Asymmetry of an emotion



Unilateral facial paralysis makes it difficult to recognise other people's emotions

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Though probably not at the top of the concerns of people affected by facial hemiparalysis, it's nonetheless a problem that should not be overlooked. Facial hemiparalysis not only makes it impossible to produce expressions, it also impairs the perception of expressions on other people's faces. A new study conducted with the collaboration of the International School for Advanced Studies (SISSA) in Trieste, the University of Wisconsin, Madison (USA), and the Harvard Medical School of Boston, shows that this difficulty is probably related to an impairment of facial mimicry, a mechanism that helps us understand the emotions of others.

There are two premises.
First, scientific research has demonstrated that when we look at other people's facial expressions, we tend to imitate them in an imperceptible and subconscious manner through a process known as facial mimicry. The hypothesis is that this behaviour helps us understand the emotions we are watching.

The second thing we need to know is that our expressions, just like our face, are asymmetrical: they are more pronounced and begin earlier (facial expression is a dynamic process) on one half of the face compared to the other. This asymmetry is thought to give expressions a special "flavour": those that begin and are more pronounced on the left, for example, are judged as being more authentic.

What happens if we combine these two assumptions? "That if, unfortunately, a person is unable to move half of their face – for example, because of a pathological condition – they will also have difficulty perceiving other people's emotions correctly", explains Sebastian Korb, SISSA research fellow and first author of a paper just published in JAMA Facial Plastic Surgery. Korb worked with a sample of patients affected by right- or left-sided facial hemiparesis. In the experiments, the patients (57 in all) watched a series of computer-generated avatar faces (three-dimensional human faces) as they dynamically showed expressions of happiness or anger. "The use of the computer-generated avatars allowed us to control all dimensions of the stimulus, from the timing of the expression to its asymmetry".

As mentioned, the literature shows that expressions that begin from the left side of the face come across as being more authentic than those that start on the right. According to the theory of embodied cognition, whereby interpretation of emotions is facilitated if we reproduce the patterns of muscle contraction on our own body (e.g., through facial mimicry), this should have an effect on persons affected by hemiparesis, who are unable to correctly mimic the expression with the paralysed half of their face.

"Our findings show that this difference clearly exists for persons affected by left hemiparesis", explains Korb. In their experiments, Korb and colleagues found that patients with right-sided paralysis did not differ much from healthy subjects in either their judgement of authenticity of the avatar's expression or in their response times when asked to identify an emotion as quickly as possible. Both groups judged expressions starting on the right side of the face as less authentic than those starting on the left, and both responded more rapidly to the latter expressions.

By contrast, patients with left-sided paralysis exhibited a more complex behaviour. While they showed no significant difference for anger, the situation changed with happiness, which was judged less authentic when starting on the left side of the face, where it also took longer to be identified.

"This means two things: that facial imitation is, at least in part, lateralized - that is, it copies the expression it observes - and that it is asymmetrical in an anatomical rather than specular

manner", explains Korb. Therefore, when we observe an expression that begins on the left side of the face, we mimic it with the left side of our face, and not with the right side as if we were in front of a mirror.

"This finding not only extends our knowledge of the 'lexicon' of facial expressions, but it also shows that those affected by disorders blocking the movement of facial muscles may also experience other types of difficulty, also in social interaction", concludes Korb. "These persons in fact are not only unable to generate correct facial expressions, they also have trouble interpreting facial expressions, a vital skill for displaying empathy, a function that underlies our social lives".

USEFUL LINKS:

- **Link to the original paper: http://archfaci.jamanetwork.com/article.aspx?articleid=2487385**

IMAGES:

- **Credits: David Blackwell (Flickr: https://goo.gl/OBBnRV)**

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