

Aesthetic appeal may have neurological link to contemplation and self-assessment

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A network of brain regions which is activated during intense aesthetic experience overlaps with the brain network associated with inward contemplation and self-assessment, New York University researchers have found. Their study sheds new light on the nature of the aesthetic experience, which appears to integrate sensory and emotional reactions in a manner linked with their personal relevance.

The study's co-authors were: Edward Vessel, a researcher in NYU's Center for Brain Imaging; Gabrielle Starr, an associate professor in NYU's Department of English; and Nava Rubin, an associate professor in NYU's Center for Neural Science. It appears in the journal *Frontiers in Human Neuroscience* and may be downloaded [here](#).

We all have strong aesthetic reactions to works of art, even though the images that move us vary across individuals. Moreover, we are moved by particular images for very different reasons. Nonetheless, the ability to be aesthetically moved appears to be universal.

Previous neuroimaging studies have begun to pinpoint this process by identifying several brain regions whose activation correlates with a variety of aesthetic experiences. These include locations in the anterior [medial prefrontal cortex](#) (aMPFC) and the caudate/[striatum](#), with several additional regions detected in some studies but not in others.

The NYU researchers sought to build on this scholarship by examining more closely the intensity and diversity of aesthetic responses toward

works of art.

To do so, the study's subjects, who ranged from those with novice-level experience of art and art history to several having completed some undergraduate study in the history of art, examined 109 images from the Catalog of Art Museum Images Online database. These works of art came from a variety of cultural traditions (American, European, Indian, and Japanese) and from several historical periods (from the 15th century to the recent past). Images were representational and abstract, and included several classifications (e.g., female, male figure, a mixed group, still life, landscape, or abstract). In order to minimize recognition, which could yield responses based on a piece's notoriety rather than on its appeal, commonly reproduced images were not used—in fact, most of the study's subjects did not recognize any image.

The subjects rated each work of art on a scale of 1 (lowest) to 4 (highest) in response to the following question: "How strongly does this painting move you?" They were told that the paintings may cover the entire range from "beautiful" to "strange" or even "ugly," and that their responses should reflect how much this image "moves" you ("What is most important is for you to indicate what works you find powerful, pleasing, or profound"). During this period, the researchers gauged the subjects' neurological activity using functional magnetic resonance imaging (fMRI).

After the fMRI session, the study's subjects viewed the same set of paintings on a computer screen and completed a nine-item questionnaire that asked them to rate the intensity each artwork evoked of the following: joy, pleasure, sadness, confusion, awe, fear, disgust, beauty, and the sublime.

The subjective ratings showed very low agreement across the subjects, revealing that the artworks that people found moving varied from

individual to individual.

The readings of brain activity showed that the brain's sensory, or occipito-temporal, regions responded no matter what rating (1 through 4) the subjects gave a painting, and that the response was bigger for more moving paintings.

However, for paintings receiving a "4"—indicating a piece truly moved a subject—fMRI results showed the engagement of an additional neurological process. While subjects varied in which paintings received "4s," the brains of all subjects showed a significant increase in activity in a specific network of frontal and subcortical regions in response to artworks they reported as highly moving. This activity included several regions belonging to the brain's "default mode network" (DMN), which had previously been associated with self-referential mentation.

"Aesthetic judgments for paintings are highly individual, in that the paintings experienced as moving differ widely across people," the researchers observed. "But the neural systems supporting aesthetic reactions remain largely the same from person to person. Moreover, the most moving paintings produce a selective activation of a network of [brain regions](#) which is known to activate when we think about personally relevant matters such as our own personality traits and daydreams, or when we contemplate our future."

Provided by New York University

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