

THE OTHER SIDE OF THE BRAIN The Politics of Split-Brain Research in the 1970s–1980s

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In the course of the 1970s and 1980s, theories derived from neuropsychological research on the bisected brain came rapidly to achieve the status of common sense in the United States and Canada, inflecting all manner of popular and academic discussion. These theories often posited that the right hemisphere was the seat of creative expression, whereas the left hemisphere housed rationality and language. This article analyzes the political and cultural implications of theories about the split brain. Gender relations, educational reform, management theory, race relations, and countercultural concepts about self-expression all quickly came to be viewed through the lens of left-brain/right-brain neuropsychological research. Yet these theories were often contradictory. On the one hand, some psychophysiological experiments premised that the brain was inherently plastic in nature, and thus self-improvement techniques (like mindfulness meditation) could be practiced to unfurl the right hemisphere's intuitive potentialities. On the other hand, other psychophysiological experiments concluded that Native Americans as well as African Americans and persons from "the East" appeared inherently to possess more highly developed right-brain talents, and therefore suffered in the context of a left-hemisphere-dominated Western society. In both instances, psychologists put neuroscientific research to political and social use. This article thus connects a story from the annals of the neurosciences to the history of psychological experimentation. It analyzes the critical impact that speculative ideas about the split brain were to have not only on the post-1960s history of psychology but also on what soon emerged after the 1990s as the social neuroscience revolution.

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In the course of the 1970s and 1980s, a singular development within the neurosciences swept unexpectedly both into the rarified world of academia and into the popular mainstream. This was the split-brain craze, sometimes known as "dichotomania," and it extrapolated from research findings regarding a single neuroanatomical fact about the mammalian brain—namely, that it is divided into a right and a left hemisphere—only then to make an incredible range of claims about what the two hemispheres could (or could not) do.¹ It became customary in the course of these decades to voice a desire to access one's own right-brain intuitive talents

or to state openly that one's rational left brain was simply too dominant and needed to be mellowed. Influential psychologists as well as many leading public intellectuals in a variety of disciplines across the humanities and hard sciences contributed to these remarkable developments, as did well-regarded general interest magazines and journals like *Scientific American* and the *New York Times Magazine*.

In 1976, for instance, iconoclastic management guru Henry Mintzberg effused (in the pages of the *Harvard Business Review*) that split-brain research had "great implications for both the science and art of management." He declared that management theorists too frequently neglected the creative capacities of "well developed right-hemispheric processes,"

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¹ Neuropsychologist Marcel Kinsbourne is credited with coining the term "dichotomania" to denote split-brain theorizing "in its excesses" (as cited in Galin, 1979, p. 23).

choosing to focus instead on “the logical, linear functions” that resided in the human brain’s left hemisphere. “Did you ever wonder why some things come so easily and others seem so difficult, why sometimes you just cannot get your brain to work?” Mintzberg rhetorically inquired. “Maybe the problem is not that you are stupid or tired, but that you are tackling a problem that taxes the least developed hemisphere of your brain” (Mintzberg, 1976, pp. 57–58).

Such pronouncements on the virtues of right-brain thinking were hardly limited to the question of how to make it in the corporate world. Psychologist Julian Jaynes hypothesized in *The Origins of Consciousness in the Breakdown of the Bicameral Mind* (1976) that schizophrenia could be traced to the asymmetric hemispheres of the brain and that the voices heard by schizophrenics emanated from the right temporal cortex. These voices had become stigmatized in the course of human history and were now largely taken to signal mental illness. However, Jaynes averred, the hallucinatory voices heard by schizophrenics should be interpreted as “the voices of the gods” because it was entirely possible “that there exists [a] vestigial godlike function in the right hemisphere” (Jaynes, 1976, pp. 404–405). Jaynes’s book was a great commercial success and was nominated for a National Book Award in Contemporary Thought. (It has remained in print to the present day.)

In the late 1970s and early 1980s, there were numerous advice manuals that urged persons to learn to utilize *both* hemispheres of their brain. People should engage in *whole-brain thinking* and not neglect the untapped potentialities of their right brain. An entire shelf of self-help split-brain books appeared; these included *The Tao Jones Averages: A Guide to Whole-Brained Investing* (1983), *Whole-Brain Thinking: Working from Both Sides of the Brain to Achieve Peak Job Performance* (1984), and *Intuitive Management: Integrating Left and Right Brain Management Skills* (1984). There were also (still-in-print) titles like *Teaching for the Two-Sided Mind: A Guide to Right Brain/Left Brain Education* (1983) and *Drawing on the Right Side of the Brain: A Course in Enhancing Creativity and Artistic Confidence* (1979), which has sold more than 2 million copies worldwide. Marketed as an asset to anyone in pursuit of an extra edge (at work or in life more generally), split-brain theory became a lucrative business.

