Leonardo Da Vinci and the nature of "creative genius"

Leonardo's Brain: Understanding Da Vinci's Creative Genius

Leonard Shlain, Lyon's Press, Guilford, Connecticut, 2014, ISBN: 978-1-4930 0335 8, hardcover, 240 pages, price: US$ 25.95

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DOI 10.1002/bies.201500037

For most questions of the sort, "Who is the best (or most) [something] in the world?," such as "Who is the most brilliant living scientist?" or "Who is the most beautiful woman?," polls would reveal a variety of answers and often as fervently held beliefs. Such variety of opinion is hardly surprising; choices of this sort are highly subjective ones and for most qualities or abilities, there is either no metric at all or at best a proxy metric (such as IQ for intelligence) whose adequacy is debatable. (The world of sports is different, however, because it does possess good metrics of performance.) One might think, therefore, that the answer to the question, "Who was the greatest creative genius who ever lived?", would be equally contentious, since there is no way to measure creative genius. Yet, in this case, it is probable that there would be nearly universal agreement: Leonardo Da Vinci would be the overwhelming choice. Leonardo had extraordinary abilities as an artist, inventor, and scientist, and deployed them again and again. Indeed, the amount that he accomplished—although most of his projects were unfinished—is nearly as staggering as its diversity and quality. There really has never been anyone quite like him, at least anyone who has left a historical record. Much of what he accomplished was made possible by a truly remarkable capacity for visualization, but his gifts and accomplishments cannot be reduced solely to the operation of that capacity; his analytical skills and artistic abilities were an inextricable part of the mix. Although the word "genius" has lost much of its force in recent decades, being used to denote anyone with an exceptional talent, Leonardo was a "genius" in the older and far more exclusive sense, and a more versatile one than other undoubted geniuses, such as Newton, Galileo, Mozart, or Rembrandt.

How does one account for Leonardo's utterly remarkable set of gifts? In an earlier time, the question would have been simply dismissed as impossible to answer or dealt with by reference to inscrutable divine providence. Today, however, in the Age of Neuroscience, it might be possible to frame an answer—or, at least, try—in terms of what is now known about the workings of the human brain. This is the goal of Leonard Shlain's *Leonardo's Brain: Understanding Da Vinci's Creative Genius*. Shlain, who died shortly after completing the manuscript—it is clear from the front matter that he knew he was racing to get it finished before his death—was himself both a neurosurgeon and a best-selling writer, focusing on connections between the arts and sciences. Given those interests, Leonardo da Vinci was a natural—perhaps inevitable—choice for his next and, as it happened, last book.

Although Shlain's treatment allows one to piece together the chronology of Leonardo's life, it is not a conventional biography. Rather, it is an account of the life of the man in terms of his projects, interests, and abilities, covering everything from the brilliance of composition in the painting of *The Last Supper* (and how this opened up a whole new way of seeing and painting) to Leonardo's inventions (mostly in the realm of new armaments), to his anatomical studies, to his prescient insights on the nature of fossils and his extraordinary map-making abilities. In the course of this accounting, Shlain describes abilities of Leonardo that seem beyond the ability of contemporary modern science to explain, such as his capacity for understanding the layout of towns that he had never visited—what the author refers to as "remote viewing"—and of the geological history of different regions before there was a science of geology. Shlain unabashedly plumps for the existence of "extrasensory perception" (ESP) and Leonardo's use of it, after discussing some of the evidence for its existence, and hints at the idea that Leonardo was capable of mental time travel, far beyond the ordinary person's ability to

imagine the past. The fact that such phenomena are currently beyond the ken of modern science should, in my opinion, have been acknowledged and discussed more explicitly in the text. Yet, the reader is given enough information to realize that simply dismissing these ideas is not an adequate response.

