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Color contrast is 'seen' by the brain early doors

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Colour contrast is detected much earlier in the brain than previously thought, a new study shows.

Scientists at Durham University have confirmed that colour contrast is first detected by part of the brain called primary visual cortex, which is located at the very back of the head where visual information first enters the cortex of the brain. This was recently discovered to be the case in animals but has not been tested on human beings until now.

The research also confirms that the brain does most of the work in seeing the difference between colours, rather than the eye.

The team of neuropsychologists identified a patient with damage to this specific part of the brain. They showed the patient visual illusions in which the contrast between the coloured spots in the foreground and their background colour affected the way the spots looked. People with this part of the brain intact would see the spots as different as they look different on varying backgrounds. The patient was not able to detect that difference.

The research, which is published in the *Proceedings of the National Academy of Sciences* this week, makes a significant contribution to the understanding of how the brain functions.

Dr Robert Kentridge, lead researcher and lecturer in Durham University's Psychology Department explains: "Colour is a product of

our nervous system – it is a ‘pigment’ of our imagination. The colours that we see are more related to the materials that things are made of than the light reflected from them into our eyes. Making this happen involves many complex processes. One of the earliest involves seeing contrast between pairs of colours. We have found that this important step of seeing colour contrast happens much earlier in the brain than we had realised up to now.”

The research study used a common approach in neuropsychology, that of extensive testing of a single patient, in this case one who had portions of the right primary visual cortex surgically removed in 1973 for treatment of abnormal blood vessels in the brain.

Professor Charles Heywood, who leads Durham’s Psychology Department, added: “People can distinguish between colours partly because of the contrast with its background. If someone has lost that ability through brain damage, it means that they might see colours as changing all the time. The colour of clothes, and indeed everything else we see, would change dramatically, depending on the colour of light which shines on them.”

Source: Durham University