00507 Slow Wave Sleep Strengthens Spontaneous Retrieval Processes in Prospective Memory

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Aims: Prospective memory (PM) is defined as remembering to execute a future intention. Here, we investigated the effect of sleep on prospective memory as well as the relationship between macrostructural features of sleep and prospective memory consolidation.

Methodology: Forty-nine adults (mean age ± SD: 22.1 ± 1.71 years; 18 males) encoded intentions comprising 4 related ('phone-unplug earphones') and 4 unrelated ('mirror-close the book') cue-action pairs. They were instructed to remember to perform these actions in response to cue words presented during a semantic categorization task performed 12-h later. The interval was either across a period of wakefulness (09:00 - 21:00; n = 24) or following overnight sleep that was monitored with polysomnography (21:00 - 09:00; n = 25).

Result: We found a significant group x relatedness interaction for prospective memory accuracy ($F(1,47) = 8.35$, $p < 0.01$). The sleep group successfully executed a significantly higher percentage of related intentions compared to the wake group (mean ± SEM: 94.00 ± 2.61 % vs. 66.67 ± 6.84 %, $p < 0.01$).There was no significant group difference in the percentage of unrelated intentions successfully executed (82.00 ± 5.10 % vs.72.92 ± 6.88 %, $p = 0.29$). Further, the benefit for related intentions was associated with more post-learning slow wave sleep ($p < 0.05$).

Conclusion: We found that sleeping versus staying awake after intention encoding benefitted the execution of intentions via spontaneous retrieval, and that this sleep-related benefit was associated with more time spent in slow wave sleep during the post-learning sleep episode. These findings are in line with prospective memory impairments observed in individuals with little slow wave sleep, e.g. older adults, and point to the potential memory benefit of interventions boosting this sleep feature.