

Analyzing babies' expressions could help children at risk for developmental disorders

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Infants understand the meaning of some words far earlier than parents or even social scientists theorized, research says. In fact, before they talk, walk or point, infants know the meaning of some words merely from everyday exposure to them. Credit: Thinkstock

Parents and babies smile, laugh and coo at each other, but scientists still have a lot of questions about how these interactions help infants develop.

"Parents tend to put a lot of emotional energy into these interactions," says University of Miami [psychology professor](#) Daniel Messinger. "And, the job of the baby is to do whatever they want, and they take that job very seriously."

With support from the National Science Foundation (NSF), Messinger and his colleagues want to learn more about child development by studying how moms, dads and babies respond to each other.

"We believe that through interacting, babies learn early social rules, such as when to take turns with their [vocalizations](#), when to smile at the same time," says Messinger. "It's by smiling at the same time as their mothers, the baby responding to the mother and the mother responding to the baby, that babies develop a sense of shared social emotion."

"This is a very interdisciplinary team, including developmental scientists, [machine vision](#) experts, and [face perception](#) researchers," notes Peter Vishton, program director for Developmental and [Learning Sciences](#) in NSF's Directorate for Social, Behavioral and Economic Sciences. "The researchers are enhancing our understanding of [social interaction](#) during [infancy](#) and at the same time, developing tools that may transform how many other questions about early development are addressed."

In an experiment at the University of Miami's Early Play and Development Lab, babies are secured in a special seat, so they can get a good view of mom or dad, and move both their arms and legs. Babies are tested at four months, and again at one year.

Several [video cameras](#) capture this short, structured [playtime](#).

"They play. Then, after two minutes, the mom will stop responding to the baby. We want to see what the baby does. How the baby either chooses to try to re-engage the mom, or maybe uses that time to look

away and disengage, and then, start playing again," explains Messinger.

The videos are analyzed with a software program that precisely measures the facial movements of both the baby and the mom.

"So, we are actually automatically registering and tracking the movements of the babies' and moms' faces, as they interact in time," continues Messinger. "The baby is seeing the mom move her face and listening to what she is saying moment by moment, and this technology really lets us get at those moment-to-moment changes, and how mom is expressing smiles and joy, and engaging with the infant, and how the infant is responding to the mom."

The key, he adds, is to use those measurements to better understand how interaction occurs, and how babies learn early social rules.

"One of the things we found is that when a baby looks away from the parent, it just means they are interested in other things, it doesn't mean they are less interested in the parent. It just means they need to look around and see what else is going on," says Messinger.

Some of the moms taking part in the study liked the fact that their infants could help scientists understand more about healthy child development. Bianca Graves brought in her son, Henry. "It's kind of cool. He is my little lab rat!" she laughs.

"I find these studies interesting. My husband and I are both kind of nerdy like that. So it's really cool to be able to be involved in something like this, and know that he was able to contribute to science," says Graves.

"I would like for him to be an individual. I don't want him necessarily to be clinging to me all the time or to my husband. So we encourage other

people to hold him and interact with him and he really enjoys it," she says.

Sairy Salazar, who is earning her degree in psychology, says she enjoys participating in the experiment with her daughter, Kelly. "I just like the exposure for others that can learn from it. If I can help somebody understand the mind, or the development of the children, I think that's very neat," says Salazar.

Along with studying healthy [child development](#), Messinger and his colleagues also work with youngsters at high risk for developmental disorders.

The program Sibling Studies Measuring Infant Learning and Emotion, or UM SIBSMILE for short, investigates the social, emotional and cognitive development of children who are between the ages of two months and four years old.

"We have looked at babies who are at high risk for autism spectrum disorders in this lab, and these are kids who have an older brother or sister who has a diagnosed autism spectrum disorder," says Messinger.

"The younger siblings are at higher risk. Almost one in five of them will themselves develop an autism spectrum disorder, and that finding came out of the result of studies like our own and those of our collaborators and other investigators following up with these kids. We have increasing evidence that early intervention works with autism spectrum disorders," he says.

Doctoral student Whitney Mattson says working on this project has helped him refine an unusual talent. "I have gotten quite adept at dodging spit-up!" he laughs.

Mattson says designing the experiment has been rewarding.

"It was really great to see that all of our physical setup came together and that the babies were actually really enjoying the time that they had with their parents. The first time we brought a family in, and they went through the interaction, it was really great to see all of that come together," he says.

"Sensitive and responsive interaction with babies is what makes [babies](#) grow healthy," adds Messinger.

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