

'Executive' training for problem drinkers?

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Hangover, the low-budget comedy hit of 2009, tells the story of Phil, Stu and Alan, twenty-something buddies who wake up in a Las Vegas hotel room the morning after a booze-drenched bachelor party for their friend Doug. None of them remembers a single detail from the night of partying, and a lot needs explaining. There's the tiger in the bathroom just for starters, and then Stu's missing tooth. There's also an unfamiliar infant in the closet, and Phil is wearing a hospital wristband. What's more, Doug has gone missing—and his wedding is the following day.

Anyone who has indulged in a night of heavy drinking knows how alcohol can sabotage memory, creating autobiographical “blackouts” like the ones depicted in *Hangover*. But heavy drinking impairs much more than these historical memories. It also impairs basic cognitive skills, like the ability to pay attention, to think through plans and act on them, and the ability to choose appropriate actions over wrongheaded ones.

Cognitive psychologists lump these mental abilities under the umbrella term “executive function,” and those who study alcohol are particularly interested in one aspect of executive function called working memory. Working memory is not the same as memory for last night's party. Instead, it's the ability to hold important information in mind temporarily, and to use that information to set goals and make plans and stick to those plans. It's a building block of executive functioning, and thus crucial to inhibiting impulsive misbehavior.

A team of Dutch psychological scientists has been studying the interplay of alcohol and working memory—but with a twist on cause and effect. Maastricht University's Katrijn Houben and her colleagues wondered if impaired working memory, in addition to being a consequence of boozing, might also be a cause of intemperate drinking. Because working memory is one of the executive powers needed to resist impulsiveness, might its failure not unleash more abusive drinking? And if so, they asked further, might improving working memory actually restore a measure of control and help heavy drinkers moderate their consumption?

They decided to explore this possibility with a group of heavy drinkers. They recruited men and women, typically in their 40s, and assessed them to make sure their drinking was in the “hazardous” range. The study was done entirely on the Internet. All of the volunteers were assessed on three different working memory tasks, and then about half took part in a series of 25 training sessions (over at least 25 days) to hone these skills. In one task, for example, volunteers had to remember the sequence in which blocks in a 4×4 grid changed color. For those in training, the difficulty of the tasks increased with each success.

The scientists wanted to see, first, if the training worked. It did: The trainees' working memory improved significantly, and the improvements were still evident more than a month later. More important, the training led to a noticeable change in drinking behavior. These heavy drinkers cut their alcohol consumption by 10 glasses per week, and this moderation also persisted through the month of

follow-up. What's more—and this is important—the working memory training achieved its effects on drinking by moderating the unconscious, automatic impulse to drink. In other words, those who had the most powerful unconscious yearning for alcohol—they were the ones to profit most from the cognitive training.

So training in working memory boosted working memory capacity, and this cognitive improvement in turn strengthened self-control over the unconscious impulse to drink—and ultimately over drinking itself. These preliminary but encouraging findings, [reported on-line in the journal *Psychological Science*](#), suggest that interventions to strengthen executive powers might be a useful supplement to existing therapies for problem drinkers—one more tool in the toolbox for dealing with self-destructive habits.

Excerpts from Wray Herbert's two blogs—"We're Only Human" and "Full Frontal Psychology"—appear regularly in *Scientific American Mind* and in *The Huffington Post*. His book, [On Second Thought](#), will soon be out in paperback.