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## **What Other People Say May Change What You See**

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A new study uses advanced brain-scanning technology to cast light on a topic that psychologists have puzzled over for more than half a century: social conformity.

The study was based on a famous series of laboratory experiments from the 1950's by a social psychologist, Dr. Solomon Asch.

In those early studies, the subjects were shown two cards. On the first was a vertical line. On the second were three lines, one of them the same length as that on the first card.

Then the subjects were asked to say which two lines were alike, something that most 5-year-olds could answer correctly.

But Dr. Asch added a twist. Seven other people, in cahoots with the researchers, also examined the lines and gave their answers before the subjects did. And sometimes these confederates intentionally gave the wrong answer.

Dr. Asch was astonished at what happened next. After thinking hard, three out of four subjects agreed with the incorrect answers given by the confederates at least once. And one in four conformed 50 percent of the time.

Dr. Asch, who died in 1996, always wondered about the findings. Did the people who gave in to group do so knowing that their answers was wrong? Or did the social pressure actually change their perceptions?

The new study tried to find an answer by using functional M.R.I. scanners that can peer into the working brain, a technology not available to Dr. Asch.

The researchers found that social conformity showed up in the brain as activity in regions that are entirely devoted to perception. But independence of judgment - standing up for one's beliefs - showed up as activity in brain areas involved in emotion, the study found, suggesting that there is a cost for going against the group.

"We like to think that seeing is believing," said Dr. Gregory Berns, a psychiatrist and neuroscientist at Emory University in Atlanta who led the study.

But the study's findings, he said, show that seeing is believing what the group tells you to believe.

The research was published June 22 in the online edition of Biological Psychiatry.

"It's a very important piece of work," said Dr. Dan Ariely, a professor of management and decision making at the Massachusetts Institute of Technology, who was not involved in the study. "It suggests that information from other people may color our perception at a very deep level."

Dr. Brian Knutson, a neuroscientist at Stanford and an expert on perception, called the study "extremely clever."

"It had all the right controls and is a new contribution, the first to look at social conformity inside a brain magnet," he said.

Functional M.R.I. scanners detect which brain regions are active when people carry out various mental tasks.

The new study involved 32 volunteers who agreed to participate in a study on perception. "We told them others will be doing the same task, but you're the only one who will be in the scanner," Dr. Berns said.

The subjects were asked to mentally rotate images of three-dimensional objects to determine if the objects were the same or different.

In the waiting room, the subjects met four people who they thought were other volunteers, but who in fact were actors, ready to fake their responses.

To encourage cohesiveness in the group, the participant and the four actors played practice rounds on laptop computers, took pictures of one another and chatted.

Then the participant went into the M.R.I. machine. The participant was told that the others would look at the objects first as a group and then decide if they were same or different.

As planned, the actors gave unanimously wrong answers in some instances and unanimously correct answers in others.

Mixed answers were sometimes thrown in to make the test more believable but they were not included in the analysis.

Next, the participant was shown the answer given by the others and asked to judge the objects.

Were they the same or different?

The brain scanner captured a picture of the judgment process.

In some trials, instead of being told that the other volunteers had given an answer, they were told that a computer had made the decision. Dr. Berns said this was done to make sure it was social pressure that was having an effect.

As in Dr. Asch's experiments, many of the subjects caved in to group pressure. On average, Dr. Berns said, they went along with the group on wrong answers 41 percent of the time.

The researchers had two hypotheses about what was happening. If social conformity was a result of conscious decision making, they reasoned, they should see changes in areas of the forebrain that deal with monitoring conflicts, planning and other higher-order mental activities.

But if the subjects' social conformity stemmed from changes in perception, there should be changes in posterior brain areas dedicated to vision and spatial perception.

In fact, the researchers found that when people went along with the group on wrong answers, activity increased in the right intraparietal sulcus, an area devoted to spatial awareness, Dr. Berns said.

There was no activity in brain areas that make conscious decisions, the researchers found. But the people who made independent judgments that went against the group showed activation in the right amygdala and right caudate nucleus - regions associated with emotional salience.

The implications of the study's findings are huge, Dr. Berns said.

In many areas of society - elections, for example, or jury trials - the accepted way to resolve conflicts between an individual and a group is to invoke the "rule of the majority." There is a sound reason for this: A majority represents the collective wisdom of many people, rather than the judgment of a single person.

But the superiority of the group can disappear when the group exerts pressure on individuals, Dr. Berns said.

The unpleasantness of standing alone can make a majority opinion seem more appealing than sticking to one's own beliefs.

If other people's views can actually affect how someone perceives the external world, then truth itself is called into question.

There is no way out of this problem, Dr. Ariely said.

But if people are made aware of their vulnerability, they may be able to avoid conforming to social pressure when it is not in their self-interest.

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