

Filling in the afterimage after the image

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We have constructed a stimulus with a black central area surrounded by red and green patches. The stimulus can easily be conceived as a superposition of two different shapes consisting of all red patches in one shape and all green patches in the other shape (Stimulus 1). After disappearance of this stimulus we show a thin outline of one of the overlapping shapes (Stimulus 2).

During the presentation of Stimulus 2, the colour appearance of the black central area appears either greenish or reddish, depending on the specific shape of the outline; the afterimage appears greenish if the outline corresponds to the shape made up by the red patches in Stimulus 1 and vice versa. Notice that these differential colour appearances occur within the same area of the stimulus.

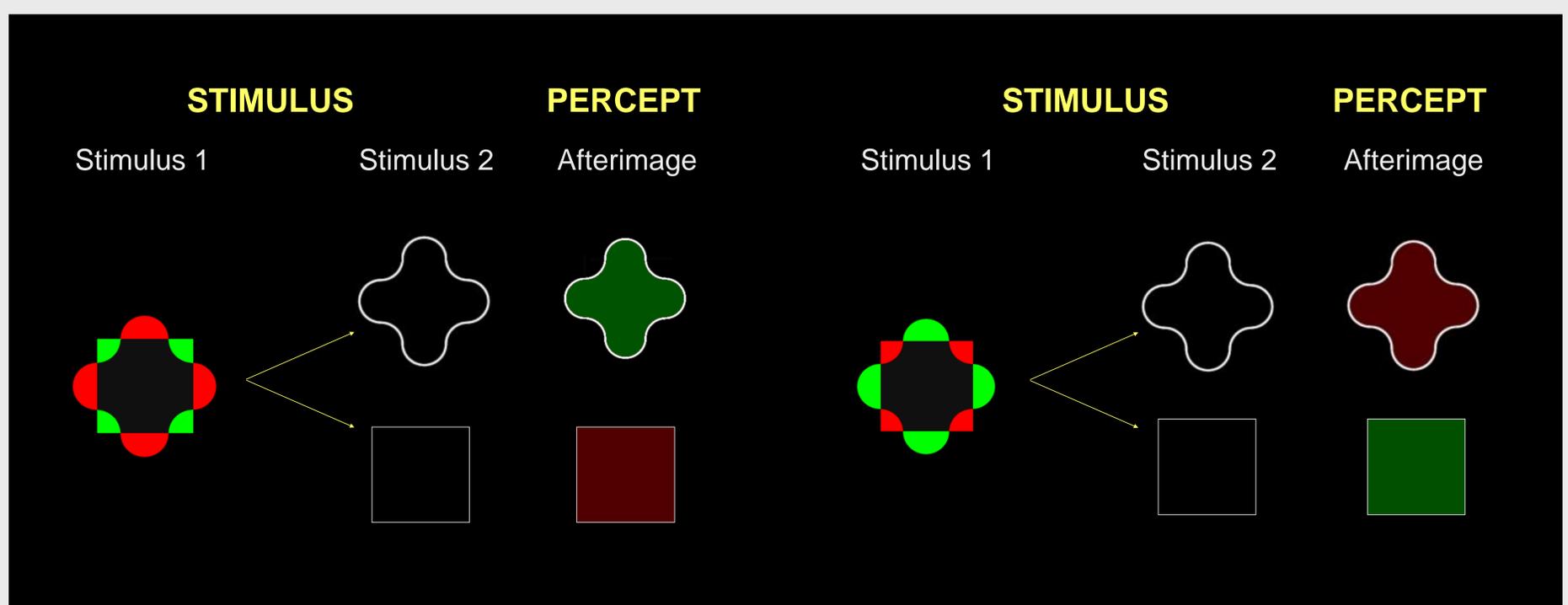


Figure 1

Experiment

An experiment was performed to test the phenomenological observations. In this experiment, Stimulus 1 and one of the outline shapes (Stimulus 2) alternated (4s for each stimulus). Below these alternating stimuli, a second outline, having the same form as Stimulus 2, was presented. The task was to adjust the colour of the inner part of this outline shape to match the afterimage in Stimulus 2. The results ($n=2$) confirm the initial observations; the color adjustments indicated afterimages as shown in Figure 1 (RvL: $t_{19}=7.09$, $p<.001$; MV: $t_{19}=2.50$, $p<.05$).

Discussion

Further observations suggest that the phenomenon is likely to be caused by a spreading of the afterimage of the coloured elements between the physical contours of the outline shape. For example, when a circle is positioned in the center of the outline shape (as in Figure 2), no afterimage is perceived within the circle. In addition, when a circle is positioned in the centre of Stimulus 1, followed by an outline shape without circle, the perceived afterimages are similar to those as seen in Figure 1.

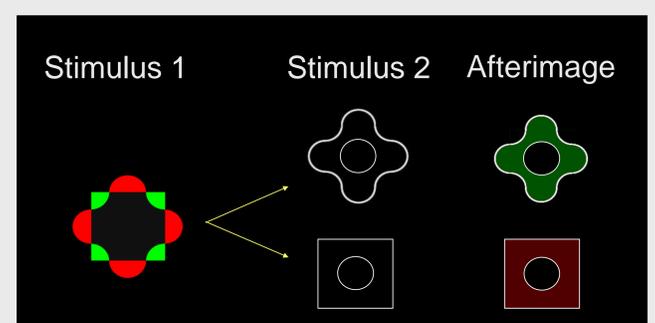


Figure 2

In conclusion, the observations so far suggest that the afterimage effect is not due to higher level effects of shape-specific coloured afterimages but rather to a rapid spreading of local patch-based afterimages within the outlines presented after the image.