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Scientist studies emotion in psychology, art and acting to help autistics

Stanford researcher David Wilkins is comparing how artists, actors and psychologists know facial emotions. He hopes to use his findings to help individuals with autism, who often are very poor at recognizing facial emotions.

BY CHRISTINE BLACKMAN

Sometimes our deepest emotions are written all over our faces.

Stanford researcher David Wilkins is studying how people can be trained to better recognize facial emotions. He is studying drawing techniques used by portrait artists, facial mimicry and emotional memory techniques used by actors, and microexpression and subtle expression recognition techniques developed by psychologists.

His findings will be integrated in an interactive learning environment to train people with autism to better recognize facial emotions.

Wilkins, a lecturer in Stanford's Symbolic Systems Program, is focusing on the seven universal emotions: happiness, sadness, anger, surprise, fear, disgust and contempt. They are of fundamental importance in human communication.

People with autism typically don't benefit from this common understanding of facial communication. "In everyday life, the average individual with autism has less than a 50 percent chance of knowing if your expression

Pablo Picasso; © Tate; London 2010; ARS



To capture facial expressions, Picasso used a live model when working on 'Weeping Woman.'

is happy or sad or angry. If you don't recognize universal emotions, any type of interpersonal interaction is really hindered," Wilkins said.

Facing the facts

The deeper scientific understanding in psychology of the seven universal facial emotions began in the 1960s, and was pioneered by psychologists such as Paul Ekman. A large amount of research now links the behavior of the facial muscles associated with universal emotions to brain states, memory and body physiology.

The understanding of facial expressions in art goes back much further than in psychology. "Historically, the fields that demonstrated the deepest understanding of facial emotions have been drawing and acting. When artists draw the face or actors express facial emotions, they capture something that we find significant and that captivates us," Wilkins said.

Good actors subtly and accurately portray authentic emotions. A powerful portrayal reflects an actor's understanding of what goes on in the face of someone who is joyful, sad or angry. Artists such as Leonardo, Michelangelo, Raphael, Rembrandt and Picasso display in their portraits their own subtle and ingenious ability to interpret human facial emotions.

Wilkins is collaborating with Kay Kostopoulos, a lecturer in the Drama Department; Michael Azgour, a guest artist in Symbolic Systems; and Antonio Hardan, an associate professor of psychiatry and behavioral sciences at the Stanford University Medical Center and the director of the Autism and Developmental Disabilities Clinic at Lucile Packard Children's Hospital.

They plan to conduct facial emotion learning experiments with autistic children this summer.

Wilkins, Kostopoulos and Azgour co-taught a course at Stanford this year, *Symbolic Systems 210: Learning Facial Emotions: Art and Psychology*.

Psychology of the face

The team is using psychology research techniques, such as the Facial Action Coding System, which categorizes how individuals move muscles in the face when displaying emotions. For example, a fearful face often raises eyebrows and pulls them together, while a surprised face often raises eyebrows and curves them. Surprised faces often also involve a drop of the jaw.

"We all, depending on our culture, have a certain way of showing when we're sad or angry. But across cultures it turns out that the specific muscles associated with each of the seven universal emotions are the same. We can try to conceal their action, but even then they often contract very briefly, for about 1/25 of a second, and tell what you're really feeling even though you are trying to conceal your feelings," Wilkins said.

In addition to these microexpressions, psychologists study subtle expressions. These are small, involuntary facial movements that are displayed when an emotion is first being felt. If a person is trying to conceal anger, for example, she may briefly lower the eyebrows and draw them together, without moving anything else on her face.

Drawing and acting out emotions

To capture facial expressions by drawing, artists from Leonardo to Picasso have traditionally drawn or painted facial portraits in a studio setting. "Common elements in the studio setting are the use a live model, an attention to the lighting of the model and having the model hold an expression for an



When actors such as Katharine Hepburn express facial emotions, 'they capture something that we find significant and that captivates us,' researcher David Wilkins said.

extended period of time," Wilkins explained. "Even an abstract work like Picasso's *Weeping Woman* involved a live model."

To exhibit facial expressions, actors often use method acting. They recall an emotional memory from their past and use it to let the emotion appear on their face. Students in the *Learning Facial Emotions* class performed acting exercises such as standing face to face while observing and mimicking expressions that naturally arise after hearing an emotionally charged story.

Wilkins and his team are designing experiments for individuals with autism in certain kinds of art, acting and psychology techniques. The goal is to find which techniques provide the greatest improvement in facial emotion recognition.

One exercise that could help an individual with autism learn surprise, for example, involves focusing on eyebrows that rise and curve on an animated, three-dimensional avatar. The avatar might bear the participant's own face.

"If you wanted to teach someone to emote sadness, one exercise would be to show them a projection of what they would look like to convey sadness and what they currently look like. They could be given interactive guidance

to get the two projections to look alike," Wilkins said.

To learn facial emotions, do artists, actors, or psychologists have the best training techniques? This fundamental question is as yet unanswered. It is what first sparked Wilkins' interest in this research area. He hopes his collaborative research projects will find the answer and help individuals with autism as well.

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