What are we to make of this episode in the annals of psychology and neuroscience? There are (at least) three ways one could read it. The first way might observe that although the excitement was enormous for a decade, there were already a few skeptical voices at the height of the fascination with split-brain research, and after the wave crested in the first half of the 1980s, the enthusiasm for this research dissipated quite rapidly. In this version, one could easily tell the phenomenon of the culture-wide fascination with split-brain theories within the paradigm of the hype cycle (often called the “Gartner hype cycle”). The idea here is that in many areas of scientific research (e.g., genetics, stem cell), a new discovery can initially trigger breathless, overblown claims (along with a sharp spike in funding), only then to be followed by dramatic disillusionments and extended intraexpert debates before scientists settle down and arrive at more modest—but also more stable—expectations (Fenn & Raskino, 2008). Another story one could tell involves the ever-challenging question about how best conceptually to relate the brain and the world. One might surmise that a turn toward the neurobiological in this era could all too easily mean leaving attention to social contexts aside, or indeed imply right-wing politics—as, for instance, *The Bell Curve* would soon do (Hermstein & Murray, 1994). Yet, in fact, many of the key players in this split-brain craze were passionately progressive in intent and—although occasionally flakey, even mystical in tone—particularly concerned with social justice for ethnic and racial minorities. Indeed, the effort to make split-brain theorizing effective specifically for education reform led to quite concrete curricular experiments—some of which (albeit in adapted form) continue to inform innovative pedagogical approaches to this day (especially by those adamantly opposed to the damaging trends set in motion by the federal *No Child Left Behind Act of 2001*).² Yet a third interpretation of this

² No Child Left Behind was the culmination of a trend in education policy taking shape through the 1990s. It used incentives and sanctions in an attempt to pressure schools to improve student outcomes in reading and mathematics. In fact, however, it ended up failing to remediate the achievement gap between lower and higher income students and created an atmosphere of “teaching to the test” while reducing support for instruction in history, science, and the arts (precisely the areas which could have helped students develop their reading and math abilities as well). See the chapter “NCLB: Measure and Punish” in Ravitch (2010).

episode not only would note how powerfully the metaphors of left- and right-brain thinking have stuck with the general public but also would consider how significant a preparatory phase the split-brain craze was to become for the subsequent dissemination of brain-talk and “brainhood”—the idea that the brain is “the location of the ‘modern’ self”—that has made the public conversant as well with such brain regions as the hippocampus, the amygdala, and the prefrontal cortex (Vidal, 2009). All three of these versions have merit.

The Return of Split-Brain Research

Theories of the split brain in humans were not new developments in the 1970s and 1980s (Harrington, 1987). More than a century earlier, French surgeon Paul Broca reported that patients with brain lesions in the left frontal lobe experienced a loss of speech. Consequently, Broca posited that the left hemisphere was likely the location in the brain for language. Karl Wernicke, a German neurologist, also proposed that the left side of the brain controlled speech and language functions. More research concerning the lateralization of cerebral faculties soon followed. Based on his clinical observations, British neurologist John Hughlings Jackson suggested in the 1860s and 1870s that the brain’s right hemisphere was the site of visual ideation. During the next several decades and into the first half of the 20th century, research into hemispheric specialization significantly subsided, although important work was done by the German neurologist Hugo Liepmann to establish the role of the left hemisphere in purposive motor activity and to reconceive the functioning of the corpus callosum (the neural fibers that connected the two cerebral hemispheres).³

In 1940, the first split-brain surgery, or cerebral commissurotomy, was performed. This involved the severing of a monkey’s corpus callosum (see Akelaitis, 1941; Van Wagenen & Herren, 1940). In the course of the 1950s, neuropsychologist Roger W. Sperry at the University of Chicago and his graduate student Ronald E. Myers conducted split-brain studies on cats, which confirmed that the corpus callosum served to transfer visual data from one hemisphere to the other (see, for instance, Myers & Sperry, 1958). Sperry further observed that when the corpus callosum was severed in ani-

mals (e.g., monkeys and cats), this not only “prevented the spread of learning and memory from one to the other hemisphere,” it also “was as if each of the separated hemispheres had a complete amnesia for the experience of the other, as if each had its own independent perceiving, learning, and memory systems” (Sperry, 1962, p. 46). Sperry began tentatively to propose that the two hemispheres of the mammalian brain were “special and nonsymmetrical” (p. 47). At another moment, Sperry had declared, even more emphatically, “In these respects it is as if the animals had two separate brains” (Sperry, 1961, p. 1749).

It was in the early 1960s as well that Sperry, now based at the California Institute of Technology (hereafter, “Caltech”), and with the assistance of psychologist Michael S. Gazzaniga, and under the supervision of neurosurgeons Joseph E. Bogen and Philip J. Vogel, conducted research with a human subject who suffered from epilepsy and who had consented to a commissurotomy. Bogen proposed that cutting the patient’s corpus callosum might prevent the epilepsy from spreading between the brain’s hemispheres. The surgery worked—it halted the patient’s seizure activity. The patient afterward told Sperry that he felt better than he had in years. But the brain surgery also resulted in “impairments,” such as an inability to “cross-locate with either hand across to the other” (Gazzaniga, Bogen, & Sperry, 1962, p. 1766). There was a similar difficulty with regard to visual perception. Sperry concluded that now, in a human patient, there was compelling evidence that “the separated hemispheres were each unaware of activity going on in the other in the case of those functions that are highly lateralized” (p. 1767).

