

Pong paddles and perception: Our actions influence what we see

January 3 2018, by Anne Manning

Most people think of vision as simply a function of information the eye gathers - what the eye alone sees.

For Colorado State University cognitive psychology researcher Jessica Witt, vision is a little more complicated than that.

For nearly a decade, the associate professor of psychology has published numerous studies showing that vision can change as a function of action - that vision is action-specific, as opposed to general purpose. Among Witt's best-known experiments: When baseball players are hitting better, they see the [ball](#) as bigger. When someone lacks fitness or is carrying a heavy backpack, they see a hill as steeper.

Witt's approach to [visual perception](#) has been called radical. It's garnered her accolades among her peers, as well as critics.

Responding to some of her harshest critics, Witt has a new paper in Psychological Science that faces head-on the notion that her experimental subjects have been victims of a psychological phenomenon called response bias. She employed a classic, action-specific experiment involving a video game familiar to children of the 80s: Pong.

Response bias happens when subjects guess or infer the purpose of an experiment, so they adjust their behaviors or answers - consciously or subconsciously. For example, a Psychology 101 student, familiar with how scientists run experiments, might volunteer as a study subject in

which they are asked to wear a backpack, and guess the incline of a hill. They might infer, "I bet the hypothesis is that the backpack will affect how I see the slant of the hill," so they might say the slant is 25 degrees, rather than 20.

Critics have told Witt that response bias may be the fatal flaw in her previous conclusions about action-specific perceptions.

So Witt ran an old experiment with a new twist. In a game very much like Pong, a ball bounces across a screen, and participants use a joystick to block the ball with a paddle of varying sizes, making the task easier or harder. After each attempt, participants estimate the speed of the ball. In visual perception-speak, the "Pong effect" is when the ball appears faster when the paddle is smaller, even though the speed remains unchanged. The Pong effect supports Witt's hypotheses about actions influencing vision.

For the Psychological Science paper, Witt added post-experiment surveys to gather data on whether participants guessed the experiments' purpose, and whether their inferences affected how they saw the ball.

Two 16-subject experiments garnered varying responses. Few guessed the nature of the experiment (Bigger paddle = ball appears slower). But, critically, the Pong effect showed up regardless of the participants' level of insight into the experiments' true purpose.

Between those who guessed the experiments' purpose, and those who didn't, "there was no systematic difference between those two groups," Witt said. "The Pong effect still emerged—just as strong as in previous studies."

Witt added that if the demonstrated Pong effects generalize to other action-specific effects, knowing that perception is influenced by action

won't protect against the effects. In other words, if a hill looks steeper because someone is tired or carrying a heavy load, knowing that won't change the effect.

Witt stressed that action can affect perception, but it doesn't always. She'd like to conduct more experiments to define boundaries of when the action-specific [perception](#) occurs, and why.

"Perception is a fundamental process of the mind," Witt said. "We are getting at core scientific knowledge of how the mind and the brain work."

More information: Jessica K. Witt et al, Is There a Chastity Belt on Perception?, *Psychological Science* (2017). [DOI: 10.1177/0956797617730892](#)

Provided by Colorado State University

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