

The Boston Globe It's a right-handed world. What if we looked at it from the left? By Linda Rodriguez McRobbie, Updated January 24, 2020, 5:00 a.m. https://www.bostonglobe.com/2020/01/24/opinion/its-right-handed-world-what-if-we-looked-it-left/

In 1968, a new shop in the heart of London's swinging Soho district made headlines with its unusual wares — openly selling the kinds of things that, until then, people could only have ordered from the back pages of certain magazines and newspapers.

Things like left-handed scissors and nail-clippers, pens with the nib to the left, and notebooks with the spiral on the right; corkscrews, potato peelers, can-openers, and pepper-grinders for left-handed people; golf clubs and bowling shoes, rulers and greeting cards, artists' palettes and carpenters' benches, all for lefties. Anything Left-Handed could even help you find a left-handed shotgun that discharged shells to the right so they wouldn't hit the user in the face.

"It was the first business of its type in the world," says Keith Milsom, the current owner of Anything Left-Handed and a lefty himself. "There were various manufacturers in the world making odd bits and pieces [for left-handed people], but there was no one place you could get a hold of them." Anything Left Handed was the innovation of William Gruby, described in a 1972 New York Times article about the shop as "an elfin, bespectacled English advertising executive who sports Sherlock Holmes-type cloaks." Gruby was also, somewhat surprisingly, right-handed. But he'd hosted a dinner party where four of the diners were left-handed. The conversation turned to all the things that were difficult for left-handers to do — such as eat their food without elbowing their dining companions — and Gruby saw an opportunity.

Anything Left Handed was a modest success, and when he retired in the late 1980s, Gruby sold the business to Milsom's family. The store, online only now, has become one of the biggest left-handed product retailers in the world, although that inevitably remains a small market — only about 10 to 15 percent of the world's population is left-handed. Milsom has also become a kind of activist for left-handed people, using his platform to spread information about lefties and advocate for better support for left-handed children in schools. Left-handedness, he says, isn't seen as a special need — and it shouldn't be, he added. But it is a difference that requires more support than most (right-handed) people think. "It's just a different way of thinking about things, and I think for that reason it tends to be ignored," he said. "But you don't need very much to help people." So what kinds of things are hard for left-handed people in this right-handed world?

"Pretty much everything is the answer," said Milsom. "[Designers] just don't think about it."

But it's not just product designers who are ignoring lefties. It's neuroscientists and behavioral psychologists, educators and technologists. It's everyone who isn't themselves left-handed. And it isn't just the ability to cut paper or peel a potato effectively that's at stake here. Handedness shapes who we are, how we perceive and engage with the world; ignoring lefties for as long as we have means that we have an incomplete understanding of how people function.

That hurts lefties, of course. But it also means that we're undermining things like mental health treatment and design innovation — for all of us. So what would we gain if we looked at the world from the left-hand side?

IN AUGUST 2019, psychology researchers from Dalhousie University in Canada revealed that left-handed people are being purposefully and systematically excluded from neuro-imaging research studies. Their <u>meta-analysis of 1,008 studies</u> published in three major neuroscience publications found that only 3.2 percent of the 30,000 subjects were "adextral," hardly representative of the more than one in 10 people who is left-handed.

Scientific research has long had a bias against lefties — as well as women, but that's another article altogether — because of the concern that any different or "weird" attribute could make it more difficult to discern the effects experiments were attempting to manipulate, or could result in the findings being rejected. And left-handers' brains are somewhat differently organized than right-handers'; for example, though language in nearly all right-handed people comes from the left side of the brain, that's the case in only two-thirds of left-handers. Research that touches on how the brain processes language or certain hand actions, such as writing or using tools, might have a legitimate reason to exclude lefties, on the grounds that including them might skew results. However, as Lyam Bailey, the Dalhousie doctoral student who co-authored the meta-analysis pointed out, there is no evidence that left-handed people process other information differently.

"There really is no reason to exclude left-handers from research in other areas, such as memory, attention, emotion, face recognition, vision, hearing . . . let's just say that the brain does a lot

more than just language and complex hand actions!" he wrote in an email to us. So why are we leaving them out? "Through conversations with colleagues, I got the impression very early on that this is a widely-accepted convention — a lot of researchers tell me that they exclude left-handers not because of a specific concern about their data/research question, but simply because their academic supervisor told them to do so." Academia tends to "play it safe," Bailey wrote, especially in projects that include neuro-imaging, which is resource-intensive and costly. Given that most previous research in neuro-imaging has been with right-handed subjects, and that the risk of a paper being rejected from publication is very high, "it is very tempting to go with the norm . . . just in case."

The result, however, is a significant weakness: "[F]ocusing exclusively on right-handers limits the generalizability of our research," wrote Bailey. "After all, one in 10 people are left-handed, therefore scientific understanding of the brain really does have a blind spot that covers 10 percent of the world's population." The effects of this are more profound than not being able to find scissors that cut. Lab research has real-life applications, "ranging from video games and entertainment to new treatments for neurological and psychological disorders," he pointed out.

For example, Cornell University cognitive neuroscientist Daniel Casasanto and his colleagues found that right-handed people associated rightward spaces with positive emotions and leftward spaces with negative emotions. This and several other studies he and his team worked on bolstered their theory that neuro-emotional systems in the brains of righties and lefties were reversed. In 2018, they suggested that in right-handed people, emotions implicated in approaching or engaging the world, such as happiness or even anger, are correlated with activity in the left side of the brain, while avoidance emotions, such as disgust and fear, are correlated with the right. The opposite appears to be true in left-handed people; that this was overlooked for decades was due to the fact that, as Bailey's analysis demonstrated, most neuropsychological research is based on right-handed subjects.