Sperry and his team subsequently went through a several-year phase in which they mused about the various possible implications of the fact that humans did not so much have a split brain as a doubled one—or continued to mull how the two halves differed. In 1964, Sperry published the results of his experiments on the bisected brain in *Scientific American*. Here, he presented the hypothesis that the “two

³ For more on the 19th-century history of the split-brain paradigm and Liepmann’s findings, see also Harrington (1985, 1995).

halves of the mammalian brain are mirror twins, each with a full set of centers for the sensory and motor activities of the body,” and that when the connection between these halves had been severed, “either half of the brain can to a large extent serve as a whole brain” (Sperry, 1964, pp. 42, 52). Gazzaniga, meanwhile—with rather contrary emphases—affirmed that in adults there was a high level of “hemispheric inequality,” and that the right hemisphere handled non-verbal cues, whereas the left hemisphere managed language abilities (Gazzaniga, 1967, p. 24).⁴ And Jerre Levy, another psychologist who studied with Sperry at Caltech, argued that there might be evolutionary reasons for the “differential perceptual capacities” of the right and left hemispheres of the brain (Levy-Agresti & Sperry, 1968, p. 1151). Levy additionally asserted that the female brain might be less lateralized than the male brain, and that this, in turn, interfered with women’s spatial abilities (Levy, 1972). Psychologists in the United States and in Canada continued to pursue and promote Levy’s theory about “sex and the single hemisphere” throughout the 1970s (Goleman, 1978; Witelson, 1976).

However, it was the neurosurgeon Joseph Bogen who did more than anyone to articulate and popularize concepts specifically about the brain’s right hemisphere. Bogen’s ideas meshed well with the countercultural mood of the historic moment. Between the years 1969 and 1972, Bogen published a multipart essay, entitled “The Other Side of the Brain,” that no doubt gained notoriety because of its author’s stature as a physician on Sperry’s team. “What is the right hemisphere for, in the human scheme of things?” became Bogen’s overarching question. At least, at first, Bogen remained tentative:

We do not yet understand *how* the one hemisphere produces language; but of the other hemisphere we do not even know *what* it is producing . . . The lesser known and hence more fruitful area for investigation of mental activity is that carried out by the other side of the brain. (Bogen, 1969a, p. 105)

Bogen went on to claim that the right hemisphere was the seat of musical ability as well as artistic and creative talents.

Bogen soon pushed his speculations into far woollier terrain. He noted that persons who lived in “the East” and tribal peoples around the

globe intuitively grasped the inherent duality of human nature (Bogen, 1969b, p. 156). He argued that individuals possessed of a “technical proficiency in music, drawing or writing” nonetheless often produced art “devoid” of genuine intuitive talent because “creativity requires more than technical skills and logical thought.” He hypothesized that “certain kinds of left hemisphere activity may directly suppress certain kinds of right hemisphere action,” and that there may be “a physiological basis” for the “failure” of some people “to develop fresh insights (in the sense of new understanding of the outside world).” Thus, and according to Bogen, the left hemisphere exerted an “inhibitory effect” on intuition and creative processes (Bogen & Bogen, 1969, pp. 200–202). The romancing of the right hemisphere had officially begun.

We Are Left-Brained or Right-Brained

Widespread fascination during the 1970s and 1980s with split-brain research may be taken as yet one further instance of what Kaiser and McCray (2016) have labeled “groovy science.” The allure of split-brain theories may also be interpreted as part of the broader “anti-modernist lament” during and immediately after the 1960s, as Harrington (2008) has identified (p. 206). However, the dynamics in this instance represent an even more complicated confluence of countercultural impulses and neuropsychological sciences. Hard science was offering new evidence for perspectives that were already widely held. The heyday of split-brain research arrived precisely at the moment of “the notorious ‘Zen boom’” (as the popularizer Alan Watts labeled it)—a moment primed to identify neurological findings through a countercultural lens (Watts, 1972, p. 248). Watts had himself called early and often for “a cross-fertilization of Western science with an Eastern intuition,” and research into the bisected brain appeared very much to be an answer to that call (Watts, 1966, p. x). Similarly, as another sympathetic account summarized, a belief that “the Eastern person interprets the world as whole/one, while the Western person interprets it as unjoined details” had been in circulation among Zen proponents long “before split-brain research be-

⁴ Also see Gazzaniga (1970).

came popular” in the United States (Zion & Raker, 1986, p. 37). According to this frame of reference, what neuroscientific experimentation confirmed was the esoteric wisdom of ancient non-Western philosophies.

“Two very different persons inhabit our heads,” dramatically opened science reporter Maya Pines in 1973 in the *New York Times Magazine*, “One of them is verbal, analytic, dominant. The other is artistic but mute, and still almost totally mysterious” (Pines, 1973a, p. 32). Pines noted further that the “sudden surge of interest” in the “nonspeaking side of the human brain” was “probably no accident at a time” when widespread fascination with the nearly “nonverbal disciplines” of yoga and meditation were “enjoying such a vogue” (p. 32). With mention to the split-brain research of Sperry, Gazzaniga, and Bogen, Pines wrote, “We know almost nothing about how the right hemisphere thinks, or how it might be educated—and we have just begun to discover how much it contributes to the complex, creative acts of man” (p. 32). Pines asserted that persons who wished to improve the rational and literate or intuitive and creative sides of their personalities might soon “learn to activate” their “left or right hemisphere voluntarily” (p. 126). Certainly, Pines observed, recent studies of the split brain were nothing less than “extraordinary in their implications” (pp. 32, 126).

