

“Gießener Abendgespräche Kognition und Gehirn“

Mittwochs, 18.00 bis 20.00 Uhr, Raum F009

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“Why Does Sleep Improve Memory? Stochastic Modeling of Cognitive Processes Underlying the Sleep Benefit in Episodic Memory”

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A hundred years of research suggest that sleep boosts episodic memory. I will present a brief overview and then focus on a persisting methodological problem: Because sleep is typically confounded with the daytimes of learning (before sleep, i.e., in the evening) and memory testing (after sleep, i.e., in the morning), it is not easy to disentangle effects of sleep from circadian influences. I will show that experimental designs developed to disentangle effects of sleep from circadian influences may produce misleading results. However, analyzing data from such designs with appropriate stochastic models provides pure measures of daytime and sleep effects on (a) encoding strength, (b) consolidation in memory (i.e., resistance to forgetting), and (c) retrieval from memory. We used this approach to assess effects of sleep on recall memory for word pairs in a sample of psychology undergraduates. Results revealed no daytime influences on encoding, consolidation, and retrieval parameters. However, both consolidation in memory and retrieval from memory benefitted from sleep significantly. Thus, sleep appears to exert two positive effects on memory: an “active” effect, resulting in a stronger representation of information in memory, and a “passive” effect that facilitates retrieval of information from memory.