If accurate, these findings would have a significant impact on how treatments such as those that use direct electrical or magnetic stimulation of the brain — increasingly popular options for recalcitrant depression — should be administered. These kinds of treatments rely on stimulating the side of the brain associated with approach and engagement, so getting the correct side is crucial. "If you give left-handers the standard treatment, you're probably going to make them worse," Casasanto told the Cornell Chronicle.

This was only one study, admittedly limited in scope. But that's part of the point — we don't really know the effect of handedness on things like mental health treatment because we haven't really looked. Meanwhile, the lack of research into handedness disadvantages lefties in other ways as well. For example, a 2012 analysis of data from the US National Longitudinal Survey of Youth found that though left-handed children aren't more likely to experience accident, injury, illness, or behavioral problems as compared to right-handed children, they do "have significantly lower cognitive development test scores than right-handed children for all areas of development with the exception of reading." This is the case even after correcting for other potential influences, including socioeconomic factors.

A 2014 paper from economist Joshua Goodman, then at Harvard, found that left-handed people earn 10 to 12 percent less than right-handed people, attributable, he wrote, to cognitive differences and differential brain structure. But without more research, as critics of the paper noted and Goodman himself acknowledged, we can't really say whether cognitive differences are actually a result of differential brain structure — or if it's a consequence of having to navigate a right-handed world from the left. It may even be that left-handedness is a red herring, a by-product of other factors like low birthweight, which is more common among lefties. Crucially, we also can't say how we can possibly remedy that difference.

Neuroscience's erasure of left-handed people is an expression of the prejudice that has persisted against left-handed people for millennia. Bias is baked into the very words we use to describe "right" and "left": "Left" comes from the Middle English for "weak," on the observation that in most people, the left hand was weaker. In classical Latin, the word for left pulled double duty: "Sinister" meant either the left side or wrong or harmful. In French, "gauche" is either the direction or clumsy. The Devil himself is left-handed, at least according to the medieval tradition. By the 19th century, bias against lefties was science: Cesare Lombroso, the 19th century Italian physician and criminologist, used his research to claim that criminals were more likely to be left-handed and were more sensitive to pain on the left side. He also claimed that women were just "undeveloped men" and that those "undeveloped men" who became prostitutes tended to be short, love orgies, and, of course, be left-handed. From the Victorian era well into the 20th century, European and American educators attempted to "cure" children of lefthandedness — and, some claimed, a "defiant personality" — by forcefully retraining them to use their right. Though the mania for retraining subsided by the 1970s, the world remains overwhelmingly right-handed in almost every respect. Lefties soldier on, irritated perhaps, but undaunted.

OUR FAILURE TO consider left-handedness, scientists say, may be limiting our ability to understand the broader human experience. "We have very few theories as to why brains of righthanded and left-handed people are different, or indeed, why any brains are different," said Chris McManus, professor of psychology and medical education at University College London and author of "Right Hand, Left Hand: The Origins of Asymmetry in Brains, Bodies, Atoms and Cultures." Handedness, he noted, is one expression of "the polymorphism that we call brain organization," and it's a way to begin to understand those vast differences between brains.

Take Casasanto's research. Not only did it demonstrate that electrical stimulation of the brain must be properly targeted to work — the left side for righties, the right side for lefties — it showed that such stimulation might have less effect on people who are not "strongly handed" in either direction. All brains, the research suggests, are different. But many treatments for difficult conditions are based on a perception that they're not.

Then there's the question of what the world would look like if we stopped designing it towards handedness. Design has inclined towards ease and comfort, of course, but more specifically, toward what a majority of people find easy and comfortable. This might come at the expense of accessibility and originality. Are there better ways to make products that we've locked into specific forms? Could there be, for example, a better way to cut wood? Take pictures? Open cans? (The answer to that is "yes," of course, and it's called a pull tab — why do we even need

can openers anymore?) This is the challenge of design, of course: Everyone needs to use things — public transit, electric kettles, pens — but not everyone uses them the same way. As McManus pointed out, "Designers have done what they've always done, which is to be right-handed themselves and design for themselves." Asking how we can make the things we use every day more flexible and radically accessible is an important exercise, the kind that reshapes the world in ways that become the new intuitive.

Of course, it's hard to know exactly what those things might look like — maybe touchscreens that can determine handedness and display accordingly, or augmented reality that can orient to an individual's hand preference. Maybe it's something as simple as an inkless metal pen that doesn't smear for lefties and can be used in all weather. Whatever the end result, it's important to ask the question.

This is a particularly useful exercise now, as digital design plays an increasingly central role in the way we live our lives. The fairly symmetrical design of some smartphones is evidence that we can design beyond handedness. Those that work best demonstrate that we don't need special left-handed devices — or devices for people who need larger print, or who are hearing impaired, or who are color blind — but that flexible accessibility can be part of the form from the beginning.

Most importantly, thinking about how life might be different or more difficult for someone else is just good practice. McManus has been studying handedness for 40 years, he says, but he still fails to notice the lefties in the room — after all, he's right-handed. "It just never occurs to us that there are people who are not like us," he said. "It's in plain view, but we don't see it."

Linda Rodriguez McRobbie is a right-handed American journalist living in England who learned to drive manual with her left hand on the wrong side of the road — and lived to complain about it.