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Can paint strokes help identify Alzheimer's?

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A new University of Liverpool study published today in *Neuropsychology* shows that it may be possible to detect neurodegenerative disorders in artists before they are diagnosed.

Psychologist Dr Alex Forsythe from the University's School of Psychology and her team, working with Dr Tamsin Williams of Tees, Esk, and Wear Valleys NHS Trust, Vale of York and Maynooth

University, Ireland, examined 2092 paintings from the careers of seven famous artists who experienced both normal ageing and neurodegenerative disorders.

Of the seven, two had suffered from Parkinson's disease (Salvador Dali and Norval Morrisseau), two had suffered from Alzheimer's disease (James Brooks and Willem De Kooning) and three had no recorded neurodegenerative disorders (Marc Chagall, Pablo Picasso and Claude Monet).

Fractal analyses

The brushstrokes of each of the paintings were analysed using a method of applying non-traditional mathematics to patterns known as 'Fractal' analyses to identify complex geometric patterns.

Fractals are mathematical characterisations of self-repeating patterns often described as the 'fingerprints of nature'. They can be found in natural phenomena such as clouds, snowflakes, trees, rivers, and mountains. This method has also been used to determine the authenticity of major works of art.

Although painters work within a different style or genre, the fractal dimension in which they operate should remain comparable.

Patterns of change

The results were examined to see if the variations in an artist's unique 'fractals' in their work over their career were due to them just increasing in age or because of ongoing cognitive deterioration.

The study showed clear patterns of change in the fractal dimension of

the paintings differentiated artists who suffered neurological deterioration from those aging normally.

Dr Alex Forsythe, said: "Art has long been embraced by psychologists an effective method of improving the quality of life for those persons living with cognitive disorders.

"We have built on this tradition by unpicking artists 'handwriting' through the analysis of their individual connection with the brush and paint. This process offers the potential for the detection of emerging neurological problems.

"We hope that our innovation may open up new research directions that will help to diagnose neurological disease in the early stages"

More information: Alex Forsythe et al, What paint can tell us: A fractal analysis of neurological changes in seven artists., *Neuropsychology* (2017). DOI: 10.1037/neu0000303

Provided by University of Liverpool

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