



American College of Neuropsychopharmacology

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Anorexia and Obesity are Linked to Brain Structure

HOLLYWOOD, FL (December 6, 2012) – A new study suggests that the volume of the insula, a part of the brain's cerebral cortex, shows structural differences in women who either have anorexia nervosa or obesity compared with healthy women. Anorexia nervosa, a serious mental disorder associated with food avoidance and malnutrition, predominately affects adolescent girls and young adult women, with a prevalence averaging 0.3–1% in women of developed countries. Obesity, which has reached epidemic proportions in the United States, leads to a host of health problems, and affected 35.7% of adults in the US in 2010. The study was presented today at the American College of Neuropsychopharmacology (ACNP) Annual Meeting.

Led by Guido K.W. Frank, M.D., Assistant Professor of Psychiatry and of Neuroscience at the University of Colorado, the research team found that brain structure in women with eating disorders differed from parallel measures in healthy women without eating disorders. Specifically, women who had active anorexia nervosa as well as those who had recovered from the disorder had greater gray matter volume in the insula than healthy women, a part of the brain's cerebral cortex. On the other hand, gray matter-volume in the insula was smaller in obese women than those of normal weight.

This research extends efforts to understand the brain pathways that drive malnutrition in anorexia and excessive eating in obesity. Studies in animals³ and earlier human studies by Dr. Frank suggest opposite response patterns associated with under- and overfeeding.

In these studies, Frank and his colleagues compared women who had anorexia nervosa with a group of healthy women. They also compared a group of obese women with a healthy group. All of the participants received MRI scans of the brain.

"It would be helpful to find a crack in the system", said Frank. "Complex disorders, such as anorexia and obesity, may have many cracks, but if we find a certain structure that is crucial to a certain pathology, we may be able to use brain stimulation or other techniques to regulate it."

Dr. Frank and his team focused on the insula because it plays a role in a person's perception of internal states. He reasoned that activity in the insula might dampen or enhance taste perception before higher processing of food-related stimuli.

Results showed that the different groups of women did not differ in total gray matter, white matter or cerebrospinal fluid in the brain. On the other hand, gray matter volume in the insula showed significant differences both in the right and left hemispheres of the brain, with larger volumes in women who had current or remitted anorexia nervosa, and smaller volumes in obese women when compared to healthy participants.

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