

# UCLA Study First to Show Autistic Brains Can Be Trained to Recognize Visual and Vocal Cues

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To understand the meaning of a conversation, kids automatically do what adults do — besides processing the meaning of words, they unconsciously "read" the expression on a person's face and listen to their tone of voice, then integrate that information with the context at hand to discern meaning, be it humor, anger, irony or straightforwardness.

Individuals with autism typically don't do this. They often miss the subtle meanings conveyed by a person's face and tone of voice, and thus have trouble determining the communicative intent of others. Neuroimaging studies have backed this up, showing that individuals with autism spectrum disorders (ASDs) — including autism, pervasive developmental disorder and Asperger's syndrome — show reduced activity in the regions of the brain that respond to such cues.

But what if those brain regions could be trained to respond appropriately? In a report in the current issue of the journal *Archives of General Psychiatry* and currently online, UCLA researchers did just that. Providing ASD children with explicit instructions to pay more attention to facial expressions and tone of voice elicited an increased response in the medial prefrontal cortex, part of the brain's network for understanding the intentions of others.

"That's significant. The fact that you can 'normalize' activity in this region in the ASD group by directing their attention to these important

social cues clearly indicates there's nothing intrinsically wrong with this region in the autistic brain," said Mirella Dapretto, associate professor of psychiatry and biobehavioral sciences at the Semel Institute for Neuroscience and Human Behavior at UCLA and a member of the UCLA Ahmanson-Lovelace Brain Mapping Center. Dapretto co-authored the study with her former graduate student Ting Wang, who is now a postdoctoral fellow at Mount Sinai School of Medicine.

"This is a very positive thing," Dapretto said, "because these findings have implications for future interventions — they suggest that you could train the autistic brain to make use of the information conveyed by the human face and voice to successfully navigate social interactions."

Autism is a complex neurobiological disorder of development that affects one of every 150 children, impairing communication and social skills. ASDs encompass a broad spectrum of disorders that range from mild to severe.

The authors had two goals in mind with their study. One was to examine the neural circuitry in the brain that underlies the problems ASD children face in interpreting communicative intent. The other was to determine whether explicit instructions to pay attention to facial expressions and tone of voice would elicit more normal patterns of brain activity in these children.

While undergoing functional magnetic resonance imaging (fMRI), 18 ASD boys between the ages of 7 and 17, as well as a control group of 18 typically developing (TD) boys, viewed cartoon drawings of children in conversational settings while listening to short vignettes that ended with a potentially ironic remark. Researchers found that, compared with the TD control group, the ASD children had reduced activity in two areas of the brain — the medial prefrontal cortex and right superior temporal gyrus. But when the researchers gave both groups explicit instructions to

pay attention to the speaker's facial expression and tone of voice, only the ASD children showed a significant increase in activity in the medial prefrontal cortex.

"The typically developing kids recognized and interpreted these cues automatically when trying to infer if a speaker's remark was sincere or sarcastic, so their brains were already responding appropriately," said Dapretto. "But not so with the ASD kids, who did not show activity in this area when specific instructions weren't provided. This is the first study to show that you can normalize activity in a key region of the so-called 'social brain' in individuals with autism by simply directing their attention to these important social cues."

Source: UCLA

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