In profiling the capacity of individuals to jumpstart the hemispheres of their own brains, Pines cited Robert Ornstein, a psychologist at the Langley Porter Neuropsychiatric Institute at the University of California, San Francisco. Not unlike Bogen, Ornstein proselytized that the left-hemisphere-dominated West had too long demeaned the right-hemisphere philosophies of the East (see Wald, 2008). Ornstein believed that individuals could practice their right hemispheric skills and thereby learn effectively to double their mental capabilities. As Ornstein (1972) wrote in his best-selling *The Psychology of Consciousness*, people had the capacity to “shift from the individual, analytic consciousness to a holistic mode, brought about by training the intuitive side of ourselves” (p. 178). Throughout, Ornstein preached the psychological and neurological benefits of techniques like Zen meditation, Sufism, and yoga. Although Bogen would soon bring the neurosciences into politics, Ornstein did more than anyone to raise

public awareness about how to unlock whole-brain potential. Ornstein really got the word out and, in the first years of the 1970s, became the right brain’s first true evangelist.

Ornstein’s theories emerged from the psychophysiological experiments he had conducted on right hemispheric activation in his university lab. Assisted by psychiatrist David Galin, Ornstein attached electrodes to the right and left sides of the scalps of “normal people” (that is, subjects who had not had surgery to sever their corpus callosum) so that they might record their subjects’ electroencephalography (EEG) patterns while they accomplished various tasks (like writing a letter or constructing a block design from memory). When subjects performed a language task, there was more left-hemispheric involvement; when they performed a spatial task, there was more right-hemispheric engagement. Having demonstrated that EEG results differed depending on the tasks performed, Ornstein and Galin went on to hypothesize that “in most ordinary activities we simply alternate between cognitive modes rather than integrating them,” and they concluded with the anticipation that ultimately their work might facilitate “the training of ordinary individuals to achieve more precise control over their brains’ activities” (Galin & Ornstein, 1972, pp. 413, 418).⁵ Again, a key to turning on the right hemisphere might be meditation (Ornstein, 1973). “All meditation techniques are alike in that all involve a focus of attention,” observed science journalist Marilyn Ferguson in her book, *The Brain Revolution* (1973): “Neurologically, the focus stimulates

⁵ Ornstein and Galin’s concluding hope that their work could “enable the training of ordinary individuals to achieve more precise control over their brains’ activities” was speculative, based on their idea that although some extant biofeedback efforts were directed to encouraging either “theta” or “alpha” activity, their own “development of an index of lateralized functions” might provide a basis for targeted training of hemispheres (Galin & Ornstein, 1972, pp. 417–418). For a typical example of the enthusiasm of the time for biofeedback’s capability for “turning on the power of your mind,” see Karlins and Andrews (1972). The general idea was that electrodes placed on a person’s body (e.g., the head, the chest, a finger) would transmit information to a monitoring device and thereby alert the subject about physiological processes of which he or she would otherwise be unaware, and hence prompt the individual to learn to self-regulate. The belief, in the early 1970s, was that biofeedback could help reduce anxiety, control migraines, alleviate hypertension, and bring about bliss.

the brain rhythmically.” Citing the research of Ornstein and Galin, Ferguson wrote that “in meditating subjects” there was “the possibility that a new generator, another source of energy, had been activated in the brain” (Ferguson, 1973, pp. 77–78). Or as psychologist Thomas H. Budzynski recommended in 1976, perhaps “a combination of self-directed phrases, breathing exercises, and the new technique of biofeedback” could help individuals “control and manipulate various internal states” which might “promote a quieting of the autonomic functions as well as the skeletal muscle system” and, thus in turn, “produce a relaxed, quiet, inward-turning state of mind” (Budzynski, 1976, p. 364). Building on earlier theorizing that the two halves of the brain might be competing for expression, some defenders of the right brain recommended trying to reduce left-brain activity. As Budzynski, for example, optimistically concluded, “Perhaps the decrease in critical, analytical, logical linear-functioning that occurs with a lowering arousal level is the gradual, functional disabling of the major [that is, left] hemisphere” (p. 381; cf. Bogen & Bogen, 1969).

Psychophysiological experimentation and split-brain neuroscience research melded in ways that psychologists announced could change the way persons were treated for a range of emotional disorders. Harvard psychologist Gary E. Schwartz reported hopefully in 1975 that “once the basic processes” of “hemispheric asymmetry data” had been “isolated,” it would become possible for subjects who suffered from anxiety or depression to be “trained with biofeedback to regulate specific patterns of EEG activity across the hemispheres and to relate these physiological states to specific underlying cognitive and affective experiences.” Much like Ornstein and Galin, Schwartz suggested that subjects might well be able to produce “self-induced cognitive states” (such as “a happy state”) by learning how to “regulate patterns of physiological activity” (Schwartz, 1975, p. 320). And as *Saturday Review* observed in 1975, techniques geared to “intervening in the brain’s processes” could help individuals “to experience our sensations more joyfully, to keep ourselves mentally and physically healthy, to learn and remember better, to ‘know who we are’ with a greater sense of wisdom and maturity, to be more creative” (Rosenfeld & Kliv-

ington, 1975, p. 14). Taken together, these psychophysiological experiments—and the hypotheses derived from them—advanced a view of the human brain as plastic; people possessed an inherent ability to effect long-term physiological alterations inside their own heads.

