paintings, a loss not filled with lime mortar might more easily be perceived as a hole (Fig. 2.a) because black tends to visually recede; instead, a loss plastered with lime mortar tends to be perceived as a figure (Fig. 2.b) because white tends to emerge (the colour of lime mortar is usually bright because of the lime contained in the mixture). Plastering is fundamental in preventing further decay, so it cannot be avoided. In addition, a form which has regular edges and a regular shape seems to be perceived as a figure more than a jagged-edged one [10] (according to the ‘law of prägnanz’ the simpler shape is perceived as a figure [3]; compare Fig. 2.b with Fig. 2.c).

Fig. 2.a Losses not yet filled with lime mortar; Fig. 2.b Losses plastered with lime mortar, with jagged edges; Fig. 2.c Losses plastered with lime mortar, with more regular edges.

The extent to which losses prevail over the image also depends on their shape, size and location. A loss will increase its ‘weight’ in direct proportion to its height, place within the image, and location in the composition [11].

2.2 Different kinds of losses: Wall paintings present several characteristics that will be relevant to the consideration of their losses: they are part of an architectonical context, usually they do not have a frame, and they cannot be moved unless for conservation reasons. Wall paintings can also appear to increase or qualify the architectural space. They can suggest the perspectival illusionism of real architecture through the depiction of architectural elements, as in a trompe-l’oeil. Losses that may alter a painting can be distinguished according to their size, location and depth. The most common kinds of losses to the layer structure are [12]:

1. Loss to the support (Fig. 2.a). These losses need to be filled with lime mortar to stop further decay, then they can be retouched. The composition of the mortar is chosen by analysing the composition of the wall painting, in order to get as close as possible to the colour and texture of the original material.

2. Loss to the paint layer. In this case, losses only need to be retouched.

Kinds of losses which may be found to the image [12]:

1. Small losses which can be reconstructed.
2. Losses that cannot be reconstructed because of their size, or location, within the image.
3. Large losses which can be reconstructed if the wall painting is considered as part of the architectural decoration, consisting in a repetition of geometric patterns. In this special case, losses can be reconstructed because they are also perceived as gaps in the architectural context. However, the reconstruction should differ from the original.

3. THE AIM OF RETOUCHING: Retouching facilitates the perception of a whole image which has been interrupted by re-establishing, when possible, both its chromatic and formal continuity. Different techniques are accepted, provided that their results are distinguishable at a close
range from the original pattern, minimal and reversible. Products used must be carefully selected according to the chemical composition of the painting, and to their resistance to ageing, atmospheric agents and light. We should take into account that there are different theories and methods; reconstruction must be considered in relation to the whole work of art [13]. The kind of intervention also depends on the style, texture of the surface, size and location of losses within the work of art. Retouching should adapt to different types of gaps. It is better to proceed gradually and treat minor deteriorations first, then treat the more significant ones [12].

During the last two centuries scientific discoveries, the development of chemical production of industrial pigments and the birth of certain modern artistic movements with a particular interest in visual perception have affected the knowledge of colour vision, and have also impacted on the theory of restoration.

Various methods can be considered to satisfy the requirement that retouching must be identifiable at a close range. Rigatino (or tratteggio) is a technique commonly used on various works of art. It was inspired by Theory of Restoration by Cesare Brandi, and developed at the ICR in Rome in 1950s. This technique interprets the work of art as a historical document: it consists in filling the loss with several colours in brush strokes which at a distance blend with the painting. The strokes do not completely overlap, so the eye perceives the mixture of colours in a ‘vibrating’ form (working in a similar way to pointillisme, but consisting of little lines) [14].

The evolution of scientific knowledge in colour vision greatly influenced painters in the second half of the XIX century, and in this context the technique of pointillisme was developed. Georges Seurat gave a scientific support to the Impressionists intuition by fragmenting representation into small patches of complementary colours close together, so as to be fused in vision [15].

Umberto Baldini in collaboration with Ornella Casazza at the OPD in Florence, developed two ways of retouching starting from rigatino. ‘Chromatic selection’ is applied when it is possible to re-establish the formal continuity of the painting, and consists in following the graphic and formal ductus with strokes of pure colours, selected by ‘breaking up’ the colour surrounding the loss. ‘Chromatic abstraction’ is used when only chromatic continuity can be re-established. The overlapping of brush strokes, consisting mainly of primary colours, creates a ‘neutral’ tone which fits in with the colours of the remaining original composition. These methods are strictly related to the knowledge of mechanisms of visual perception [16].

3.2 The use of ‘neutral colours’ in the retouching of large losses in wall paintings: Restoration has required a more rigorous methodology since the last century both because of scientific discoveries, and as a reaction to past habits involving the arbitrary reconstruction of works of art. One approach to restoration that has emerged in response adopts a purist attitude and rejects retouching altogether. This attitude respected the historical value of the work of art, but accepted damage to its aesthetic value resulting from loss to the continuity of form. The method of using a ‘neutral colour’ to fill losses was developed starting from this purist approach, according to which the work of art is treated as a historical document. This theory has been criticised because it does not restore integrity to the interrupted image, however, it has been widely used in the restoration of wall paintings because it fits in with the material and the architectonical context [14].

