The brain maintains language skills in spite of alcohol damage by drawing from other regions

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Researchers know that alcoholism can damage the brain's frontal lobes and cerebellum, regions involved in language processing. Nonetheless, alcoholics' language skills appear to be relatively spared from alcohol's damaging effects. New findings suggest the brain maintains language skills by drawing upon other systems that would normally be used to perform other tasks simultaneously.

Prior neuroimaging studies have shown alcoholism-related damage to the frontal lobes and cerebellum. Yet even though these regions are involved in language processing, alcoholics' language skills appear to be relatively spared from alcohol's damaging effects. A new study suggests that alcoholics develop "compensatory mechanisms" to maintain their language skills despite alcohol's damages… compensation which may, in turn, have a restrictive effect on other processes.

Results will be published in the June issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"We believe there are certain neural substrates associated with the preserved mechanisms of language processing in alcoholics," said Jean-Luc Martinot, director of research and psychiatrist at INSERM/CEA/Université Paris sud/Université Paris Descartes, and corresponding author for the study. "We used functional magnetic resonance imaging (fMRI) to investigate if alcoholics develop a different

pattern of neural activity that supports their language processing."

Martinot and his colleagues had 12 alcoholic males (who met Diagnostic and Statistical Manual of Mental Disorders - IV criteria) and 12 healthy males (or "controls") perform an auditory language task while receiving an fMRI scan.

Results indicated comparable performances - such as error rates and response times - by the two groups. However, the alcoholic group exhibited greater fMRI responses in the left middle frontal gyrus, the right superior frontal gyrus, and the cerebellar vermis relative to the control group.

"This study provides evidence that alcoholics actually can perform some of the tasks that may be impaired on formal testing, but that to do so, alcoholics must recruit a wider network of brain regions than nonalcoholics to get the job done," said Edith V. Sullivan, professor in the department of psychiatry and behavioural sciences at Stanford University School of Medicine. "This observation confirms several previous functional imaging studies and provides evidence that normal performance in a compromised neural system may require invocation of brain systems that would normally be used to perform another task simultaneously."

Martinot added that the greater fMRI response in these other regions might also indicate that the brains of the alcoholic group needed more oxygen, and energy, in these supplementary regions in order to achieve the same performance as the control group..

"In other words," said Sullivan, "an ostensibly 'normal' performance by a recovering alcoholic may be accomplished at the cost of reducing processing capacity to engage in or to be ready to engage in another task, for example, driving and being prepared to shift from one focus to

another when unexpected events occur."

Source: Alcoholism: Clinical & Experimental Research