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Evolution of the visual system is key to abstract art

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Famous works of abstract art achieve popularity by using shapes that resonate with the neural mechanisms in the brain linked to visual information, a psychologist at the University of Liverpool has discovered.

Humans make aesthetic judgements about shapes and forms quickly and easily, preferring certain shapes to others, even in the absence of any narrative. Dr Richard Latto, from the University's Psychology department, has discovered that these shapes resonate with the processing properties of the human visual system, which is responsible for analysing what we have seen.

Dr Latto said: "Humans inherit a basic visual system through genetics. That system provides very selective information about the world around us. It has evolved to provide only the information that we need to survive - for example, we cannot see most electromagnetic radiation or follow the leg movement of a galloping horse.

"Of course our visual systems can be influenced by social factors, like fashion and the number of abstract images that we expose ourselves to, but evolution had given us some genetically determined responses to certain shapes and forms. In popular abstract works such as Matisse's The Snail (1963), Mondrian's Composition with Red, Blue and Yellow (1930), and Malevich's Supremus No. 50 (1915), the artists start with a blank canvas and arrange shapes and colours in a way that is aesthetically pleasing, using their own brain to monitor the effect.

"We like to look at the human body or parts of the body like the face and hands, stylised representations like stick figures and organic forms of the kind incorporated into the work of Salvador Dali and Francis Bacon. Certain landscapes and horizontal and vertical lines are also popular because they resonate with our visual systems, which have been tuned by evolution and experience to respond particularly to these biologically and socially important stimuli.

"We know that neurons in the brain need to be kept active to flourish and develop, so it is important for the visual system to be stimulated and sometimes pushed to the limit to function effectively. As with other adaptive behaviours, we have evolved a mechanism for encouraging this by rewarding ourselves with good feelings. Perhaps we enjoy looking at faces, landscapes and Mondrian's work because it is good for us and good for our brains."

Dr Latto added: "Artists were experimenting with abstract shapes long before scientists began analysing our nature of perception. Through observation or trial-and-error, artists have been identifying these aesthetic primitives - critical shapes and arrangements - and have indirectly defined the nature of our visual processes. In purely abstract painting, as with much music, form is all we have. Popular works have shown that essentially we like looking at what we are good at seeing."

Source: University of Liverpool