Sleep and Learning in the Elderly

Abstract

Sleep has been implicated as a crucial and necessary brain state for memory consolidation in young, university-aged students on a variety of tasks. We attempted to expand the sleep and memory literature into an elderly population using both a motor learning task and a unique, insight learning task. A total of 21 subjects (6 males, l5 females, mean age:69, age range 60-80) participated in the study, which spanned 9 days and included 3 nights of at-home polysomnography recording, 2 sessions of motor sequence learning, and 1 session of insight task learning. For the motor task, subjects trained in the morning and tested either after 12 hr of wakefulness in one session or after 24hr, a period of wakefulness followed by a night of sleep, in the second. When comparing the last six trials of testing to the last six trials of training, the elderly improved significantly in the 24hr condition (mean improvement:I2.3yo,p:.001) but not in the 12hr condition (3.4oA, p:.339). Unlike in young subjects, however, these sleep-related improvements were not correlated to any physiological sleep measures. These results suggest that sleep plays a role in motor skill learning in the elderly as well as the young, but the lack of sleep correlations could reflect a different mechanism for sleep related enhancement. Alternatively, the lack of correlations could be a result of the long period of wakefulness that preceded the night of sleep, which was different from the study on young subjects. On the insight learning task, elderly subjects failed to gain insight after a 24hr interval, but we believe that the task was not appropriate for an elderly population. Young controls also failed to gain insight at augmented rates after 24hr interval, which we again attribute to the intervening period of wakefulness between training and sleep.