



## Drinking and the Female Brain

Two Studies Indicate Women are More Severely Affected

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Women who drink to excess experience more brain damage and sooner than males who drink the same amount and may experience even more severe long-term effects than men, according to two new research studies. The findings are the first to show gender differences in the effect alcohol has on brain “shrinkage” that is common in all long-time heavy drinkers or alcoholics. Previous studies have shown that women are also more **prone**<sup>1)</sup> to liver and heart damage than male alcoholics.

“We’re showing that the brain is basically the same as these organs,” lead author Dr. Daniel W. Hommer told the press. In the Hommer study, the researchers examined brain scans of 79 male and female alcoholics after three weeks of abstinence and compared the brain volumes with those of 39 healthy study participants. The researchers found that while male alcoholics showed signs of brain “shrinkage” compared with healthy men, the difference between alcoholic and healthy women was much greater, indicating the killing of brain cells.

### Smaller Brain Volume

Alcoholic women showed an 11 percent smaller brain volume than healthy women. The study reported that such a difference would be unlikely to make a significant change in mental capacity and none of the study participants, with an

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1) prone: -하기 쉬운, -의 경향이 있는; -에 걸리기 쉬운(to).

average age of 40, showed signs of mental deficits.

However, Hommer told reporters, “Brain shrinkage increases with age in all people. The early decreases seen in alcoholics may make them more vulnerable to cognitive decline and **dementia**<sup>2)</sup> as they grow older.” “Alcoholism is linked to dementia,” he said and this study suggests that alcoholic women may be particularly at risk. Hommer and his colleagues at the National Institute on Alcohol Abuse and Alcoholism in Bethesda, Maryland, reported their findings in the February 2001 issue of the *American Journal of Psychiatry*.

However, another California study, published in the February 2001 issue of *Alcoholism: Clinical & Experimental Research*, indicated that thinking and cognitive abilities in women alcoholics is affected by heavy drinking. In that study, researchers tested participants for cognitive (or thinking) abilities and mood before examining their functional MRI (**fMRI**)<sup>3)</sup>, and tested their working memory abilities both before and during the fMRI.

### Even Young Women at Risk

“The main finding,” said Susan F. Tapert, first author of the study, in a news **release**<sup>4)</sup>, “was that the alcohol-dependent women showed less activation in brain areas that are needed for spatial tasks like puzzles, maps and mechanics, and for working with information that is held mentally, like doing math inside your head or making sense of a lecture or set of complex instructions. The brain parts that showed the differences are in areas that we need for finding our way around, and working with all the information we are **bombarded**<sup>5)</sup> with in everyday life.” Tapert said her findings suggest that even young and physically healthy

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2) dementia: U [[의학] 치매(癡病).

3) MRI: magnetic resonance imaging. fMRI: Functional MRI. one of the most recently developed forms of neuroimaging.

4) news release: (보도 관계자에게 미리 나누어 주는) 보도 자료 (=press release).

5) bombard: 포격[폭격]하다; (비유) 공격하다, 몰아세우다, (질문·탄원 등을) 퍼붓다(with).





individuals, particularly if they are female, risk damaging their brains through chronic, heavy use of alcohol.

“Compared with the non alcoholics,” said Edith V. Sullivan, associate professor of psychiatry at Stanford University School of Medicine, “the young women with alcohol dependence appeared to **engage**<sup>6)</sup> their **cortical**<sup>7)</sup> systems less vigorously. In some cases, the brain systems activated by the alcoholic women were different from those activated by individuals with no alcohol problems.”

“One interpretation of these differences is that the alcoholic women tend to invoke brain systems that are less appropriately tuned for the task at hand, or perhaps the activation is not as intense as it might be without their history of alcohol dependence,” Sullivan said. “The Tapert study has demonstrated that even young women with alcohol dependence suffer significant **aberrations**<sup>8)</sup> in brain and cognitive function and that this pattern of abnormalities is similar to that documented in older alcoholics with many years of abusive drinking,” Sullivan said.

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6) engage: 쓰다, 사용하다

7) cortical: (특히 대뇌) 피질(皮質) [피층] 의.

8) aberration: [의학] 정신 이상[착란] (특히 일시적인)

Men's **storied**<sup>1)</sup> superior sense of direction now has some biological evidence to back it up, according to a study that compared male and female brain activity during navigation. When researchers at the University of Ulm in Germany asked 24 men and women to find their way out of a virtual-reality maze, they discovered that the sexes used different brain regions to navigate. According to a report in the April issue of *Nature Neuroscience*, these brain differences help explain why the men escaped the maze nearly a full minute faster than the women.

Dr. Matthias W. Riepe and his colleagues had the subjects navigate through three computer-displayed, three-dimensional mazes, complete with landmarks. During the exercise, the study participants' brain activity was mapped by functional magnetic resonance imaging. On average, the men got out of the mazes in 2 minutes and 22 seconds, compared with 3 minutes and 16 seconds among women.

Brain scans revealed that although men and women showed equal activity in several brain regions, there were also some distinct differences. Men showed activity in the left **hippocampus**<sup>2)</sup>, an area believed to be involved in spatial tasks, while women had activation of the **parietal**<sup>3)</sup> and **prefrontal**<sup>4)</sup> areas of the brain's

1) storied: 이야기[역사, 전설 등]에서 유명한; (일반적으로) 유명한, 잘 알려진

2) hippocampus: (뇌의) 해마상(狀)용기(측실상(側室床)에 있는 두 용기 중 하나).

3) parietal: 체(강)벽(體腔壁)의; 정수리(부분)의

4) prefrontal: 전액골(前額骨) 앞에 있는, 전두엽(前頭葉) 전부(前部)(의).





**cortex**<sup>5)</sup>, which have been linked to memorizing visual cues.

“To me, this is another example of the biological differences between men and women,” Riepe told Reuters Health. Women, he noted, have been shown to **outperform**<sup>6)</sup> men in verbal skills. This study, he added, goes further by linking specific brain patterns to behavior. These brain patterns, according to Riepe’s team, fall in **line**<sup>7)</sup> with behavioral research showing that women rely on landmarks when they navigate, while men use landmarks and spatial cues.

When choosing a route, women may concentrate on their immediate surroundings and memorize landmarks, whereas men tend to take a broader view of their environment. It is unclear why these differing brain patterns exist, but Riepe believes it is unlikely they arise from differences in the ways men and women learn to tackle spatial tasks. Animal studies, he noted, have shown similar gender differences.

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5) cortex: (대뇌) 피질(皮質)

6) outperform: (기계 따위가) -보다 성능이 우수하다; (사람이) -보다 기량이 위다.

7) fall in line: (군대속어) 규정[관례]에 따르다, 협조하다.