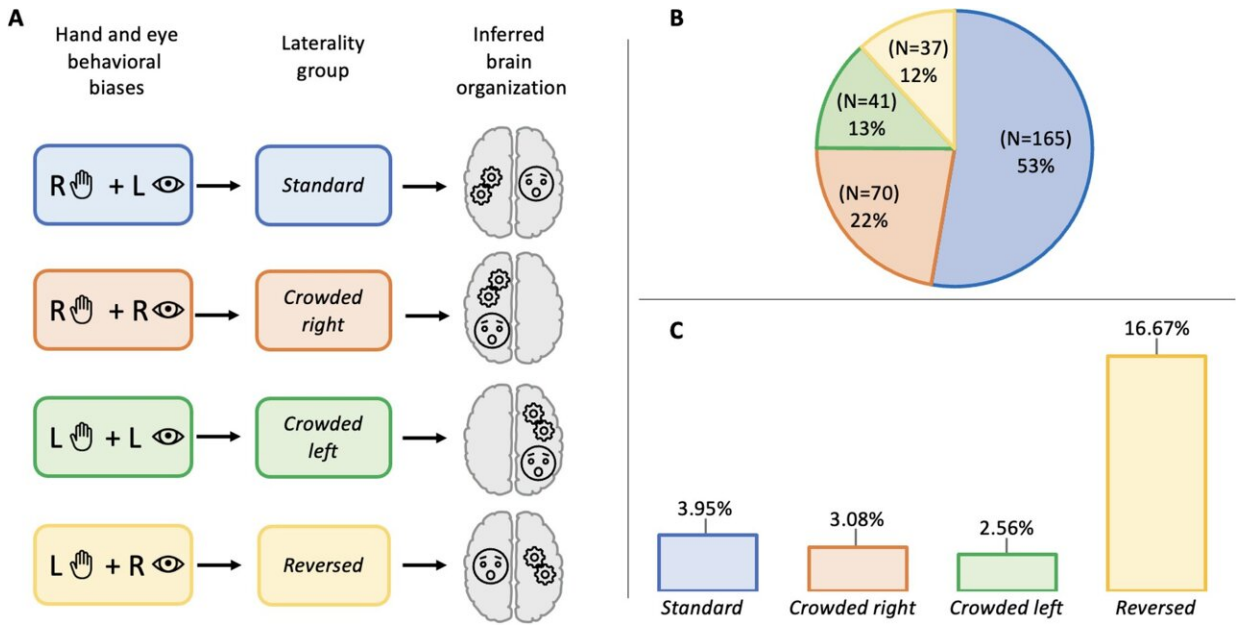
Why most people are right handed but left eyed

July 3 2024, by Gillian Forrester



Credit: *Scientific Reports* (2024). DOI: 10.1038/s41598-024-64372-2

Whether you're left, right or ambidextrous, "handedness" is part of our identity. But a lot of people don't realize that we have other biases too and they are not unique to humans. My colleagues and I have published a new study in *Scientific Reports* that shows aligning our biases in the same way as other people may have social benefits.

Across different cultures, human populations have high levels of right-

handedness (around 90%). We also have a strong population bias in how we recognize faces and their emotions.

A significant majority of the population are faster and more accurate at recognizing identities and emotions when they fall within the left visual field compared with the right visual field.

These types of biases develop in our brains in early childhood. The left and right hemispheres of the brain control motor action on the opposite sides of the body. If your left visual field is dominant, that means the right side of your brain is taking dominance for recognizing faces and emotions.

Until recently, scientists thought behavioral biases were unique to humans. But animal research over the last several decades shows there are behavioral biases across all branches of the vertebrate tree of life.

For example, chicks that peck for food with an eye bias are better at telling grain from pebbles. Also, chicks with an eye bias for monitoring predators are less likely to be eaten than unlateralized chicks. Studies show that animals with biases tend to perform better at survival-related tasks in laboratory experiments, which probably translates to a better survival rate in the wild.

But the chicks with the best advantage are ones that favor one eye to the ground (to find food) and the other eye to the sky (to look out for threats). A benefit of the "divided brain" is that wild animals can forage for food and look out for predators—important multitasking.

So why do animals have behavioral biases?

Research suggests that brain hemisphere biases evolved because it allows the two sides of the brain to concurrently control different behavior. It

also protects animals from becoming muddled. If both sides of the brain had equal control over critical functions, they might simultaneously direct the body to carry out incompatible responses.

So biases free up some resources or "neural capacity," making animals more efficient at finding food and keeping safe from predators.

Animal studies suggest it is the presence, not the direction (left or right) of our biases that matters for performance. But that doesn't explain why so many people are right-handed for motor tasks and left visual field biased for face processing.

Every person should have a 50–50 chance of being left or right biased. Yet across the animal kingdom, the majority of individuals in a species align in the same direction.

This suggests that aligning biases with others in your group might have a social advantage. For example, animals that align with the population during cooperative behavior (shoaling, flocking) dilute the possibility of being picked off by a predator. The few that turn away from the flock or shoal become clear targets.

Although humans are highly lateralized regardless of ethnic or geographic background, there is always a significant minority in the population, suggesting that this alternative bias has its own merits.

The prevailing theory is that deviating from the population offers animals an advantage during competitive interactions, by creating an element of surprise. It may explain why left-handedness is over-represented in professional interactive sports like cricket and baseball.

In the first study of its kind, scientists from the universities of Sussex, Oxford, Westminster, London (City, Birkbeck) and Kent put our human

behavioral biases to the test. We investigated associations between strength of hand bias and performance as well as direction of biases and social ability. We chose behavior that aligns with animal research.

Over 1,600 people of all ages and ethnicities participated in this investigation.

You don't always use your preferred hand: some people are mildly, moderately or strongly handed. So we measured handedness in our participants using a timed color-matching pegboard task. Not everyone knows whether they have a visual field bias, so we evaluated this for participants using images of faces expressing different emotions (such as anger and surprise) presented on a screen.

People with mild to moderate strength hand bias (left or right) placed more color-matched pegs correctly than those with a strong or weak bias. These results suggest that, in humans, extremes may limit our performance flexibility, unlike wild animals.

The majority of the participants had a standard bias (right handedness for motor tasks, left visual field bias for face processing). But not everyone.

To test the associations of social skills and bias direction, participants were categorized by their hand and visual side biases into one of four groups: standard (right hand, left visual), crowded right (right hand, right visual), crowded left (left hand, left visual) and reversed (left hand, right visual). They also completed a survey that evaluated their social difficulties.

The standard profile, found in 53% of participants, was not associated with a social advantage over crowded left or right groups. However, the reversed profile, which was relatively rare (12%), was associated with

significantly lower social scores compared with the other groups. People in the reversed group were four times more likely to have a self-reported diagnosis of autism or attention deficit hyperactivity disorder (ADHD).

We cannot say from this study whether there is a causal relationship between the reversed profile and autism and ADHD. However, we are planning research to investigate if bias profiles can act as an early risk marker for autism and ADHD during infancy, which could pave a way for earlier screening, diagnosis and the development of new interventions.

This study is a reminder that we humans have an evolutionary history, much of which we share with other animals. We need to study ourselves within the context of the wider animal kingdom if we want to truly understand our modern brains and behavior.

More information: Georgina Donati et al, Motor-sensory biases are associated with cognitive and social abilities in humans, *Scientific Reports* (2024). DOI: 10.1038/s41598-024-64372-2

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