



American College of Neuropsychopharmacology

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STUDIES SHOW VULNERABILITY TO SLEEP LOSS VARIES BY INDIVIDUAL

CONSTANT SLEEP LOSS CAN CHANGE BRAIN FUNCTION

Conventional Wisdom About the Need for Eight Hours of Sleep Each Night

May Not Be True for All

MIAMI, FL (December 6, 2010) – The less sleep a person gets, or the more constant the sleep restriction, the greater the change in brain functions, such as alertness, sustained attention, and memory. Researchers studying the effects of sleep restriction on brain function have found that some individuals are more vulnerable to sleep deprivation than others, and that the ability to recover from chronic sleep restriction varies by individual. Findings from this research are being presented this week at the annual meeting of the American College of Neuropsychopharmacology (ACNP).

Through a series of nine studies, David Dinges, Ph.D., professor and chief of the Division of Sleep and Chronobiology in the Department of Psychiatry at the University of Pennsylvania School of Medicine, and colleagues sought to identify changes in brain function as a result of chronic sleep deprivation, and differences in individuals' sleep need, vulnerability to sleep restrictions and ease of recovery after sleep deprivation. The studies included more than 500 healthy adults, both men and women, whites and minorities and people with an average age of 30 (21-50 years old). Each study included 40 to 150 participants, who lived in the laboratory 24 hours a day for two to three weeks.

The researchers found there were large individual differences among healthy people in the response to chronic sleep restriction. Some people were severely affected and showed a dramatic decline in alertness from continued deprivation. Others were not as severely affected, and a subset showed no cognitive deficits from the sleep restriction.

"Our findings indicate that there are likely people who are resistant to the effects of sleep restriction and those who are very vulnerable," said Dr. Dinges. "Even though they all obtain the same amount of sleep normally in their lives, and even though they

are getting the same restriction in the laboratory, they are having markedly different neurobehavioral responses to the reduction of sleep."

Researchers found that all subjects sleeping seven to eight hours a night function normally, but with each day of sleep restriction, differences between the group start to emerge. As sleep is reduced, cognitive functioning is impaired, with the rate of change determined by membership in one of the three groups. Changes begin to occur when participants sleep fewer than seven hours each night, and become much more dramatic when sleep time is reduced to four hours per night.

Through psychomotor vigilance testing, a test of sustained attention that is used to detect sleepiness, the researchers identified the effects of sleep restriction on each participant. Using this test as a marker, they have found that attention is profoundly affected by inadequate sleep. For most people, attention destabilizes early in the sleep restriction and is more affected by restriction than any other cognitive area. Interestingly, though, not everyone shows these effects.

"This is not a simple story because each person's sleep needs and response to sleep restriction are unique," Dinges said. "The bottom line is that it is important not to restrict your sleep, and that if you do it night after night, most people will begin to see the effects in behavior and brain function. Furthermore, it's important to oversleep when possible in order to recover from any sleep deficit to the extent possible."

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ACNP, founded in 1961, is a professional society of nearly 1,000 leading scientists in the field of brain and behavior disorders. ACNP members include Nobel Laureates as well as the recipients of many other distinguished awards. The mission of ACNP is to further research and education in neuropsychopharmacology and related fields in the following ways: promoting the interaction of a broad range of scientific disciplines of brain and behavior in order to advance the understanding of prevention and treatment of disease of the nervous system including psychiatric, neurological, behavioral and addictive disorders; encouraging scientists to enter research careers in fields related to these disorders and their treatment; and ensuring the dissemination of relevant scientific advances.