Android designed to teach social skills

Scientists in Italy are developing an interactive android that they believe will aid autistic children and adults in learning social skills and recognizing emotions.

Giovanni Pioggia and colleagues are developing a "facial automaton for conveying emotions" (FACE) which is capable of both expressing emotions and recognizing the emotional states of others. The android's automated, lifelike head rests on a immobile body that can be positioned naturally.

According to Pioggia et al., "FACE is able to express and modulate the basic emotions in a repeatable and flexible way, to quantitatively analyze the emotional reactions of individuals through optical analysis of facial expression, to track a human face over time, and to automatically store all data." Autistic children, with the help of a therapist, will be able to interact with FACE via computer. Eventually, the researchers hope to be able to program FACE to react appropriately to individual children's responses in real time.

Initial testing suggests that autistic children respond positively to the android face. The researchers plan to use FACE to teach facial matching (by allowing the children to select, from several images, an image of a human face expressing the same emotion as FACE); emotion labeling (by naming the emotion expressed by FACE); and emotional contextualization (by presenting the children with different social situations and asking them select an appropriate response for FACE).

While the FACE program is still in a developmental phase, Pioggia et al. are optimistic about its benefits. "Our hypothesis," they say, "is that this method will diminish social impairment and increase expressiveness, facial mimicry, and shared attention, and, thus, it will lead to a better quality of life for children and adults affected by autism."

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"An android for enhancing social skills and emotion recognition in people with autism," Giovanni Pioggia, Roberta Igliozzi, Marcello Ferro, Arti Ahluwalia, Filippo Muratori, and Danilo de Rossi, *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 13, No. 4, December 2005, 507-515. Address: Giovanni Pioggia, Faculty of Engineering, University of Pisa, 56100 Pisa, Italy, giovanni.pioggia@ing.unipi.it.

SCHOOLS AND SERVICES

The Autism Research Institute maintains a list of schools and services for autistic individuals. If your facility should be included on our list, and you believe it may not be, please send a self-addressed, stamped envelope to receive our referral list questionnaire.

Viewing autism: researcher says "systemic" approach more valuable than "genes/brain/behavior" appproach

Two contrasting schools of thought exist in the field of autism research today, one seeing autism as a strongly genetic, brain-based disorder, and the other seeing it as a systemic disorder—affecting not just the brain but other tissues as well—in which genes create varying degrees of vulnerability to environmental factors. A recent review article by Martha Herbert, a leading autism expert, concludes that the second approach is far more likely to yield insights into the nature of autism, and to offer effective treatments and methods of prevention.

Herbert outlines multiple lines of research indicating that a "systems" model is increasingly relevant to autism research. Emerging findings, she notes, include:

—The presence of widespread and pervasive brain tissue changes "that do not strictly localize in a pattern consistent with neural systems presumed to be implicated in autistic behaviors."

—Researching indicating that the processing abnormalities in autism are network-based rather than region-based, "supporting the idea that the problem lies not necessarily in any one cortical area or function, but may derive from altered circuitry, network dynamics, and supporting metabolic processes."

—The overlap of autistic symptoms with other disabilities, suggesting the possibility that prenatal infection, maternal antibody factors, or other environmental causes may play a common role in these disorders.

—Brain and behavioral changes occurring well after birth, in a disorder previously assumed to be due solely to inborn genetic effects.

—Chronic, ongoing tissue alterations such as neuroinflammation and oxidative stress that have been identified in autism, indicating that autism is not simply the result of "hardwired" alterations in brain architecture.

—The presence of gastrointestinal, immune system, and other systemic illnesses, revealing that autism is not solely a disorder of the brain.

—Recent sharp increases in the rates of autism, a phenomenon that cannot be explained solely by genes.

—Cases of improvement and even recovery in autistic children, in a disorder previously believed to be incurable.

All of these findings, Herbert says, imply that the traditional idea of autism as a genetically caused, brain-based disorder is simplistic. "When genetics is placed into more explicit interplay with environmental factors, and when the focus is expanded from brain to organism/systemic biology," she says, "these anomalous features can be incorporated comfortably into an integrative model of autism."

Herbert notes that researchers who view autism solely as a genetic, brain-based disorder tend to believe that psychiatric drugs are the most plausible treatments for autism. In contrast, she says, doctors who take the systemic approach believe that "biomedical treatment targets may be found in any pathway or pattern that contributes to degrading tissue, connectivity and/or processing in the autistic brain, or that leads to symptoms in any part of the body," and that improvement at any of these levels may cause systemic changes that improve brain function, behavior, and overall health and well-being.

Moreover, Herbert notes, such an approach is more likely to uncover beneficial treatments. Researchers who view autism solely as a genetic, brain-based disorder, she says, tend to believe that psychiatric drugs are the most plausible treatments for autism. In contrast, she says, doctors who take the systemic approach believe that "biomedical treatment targets may be found in any pathway or pattern that contributes to degrading tissue, connectivity and/or processing in the autistic brain, or that leads to symptoms in any part of the body," and that improvement at any of these levels may cause systemic changes that improve brain function, behavior, and overall health and well-being.

Editor's note: Dr. Herbert's discussion of the advantages of the "systemic" approach to autism over the "genes/brain/behavior" approach is a strong vindication of the diagnostic and treatment approaches that are currently being used by our Defeat Autism Now! (DAN!) doctors and have resulted in so many success stories.

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"Autism: A brain disorder, or a disorder that affects the brain?" Martha R. Herbert, *Clinical Neuropsychiatry*, Vol. 2, No. 6, 2005, 354-79. Address: Martha R. Herbert, 149 13th Street, Room 6012, Charlestown, MA 02129, mherbert1@partners.org.

MORE ON THIMEROSAL: Many parents and doctors are under the impression that thimerosal in vaccines is no longer a threat to children. However, a new report by Dan Olmsted of United Press International reveals that children may still be receiving as much as half of the dose of mercury that was in vaccines in the 1990s. For more, go to www.upi.com/ConsumerHealthDaily.