So, what neurobiological explanation does Leonard Shlain offer for Leonardo's unparalleled creative genius? The explanation is based on the well-known fact that the human cerebrum consists of two hemispheres, which are specialized in how they function. In particular, the left hemisphere or "left brain" is specially adapted to tasks of language and analytical thinking; hence, while two critical areas for language development, Broca's area and Wernicke's area, are present in both hemispheres, it is the left hemisphere's Broca's and Wernicke's areas that are most important for language. In contrast, the right hemisphere or "right brain" is dedicated to matters of visualization and feeling (and intuitive insight). To give one specific example, face recognition is primarily a right hemisphere capacity. Altogether, in its functioning, the right brain is more "feminine" and, presumably, the major initial source of creative insights. Correspondingly, the left-brain is more "masculine" in its functions (that is, more analytical). Yet, of course, the two hemispheres do not function wholly independently. They are connected by a thick neural cord that links the left and right hemispheres, the corpus callosum. In the author's view, the most creative insights start with germinal ideas supplied by the right brain to the left, where they are processed by the latter's verbal-analytical-logical machinery. The corpus callosum is the bridge that allows this flow of information and, indeed, possibly plays a major part in its ultimate integration. Nevertheless, in most people today, the roles of the two hemispheres are not equal; the left hemisphere is clearly the "dominant" one, as indicated by, amongst other things, the predominance of right-handedness. (Each hemisphere controls body part movements on the opposite side, hence right-handers show left-brain control in this behavior.) Shlain believed, and many would probably agree with him, that a very high degree of left-brain dominance works against creative insight.

These ideas are brought to bear on the case of Leonardo specifically in one of the final chapters, titled "Leonardo's Brain". Drawing on the known facts that Leonardo was ambidextrous and, almost certainly, gay, Shlain argues—more implicitly than explicitly—that the ultimate source of Leonardo's creativity lay (probably) in a larger corpus callosum, permitting a stronger throughput of creative, intuitive thoughts from the right brain into the left brain, where they could be molded into brilliant, analytical insights. In making the argument, he draws upon data showing that both women and gay men—both groups having more "feminine" brains—have larger anterior commissures in their corpus callosum than heterosexual men. Presumably, this increased size correlates with increased trafficking of neural information from right- to left-brain. In the final chapter, the author extends these thoughts to speculations about the future of humanity, and suggests that Leonardo, in some sense, points the way toward that future, as one in which the creativity of the right brain is unleashed more effectively. This will not be because of evolved biological change but because human culture, especially via the internet, is beginning to stress right-brain functions—in particular visualization—more and more. If traditional education has always emphasized left-brain analytical, word-based learning, the new ways of learning about the world developing in our electronically hyper-linked world are inherently more oriented toward right-brain functions and, thus potentially, a more balanced right-left brain integration.

This is an interesting set of ideas but one has to ask: is it really sufficient to explain Leonardo's exceptional creativity? My opinion is that, like all single-factor explanations of complex phenomena, it cannot be the whole story, though it may very well be part of it. There have simply been far more gay, left-handed or ambidextrous individuals than there have been Leonardos, indicating that there must have been additional specific factors in his case. Unless one posits that Leonardo had an exceptionally large corpus callosum, and that extra difference in size made a grossly disproportionate difference in hemispheric integration and creativity, the idea cannot be the entire explanation of Leonardo's gifts. Furthermore, in general, we know that individual experience shapes both brain development and abilities. If so, there had to have been something special in Leonardo's individual development that helped make him the individual he became, even if we do not know what those formative influences were. There may well also have been some special genetic characteristics contributing to his creative potential, but we will never know, since he left no descendants. Furthermore, the corpus callosum theory hardly seems to touch such matters as "remote viewing" and ESP, which—if they were part of Leonardo's mental repertoire—must have foundations beyond simply better integration of right-brain intuitions with left-brain logic. Finally, there is the fact that individuals who have had their corpus callosum severed are not as dramatically affected in their behaviors and abilities as this theory would seem to predict. There was, indeed, a vogue for this operation, for about a decade in the mid-20th century, as a treatment for epilepsy, and Shlain goes into this matter. However, surprisingly, he stresses how normal these individuals were on the whole, and does not discuss how their creative abilities specifically were affected. Taking such caveats seriously, we are thus, in the end, still left with the great mystery of just how Leonardo came to possess his unique set of gifts.

Nevertheless, Shlain's speculations are insightful and provocative, and probably launch us in the right direction. Despite some flaws in the book (a perhaps overly hagiographic tone, occasional lapses into cliches, some loose ends in the explanations), problems that might have been eliminated had the author had more time, it is a fascinating account of one of the most remarkable humans who ever lived, told in an engaging and lively style. And, perhaps only an individual as creative and curious about the world as Shlain himself evidently was, could have put it together so well.