

# Scientists uncover why picture perception works

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A team of scientists has solved a key mystery of visual perception. Why do pictures look the same when viewed from different angles?

When you look at a picture, there is only one viewing position--the picture's center of projection--that yields a correct image at your eye. For example, there's but one place in the movie theater where the film creates the same image at your eye as the original scene. Viewing from other places causes distortion of the image at your eye. Why, then, don't moviegoers rush to the correct position? Indeed, do they even know where that position is?

Martin S. Banks, Professor of Optometry and Vision Science at the University of California at Berkeley, Dhanraj Vishwanath, Assistant Professor of Psychology at Rochester Institute of Technology, and Ahna Girshick, a Ph.D. student at UC Berkeley, have developed a new scientific model of the processes underlying the phenomena. Their results will be presented in the upcoming edition of *Nature Neuroscience*.

"If the brain processed pictures in the same way it did real objects, you should actually see things in the picture change and distort for every different location you view it from," Banks says. "The human visual system automatically corrects such distortions, but researchers have not been able to pinpoint how this correction occurs."

Using a series of psychophysical experiments, Vishwanath, Girshick and

Banks were able to show that the human visual system flexibly adjusts to viewing position such that sitting at the right place isn't required. The brain makes small adjustments to the image the eyes receive, such that the picture appears the way it is supposed to--even when you look at it from different locations. The work has implications for designing better devices that display 3D pictures, and also for creating more realistic computer-graphic images. It will also increase our understanding of how the eyes and brain work, providing insight for both medical and psychological use.

"Visual perception of displayed images is a key factor in human decision making," Vishwanath notes, "Properly describing how humans view and perceive images will provide a better understanding of why people respond positively to some images and negatively to others."

Source: Rochester Institute of Technology

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