Babies and sleep: Another reason to love naps

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Anyone who grew up in a large family likely remembers hearing "Don't wake the baby." While it reinforces the message to older kids to keep it down, research shows that sleep also is an important part of how infants learn more about their new world.

Rebecca Gomez, Richard Bootzin and Lynn Nadel in the psychology department at the University of Arizona in Tucson found that babies who are able to get in a little daytime nap are more likely to exhibit an advanced level of learning known as abstraction.

Nadel, a Regents' Professor at the UA, described the group's work (Early Learning in Infants May Depend on Sleep) in a session at the American Association for the Advancement of Science annual meeting in San Diego on Sunday, Feb. 21.

In their research, Nadel and his colleagues played recordings of "phrases" created from an artificial language to four dozen 15-month-old infants during a learning session. Their methodology included repeatedly playing phrases like "pel-wadim-jic" until the babies became familiar with them.

These phrases contained three units, with the first and last unit forming a relationship. In this example, the first word, "pel," predicts the last, "jic." Even though these are nonsensical sounds, the language created for the test shares some similarity with structure commonly found in subject-verb agreement in English sentences.

Prior to being tested, some infants learning this faux language took their normally scheduled naps. Others were scheduled at a time when they would not nap following the session. When the infants returned to the lab, they again heard the recordings - along with a set of different phrases in which the predictive relationship between the first and last words were new.

By carefully watching the babies' facial expressions as they listened to both old and new phrases, the researchers were able to rate their level of attention. They found that babies' longer gazes at a flashing light that coincided with the phrases signaled attention, which indicated that they had learned a particular phrase or relationship.

Differences arose between the infants who had napped and those who had not. The infants who did not sleep after the sessions still recognized the phrases they had learned earlier. But those babies who had slept in between sessions were able to generalize their knowledge of sentence structure to draw predictive relationships to the new phrases. This suggests that napping supports abstract learning - that is, the ability to detect a general pattern contained in new information.

In follow-up work, the UA researchers have shown that infants must have their naps within four hours of listening to the artificial language in order for them to demonstrate this beneficial abstraction effect. Those who failed to nap within that time, but slept normally that evening, failed to show the abstraction effect the next day.

"It's a fairly nuanced story," Nadel said. "What we know is that infants have mostly REM sleep, given the type of sleep they have, given how their brains are developed at that point. And they have to get some of that sleep within a reasonable amount of time after inputting information in order to be able to do abstracting work on it. If they don't sleep within four to eight hours, they probably just lose the entire thing," he said.

What this should reinforce for parents, he said, is that while it obviously is important to give infants and young children the kind of stimulation that comes from reading, talking and exposing them to lots of words, thise stimuli need to happen within the context of a reasonably well-regulated daily cycle that includes adequate sleep.

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