

The surprising connection between two types of perception

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(Medical Xpress) -- The brain is constantly changing as it perceives the outside world, processing and learning about everything it encounters. In a new study, which will be published in an upcoming issue of *Psychological Science*, a journal of the Association for Psychological Science, scientists find a surprising connection between two types of perception: If you're looking at a group of objects and getting a general sense of them, it's difficult for your brain to learn relationships between the objects.

It's not known how these two ways of perceiving are related, says Nicholas Turk-Browne, an Assistant Professor at Princeton University. He co-wrote the new article with Princeton graduate student, Jiaying Zhao, along with research assistants Nhi Ngo and Ryan McKendrick. But both have to do with statistics. In "statistical summary perception," your brain calculates general properties from a brief glance. "If I'm looking at a roomful of faces, how happy are people on average?" Or, by looking out a window, someone could sense what season it is based on the general color and presence of leaves on trees.

The other is called "statistical learning" - finding patterns in the world over time. "After seeing the front of the psychology building at Princeton, you're much more likely to see my face than the face of your favorite actor," Turk-Browne says. Patterns are everywhere, and learning about them, helps in acquiring language, predicting the trajectory of a tennis ball, or discovering the layout of a building. "Even though these two cognitive processes are different, they're both inherently statistical,"

Turk-Browne says.

Turk-Browne and his colleagues devised a study to figure out how these two ways of seeing were entangled. They showed people grids that contained lines slanted to varying degrees. Some people were asked to do summary perception - to decide whether the lines were generally leaning to the left or right. Others were asked to answer a different question or to just look at the lines. At the end of the experiment, people who did summary [perception](#) displayed no statistical learning - they were unable to recognize pairs of lines that had been hidden repeatedly in the grids.

This shows that when you're extracting the general properties of a set of objects, you're not able to learn about their relationships, Turk-Browne says. Other experiments found that the reverse was also true - when there are relationships to be learned, you're worse at perceiving general properties.

The overall goal for Turk-Browne and his colleagues is figuring out how your brain changes as you interact with the world. "Every moment your eyes are open, your brain is changing in sophisticated ways," he says. "What's cool about this study is that it demonstrates that your mind is a great statistician, and you don't even realize it." Experiments like these help psychological scientists understand how the brain perceives the world and give hints to the unconscious calculations the [brain](#) is making all of the time.

Provided by Association for Psychological Science

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