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Empathy is hard-wired into the mind, study finds

People with a certain type of brain damage showed less aversion to hurting others.

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Damage to the part of the brain that controls social emotions changes the way people respond to thorny moral problems, demonstrating the role of empathy and other feelings in life-or-death decisions.

Asked to resolve hypothetical dilemmas — such as tossing a person from a bridge into the path of a trolley to save five others — people with damage to their ventromedial prefrontal cortex tended to sacrifice one life to save many, according to a

study published Wednesday by the *Journal of Nature*.

People with intact brains were far less likely to kill or harm someone when confronted with the same scenarios.

The study, funded by the National Institutes of Health, the National Science Foundation and private sources, suggests that an aversion to hurting others is hard-wired into the brain.

"Part of our moral behavior is grounded . . . in a specific part of our brains," said Dr. Antonio Damasio, one of the study's lead authors and director of the Brain and Creativity Institute at USC.

The findings could not be used to predict actual behavior, Damasio said, because the scenarios presented in the study were unrealistic. More research is needed to determine if people with and without brain damage would react differently when faced with real-world dilemmas.

A finding linking a specific type of brain damage to day-to-day moral behaviors could have legal implications in criminal cases. But researchers said the study was meant to explore the psychological underpinnings of moral actions, not to characterize decisions as right or wrong.

The ventromedial prefrontal cortex processes feelings of empathy, shame, compassion and guilt. Damage to this part of the brain, which occupies a small region in the forehead, causes a diminished capacity for social emotions but leaves logical reasoning intact.

Researchers from USC, the University of Iowa, Harvard University and Caltech posed 50 hypothetical scenarios to six people whose ventromedial prefrontal cortices were damaged by strokes or tumors. Their responses were compared to those given by 12 people without brain

damage and 12 others with damage in brain areas that regulate other emotions, such as fear.

Researchers found no difference among groups in their responses to scenarios with no moral content, such as turning a tractor left to harvest turnips.

Scenarios that did not require participants to directly kill or harm someone elicited very similar responses among the groups. For example, people said they would classify personal expenses as business expenses to lower their taxes.

Additionally, members of all groups rejected decisions that would harm someone for the personal benefit of another, such as killing a newborn because a parent couldn't care for the infant.

But people with damage to their ventromedial prefrontal cortex were about three times as likely to sacrifice one person for the greater good compared to

people without brain damage or those with damage in a different part of their brains.

Joshua D. Greene, a Harvard psychologist not involved in the research, said the study showed that moral judgment was shaped by two brain systems — one focused on intuitive emotional responses and another that controlled cognition.

"When one of those systems is compromised, decisions are skewed," he said.

Mirella Dapretto, associate professor of psychiatry at the UCLA Ahmanson-Lovelace Brain Mapping Center, said the brain might not work so simply.

"One reason these people may have the guts to push someone off a bridge is that they don't comprehend how their actions would be evaluated by others," she said.

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