

# Seeing Isn't Believing

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Pay attention! It's a universal warning, which implies that keeping close watch helps us perceive the world more accurately. But a new study by Yale University cognitive psychologists Brandon Liverence and Brian Scholl finds that intense focus on objects can have the opposite effect: It distorts perception of where things are in relation to one another. The findings will be published in an upcoming issue of *Psychological Science*, a journal of the Association for Psychological Science.

"Figuring out where objects are in the world seems like one of the most basic and important jobs the brain does," says Liverence, a graduate student. "It was surprising to discover that even this simple type of perception is warped by our minds." The researchers studied such distortions when people had to focus their attention on some objects, but not others. When they did this, Liverence explains, the "attended objects" were seen as closer together than they really were, while the other objects were seen as farther apart than they really were.

To test this phenomenon, the researchers had people—10 in each of three experiments—complete simple visual tasks. In the one with the most striking results, participants watched four circles as they moved around on a computer monitor while rapidly changing colors. Before the movement began, two of the circles flashed several times; these were the "targets." During the ensuing motion, the participants had to press a key whenever either of those targets turned red or blue. Then, after several seconds of motion, all of the circles disappeared, and the participants clicked with a mouse on the locations they'd last seen the circles.

The subjects located the objects with high accuracy—good news, says Liverence, for people trying to cross the street. But their errors were not random. Instead, the researchers discovered two distortions—one expected, one surprising. As in past research, the reported locations of the circles were all compressed slightly toward the center of the display, as if the mind's representation of the world were slightly shrunk. Beyond this global distortion, though, subjects remembered the two target circles as closer to each other than they actually were (as if they were attracting each other), and reported the other two circles as farther apart than they'd been (as if they were repelling each other).

The findings add to a growing body of cognitive psychology that destabilizes our trust in what we think we know for sure and how we think we can know it more surely. "Attention is the way our minds connect with things in the environment, enabling us to see, remember, and interact with those things," says Liverence. "We tend to think that attention clarifies what's out there. But it also distorts."