

Mona Lisa's smile not genuine, researchers believe

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Credit: St. George's University of London

New research has found that the Mona Lisa's famed smile is almost certainly 'forced'—raising the intriguing possibility that Leonardo deliberately portrayed her that way.

A trio of neuroscientists set out to investigate the truth of the Mona Lisa's expression and apply neuroscientific principles to the world's best-known painting.

Dr. Lucia Ricciardi at St George's, University of London is part of the "Motor Control and Movement Disorders" group and has a special interest in facial expressivity and facial emotion recognition in people with [movement disorders](#). She has carried out research into conditions such as Parkinson's Disease which is characterized by a reduced facial expressivity, and has begun to investigate the facial expressions of healthy subjects. Together with colleagues Luca Marsili of the University of Cincinnati and Matteo Bologna of Rome's "Sapienza" university, she set out to find if the mysterious smile's secrets could be unlocked.

Firstly they investigated the mechanism of the expression. The researchers used a 'chimeric face' technique; cutting the mouth in half and placing each half alongside its [mirror image](#).

The two chimeric images were judged by a group of 42 healthy subjects and rated according to the expression perceived.

The subjects agreed that the left-left image showed happiness, while the right-right side image was less expressive, being perceived as neutral or even sad. This led to the researchers' conclusion that the Mona Lisa is smiling asymmetrically.

The researchers then applied their neuroscientific knowledge to this conclusion. Dr. Ricciardi explained: "According to the most accredited

neuropsychological theories, if a smile is asymmetric it is usually non-genuine. While what we call a "Duchenne" smile, a genuinely spontaneous smile, is bilateral and symmetrical. It's also characterized by upper face activation and that also doesn't seem to be the case in this portrait."

More recently, research by Paul Ekman in this field has suggested that asymmetric smiles can be a sign of insincerity or of a lie.

So if her smile is "forced," what could that mean? Dr. Ricciardi explained: "Of course, we know that posing for a picture for many hours will result in a forced expression. But we also know that Leonardo was a master of 'sfumato'—the technique of shading which is used to demonstrate expression. He deliberately raised her left lip, as if to paint a smirk. He would have known that curving the lip on both sides and adding folds around the eyes would have shown a genuine smile. And he had this knowledge hundreds of years before Duchenne's work in the 1800s. So we have enjoyed hypothesizing that this asymmetry was a deliberate action. What we still don't know is the reason that he portrayed her this way—so her [smile](#) is as elusive as ever."

More information: Luca Marsili et al. Unraveling the asymmetry of Mona Lisa smile, *Cortex* (2019). [DOI: 10.1016/j.cortex.2019.03.020](https://doi.org/10.1016/j.cortex.2019.03.020)

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