What sleeping babies can teach us about cognitive development

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A new UA study is exploring the link between infants' early sleep quality and later cognitive development.

There are few sights more peaceful than a quietly sleeping infant, and a good night's rest for baby may offer much more than just a respite for weary parents.

University of Arizona researchers are exploring how infants' early sleep quality might affect their cognitive development later on.

Jamie Edgin, a UA assistant professor of psychology, is conducting the "Arizona Sweet Dreams" study, which will track sleep development in typically developing and at-risk infants to determine if early sleep quality is predictive of later cognitive development or an eventual autism diagnosis.

The study has the potential to contribute valuable new knowledge to the sleep research literature.

"Sleep is very important for setting up neural networks and for helping to support early language and behavioral development," Edgin said. "This study could help increase awareness of these links and encourage people to get earlier screenings for sleep problems in children."

Edgin and co-principal investigator Caron Clark, a UA psychology research associate, will track sleep development in two groups of infants. In the first group will be typically developing infants between the ages of 6 and 24 months, a period marked with critical and rapid cognitive development.

In the second group will be infants in the same age range who were either born prematurely, have Down syndrome or have siblings who have been diagnosed with autism. These infants tend to have higher rates of sleep disruptions—such as snoring or frequent night awakenings—and are at increased risk for neurodevelopmental impairment. They also are at greater risk to develop autism.

"If we find that the quality of an infant's sleep predicts whether they are at risk for autism or learning difficulties later in life, then we can initiate intervention strategies early and start to help these children as soon as possible," Clark said.

The infants' sleep will be measured in the home using video monitoring

and an actiwatch, a small computerized motion detector worn on the baby's leg that can provide data on when the child falls asleep, how long he stays asleep, his activity during sleep, and how often he transitions between sleep and wake states. Parents also will provide information about their babies' quality of sleep.

In addition, the researchers will gather information about the infants' behavior, language and cognitive development. Sleep assessments and surveys will be repeated once every six months over the two-year study period.

A growing body of research points to the critical role that sleep plays in all facets of life—from our physical health to our mental and emotional well-being. There is strong scientific evidence that knowledge is consolidated during sleep. And studies completed by Edgin's lab at the UA—originally funded by the LuMind Foundation, the Thrasher Research Fund and Research Down Syndrome—have shown that sleep quality in toddlers and school-age children with Down syndrome is strongly correlated with language development. (PDF)

The new study will provide unprecedented data on early sleep patterns in typically developing infants and those at risk for cognitive development challenges.

"We have these correlations at single time points that show language and cognition are relating to sleep," Edgin said. "What we really need to do, and what we are doing in this study, is ask: Can we measure sleep across infancy and preschool across time to get an understanding of how disturbed sleep may drive differences in cognitive development later on?"

Edgin and Clark currently are enrolling infants in the first phase of the study, which will be conducted in Tucson in partnership with the UA's

Sonoran University Center for Excellence in Developmental Disabilities.

Edgin said she hopes to add more collaborators and expand the scope of the study in the future.

"We're trying to build as many collaborations as we can because this is a grand challenge not only for us as individual researchers but also for the U of A and the city," she said. "If we come together and demonstrate the importance of this project in the next 18 months, it could be expanded into a larger study to answer these important questions."

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