Right-Brain Neglect

A concept of neuroplasticity was less consistently applied, however, when the topic turned to the implications of split-brain research for race relations and education reform. In 1969, Joseph Bogen remarked that persons labeled “culturally disadvantaged” most probably possessed right-hemisphere talents that “remained undeveloped for lack of proper schooling,” suggesting that environmental factors had a profound impact on the brain’s development (Bogen & Bogen, 1969, p. 202). Yet in 1972, Bogen went on to argue that “certain ethnic groups” were the beneficiaries of “relatively greater development of right hemisphere potential.” He also proposed that the “hemispheric specialization” of indigenous peoples and persons of color was related to the fact that these peoples had grown up in subcultures that emphasized “spatial skills” and deemphasized “intensive education of the left hemisphere potential for reading, writing, grammar, etc.” Thus, the “cultural differences” between White people and persons of color “can be interpreted in part as a result of asymmetry in hemispheric utilization” (Bogen, DeZure, TenHouten, & Marsh, 1972, pp. 49–50, 58). In sum, Bogen sought—however clumsily—to use split-brain neuroscience to challenge a repressive left-brain (and Western and white) social order, even as he remained fuzzy as to the direction of causation at the source of the problems he had identified.

A growing body of empirical research in the 1970s sought to bolster claims that minority groups exhibited hemispheric activity in a manner that was essentially different from white and/or Western people. In 1977, the *International Journal of Neuroscience* reported on a psychophysiological experiment that used EEG recordings to map differentials in the right–left brain activity of 16 bilingual Hopi Indian children. The children first listened to a story in English and then again in Hopi. The children experienced “a greater right hemisphere participation in the processing of the Hopi speech.”

This finding led researchers to conclude that Hopi language (said to be less abstract than English) and Hopi culture were more right-hemispheric than White culture and the English language (Rogers, TenHouten, Kaplan, & Gardiner, 1977, p. 1). And a study published in the journal *Child Development* in 1979 used a dichotic listening test (premised on the idea that because the left ear corresponded with the right hemisphere of the brain, a full appreciation of emotional tones and statements was processed principally through the left ear rather than the right) to determine whether Navajo and Anglo children favored one ear or the other. The study found that Navajo children had a left-ear preference, indicating (or so it was asserted) that the indigenous brain processed language in their right hemisphere because of a “cognitive style” in harmony with the natural world (Hynd & Scott, 1980; see also Scott, Hynd, Hunt, & Weed, 1979). Again, it remained vague whether such differences were rooted principally in culture or in biology.

Decrying the injustices of an educational system geared to left-brain (i.e., White) students became a fashionable sport. In 1973, Maya Pines concluded—as if it were really just a matter of common sense—that a growing body of evidence from the neurosciences indicated how “children from poor black neighborhoods generally learn to use their right hemisphere far more than their left—and later do badly on verbal tasks” (Pines, 1973b, p. 151). Ornstein and Galin delivered a paper in 1974 at the annual meeting of the American Association for the Advancement of Science in which they freely applied their research on brain lateralization to explore the relationship between socioeconomic inequality and the limited educational opportunities available to right-brain students (Ornstein & Galin, 1976, p. 65). Harvard Medical School neurologist Norman Geschwind additionally questioned the classification of individuals with learning difficulties, wondering what, in fact, such classification might be revealing about a highly rational and literate society that lacked an appreciation of the whole brain. Geschwind wrote in 1978 of “the child who has trouble learning to read”:

My suspicion would be that in an illiterate society such a child would be in little difficulty and might, in fact, do better because of his superior visual-perceptual talents, while many of us who function well here might

do poorly in a society in which a quite different array of talents was needed to be successful. (cited in Ornstein, 1978, p. 83)⁶

No less an authority than Roger Sperry also came to advocate for education reform on the basis of split-brain research. Repeatedly in the course of the 1970s, Sperry argued that the right-brain skills of children were being neglected by the left-hemispheric emphases of American curricula. In 1973, Sperry put the matter bluntly: “What it comes down to is that modern society discriminates against the right hemisphere” (Sperry, 1973, p. 209). In 1975, Sperry emphatically underscored this point again when he opined how “our educational system and modern society generally (with its very heavy emphasis on communication and on early training in the three Rs) discriminates against one whole half of the brain” (Sperry, 1975, p. 33). Sperry even used the occasion of his lecture in Stockholm on being awarded the Nobel Prize in 1981 for his research on the bisected brain to comment on how “the need for educational tests and policy measures to identify, accommodate, and serve the differentially specialized forms of individual intellectual potential” had become “increasingly evident” (Sperry, 1982, p. 1225).⁷

No doubt spurred by pronouncements like these, specialists on education looked increasingly to split-brain theory for guidance on how to reconceive the learning experience of students. When education psychologists at Stanford University in 1975 examined a student’s decision on where to sit in a classroom (on the left or the right side of the room), they determined that this decision might be a predictor of that student’s left or right hemispheric dominance (with analytic left-brain students displaying a preference for the right side and right-brain students selecting the left side of the room; Gur, Gur, & Marshalek, 1975). In 1976, when researchers used a dichotic listening test

⁶ Geschwind had argued already in 1974, “In an illiterate society a lack of visual-auditory associations would not seriously inconvenience anyone except in unusual situations; literacy makes this ability highly important” (Geschwind, 1974, p. 229).

