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A short daytime nap is necessary for consolidating memories in three month old infants.

Objectives: Recent findings showed that the memory of infants as young as half year old benefit from a short daytime nap, however it is not clear whether sleep is also beneficial in the first few month of life, when memory functions are less developed. Our goal was to investigate whether three month old infants show sleep dependent memory consolidation and whether their performance is related to sleep spindles.

Methods: Infants were presented with a cartoon face until they became habituated and lost interest. Half of the infants had a nap in our sleep laboratory with electroencephalographic activity being recorded; half of the infants stayed awake. Then, infants were shown with the previously seen cartoon face together with a new one and their eye-movements were monitored with an eye-tracker. If infants remember, they will show novelty preference and will look significantly longer to the new cartoon face.

Results: While the wake group infants did not show novelty preference, the looking behaviour of the nap group significantly differed from chance, indicating only they remember the old face. In a subset of our sample, we correlated novelty preference to sleep spindle variables and found a significant positive association with the amplitude of slow spindles at C4.

Conclusions: Our results indicate that without a short nap infants are not able to remember the familiar cartoon face. The increased dependence on the consolidation during sleep might be the consequence of their less developed memory system.