

## Cultural Experience Affects Perception

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A new study of East Asians and Westerners suggests that culture can shape the way some people see the world—literally.

Using functional magnetic resonance imaging (fMRI), researchers in Illinois and Singapore tracked brain activity in young and elderly participants as they were shown a series of images depicting different objects against varying backgrounds. Their analysis focused on the lateral occipital complex in the brain, which processes visual information about objects.

“These are the first studies to show that culture is sculpting the brain,” says senior researcher Denise Park, a professor of psychology at the University of Illinois at Urbana-Champaign. “The effect is seen not so much in structural changes, but at the level of perception.”

While all younger participants showed similar brain activity, researchers noted a stark contrast in the neural response between the older groups. In Westerners, the lateral occipital complex remained active; in East Asians, the region responded only minimally.

The difference noted between older people in the two cultures can be explained in part by earlier research that suggests East Asian culture is less individual-oriented than Western culture, Park says.

“East Asian cultures are more interdependent and individuals spend more time monitoring the environment and others,” Park says. “Westerners focus on individuals and central objects because these cultures tend to be independent and focused more on self than others.”

Scientists have known since the early 1970s that Westerners and East Asians respond differently to visual stimuli. But until recently, research on the subject lacked data on what neurological differences—if any—existed between the two cultures.

Last year, Park’s group published a report suggesting that activity levels in certain parts of the brain are different in Americans than in East Asians when they process visual stimuli. In Americans, regions of the brain involved in object processing were more active; in East Asians, areas engaged in processing background information were more active.

This new study, published in the May issue of *Cognitive, Affective & Behavioral Neuroscience*, builds on the earlier work, offering further evidence of a neural component to this behavioral theory. The findings add weight to the argument that culture impacts individuals on a biological level, Park says.

For the latest project, researchers recruited 38 Westerners—half ages 19 to 27 and the other half ages 60 to 78. Participants were shown a series of four images, with each series featuring either one object on four different backgrounds; four different objects on one background; the same object and background shown all four times; or four different objects against four different backgrounds. Researchers used fMRI to capture images of brain activity as participants studied each image.

They then compared their findings to data collected during the 2006 study, which included a similar number of young and elderly East Asians, and found that elderly East Asians showed a weaker brain response to the addition of images featuring new objects than did their Western counterparts.

“Parts of the brain involved in processing background and objects are engaged differently across two sets of elderly people coming from different geographical—and by inference, cultural—backgrounds,” says study co-author Michael Chee, a professor with the Cognitive Neuroscience Laboratory in Singapore.

It is unclear how the study findings would hold up over time, as global enterprise and travel expose more and more people to different cultures.

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"We measure cultural values of participants and find that they vary markedly as a function of culture, even in the young," Park says. "The differences should disappear when cultural values change. But so far, despite the 'Westernization' of East Asian cultures, we still find very significant differences in values between the cultures, even young, educated Asians versus Americans."

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