

Neuropsychology of Left-Handedness

Jeannine Herron, editor

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Edited by

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Preface

Derided, chided—the offending hand smacked with a ruler, even tied behind the back. Shamed and blamed, left-handers have suffered vicious assaults. Despite this history, left-handers did not quietly wither away. They survived. Why? Because, as this book shows, they do not choose their preference; they follow a neurological imperative.

This neurological imperative is the subject of this book. What is unique about the brain organization of left-handers? Where does it come from? How does it vary among left-handers, and how is it expressed in terms of ability or personality? Research on left-handedness has snowballed in recent years because of the surge of interest in the specialties of the two cerebral hemispheres. This volume serves to bring together representative studies and reviews by the foremost investigators in this field.

The book is introduced with a witty and scholarly chapter that takes the reader historically through some of the more colorful theories of left-handedness. This introduction lays the groundwork for the newer data on left-handedness presented in later chapters. In the first section other authors probe current ideas about the origins of left-handedness: possible genetic mechanisms, the manner in which asymmetries may occur during the first cell cleavages following fertilization, handedness of twins, and the possibility that some left-handedness may be due to environmental (even pathological) influences.

Quite early in the book the neurological imperative appears: Hand preference is linked to the functional organization of the two hemis-

pheres of the brain. The brain's activity is aimed toward behavior; to study its organization is to take into account the asymmetric components of the entire sensory–cognitive–motor loop: from the environment back to the environment.

In the second section several chapters are devoted to investigations of asymmetric hemisphere specialization in right- and left-handers. A variety of research methods are presented, and different groups of left-handers are identified and examined separately: male and female, strong left-preferrers and ambidexters, familial and nonfamilial left-handers, and those who prefer an “inverted” position for writing as opposed to a “noninverted” position.

As the brain has been probed in more detail in the last two decades, we find the list of asymmetries growing remarkably. There are structural asymmetries, functional asymmetries (sensory, motor, and cognitive), and even biochemical asymmetries. How are asymmetric patterns of organization developed? What is the relationship of hemisphere asymmetries to eye, foot, hand, or ear preference? Does a particular pattern produce “talent” — musical, mathematical, or artistic genius? (It does not take too much wondering to be curious why Michelangelo, Leonardo da Vinci, Holbein, Picasso, and Escher were all left-handed.) Or are left-handers really “gauche”? Matters of skill and achievement are considered in the final section.

These are the kinds of questions that concern researchers in the brain sciences today. The study of left-handedness serves a vital role in this research because it is frequently through the exceptions that we understand the rule. Left-handers provide a population that varies in brain asymmetry, and by examining different groups of left-handers and asking the same questions about each one, investigators are learning much about brain organization.

Although the subjects of these investigations are left-handers, the real questions being asked are not just about left-handedness per se, but about how the human brain functions.

This book is dedicated to left-handers. At last their unique attributes are seen in the light of modern research, research that is supplying some of the most important clues to help answer our most probing questions into the mysteries of the human brain.

I would like to acknowledge the assistance and encouragement of my colleagues David Galin, Jack Johnstone, and Robert Ornstein, and of my right-hand (and right-handed) man (and husband), Matt.

|

WHENCE SINISTRALITY?

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1

Left-Handedness: Early Theories, Facts, and Fancies¹

LAUREN JULIUS HARRIS

The left hand has nothing to do with conducting. Its proper place is in the waistcoat pocket, from which it should emerge to restrain, or to make some minor gesture—for which in any case a scarcely perceptible glance should suffice.

—RICHARD STRAUSS
quoted by Schonberg, 1967, p. 237

The left-handed are precious; they take places which are inconvenient for the rest.

JEAN VALJEAN
in Victor Hugo's *Les Misérables*

I have not adequate knowledge derived from experience to warrant me in expressing an opinion as to the best means of dealing with left-handed pupils.

A. B. POLAND
School Superintendent
Newark, New Jersey (McMullin, 1914)

¹ This chapter is an expanded version of a paper presented at a symposium, *The Sinistral Mind*, March 3-4, 1977, San Francisco, Calif., and at a conference, *Left-handedness, Brain Organization, and Learning*, March 5-6, 1977, University of California, Berkeley. The section on "Ambidextral Culture" was presented, in different form, in papers at the Annual Meetings of the Midwest Psychological Association (Harris, 1978) and the International Neuropsychology Society (Harris, 1979).

I am grateful to the staff of the Science Library and the Inter-Library Loan Office of Michigan State University for their help. Preparation of this paper was supported, in part, by an All-University grant from Michigan State University.

*The stranger greets thy hand with proffered left?
 Accept not: 'tis of loyalty bereft.
 Left-handed friends are underhanded foes;
 True openness a swordless right hand shows.*

—HARVEY

Sheep in Wolves' Clothing, (Burt, 1937, p. 314).

His name is Babe Ruth. He is built like a bale of cotton and pitches lefthanded for the Boston Red Sox. All lefthanders are peculiar and Babe is no exception, because he can also bat.

—ANON. NEW YORK SPORTSWRITER
 quoted by Creamer, 1974, p. 108.

INTRODUCTION

“Cack-handed, bang-handed, wacky-handed, gammy, keggy, scrammy, skiffly, skivvery, watty, coochy, schoochy, scroochy, quiffy, bawky, cowey, cowley, hawky, garpawed, kay-pawed, and cow-pawed”—the British have proved themselves true adepts at the sport of naming left-handers, and these are a few of the terms they have coined. No surprise that nearly all are ugly in tone (e.g., cack-handed from “cack,” meaning excrement).²

Left-handers, being exceptions to the rule of right-handedness, have provoked more than mean-spirited names; like many minorities, they also have inspired enmity, suspicion, and the reputation for lacking practically every human virtue and skill. For instance, their supposed deficiency in finer muscular coordination inspired the late British educational psychologist, Cyril Burt, to rhapsodize: “They squint, they stammer, they shuffle and shamle, they flounder about like seals out of water. Awkward in the house, and clumsy in their games, they are fumbler and bungler at whatever they do . . . [1937, p. 287].”

Proportionately more left-handers than right-handers also have been said to be psychoneurotic, epileptic, stutterers, reading-disabled, mentally retarded, mirror-writers, poor in penmanship, deficient in spatial or artistic

² These and other terms were collected by Samuel Orton and reported by Michael Barsley, an estimable philo-left-hander, in his book, *Left-handed Man in a Right-handed World* (1970, pp. 157–158). Orton also listed “southpaw”—the only name likely to be familiar to North Americans. The term is believed to have arisen from the position of the arm of a left-handed pitcher in an old baseball park in Chicago. In this park, when the left-handed pitcher faced west, with the setting sun behind him, his pitching arm was on the south side of his body. “Southpaw” is not a term of opprobrium, but still, the minority was singled out. Right-handed pitchers, after all, are not called “northpaws.”