The Washington Post

CORRECTION TO THIS ARTICLE
This article said that Ronald Reagan was left-handed. Although many lists of left-handed presidents include him, Reagan was right-handed, according to people who knew him. He performed some activities that require dexterity with his left hand, but he wrote with his right, which is the conventional determiner of handedness. Joanne Drake, who served as Reagan's chief of staff after his presidency, said yesterday that she and others had "heard the president say he was born left-handed and was forced to learn to write with his right hand as a young child."

Why Righties and Lefties? Scientists Have Hands Full.

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Monday, March 23, 2009; A07

Five of the last seven presidents have been left-handed. Ford, Reagan, Bush the elder, Clinton and now Obama (but not Carter or Bush the younger).

So what does this mean in a world where only one out of every 10 people, roughly speaking, is a lefty?

The answer is . . . nobody knows. It may be a fluke. But even if it isn't, exactly what left-handedness has to do with political skill, intelligence, popularity, family connections, wealth and luck -- all at play in our selection of national leaders -- is almost certainly a matter of subtle advantage, not one of dramatic benefit.

What is clear is that "handedness" runs all through the animal world.

Once thought to be uniquely human, some version of this attribute has been seen in chimpanzees, marmosets, cats, chickens, toads, mice, rats and almost certainly thousands of other species. It is present in animals that don't have hands (fish) and in some that don't have backbones (honeybees).

In biology, this phenomenon is known as "lateralization." It is the preference for doing or perceiving things more with one side of the body than the other. It appears to be an important -- although perhaps not necessary -- consequence of having a brain.

Like many structures in the body, the brain is "bilaterally symmetrical." It is made up of two halves -- called "hemispheres" -- divided by a plane that makes one the mirror image of the other.

Lateralization saves space and, therefore, working capacity, by not requiring that both hemispheres do the same thing. It diminishes the chance of interference and confusion, which might arise if each side of the brain independently analyzed the same input from the environment and came up with its own decisions about what to do about it. It also allows the brain to sometimes do two things at once.

"Any brain seems to lateralize if it can," said Lesley J. Rogers, a longtime researcher in the field who is an emerita professor at the University of New England in Australia.

The brain's asymmetry is primarily in function, not structure (although careful measurement shows that certain regions are bigger on one side than the other in nearly everyone). The most dramatic example involves language.

The ability to produce and comprehend language emanates from the left side of the brain in more than 95 percent of right-handed people and in about 70 percent of left-handed ones. That difference is a big clue that the neural wiring -- and perhaps more subtle things -- may be different in lefties.

Curiously, there is no anatomical "home" for handedness the way there is for language. For most voluntary movement, however, each side of the brain controls the opposite side of the body. A part of the right side of the brain drives the left arm and leg, and vice versa. Similarly, sensation, including vision, that is perceived on one side of the body is projected to the opposite side of the brain for processing.

What determines whether a person is right- or left-handed is not really known, although it seems to be a combination of genes, environment and culture.

About 27 percent of sons of left-handed parents are left-handed, compared with 10 percent of sons of right-handed parents. However, about 20 percent of identical twins have different handedness. So genes count for something but not everything.

Because left-handedness is more common in men than in women, many scientists have speculated that testosterone has something to do with it. Lots of research has been done (and more is underway) testing this hypothesis.

The best evidence at the moment supports the idea that testosterone may "prune back" some of the fibers in the corpus callosum, the huge bundle of nerves that connects the right and left halves of the brain across the midline. That, in turn, may diminish traffic between the two hemispheres, enhancing lateralization of function.

"The effect seems to be on the strength of lateralization, not on the direction," said Ton G.G. Groothuis, who is researching this effect at the University of Groningen in the Netherlands. He hastened to add that, as with all differences in lateralization, "the size of this effect is not very large."

Prenatal effects are much clearer in chickens, where lateralization is largely determined by which eye is exposed to light coming through the shell during incubation.

In most chick embryos, it's the right eye. That produces adult birds that are better at identifying food and prey using the right eye (with the information processed on the left side of the brain), and better at detecting predators and sexual advances using the left eye (and right side of the brain).

When eggs are incubated in the dark, however, the chicks hatch with a lesser degree of that inborn tendency. If they are then raised together, the whole group tends to end up with the same lateralization of behavior, either right or left.

This last observation suggests that social interactions help determine the chicken brain's division of labor. Groothuis said this is not surprising in species that travel in flocks, for whom simultaneous movement of the flock is a form of self-defense.

In fish, the brain's lateralization also affects individual behavior, at least to some extent.

For example, if you put a mosquitofish in a narrow tank with a caged predator at one end, it will inspect the predator more closely if there's a mirror along the fish's left side than if there's one along the right.

In both cases, the mirror makes the fish think it is not alone. But when the mirror is on the left, the image is presented to the left eye and sent to the right side of the brain, where social interactions are processed better.

The ultimate effect, Rogers said, is that mosquitofish "are braver when they have a companion on the left side."

Whether the slight differences in brain lateralization between right- and left-handed people similarly affects behavior (beyond the use of our hands and feet) isn't known.

A more basic question is: Why does handedness exist?

Left-handed people are more likely to die from accidents. They may also be more likely to have neurological, immunological or psychiatric diseases -- probably because at least some left-handedness arises from prenatal damage or birth trauma. Whether left-handed people have shorter lives on average is in dispute.

Despite those "costs," left-handedness has persisted through human evolution. One of the reasons is simple: Lefties do better in fights.

A 2004 study by Charlotte Faurie and Michel Raymond, of the University Montpellier II, in France, found that among eight traditional societies, those with the highest homicide rates had the highest proportion of left-handed people.

For example, among the Eipo people in the Indonesian province of Irian Jaya, where the homicide rate is 3 per 1,000 people per year, 20 percent of people are left-handed. Among the Dioula people of Burkina Faso, where the homicide rate is 0.01, 3 percent are left-handed.

This does not mean that lefties are more violent. It means that in violent societies, lefties may fare better.

"When it is important in a society to be a winner of a fight, then left-handers have an advantage," Faurie said.

Of course, there are limits.

The low prevalence of left-handedness everywhere suggests that the advantage holds only when lefties are rare, preserving their unfamiliarity and ability to surprise.

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