⁷ For a helpful overview of the stages in Sperry’s research, the scene at Caltech, and the funding streams and professional networks that nourished his productivity—but also Sperry’s conviction that his split-brain work had been “over-interpreted, especially by non-scientists”—see Puente (2002, p. 74).

on White and Black children of various socioeconomic backgrounds, they determined that there were no innate “racial differences” in the development of “cerebral dominance,” but that there were “significant social class differences” in how these children’s brain hemispheres developed (Borowy & Goebel, 1976, pp. 363–364). And when the National Education Association of the United States that same year announced how urgently important it was that schools address the special needs of “right-brained kids” trapped “in left-brained schools,” it concluded that it was unacceptable that children be “handicapped” in their studies simply because they were actually “more proficient in right hemisphere (visual) input processing” (Hunter, 1976, pp. 45–48). Here, too, the question of whether schools needed to better accommodate right-brain students or whether brains were so plastic that with holistic training all children could develop both sides of their brains had not been fully sorted out.

The unclear relationship between (supposed) right-brain preference and racial group identity notwithstanding, it became commonplace to hold that the right hemisphere of countless minority and disadvantaged youngsters’ brains was getting short shrift in the setting of the American classroom, and that gross disinterest in right-brain learning was causing these same children of color to flounder and fail. Repeating a now-familiar argument, the *New York Times* cautioned in 1978 that “the brain’s division of labor” meant that right-brain schoolchildren were being unfairly tracked into remedial classes. “Given new insights into the nature of the two hemispheres of the brain,” the *Times* critically observed, “educators should be wary about assuming that they are dealing with a slow learner” (Landsmann, 1978, p. EDUC24).

A liberal-left political position about disparities in the American educational system became consolidated, based almost wholly on hypothetical notions about the split brain. In 1979, the *Journal of Research and Development in Education* directly attacked “current individual intelligence tests” that “do not begin to tap the rich resources of the right cerebral hemisphere,” because these tests tended to discriminate against “socioeconomically disadvantaged black children” with “a right brain leaning” (Kaufman, 1979, pp. 102–103).⁸ And citing the neuroscience research of Sperry, an expert in

child development rhetorically inquired in 1980, “What is our loss when schools stress the more measurable left hemispheric mathematical and verbal skills which are referred to popularly as ‘the basics’ and at the same time ignore the development of ‘right brained’ intuitive thinking?” (Gray, 1980, p. 131).

Throughout, and strikingly, education reformers did not call for poor and minority children to receive *more* compensatory “left-brain” education. The opposite was often the case. In 1975, Joseph Bogen railed against how “the usual justification of IQ tests is that they predict further scholastic achievement, and that the latter is in turn predictive of ‘life success.’” Bogen added that such efforts to predict “life success” were “ultimately based upon a criterion of ‘success’ which is not only most often measured monetarily, but seems to depend in part upon an analytic attitude hypertrophied by centuries of contention against nature.” The reason so many students were choosing to reject traditional approaches toward education, Bogen suggested, was that these conventional pedagogical methods solely addressed students’ “left-hemisphere potential,” while they typically and almost entirely neglected these students’ deep desire to “learn to live within nature as bilaterally educated, whole persons” (Bogen, 1975/1977, p. 146).⁹ Indeed, “the dominant white culture” had “almost religiously accepted the rational logical modes of the left hemisphere,” as psychologist Bob Samples (1976) wrote in his popular right-brain manifesto, *The Metaphoric Mind*. Thus, Samples added, “minorities, locked out of the contexts of the dominant culture, have been falsely judged to be inferior in motivation” (pp. 151–152). The clear goal was hemispheric equality—not further neglect.

In a historical context in which (purported) genetic differences between racial groups were being put forward to explain variations in IQ—most influentially by Berkeley psychologist Arthur Jensen in his 1969 *Harvard Educational Review* essay, “How Much Can We Boost IQ and Scholastic Achievement?” (A. R. Jensen, 1969)—the invocation of split-brain research

⁸ Kaufman went on to assert, “The possibility that blacks may have some degree of preference for the right hemisphere may actually suggest an inhibiting effect on their scores earned on left-brain tests” (Kaufman, 1979, p. 104).

⁹ Also see Thompson, Bogen, and Marsh (1979).

seemed to provide hard-science support for a (self-understood as progressive) reconceptualization of the issues at stake in the debates about race and education.¹⁰ The new excitement about hemisphericity offered a kind of sideways rejoinder that sought to break the impasse that had been evolving all through the 1960s between hereditarianist and environmentalist approaches—even as both sides had all too often veered into problematic and condescending assumptions about maternal or cultural “deprivation” to press their respective cases (Raz, 2013, pp. 62–75). Split-brain fervor left open the question of whether the differences being asserted were the result of nature or nurture. Instead, the aim was to redirect the entire discussion by reevaluating the creative and intuitive abilities that had for so long been scorned, and by calling into question the high esteem traditionally accorded to reasoning and verbal facility.

