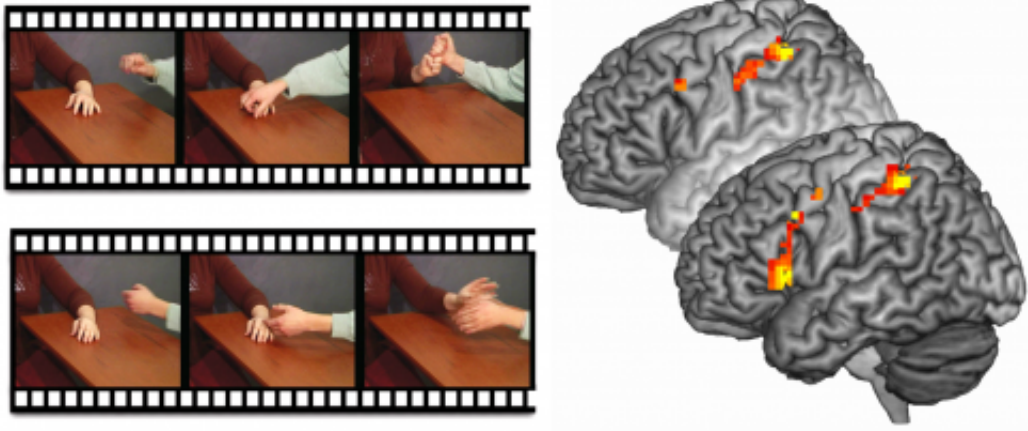


# Brain research shows psychopathic criminals do not lack empathy, but fail to use it automatically

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This image shows the movies shown to the participants (left) and brain activation of the participants with psychopathy without instructions (behind) and with instructions to empathize (front). Credit: Royal Netherlands Academy of Arts and Sciences

Criminal psychopathy can be both repulsive and fascinating, as illustrated by the vast number of books and movies inspired by this topic. Offenders diagnosed with psychopathy pose a significant threat to society, because they are more likely to harm other individuals and to do so again after being released. A brain imaging study in the Netherlands shows individuals with psychopathy have reduced empathy while witnessing the pains of others. When asked to empathize, however, they

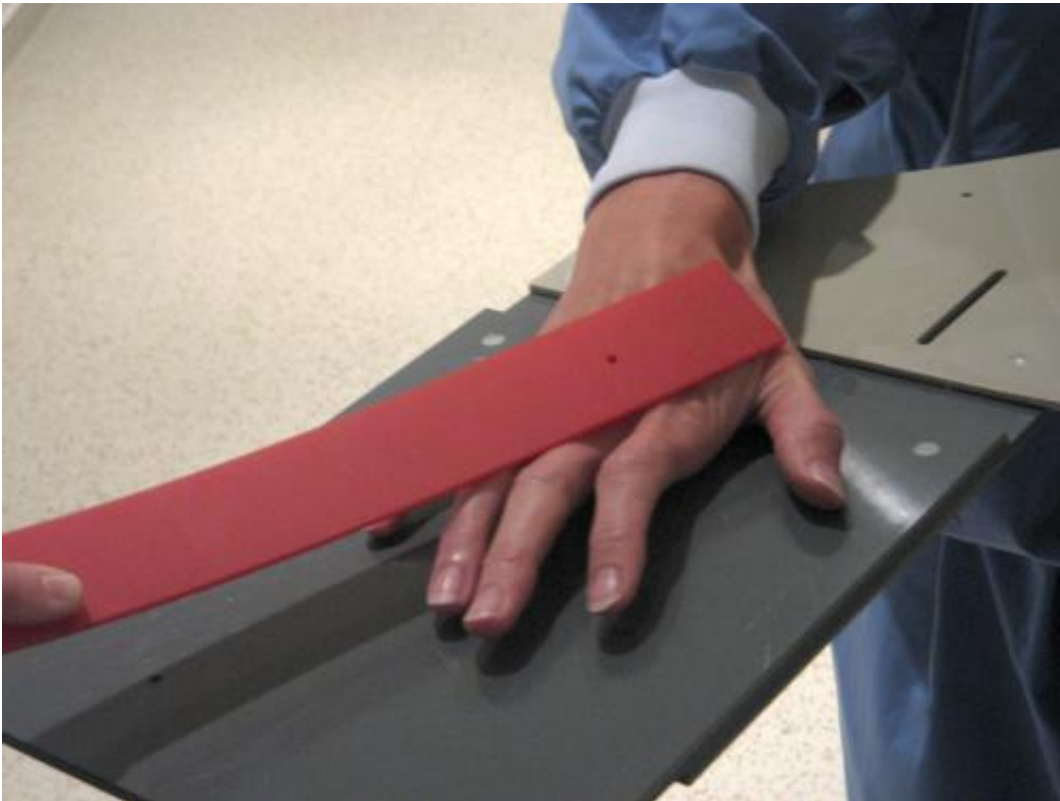
can activate their empathy. This could explain why psychopathic individuals can be callous and socially cunning at the same time.

