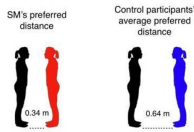


31 August 2009

By: Tudor Vieru, Science Editor

'Personal Space' Is Hardwired in the Brain

Experts discover the region responsible for it



Patient SM (red), preferred standing close to the experimenter (black). On average, control participants (blue) preferred standing nearly twice as far away from the same experimenter via ScienceDaily

In spite of the fact that humans are largely social creatures who like to come together on various occasions, we all have what is called our personal space, a minimum safe distance from those we are meeting and conversing with. If someone trespasses this space, then we feel threatened and uncomfortable. For a long time, researchers believed that this behavior was something of an oddity, but a recent study has uncovered the region of the brain that codes personal space limits.

In a paper published in the August 30th issue of the respected scientific journal *Nature Neuroscience*, experts from the California Institute of Technology (Caltech) describe the brain structure that they have found to be of significant importance in dictating each individual's personal space, [ScienceDaily](#) reports. This area is the almond-shaped amygdala, a formation in the medial temporal lobes. In previous researches, it has been associated with controlling negative emotions such as anger, and especially fear.

The new research could bear significant implications for devising new courses of treatments for diseases such as autism, in which distance is an issue. In their experiments, the Caltech team analyzed the actions of a unique individual, a woman known only as SM, who had extensive damage on the amygdala, in both hemispheres of her brain. The study was conducted by the Caltech Bren Professor of Psychology and Neuroscience Ralph Adolphs, and postdoctoral scholar Daniel P. Kennedy, who is also a professor of biology at the Institute.

"SM is unique, because she is one of only a handful of individuals in the world with such a clear bilateral lesion of the amygdala, which gives us an opportunity to study the role of the amygdala in humans," Kennedy, who has also been the lead author of the *Nature* paper, explains. "She [SM] is extremely friendly, and she wants to approach people more than normal. It's something that immediately becomes apparent as you interact with her." This type of behavior may come from the fact that the lesions she has to her amygdala may prevent her from respecting others' private space.

In an experiment, SM and 20 other volunteers were asked to approach a scientist from the team to a distance of their choosing, and then engage in a conversation. While most of the other participants, who represented most races, ethnic groups, and age ranges, stopped at a distance of about .64 meters (or about two feet), SM stopped at about .34 meters (or one foot). The other participants expressed discomfort when approached to less than their preferred distance, while SM had no problem with that, even when she was nose-to-nose with a researcher.

"Respecting someone's space is a critical aspect of human social interaction, and something we do automatically and effortlessly. These findings suggest that the amygdala, because it is necessary for the strong feelings of discomfort that help to repel people from one another, plays a central role in this process. They also help to expand our understanding of the role of the amygdala in real-world social interactions," Kennedy concludes.