The K-Mart of Brain Science

Not everyone, however, concurred that split-brain research had broad and positive cultural and political implications. A few psychologists argued from the start that the claims being made by split-brain advocates were distortions of real science. A small backlash against the split-brain paradigm took shape. Cognitive psychologist Robert D. Nebes, who had trained with Sperry at Caltech, complained already in 1975, “Lately, everything from creativity and imagination to the id, ESP, and cosmic consciousness have been suggested to reside in the right hemisphere.” It was, Nebes added, as if the right hemisphere had been annexed “by counterculture groups as their side of the brain” (Nebes, 1977, pp. 104–105). In 1977 psychologist Daniel Goleman (despite the fact that he had actively promoted split-brain theory elsewhere) criticized “the hemisphere fad” because it fomented “widespread confusion between the poetics of experience and the hard facts of brain function” (Goleman, 1977, p. 151). Developmental psychologist Howard Gardner expressed weary despair at split-brain mania. “It is becoming a familiar sight,” Gardner wrote in 1978, sardonically adding,

or greys) are the words “logical,” “analytical,” or “Western rationality.” More luridly etched across the right cerebral hemisphere (perhaps in rich orange or royal purple) are the words “intuitive,” “artistic,” or “Eastern consciousness.” (Gardner, 1978, p. 113)

Or as an account from the 1980s put it in starker terms, and based on near-incompatible metaphors, the “widespread cult of the right brain” had pulled down “the duplex house that Sperry built” so that there could be constructed in its place “the K-Mart of brain science” (Hooper & Teresi, 1986, p. 223).

Leading neuroscientists began to speak out more generally against dichotomania. Psychologist and neuroscientist Michael C. Corballis succinctly wrote in 1980, “This transcendental conception of hemispheric duality is inspired more by age-old myths about left and right than by the empirical evidence” (Corballis, 1980, p. 287). Neurologist Joseph E. LeDoux, who had studied with Gazzaniga, wrote in 1983 that although “cerebral asymmetry has attracted much attention in recent years,” it was nevertheless an unfortunate fact that “speculation concerning the implications of hemisphere differences has gone well beyond the data” (LeDoux, 1983, p. 212).¹¹ Gazzaniga was more harshly dismissive. “It’s pure nonsense,” he reflected, in 1985, about claims concerning the talents of the right hemisphere. He sarcastically added,

The simple fact is that you don’t have to invoke one cent’s worth of experimental psychological data or neuroscience to make the observation that there are some people in this world who are terribly intuitive and creative, and some who aren’t. (cited in McKean, 1985, p. 34)

Neuropsychological experiments failed to replicate many of the more exuberant results linked to the bisected brain. One study challenged the reliability of dichotic listening experiments concerning asymmetry in hemispheric responses to musical tones and verbal speech; the study argued that “ear preference” was often arbitrary, and it calculated that 30% of subjects altered ear preference when retested (Pizzamiglio, De Pascalis, & Vignati, 1974). A study in the *American Journal of Psychiatry* “did not provide support for the notion” of “structural asymmetries in schizophrenic pa-

Staring directly at the magazine reader—frequently from the publication’s cover—is an artist’s rendition of the two halves of the brain. Written athwart the left cerebral hemisphere (probably colored in stark blacks

¹⁰ For a valuable contemporary assessment of the disputes unleashed by Jensen, see Cronbach (1975).

¹¹ Also see Gazzaniga and LeDoux (1978).

tients,” thus casting doubt on Jaynes’s theory of “the bicameral mind” (Andreasen, Dennert, Olsen, & Damasio, 1982, p. 430).

Split-brain research that suggested that minorities and White people or women and men exhibited differential brain activation also did not prove to be especially robust. A study in 1981 concluded that “both the direction and magnitude of language laterality appear to be identical in Anglo and Navajo persons” (McKeever, 1981, p. 597). A study conducted with bilingual Crow Indian children did not establish that these children’s right hemispheres were more dominant (Vocate, 1984). After Native American scholar Roland Chrisjohn and neuropsychologist Michael Peters examined all the available split-brain studies on indigenous hemispheric brain activity, they angrily wrote that the idea of “the right-brained Indian” represented nothing more than a “pernicious myth” (Chrisjohn & Peters, 1986). The claims advanced by psychologist Jerre Levy and others that the female brain might suffer from a deficit in spatial abilities (whereas the male brain excelled at these) were also met with strong skepticism. Biologist Anne Fausto-Sterling concluded, in 1985, that although concepts about split-brain neuroscience and gender differences remained “still in fashion,” there was in truth “no evidence” to support them—as in “quite simply, none whatsoever” (Fausto-Sterling, 1985, p. 50).¹²

Curricular Reform

Yet despite these diverse caveats, within the realm of education theory, split-brain thinking was just coming into its own. Educators cited split-brain neuropsychological research (including dichotic listening tests) in their defense of the neurological benefits of bilingualism, just as many public school systems were shifting away from their support for bilingual programs. The argument was that learning two languages strengthened the whole brain (Krashen, 1981). Already in the late 1970s, but through the 1980s and accelerating after the publication of psychologist Renate Caine and Geoffrey Caine’s highly influential *Making Connections: Teaching and the Human Brain* (Caine & Caine, 1991), leading educators and psychologists articulated a comprehensive case for applying hemisphericity research to curricular reforms in

