

## Negative afterimages as locally filtered perception

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Traditionally, negative – or complementary – afterimages are classified as visual illusions or even as hallucinations. For instance, the popular view is that, after staring at a RED patch for several seconds, one sees a GREEN afterimage and vice versa – a view shared by many scholars [1-9]. The paper presents empirical evidence that contrasts such a view.

A simple perceptual test was administered to a sample of 350 students. The results were divergent from Hering inspired models. A different hypothesis is thus put forward – negative afterimages are partial and temporary blindness to color components. In short, if S is the color of the original stimulus, A is the color of the afterimage, B is the color of the ensuing background, k is a modulating parameter, a simple relation can be devised:  $A = B - k S$ .

In the red stimulus example, this is exactly what happens. S is red, B is white, and A is white minus red, which is cyan:  $A = \text{white} - \text{red} = \text{cyan}$ .

According to such a model, negative afterimages are perception of a subset of the available color components in the external world. They are neither illusions nor hallucinations – they are perception of actual colors normally conceived. The model suggests that the afterimage is a function both of the stimulus and of the ensuing background.

The experimental setup tested whether different afterimage hues could be predicted using different ensuing background and identical stimulus. This was indeed the case. An afterimage is thus the result of a subtraction and not of an addition. Afterimages are not perceptual objects but localized filtering areas. Afterimages are neither projected nor seen, rather they are a local alteration of the visual field through which one sees something less than usual. One thus sees a stimulus-shaped floating filtered area – an area inside which certain color components are filtered away. To recap:

- a. Hering-inspired models are not coherent with empirical evidence
- b. Negative afterimages depend both on the stimulus and on the ensuing background ( $A = B - k S$ )
- c. Afterimages do not require any mental illusory color. Afterimages are perception of the subset of the existing colors.
- d. Afterimages are locally filtered perception of the external world.

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