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Decision-makers seek internal balance, not balanced alternatives

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A researcher at the University of California, San Diego School of Medicine suggests that psychiatrists may need to approach the treatment of psychiatric patients from a new direction – by understanding that such individuals' behavior and decision-making are based on an attempt to reach an inner equilibrium.

In a special section in the October 26 issue of the journal *Science*, Martin Paulus, M.D., professor in UCSD's Department of Psychiatry, has compiled a body of growing evidence that human decision-making is inextricably linked to an individuals' need to maintain a homeostatic balance.

"This is a state of dynamic equilibrium, much like controlling body temperature," said Paulus. "How humans select a particular course of action may be in response to raising or lowering that 'set point' back to their individual comfort zone. In people with psychiatric disorders or addictions, the thermostat may be broken."

Up to now, according to Paulus, psychiatrists and others have looked at the decision-making process as a considered series of options and values.

"What has never been considered closely, but should be, is the state of the decision-maker," Paulus said. According to the researcher, this homeostatic state – the tendency to maintain internal stability, due to the mind and body's coordinated responses to any stimulus that disturbs the normal condition – is altered in individuals with addictions and

psychiatric disorders such as schizophrenia or anxiety. “This disturbance of homeostatic balance leads to dysfunctions in decision-making – which helps explain why such patients make seemingly bad choices,” he said.

Recent neuroimaging research shows strong support for the homeostatic nature of decision making, according to Paulus. “For example, interoceptive information – which is related to the body’s internal state or sense of balance – is integrated in a particular part of the brain called the anterior insular cortex,” he said. The same brain structures implicated in the urge to take drugs are involved in other biological urges, Paulus added, suggesting that a homeostatic approach could have a broad impact on treatments that seek to control addictions or psychiatric disorders, and will lay the groundwork for new areas of research.

The question addressed in part by this paper are whether changes in decision-making behavior and associated brain functions are a result of pre-existing characteristics – which may predispose individuals to use drugs – or as a consequence of long-term use.

“Decision-making dysfunctions and resultant altered neural processing could provide a biomarker to identify those at high-risk for addictive behaviors,” said Paulus, who added that much additional research is needed before scientists could begin to use such an approach.

In an upcoming paper in the journal “Dialogues in Clinical Neuroscience,” Paulus cites the complex affective, cognitive and behavioral phenomena that come into play during decision-making. “The interoceptive system is able to connect with various physiological systems in the brain to orchestrate a complex set of responses,” he said, adding that craving and urges are among the most notable responses that play important functions in maintaining homeostasis. Insights into how pleasure and urge are integrated in the brain and how this process is

modulated can play an important role in the understanding of – and possible future treatment of – drug addiction, according to Paulus.

Source: University of California - San Diego