

# Rutgers researcher examines connections between vision and movement

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A hand moves forward, but is it a friendly gesture or one meant to do harm? In an instant, we respond -- either extending our arm forward to shake hands or raising it higher to protect our face. But what are the subtle cues that allow us to interpret such movement so we can properly respond to others?

In research projects designed to assist the U.S. Department of Homeland Security and to provide deeper insight into how autistic individuals perceive others, Maggie Shiffrar, professor of psychology at Rutgers University in Newark, is examining how our visual system helps us to interpret the intent conveyed in subtle body movements.

While most autism research has focused on the difficulties in face perception, Shiffrar is one of the first researchers to examine autism as it relates to connections between visual analysis, body movement and our ability to interact with others.

## **Identifying Terrorist Threats from a Distance Via Visual Analysis**

Shiffrar's research is paving the way for identifying possible terrorist threats from the way people move their bodies. Working under a \$400,000 Homeland Security grant from the National Science Foundation, Shiffrar and co-investigator Kent Harber, associate professor of psychology at Rutgers, are examining how people are able

to identify the emotional state and intent of others by their body movements. Being able to quickly and accurately interpret body movements from a distance would allow for the identification of potential terrorist activities in crowded areas such as airports, subways and city streets.

"It's the same sort of process basketball players use to tell whether someone is going to throw the ball or fake a pass," explains Shiffrar. "The question is how to determine which people are best at picking up the cues revealed in body movement and what those cues are."

The hope is that such research will allow for the development of computer programs to train people who are good at picking up such signals to better interpret body movement and identify possible threats. It also could pave the way for the development of computer applications to recognize such movements.

## **Autism -- A Lens Devoid of Emotion**

Almost all people possess some autistic tendencies, explains Shiffrar, but her research shows that those with the fewest autistic tendencies "are best at detecting the weak signals provided by body movement." Thus, people with very few autistic tendencies are the best at interpreting emotion from body movement.

Working with test participants under a \$750,000 grant from the Simons Foundation, Shiffrar has discovered that people with autistic spectrum disorder (ASD) tend to view other people and objects alike. It is as if they view the world through a lens devoid of emotion.

People and objects appear to hold the same level of significance.

People with few autistic tendencies, on the other hand, have visual

systems that analyze human movement and the movement of objects differently. As a result, when presented with limited information they find it easier to identify people over objects.

Once rare, autism in the United States has reached epidemic proportions. The U.S. Centers for Disease Control and Prevention estimates that autism today affects about one in every 150 children.

In her Research on Autism at Rutgers (ROAR) lab, Shiffrar and her team videotape people's body movements with lights attached to the major joints and then show research participants only the movement of the lights. Lights also are attached to objects such as a moving tractor or a dog and those light movements too are shown to participants.

Those with ASD tend to identify people and objects with an equal rate of accuracy, while those with few autistic tendencies are much better at identifying people and less able to identify objects from point-of-light representations.

"The way people move their bodies tell us volumes about their actions, intentions and emotions. To interact well with others, we need to be able to perceive this all accurately," says Shiffrar. "What we hope to determine through our research is whether people with ASD have trouble perceiving human movement because they avoid human contact in order to function, or if it is their visual system that is treating people as objects."

Previous research has revealed that the part of the brain – the amygdala – involved in emotion communicates with that part of the brain involved in the perception of human movement. This connection is impaired in people with autism and could be what makes it difficult for them to perceive other people's emotional states from their actions. Should that be the case, it may become possible to develop training programs for

people with ASD to help them perceive and understand the intentions and emotional states of people from their body movements.

Source: Rutgers University

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