

Sensation-seeking may be linked to brain anatomy

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Credit: public domain

People prone to seeking stimulation and acting impulsively may have differences in the structure of their brains according to a study published in the April 6 issue of *The Journal of Neuroscience*. What's more, those differences may predispose them to substance abuse.

Avram Holmes, a psychologist at Yale University, and a team of researchers from Harvard University and Massachusetts General Hospital in Boston, found that increased impulsivity and sensation-

seeking in healthy young adults was linked to distinct differences in their brain structures: the areas involved in decision-making and self-control had a thinner cortex, the brain's wrinkled outer layer or gray matter.

This study builds on well-established links between impulsivity, sensation-seeking, and [substance abuse](#). Prior research indicates genes play a role in these behaviors. Other studies conclude substance use can affect [brain anatomy](#) and function over time. Scientists don't know the extent to which [brain abnormalities](#), present prior to drug-taking, contribute to the likelihood that a person will develop a [substance abuse disorder](#).

Holmes and colleagues examined the variability in [brain structure](#) among 1,234 males and females aged 18 to 35 with no history of psychiatric disorders or [substance dependence](#). Using [magnetic resonance imaging](#) (MRI), the team measured the size of particular regions of the brain for each participant. The participants also completed questionnaires assessing traits associated with sensation-seeking and impulsivity such as their need for novel and intense experiences, willingness to take risks, and a tendency to make rapid decisions. The participants also reported alcohol, tobacco, and caffeine usage.

They found that people who reported seeking high levels of stimulation or excitement had reduced cortical thickness, or gray matter, in brain regions associated with decision making and self-control. The strongest links occurred in brain areas related to the ability to regulate emotions and behavior, the anterior cingulate and middle frontal gyrus. Changes in those brain structures also correlated with participants' self-reported tendency to act on impulse and with heightened use of alcohol, tobacco, or caffeine.

"The findings allow us to have a better understanding of how normal variation in brain anatomy in the general population might bias both

temperamental characteristics and health behaviors, including substance abuse," Holmes said.

Kristine Beate Walhovd, a professor of neuropsychology at the University of Oslo in Norway who was not involved in the study, agreed. "A strength of the study is that they identify this relationship within non-substance using participants, implying that these variations are not merely the consequence of individual history of substance use," she added.

The significance of individual variability in brain anatomy is still a subject of debate in the field, Holmes added. He plans to continue to examine how shifts in both [brain](#) anatomy and function might affect these and other behaviors associated with risk for psychiatric illness and poor health outcomes.

Provided by Society for Neuroscience

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