

## The Evolution and Diagnosis of Empathy

---

SIMON BARON-COHEN

In the movie *Blade Runner*, the earth becomes populated by a species that looks and behaves just like humans, except they lack empathy. The problem becomes how to identify who is truly human, and who is an impostor. In the movie there was an empathy test. If you took a photo of the person's iris, when presented with an emotional stimulus (a loving phrase, an expression of pain), the true human showed a pupil-dilation reflex only visible using a sensitive camera. The human impostor did not.

Is there an unambiguous test to identify if someone has empathy? Empathy seems straightforward to identify because, countless times each day, we observe *surface behavior* that we take to be empathy. A man holds the door open for the person behind him. A woman gives her friend a birthday present. A policeman slows down the cars for a blind man crossing the street. A child hands in a wallet he found in the road. Such simple, ordinary acts are assumed to reflect empathy. So is empathy just a synonym for acts of kindness? And if alien impostors produced such acts, without a special empathy-detector camera, wouldn't we just assume they were true acts of empathy?

The problem is that the aforementioned examples could reflect at least four processes *other* than empathy. First, they could be acts of moral behavior, and not all moral acts involve empathy. "Thou shalt not kill" may be part of our moral behavior because we have empathy, but it might be that we follow this commandment simply because it is part of our *set of rules* for how to be good. Rule-following doesn't require empathy. Secondly, the examples might simply reflect convention, and adhering to conventions need not involve empathy. What if we hold doors open, or hand in wallets, or give birthday presents for the same reasons we use a knife and fork to eat, or drive on the left, or stop at a red traffic light? Following rules of morality, or adhering to convention are important for our social system to function smoothly, but they may not reflect empathy. Detecting unambiguous examples of empathy may not be as straightforward as we first thought.

Thirdly, such behavior could just be convincing acting. Jane may be said to have good empathy because she *appears* so sympathetic. She says all the right things. But just because when a speaker is describing something distressing she makes all the right sorts of soothing sounds ("Oh, how awful! You poor thing!

You must have been so angry/afraid/upset/shocked/etc.”), this doesn't prove she is particularly empathic. She might just be a very good mimic of an empathic person, and have picked up that empathic people make these sorts of sounds. Or she might have “hacked out” how to appear empathic. For example, she may have picked up that someone seems empathic if they are a good listener, so she learned not to interrupt. Or maybe she seems a good listener not because she has good empathy but because she is shy. But shyness is not empathy.

As yet there is no foolproof test of empathy, yet given its growing importance within cognitive neuroscience, it won't be long before there is one. The advent of functional magnetic resonance imaging (fMRI) is making it possible to see *beneath* surface behavior, to establish if the typical neural circuitry for empathy is (or is not) being employed, when someone says they care. Currently, we know that there is a network of about ten regions in the brain that play different roles during empathy, and these regions include the ventromedial prefrontal cortex,<sup>1</sup> the orbitofrontal cortex,<sup>2</sup> and the amygdala.<sup>3</sup> These regions are underactive in people with reduced empathy, such as those with conduct disorder or antisocial personality disorder. This raises the possibility that one day fMRI will be able to diagnose these conditions characterized by reduced empathy. Indeed, from the previous discussion, it may be the case that a behavioral test alone will never be able to detect genuine empathy, but an fMRI test might.

Empathy is measurable using questionnaires, such as the Empathy Quotient (EQ),<sup>4</sup> which suggests that there are at least two different components to empathy: the cognitive aspect (also called “theory of mind”), involving imagining another person's thoughts and feelings; and the affective component, involving responding to someone else's thoughts and feelings with an appropriate emotion. Individual differences on the EQ correlate with both prenatal testosterone measures<sup>5</sup> and even with candidate genes.<sup>6</sup> This suggests that whatever the important role the postnatal environment plays in boosting or reducing one's empathy (and Bowlby's work showed how early environmental neglect and abuse does impact one's later capacity for empathy<sup>7</sup>), empathy is also a

function of our biology. Recognizing this means we should be thinking about the evolution of empathy.

It is easy to imagine why empathy would have evolved. Individuals with good empathy would have an advantage in caring for their offspring (being able to tune into their infant or child's needs), an advantage in resolving conflict without resort to physical fights, an advantage in creating social networks that would provide social support and alliances during times of need, and a way of negotiating social groups effortlessly, in being able to read other people's behavior. All of these are prosocial benefits. If one just possessed the cognitive without the affective component of empathy, even this might confer advantages on the individual, in predicting what someone might do next, and in being able to manipulate and deceive others, though this may be antisocial. For example, the psychopath, with good cognitive empathy but poor affective empathy, might have survived long enough to reproduce and pass on his or her genes. But if empathy is the result of evolution, it raises the question whether it is uniquely human, or whether other animals possess simpler precursors of what we see so clearly in our own species.<sup>8</sup>

#### ACKNOWLEDGMENT

Part of this essay first appeared in the *Huffington Post*, 2010.

#### BIBLIOGRAPHY

- Baron-Cohen, S., H. Ring, E. Bullmore, S. Wheelwright, C. Ashwin, and S. Williams. “The Amygdala Theory of Autism.” *Neuroscience and Behavioral Reviews* 24 (2000): 355–64.
- , H. Ring, J. Moriarty, P. Shmitz, D. Costa, and P. Ell. “Recognition of Mental State Terms: A Clinical Study of Autism, and a Functional Neuroimaging Study of Normal Adults.” *British Journal of Psychiatry* 165 (1994): 640–49.
- , and S. Wheelwright. “The Empathy Quotient (EQ): An Investigation of Adults with Asperger Syndrome or High Functioning Autism, and Normal Sex Differences.” *Journal of Autism and Developmental Disorders* 34 (2004): 163–75.
- Bowlby, John. *Child Care and the Growth of Love*. Abridged and edited by Margery Fry. London: Penguin, 1953.

Chakrabarti, B., G. Hill-Cawthorne, F. Dudridge, L. Kent, S. Wheelwright, C. Allison, S. Banerjee-Basu, and S. Baron-Cohen. "Genes Related to Sex-Steroids, Neural Growth and Social-Emotional Behavior Are Associated with Autistic Traits, Empathy and Asperger Syndrome." *Autism Research* 2 (2009): 157–77.

Chapman, E., S. Baron-Cohen, B. Auyeung, R. Knickmeyer, K. Taylor, and G. Hackett. "Foetal Testosterone and Empathy: Evidence from the Empathy Quotient (EQ) and the 'Reading the Mind in the Eyes' Test." *Social Neuroscience* 1 (2006): 135–48.

De Waal, Frans. *Our Inner Ape: A Leading Primatologist Explains Why We Are Who We Are*. New York: Riverhead Books, 2005.

Lombardo, M., B. Chakrabarti, E. Bullmore, S. Wheelwright, S. Sadek, J. Suckling, MRC AIMS Consortium, and S. Baron-

Cohen. "Shared Neural Circuits for Mentalizing about the Self and Others." *Journal of Cognitive Neuroscience* 277 (2010): 1623–35.

#### NOTES

1. Lombardo et al., "Shared Neural Circuits."
2. Baron-Cohen et al., "Mental State Terms."
3. Baron-Cohen et al., "Amygdala Theory."
4. Baron-Cohen and Wheelwright, "Empathy Quotient."
5. Chapman et al., "Foetal Testosterone."
6. Chakrabarti et al., "Genes Related to Sex Steroids."
7. Bowlby, *Child Care*.
8. De Waal, *Our Inner Ape*.