

## PSYCHOLOGY

# Sleight of hand

A history of handedness shows how attitudes can influence scientific conclusions

By Daniel Casasanto

What causes some people to be left-handed? Is handedness a uniquely human trait? Are left-handers more likely than other people to be creative geniuses or to suffer cognitive disabilities? Historian Howard Kushner raises these and other questions in his new book, *On the Other Hand*.

Primarily a history of handedness research, the book also has an agenda: to show that scientific conclusions have been influenced by social attitudes about handedness. Indeed, researchers' personal views can skew their interpretation of scientific data, a point made clearly in Kushner's book, although not in the way that the author intended.

Today, being a lefty is a point of pride in the Western world. Historically, however, the left hand has been associated with atavism or corruption and its use has been discouraged, if not savagely punished. Kushner reports that in the early 1900s, for example, Zulu children who could not remember to eat with their right hand would have their left hand immersed in boiling water. Less extreme measures to "retrain" natural left-handers were common in the United States as recently as the 1940s and are still practiced in parts of India, Africa, and Asia.

Over several chapters, Kushner explores the biological underpinnings of handedness. He convincingly debunks the myth, still believed by many neuroscientists, that left-handers tend to have language functions localized in the right cerebral hemisphere and traces a century of efforts to discover the origin of left-handedness. Kushner notes that researchers' tendency to pursue either genetic or environmental causes for handedness reflects broader trends toward explaining human behavior in terms of nature or nurture, which vary from one era to the next.

His clear-eyed view of large scientific literatures becomes clouded, however, when Kushner turns from questions about brains

and genes to more socially resonant questions. Despite his focus on handedness and mental disorder, he does not engage with studies showing that left-handers are more likely to experience depression, the most common mental disorder in the United States (1). And in the final chapter, he tries hard to discredit studies linking handedness with schizophrenia and autism—to the book's detriment.

To evaluate the evidence for these links, Kushner draws on two recent large-scale meta-analyses, one for each disorder (2, 3).



Kushner claims that links between left-handedness and mental illness are spurious, but are they?

His primary criticism of both studies is that they show statistical associations between a mental disorder and non-right-handedness, as opposed to left-handedness, per se. He argues that comparing disease rates in right-handers versus non-right-handers constitutes "sleight of hand": a "tactic" that researchers use to provide a "rationale for publication" of otherwise unpublishable results.

Crucially, Kushner claims that "none of the studies, including those discussed [in his book], has been able to demonstrate that *left-handedness alone* is associated with either schizophrenia [or] autism." He concludes that using "the often vague category of non-right-handedness" has "enabled research into the supposed pathology of left-handers to continue, when

**On the Other Hand**  
Left Hand, Right Brain,  
Mental Disorder, and History  
Howard I. Kushner  
Johns Hopkins University  
Press, 2017. 216 pp.



a focus exclusively on left-handers would have eliminated this line of research."

There are serious problems with this argument. Most broadly, there is nothing inherently wrong with the category "non-right-hander," which can be defined with exactly the same level of precision (or imprecision) as the category "right-hander."

Most problematically, Kushner is factually wrong about the data on which his argument rests, at least in the case of autism. In the meta-analysis that Kushner condemns, the researchers did not analyze left-handers and mixed-handers separately, but they did provide all of the data needed to do so.

Using the same statistical test used in the study, I performed this analysis, which showed that the rate of left-handedness was, in fact, significantly greater in the autistic sample than in the sample of healthy controls.

Kushner appears to be motivated by the desire to conclude that left-handed people are actually normal and that left-handedness is not a pathology. But even if left-handers are statistically more likely to develop autism or other disorders, this doesn't mean that left-handedness is pathological. It is well established that males are more likely to develop autism than females, yet maleness is not generally considered to be a pathology.

Kushner succeeds in showing that left-handedness has been stigmatized and suppressed, but he fails

to show that all links between handedness and disease are spurious or that researchers' conclusions are based on "cultural norms" about left-handers' "abnormality." By denying demonstrated links between handedness and mental disorders, Kushner may hope to prevent scientific findings from being used to justify prejudice. But the problem is not with the science, it's with how people might use it. And as Kushner's engaging history illustrates, prejudice against the "sinister" hand is rarely based on science. ■

## REFERENCES

1. K. Denny, *Laterality: Asymmetries Body Brain Cognition* 14, 246 (2009).
2. I. Sommer et al., *Brit. J. Psychiatr.* 178, 344 (2001).
3. A. L. Rysstad, A. V. Pedersen, *J. Autism Dev. Disord.* 46, 1110 (2016).

10.1126/science.aao1868

The reviewer is at the Department of Human Development, Cornell University, Ithaca, NY 14853, USA.  
Email: casasantod@alum.mit.edu

# Science

## Sleight of hand

Daniel Casasanto

*Science* **357** (6357), 1246.  
DOI: 10.1126/science.aao1868

### ARTICLE TOOLS

<http://science.sciencemag.org/content/357/6357/1246>

### REFERENCES

This article cites 3 articles, 1 of which you can access for free  
<http://science.sciencemag.org/content/357/6357/1246#BIBL>

### PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.