Study finds evidence of the visual system's ability to perceive only one group at a time

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(Medical Xpress) -- Selecting matching shoes and gloves before you go to work is relatively easy for most of us. Within a single glance, it's obvious that, say, the brown gloves chosen match as do the red shoes. That's because your visual system groups areas of the world with similar characteristics (red with red, brown with brown).

But new Northwestern University research suggests that you did not group your gloves and shoes in a single glance. Instead, you may only be able to see one group at a time, requiring you to take two mental 'glances' at your wardrobe.

Intuitively, without any work on our part, our visual systems produce groupings with similar characteristics such as color, shape or motion, said Steven Franconeri, an assistant professor of psychology in the Weinberg College of Arts and Sciences at Northwestern and a co-author of the study.

Franconeri and Brian R. Levinthal are co-authors of "Common-Fate Grouping as Feature Selection," which is published by *Psychological Science*, a journal of the Association for Psychological Science.

Participants in one of the study's experiments were given displays containing multiple groups. Participants were asked to perform a visual search for a vertically positioned group among horizontally positioned groups; groups consisted of pairs of dots that shared the same features.

“We asked them (participants) questions like, ‘Tell me whether one of the groups has individuals that are arranged vertically’” [on a computer screen].

The researchers hypothesized that if the visual system can construct only one group at a time, then the task should become progressively harder as more groups are added to the screen.

“That is exactly what we found,” Franconeri said. “People were really slow at this task as we added more and more groups. They were limited by their one-at-a-time visual systems.

“The exciting part about this is that you really do not feel like you are doing this in the real world. This phenomenon nicely demonstrates how, under the hood, your visual system actually processes many things 'on demand' only when you need it. But that process is so seamless that we feel like we’re taking everything in simultaneously.”

The researchers said this new research will enhance scientists’ understanding of ordinary vision.

“The visual system fools us into thinking that we process everything in rich detail, when we often process only the most relevant pieces of the world,” Franconeri said.

Provided by Northwestern University