actual educational settings. The instruction of the fine arts (e.g., art, music, theater) were among the initial scholarly disciplines in which split-brain research had an often profound impact on pedagogical practices, spurred in large part by the publication of art teacher Betty Edwards’s blockbuster guidebook, *Drawing on the Right Side of the Brain* (1979). At a moment when budgets for the fine arts were being slashed, neuroscientific evidence about the distinctive way the right brain processed the world became a useful weapon. A view that right-brain-stimulating activities might be used to assist in the teaching of (the purportedly left-hemispheric-grounded matters of) language and literacy followed, as educators contended that especially slow learners could be helped through the use of body movement and through the incorporation of visuospatial techniques into the instruction of reading and writing skills (Sinatra & Stahl-Gemake, 1983). Elementary and high schools from New Jersey to Michigan to California soon began to implement what they called “brain-based learning”—and school principals cited strong successes after doing so (Caine & Caine, 1995; Della Neve, 1985; Walker, 1995). By the early 1990s, there was also much talk in education circles about psychologist Frances Rauscher’s so-called “Mozart effect,” that is, the cognitive benefits that appeared to result after very young children listened to a Mozart sonata (Rauscher, Shaw, & Ky, 1993). Rauscher’s argument was that when children listened to classical music, it helped to “systematize the cortical firing patterns so they can be maintained for other pattern development duties, in particular, the right hemisphere function of spatial task performance” (Rauscher, Shaw, Levine, Ky, & Wright, 1994, p. 21). Also the potential advantages of “whole-brain learning” for the academic performance of African Americans once again became, in this moment, a theme in educational discourse (Walker, 1995). In every instance, the proponents of brain-based curricular reform announced a desire that students be taught “in accordance with the way the brain is naturally designed to learn” (E. Jensen, 1995, p. 6).

¹² And yet these claims do persist (cf. Ecuyer-Dab & Robert, 2004).

The call to tap the potential of neuroplasticity in underprivileged children has continued to undergird much 21st-century discussion of brain-based education reform. If the brain can be rewired in the context of an enriched educational environment, or so the argument goes, *neuroeducation*—with its call for a more holistic pedagogical approach—represents a powerful rebuke to a single-minded obsession with math and reading testing scores (Sousa, 2005; Wolfe, 2009). In this way, neuroeducation could well be said to be a step-child of right-brain advocacy a generation earlier. Just as the pronouncements of right-brain advocates from the 1970s were, so, too, the more recent assertions about the brain and learning put forth by so-called *neuroeducators* have been prominently debunked as unsubstantiated and overstated (Howard-Jones, 2014). And yet notwithstanding such critiques, many popular pedagogical models for holistic learning—such as those offered by the global network of Waldorf schools—continue to be represented as “provid[ing] a developmental framework aligned with the . . . neuroscience understanding of the development of specific systems of the brain” (Larrison, 2013, p. 65; cf. Amso & Casey, 2006). To keep pace with neuroscientific progress, many key assumptions about hemispheric specialization have since been adapted to be more attentive to the *localization* (not the *lateralization*) of skills (e.g., memory and higher cognitive abilities) in specific regions of the brain. Nonetheless, it is clear that the history of split-brain research remains a crucial precursor in terms of its ability to speak powerfully to a broader public. In this redefined context, theories about how to use brain science to optimize the way children learn continue to find a receptive audience among educators.

Moreover, perhaps more surprisingly, and although he once deemed florid speculations about split-brain research to be “pure nonsense,” psychologist and neuroscientist Michael Gazzaniga (2005) argued that this research was “still going strong.” Indeed, “what is exciting about the present era is that split-brain research is now leading the way again.” In particular, Gazzaniga reported, split-brain research was proving useful in “providing the basis for interpreting neuroimaging results.” Yet he, too, had changed with the times, as he turned his attention to the question of whether each of the

brain’s hemispheres possessed “its own sense of self” (pp. 655, 657). In so doing, Gazzaniga echoed older formulations but also served to meld split-brain study with a broader 21st-century conversation among psychologists, historians of science, and philosophers as to the consequences for selfhood in what has been dubbed the era of “cerebral subjects” (Ortega & Vidal, 2007). Split-brain study—however selectively recast—has remained in play as a key historical reference point.

Conclusion

In conclusion, it is evident that the passionate interest in split-brain research in the 1970s and 1980s did not just consist of a characteristic reaction of excitement, overpromising, and increased funding flows in response to a new set of discoveries. Nor is the best explanation for the fascination with split-brain research that it provided natural science justification for socio-cultural agendas. Yet the hemisphericity fad was also not merely a precursor step preparing the American public for the most recent trend of correlating brain regions to cognitive functions, emotions, and behaviors.

Above all, split-brain thinking succeeded because it offered something for everyone. It could appeal to those who held that there were essential differences (whether genetic or environmental) between different ethnicities or racial groupings—while giving positive valuations to those typically underprivileged. And it could appeal to those who believed that brains were plastic and that training could result in transformation and improvement.¹³ It could attract the financial bottom-line-oriented business elite. But it could inspire do-gooders and romantics of all stripes as well. And as limited as the science was subsequently declared to be, the political claims made in its name—not least about the benefits of a more well-rounded education—have proven to be especially prescient (Ravitch, 2010, p. 108). Important insights can sometimes be based on imperfect science.

¹³ For another instance in which plasticity and training were connected with popular and expert debates over race, class, and intelligence (in the evolving uses to which personality psychologist Walter Mischel’s “marshmallow” experiments in self-control were put), see Staub (in press).

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