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In a study of New Yorkers three years after the Sept. 11 terrorist attacks, people who were closer to the World Trade Center (bottom circle) had more vivid recollections than those who were a few miles farther away, in Midtown. The graph indicates the relationship. Photo credit: Courtesy of Tali Sharot and Elizabeth Phelps

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Proximity to an Event Influences ‘Flashbulb Memories’
By Scott P. Edwards
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For the first time, scientists have identified the brain circuitry involved in the creation of “flashbulb memories”—vivid, picturelike recollections of shocking, traumatic events such as the Sept. 11 terrorist attacks—and that personal involvement in these events may be crucial in forming these memories.

New York University psychologist Elizabeth A. Phelps and her colleagues say that activation of the amygdala, the brain’s emotional arousal center, is stronger in people in close proximity to significant events than it is in those farther away, possibly because the amygdala, which enhances the memory of emotional information, is more engaged when people witness such events firsthand.

Phelps and her team studied functional magnetic resonance imaging scans of the brains of 24 people who were in New York City on the day of the terrorist attacks. Three years after the attacks, they observed the participants’ brain activity during recall of the day’s events, as well as other autobiographical events from the preceding summer. The participants, who were asked to retrieve memories of Sept. 11 while being scanned, rated their memories for vividness, level of detail, and confidence in the accuracy of the memories, and they were asked to write about their personal experience of the terrorist attacks and where they were at the time.

People who were in downtown Manhattan, near the World Trade Center, reported more vivid recollections of the attacks, including specific details about sounds and smells, than people who were a few miles away, in midtown, and experienced the event via television or the Internet.

“While all of the study subjects were in Manhattan on 9/11, the recollections of those in lower Manhattan, closer to the World Trade Center, described the attack more vividly and in more detail than those who were farther away,” Phelps says.

The study was published in the Jan. 2 issue of the Proceedings of the National Academy of Sciences.

Defined by psychologists James Kulik and Roger Brown in 1977 as the recall of significant historical events, such as the
assassination of presidents, flashbulb memories were originally thought to trigger a unique mechanism in the brain similar to taking a “picture” of the event. Scientists have largely debunked this theory. David Rubin, a Duke University psychologist who has studied people’s confidence in flashbulb memories, says this is a “seductive idea, but it’s wrong. The brain doesn’t—can’t—take a picture of these events.”

Phelps says these memories are instead tied to emotional arousal. The amygdala, a tiny, almond-shaped structure, regulates the influence of emotion on memory. While she is not surprised the amygdala is involved, she says she did not expect it to be more active in some people than others when recalling Sept. 11.

This finding, she says, suggests that personal involvement in an event—such as being close to the World Trade Center on Sept. 11—is critical for producing memories with flashbulb qualities and that the amygdala is more active during firsthand experience.

For these people, Phelps says, Sept. 11 “was a more emotional event because of their proximity to it.”

About Scott P. Edwards

Scott P. Edwards is a freelance health and medical writer based in Holliston, Mass. He has written for Harvard Medical School, Brigham and Women’s Hospital, the Mayo Clinic, the Robert Wood Johnson Foundation, and the H. Lee Moffitt Cancer Center. He can be reached at scottpedwards@verizon.net.