

Differences in language-related brain activity affected by sex?

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(PhysOrg.com) -- Men show greater activation than women in the brain regions connected to language, according to researchers from CNRS, Université de Montpellier I and Montpellier III. This work is published in the February 2009 issue of the journal *Cortex*.

The researchers studied the strength of brain activation in women and men of high and low verbal fluency. For their study, they made up two groups of female and two of male subjects, chosen for their high or low verbal performance at a particular linguistic task (word generation). They then asked each subject in the four groups to mentally generate the largest possible number of words beginning with a given letter while observing them by functional magnetic resonance imaging (fMRI).

The researchers observed by fMRI that brain regions are activated differently according to sex and to verbal fluency level (variation in the number of generated words).

Independent of the number of words generated, men showed greater activation than women in the classical language regions of the brain. Furthermore, regardless of the sex of the subject, participants with low verbal skills elicited greater activation in a brain zone (the anterior cingulate) whereas highly fluent subjects activated the cerebellum to a greater extent.

The researchers also showed the combined effects of sex and verbal competence in the strength of activation of particular brain regions.

- The group of men with high verbal fluency, when compared to the three other groups, showed greater activation of two brain regions (the right precuneous and left dorsolateral prefrontal cortex) and lesser activation of another region (right inferior frontal gyrus);
- In low fluency women, the researchers noticed a greater activation of the left anterior cingulate than in women with high fluency.

By separating out the effects of sex and performance on the strength of brain activation for the first time, this study shows that there is an effect linked exclusively to the sex of the subject, another effect linked exclusively to performance, or an effect linked to both factors in different brain regions. The authors conclude that to explore neural correlates of verbal fluency with an aim to understanding the difference made by sex, it is important to take into account performance levels in order to obtain conclusive results.

More information: Sex and performance level effects on brain activation during a verbal fluency task: A functional magnetic resonance imaging study, Christophe T. Gauthier, Michel Duyme, Michel Zanca and Christiane Capron, Cortex, Volume 45, Issue 2, February 2009.

Provided by CNRS

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