

Researchers Develop New Tool for Child Psychologists

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Researchers at the University of Rochester are developing new technologies that will offer an in-depth look at how toddlers deal with stressful situations.

Child psychologists have long been interested in understanding the complexities of early parent-child interaction, but they have been hampered by a toddler's inability to explain how she feels. Using a new system they call WiPsy (Wireless technology for Psychological research), researchers hope to gain a new window into the behavioral and physiological adaptation of toddlers. WiPsy could ultimately be used for a variety of applications in research on physical and mental health in children and adults, they say.

Development of the WiPsy system is the result of collaboration by the University of Rochester's Mt. Hope Family Center and the Department of Electrical and Computer Engineering through an effort called Project Connect. Project Connect is funded by a four-year, \$1.2 million grant from the National Institute for Nursing Research.

"The WiPsy system is going to give us a very sophisticated and unobtrusive way to assess a child's reactions with computerized physiological and behavioral data," said Melissa Sturge-Apple, University psychology researcher.

Because of its unobtrusive nature, researchers hope that toddlers will exhibit a more natural reaction when using WiPsy than they do when

bulkier devices are used to collect physiological data.

The WiPsy system consists of a wireless wearable device that measures the heart activity of a toddler, and a ceiling-mounted ultrasound system that measures the distance between a toddler and his or her parent. Researchers are developing and testing the system with a routine study, "The Strange Situation," where a toddler is separated from his or her mother for two brief periods. The interaction between the toddler and parent, and the stress exhibited by the toddler are assessed and recorded.

The wearable part of the system will fit snugly into a special pocket of the child's clothing. Currently, two small wires from the wearable device must be taped to the wearer's skin for obtaining heart rate data, but Zeljko Ignjatovic, assistant professor of electrical and computer engineering and WiPsy's co-designer, hopes to eliminate these wires with advances afforded by the grant, making the wearable device even more unobtrusive.

The WiPsy system is expected to dramatically improve the data collected during "The Stranger Situation" by allowing researchers to record physiological data in addition to the traditional observational data they already collect. The common method for analyzing toddler reaction to stress in "The Strange Situation," said Sturge-Apple, is to view videotape of the interaction and draw conclusions from the toddler's verbal behavior and body language.

Wendi Heinzelman, associate professor of electrical and computer engineering and Ignjatovic's co-designer of the WiPsy system, said the information provided by the system will give researchers insights not possible with simple observation alone.

"Using data provided by the WiPsy system, we'll be able to measure changes in heart rate, the distance between the child and others in the

room, and the stress level he or she is exhibiting," Heinzelman said. "Then we'll be able to analyze the relationship between those factors."

Joe Rausch, an assistant professor in quantitative psychology at the University of Minnesota, is also collaborating on the grant by developing advanced statistical methods designed to analyze the dynamics found in the toddler-parent assessments. The methods will also compare the differences in findings associated with different types of families and children. The development of these methods will also allow researchers to use the data collected by WiPsy for understanding individual functioning and outcomes.

The WiPsy system is being developed and tested at the Mt. Hope Family Center where Sturge-Apple and grant collaborator Fred Rogosch, the research director at Mt. Hope, and others assess and treat families experiencing dysfunction and children at risk for social and emotional difficulties. Sturge-Apple said an important goal of Project Connect is to share the study's results so researchers in many different fields can take advantage of the data provided by the WiPsy system.

It's also possible that the WiPsy system could allow researchers to study subjects in their home environments and collect data without being physically present, Sturge-Apple said. That development could revolutionize certain fields of psychological research by taking it out of the lab, which could lead to better understanding and treatment of children and families.

Source: University of Rochester

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