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Vision: The Brain Circuit of Sight, Traced

Color doesn't exist out there, in the physical world. The mind creates it.

"We view the world from inside our brains," said neuroscientist Rudy Behnia. "Our visual system constructs everything we see."

The Behnia lab studies the fruit fly. Its simple brain, now fully mapped by scientists, offers a special tool to ask questions about how vision works.

For example: How do animals perceive so many colors? In 2020, Dr. Behnia's team measured how different photoreceptors in the eye specialize for different wavelengths of light and showed that comparisons between these photoreceptors expand the number of colors that a fly is sensitive to.

Or: How do we detect motion in our environment? In 2021, the researchers traced some of the basic neural circuitry that distinguishes movement to the left or right in a variety of different circumstances.

Vision may rely on illusions, but it governs our responses to the world. Consider akinetopsia, in which people lose the ability to see objects in motion. They see their surroundings in frozen frames (like low-budget claymation) or find that moving objects disappear completely. Those with the condition might need to stick their finger in a cup of coffee while pouring to detect its fullness.

"To understand how we behave, we need to understand how we perceive the world," said Dr. Behnia. "We're finding out things about perception that nobody else has found because nobody asked these questions."