



## Emotions in the age of Botox



### **Aesthetic treatments based on botulin toxin affect the perception of emotions**

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Botulin injections in the facial muscles, which relax expression lines and make one's skin appear younger as a result of a mild paralysis, have another, not easily predictable effect: they undermine the ability to understand the facial expressions of other people. This consequence, as SISSA scientists explain in a new research study, depends on a temporary block of *proprioceptive feedback*, a process that helps us understand other people's emotions by reproducing them on our own bodies.

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By now we are all used to seeing its more or less successful results on Italian and international celebrities, but in fact the market of Botox-based procedures (cosmetic treatments that exploit the effects of type A botulin toxin) involves a large number of individuals. Just to give an idea, about 250,000 procedures were done in Italy in 2014. It is therefore natural to wonder about the possible side effects of this practice. One fairly unpredictable consequence concerns the emotional domain, and in particular the perception of emotional information and facial expressions. "The thankfully temporary paralysis of facial muscles that this toxin causes impairs our ability to capture the meaning of other people's facial expressions", explains Jenny Baumeister, research scientist at the International School for Advanced Studies (SISSA) in Trieste and first author of a study just published in the journal *Toxicon* (and carried out with the collaboration of Cattinara Hospital in Trieste).

Baumeister's intuition stems from a very well-known scientific theory, called *embodiment*. The idea is that the processing of emotional information, such as facial expressions, in part involves reproducing the same emotions on our own bodies. In other words, when we observe a smile, our face too tends to smile (often in an imperceptible and automatic fashion) as we try to make sense of that expression. However, if our facial muscles are paralyzed by Botox, then the process of understanding someone else's emotion expression may turn out to be more difficult.

Jenny Baumeister had a sample of subjects carrying out a series of different tests assessing their understanding of emotions, immediately before and two weeks after they had had a Botox-based aesthetic procedure, and compared the measurement with a similar sample of subjects that had no treatment. Regardless of the types of measurement (judgement or reaction times) the effect of the paralysis was obvious.

"The negative effect is very clear when the expressions observed are subtle. Instead when the smile is wide and overt, the subjects were still able to recognize it, even if they've had the treatment", explains Francesco Foroni, SISSA researcher who coordinated the study. "For very intense stimuli, although there was a definite tendency to perform worse, the difference was not significant. On the other hand, for "equivocal" stimuli that are more difficult to pick up, the effect of the paralysis was very strong".

The finding confirms the assumption that, to some extent at least, "embodied" processes help us understand emotions. It also suggests that the negative influence of Botox may be manifest precisely in those situations in which this help could prove most useful. For instance, think of a normal conversation between two individuals, where mutual understanding is vital to ensure proper social interaction: failure to pick up on emotional nuances or sudden changes in the other



person's mood can make the difference between successful communication and communication breakdown.

"Our study was devised to investigate embodied cognition. At the same time, we think that awareness of this consequence will be of use to those involved in aesthetic medicine, not least to adequately inform people seeking to undergo these treatments" commented Foroni.

#### **USEFUL LINKS:**

- Original paper: <http://goo.gl/kNqWBU>

#### **IMAGES:**

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#### **Contact:**

Press office:

[pressoffice@sissa.it](mailto:pressoffice@sissa.it)

Tel: (+39) 040 3787644 | (+39) 366-3677586

via Bonomea, 265  
34136 Trieste

More information about SISSA: [www.sissa.it](http://www.sissa.it)