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Brain Scan Shows Emotion in Decisions

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WASHINGTON — Is it OK to save lives by switching a runaway train to another track, where it will hit only one person instead of five, but not to stop the train by pushing that one person in its path?

Even though either scenario saves a net of four lives, philosophers have long puzzled over why most people say the first choice is moral but the second isn't.

Now Princeton University researchers have scanned volunteers' brains as they pondered similar ethical dilemmas – and found that a key to tough moral judgments is emotion, not logical or analytical reasoning.

The study doesn't say what's a right or wrong decision. For the first time, however, images of which brain areas are activated – they literally light up in the scans – show how people make individual moral judgments.

The research, published in Friday's edition of the journal Science, is groundbreaking, said Jonathan Haidt, a social and cultural psychologist at the University of Virginia.

"We don't really understand how our moral reasoning and judgment works," Haidt said. But he said the new study backs his own theory that "we carry out our lives as though our moral judgments are based on reason," but instead people act on "gut feelings and make up reasons post hoc."

The study illustrates "the rich way the two parts of us (emotional and analytical) seem to interact and come into play in just about every situation we encounter," said co-author Dr. Jonathan Cohen, director of Princeton's Center for the Study of Brain, Mind and Behavior.

Better understanding of how we make moral judgments could be important for society, said Joshua Greene, a Princeton philosophy graduate student who led the experiment.

"Most of the important social and political issues that divide people are really moral issues. And moral reasoning is highly structured by the structure of our brain. If we want to get along with one another and ... we see the world in varying moral colors, we need to understand where those pictures of the world come from," Greene said.

Eighteen people were put into brain scanners while answering a battery of 60 questions:

–Personal moral dilemmas like the runaway train case; whether, during a war, it's appropriate to smother a crying baby so invaders won't find and kill a whole group of people; a case of throwing people off a sinking lifeboat.

–Impersonal moral dilemmas such as do you ignore appeals for money to save starving children even if you're well off, and do you keep the money if you find a lost wallet?

–Nonmoral questions such as how to navigate a complicated trip.

The people used brain areas that deal with emotion in deciding the personal moral questions far more than when they decided the impersonal or nonmoral questions.

Also, areas of working memory – for using cold logic – were far less active as the volunteers debated personal moral questions.

Then researchers tracked how long it took the volunteers to decide each question. The few who made such choices as pushing the passer-by onto the train track or people out of the lifeboat took far longer to make that decision.

"That suggests the emotions really are acting as interference for saying, 'Yes, it's morally acceptable'" to sacrifice the few for the greater good, Cohen said.

The study is part of growing neurology research on the interaction between emotion and cognition. Scientists have discovered, for instance, that brain chemicals once thought important purely to emotion also have cognitive roles, such as the so-called feel-good molecule dopamine that's important for learning.

Those discoveries in turn affect other fields, Cohen said. He points to behavioral economists, who study how emotion interacts with rational spending decisions to develop better models of the economy.

The findings can shed light even on how people react to Tuesday's terrorist attacks, he said: Anger is a normal reaction, but the brain's cognitive side can harness – balance – that emotion.

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