Why are psychopathic individuals more likely to hurt others? Individuals with [psychopathy](#) characteristically demonstrate reduced empathy with the feelings of others, which may explain why it is easier for them to hurt other people. However, what causes this lack of empathy is poorly understood. Scientific studies on psychopathic subjects are notoriously hard to conduct. "Convicted criminals with a diagnosis of psychopathy are confined to high-security forensic institutions in which state-of-the-art technology to study their brain, like magnetic resonance imaging, is usually unavailable", explains Professor Christian Keysers, Head of the Social Brain Lab in Amsterdam, and senior author of a study on psychopathy appearing in the Journal *Brain* this week. "Bringing them to scientific research centres, on the other hand, requires the kind of high-security transportation that most judicial systems are unwilling to finance."

The Dutch judicial system, however, seems to be an exception. They joined forces with academia to promote a better understanding of psychopathy. As a result, criminals with psychopathy were transported to the Social Brain Lab of the University Medical Center in Groningen (The Netherlands). There, the team could use state of the art high-field functional [magnetic resonance imaging](#) to peak into the brain of criminals with psychopathy while they view the emotions of others.

The study, which will appear on the 25th of July in the journal *Brain* (published by Oxford University Press) and is entitled "Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy", included 18 individuals with psychopathy and a control group, and consisted of three parts. "All participants first watched short movie clips of two people interacting with each other, zoomed in on their hands. The movie clips showed one hand touching the other in a

loving, a painful, a socially rejecting or a neutral way. At this stage, we asked them to look at these movies just as they would watch one of their favourite films", Harma Meffert, the first author of the paper, explains. Meffert was a graduate student in the Social Brain Lab while the study was conducted, and is now a post-doctoral fellow at the National Institutes of Mental Health in Bethesda.



This image shows a participant being slapped on the hand to localize brain regions sensitive to pain. Credit: Royal Netherlands Academy of Arts and Sciences

Next, the participants watched the same clips again. This time, however, the researchers prompted them explicitly to "empathise with one of the actors in the movie", that is, they were requested to really try to feel

what the actors in the movie were feeling.

"In the third and final part, we performed similar hand interactions with the participants themselves, while they were lying in the scanner, having their brain activity measured", adds Meffert. "We wanted to know to what extent they would activate the same brain regions while they were watching the hand interactions in the movies, as they would when they were experiencing these same hand interactions themselves."

Our brains are equipped with what scientists call a "mirror system". For example, the motor cortex of the brain normally allows you to move your own body. Your so called somatosensory cortex, when activated, makes you to feel touch on your skin. Your insula, finally, when activated makes you feel emotions like pain or disgust. In the last decades, brain scientists have discovered that when people watch other people move their body, or see those people being touched, or have emotions, these same brain regions are activated. In other words, the actions, touch or emotions of others become your own. This "mirror system" possibly constitutes a crucial part of our ability to empathize with other people, and it has been previously shown, that the less you activate this system, the less you report to empathize with other people. It has been suggested that individuals with psychopathy might somehow suffer from a broken "mirror system", resulting in a diminished ability to empathize with their victims.

As it turns out, however, the picture seems to be more complex. When asked to just watch the film clips, the individuals with psychopathy indeed did activate their mirror system less. "Regions involved in their own actions, emotions and sensations were less active than that of controls while they saw what happens in others", summarizes Christian Keysers. "At first, this seems to suggest that psychopathic [criminals](#) might hurt others more easily than we do, because they do not feel pain, when they see the pain of their victims."

As the second part of the study revealed, however, it's not quite so simple. Instead of generally activating their mirror system less, individuals with psychopathy rather seem not to use this system spontaneously, but they can use it when asked to. "When explicitly asked to empathize, the differences between how strongly the individuals with and without psychopathy activate their own actions, sensations and emotions almost entirely disappeared in their empathic brain", explains Valeria Gazzola, Assistant Professor at the UMCG and second author of the paper. "Psychopathy may not be so much the incapacity to empathize, but a reduced propensity to empathize, paired with a preserved capacity to empathize when required to do so". The [brain](#) data suggests, that by default, psychopathic individuals feel less empathy than others. If they try to empathize, however, they can switch to 'empathy mode'.

There might be two sides to these findings. The darker side is that reduced spontaneous empathy together with a preserved capacity for empathy might be the cocktail that makes these individuals so callous when harming their victims and at the same time so socially cunning when they try to seduce their victims. Whether individuals with psychopathy autonomously switch their empathy mode on and off depending on the requirements of a social situation however remains to be established. The brighter side is that the preserved capacity for empathy might be harnessed in therapy. Instead of having to create a capacity for empathy, therapies may need to focus on making the existing capacity more automatic to prevent them from further harming others. How to do so, remains at this stage uncertain.

Provided by Oxford University Press

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