Before choosing a retouching technique, we should consider the advantages and disadvantages of each one in relation to the size of the loss and the context in which it is located. Large losses, unsuitable for reconstruction, require the restoration of chromatic continuity to prevent the gap from interfering within the painting and the context. The reconstruction of missing parts is no longer justified when involves large areas (apart from for architectural purposes), and the advantages of rigatino decrease as losses become bigger [12]. Nowadays, the most common solution is plastering the losses in a tone similar to arriccio [17] (the layer of lime plaster which provides a base for the intonaco); however, we might also consider using a ‘neutral colour’. It is intended as a chromatic harmonisation of the area of loss with the original surrounding area, in order to fill the interrupted
image, without reconstructing it. The 'neutral colour' is one of the solutions adopted in order to respect the work of art as a historical document; however, we should question whether 'neutral' is the right word or not. Finally, the colour of an object depends on three key parameters (saturation, lightness and hue). In *Theory of Colour* (1810), Johann Wolfgang Goethe stated that what really matters are 'physiological colours'; colours as they are actually perceived [18]. Also, in his physiological account of colour interaction the French chemist Michel Eugène Chevreul defined 'chromatic contrast' when two or more colours seen contiguously are influenced in lightness and/or in hue [19] (Fig. 3). Therefore, considering that the perception of each colour is influenced by its context, some problems arise about how to define a 'neutral colour'.

**Fig. 3 Chromatic contrast**

4. PERCEPTUAL SURVEYS: The theory of restoration has been influenced by the history of art and science; however, we should also take into account the results of perception. The following perceptual surveys are proposed as a method of investigating 'subjective' perception. In addition, the results of these surveys might lend scientific support to some of the choices made by theorists of restoration up to now, and/or help us to understand how they have been developed.

4.2 Method: The images presented will be digital representations of wall paintings, artificially elaborated, when necessary. The images will be projected on a large screen to respect the original size of the works of art, when possible. The observers will be grouped together according to their age, sex, and interests. Several figures will be presented in each survey, asking the observers a simple question, such as: ‘which image do you prefer/disturbs you more?’, or ‘which image causes a greater disturbance in perceiving the whole composition?’. A second question might be: ‘why did you answer that?’ to check which features of the image affect the perception of the observer. Statistical methods will be used to analyse the data.

**First survey:** The survey will be useful to understand the relationship between perceived disturbance and position of the loss. We will present the observers with the same image in two different -artificially created- loss conditions. In the first case the loss will cover the main element of the image, in the second it will cover part of the background. In both cases, the losses will have the same shape and size, and ‘height’ within the image. We will ask ‘which loss is more disturbing’, and then, ‘whether both the losses perceived are of the same size or not’. We suppose that the loss which disturbs more, would be perceived as bigger.

**Second survey:** This concerns ‘amodal perception’. In this case we will present the observers with two simple images to check if a loss disturbs more within a single geometric figure, or within a pattern repetition of the single geometric figure. The losses will be artificially produced. The observers, presented with the two different images, will be asked which loss is more disturbing. If we find that the gap in a pattern disturbs more, the result would support the choice to reconstruct losses when a wall painting is a recurrent pattern repetition.

**Third survey:** This concerns the level of saturation of a ‘neutral colour’. Taking into account that a loss, when filled with an appropriate neutral colour, would recede into the background, we would try to understand when observers perceive it receding. We will present the observers with an image of a wall painting with an artificial large loss filled with a ‘neutral colour’. Each observer will be permitted to adjust the level of the saturation of the neutral colour by an experimental device. We will ask each observer to choose the level of saturation at which he/she perceives the loss receding. If he/she perceives the loss receding already when not highly saturated, this result will support the use of *sottotono* retouching (keeping integration in less saturated colours than the original).
Fourth survey: This deals with the choice of using ‘neutral colour’ to fill multiple losses in images. In this case it is not clear whether the choice of the neutral colour should take into account the entire context (i.e. assigning one colour for the whole set of losses), or the local one (i.e. adapting the colour to the surrounding area of each loss). We will present the observers with three variations of the same image containing large artificial losses. In the first image the losses will be filled with the same physical colour, chosen from the general context of the painting. In the second they will be filled with the same perceived colour (losses filled with the same physical colour, but altered in lightness and/or hue to compensate for the chromatic contrast, in order to be perceived as the same). In the third image the neutral colour will be different for each loss, strictly depending on the colour of the surrounding area. In this case the observers will be asked ‘which image they like better’ in order to understand if they prefer the losses filled in accordance with the local context or with the entire one, and also to see if they notice the disturbance produced by the chromatic contrast.

5. CONCLUSION: Restorers should aim to find the right balance between theory and practice and consider the work of art as a whole. The main problem is how to reduce the disturbance resulting from losses. This aspect also involves perception, so, I propose some surveys to explore systematically the disturbance produced by losses in the perception of a work of art. The results of the surveys could help restorers in their interventions, facilitating them both in considering the whole context in which the work is located, and in understanding upon what basis some theories have been developed, especially concerning retouching. The critical problem is how to choose an appropriate ‘neutral colour’. We are thinking about developing a scientific method (*) to calculate the average and the main neutral value of the whole painting, and of the area immediately surrounding the loss. Then, we could compare the data obtained with the neutral colours suggested by experienced restorers to evaluate if and how the results differ.


REFERENCES