

Chapter 1 : Are left-handed people more gifted than others? Our study suggests it may hold true for maths

Left-Handedness and Your Health. There's no denying it. Left-handers are the odd ones out. Sure, lefties make up about 10 percent of the population – but, frankly, it seems like society has.

This article has been cited by other articles in PMC. Abstract Handedness and brain asymmetry have been linked to neurodevelopmental disorders such as dyslexia and schizophrenia. The genetic nature of this correlation is not understood. Cilia play a key role in this process, and candidate genes for dyslexia have also been recently shown to be involved in cilia formation. Defective cilia result not only in LR body asymmetry phenotypes but also brain midline phenotypes such as an absent corpus callosum. These findings suggest that the mechanisms for establishing LR asymmetry in the body are reused for brain midline development, which in turn influences traits such as handedness and reading ability. This suggests there is an advantage to being right-handed, but also begs the question of why there are left-handers. Researchers have hypothesized that instead of being part of normal variation, there is a disadvantage to being left-handed. Because hand-writing preference is easy to measure, being a simple tick-box on a questionnaire, it is often included in clinical or epidemiological studies, but results are typically only published if they are significant. Accordingly, many associations between handedness and disorders or traits appear to be due to publication bias, where initial small studies have shown associations that have not been replicated in larger follow-up studies or meta-analyses Box 1. The only systematic review of the relationship between handedness and developmental disorders was performed in and found no evidence to suggest there are any associations [6]. Any significant result leads to an additional publication, whereas nonsignificant results are often forgotten, gathering dust in the file drawers of researchers. This publication bias is known as the file drawer problem [83]. Indeed, out of published GWASs, only 55 3. A further study of individuals also failed to report any association between APOE variants and either left handedness or higher left-hand grip strength [90]. This example highlights the need for replication of genetic associations, particularly where the initial study cohort is small i. Being right-handed implies left-hemisphere dominance see Glossary for fine motor control, and handedness correlates with brain hemispheric asymmetries [9]. Language processing involves a complex network of regions distributed throughout the brain [11]. There is growing support from neuroimaging studies that atypical or weak cerebral lateralization is associated with neurodevelopmental disorders such as specific language impairment and dyslexia [12]. Similarly, magnetic resonance imaging studies have suggested that the planum temporale is less asymmetric in individuals with schizophrenia [13–15]. Although making connections is tempting, it remains difficult to determine cause and effect. Does weak cerebral laterality cause the disorder or vice versa, or do genetic influences underlie both weak laterality and neurodevelopmental disorders pleiotropy [12]? Understanding the molecular basis of these traits may contribute to answering these questions. This review will chart recent developments in the fields of genetics and genomics that are beginning to offer insights into the relationship between handedness, cerebral asymmetry, and neurodevelopmental disorders, with a particular focus on schizophrenia and dyslexia. The genetic architecture of handedness: Laland argues that humans have a universal predisposition towards right-handedness that derives from a series of selective sweeps throughout evolution [16]. His theoretical model suggests that our genes favor right-handedness, and any variation between individuals derives purely from environmental influences, such as cultural pressure to conform [17]. Conversely, single gene models that can explain the observed variation in hand preferences have been proposed [18–20]. However, even though single gene theories fit data on the prevalence of handedness, linkage studies have failed to identify a single locus, pointing instead to different regions of the genome, including 2p12–q11 [22,23], 10q26 [24], 12q21–23 [25], and Xq21 [26]. Taking these studies in combination, McManus et al. Instead, they estimated that at least 40 loci underlie the variation in this trait [29]. Given the universality of right-handedness among humans [1], it seems that an innate bias towards being right-handed has been selected for during evolution as Laland suggests [16]. However, this bias is probably influenced by both cultural and environmental pressures as well as genetic variants, as expected for a polygenic trait. Shared genetics between handedness and schizophrenia

The proposed link between schizophrenia and left-handedness [7] has led to numerous molecular investigations of its relationship to handedness. Linkage studies have pointed to regions on chromosome 2p carrying genetic factors implicated in the development of both schizophrenia [30,31] and handedness [22,23]. One study selected four candidate genes within the overlapping region and genotyped common single nucleotide polymorphisms SNPs, which resulted in finding a haplotype associated with relative hand skill in a set of dyslexic siblings assessed by the peg-board task; Box 2 upstream of leucine-rich repeat transmembrane neuronal protein 1 LRRTM1 when paternally inherited [32]. Although this finding does not replicate in independent cohorts unaffected with dyslexia, the same haplotype was also associated with schizophrenia when paternally inherited [32,33].

Box 2 How to measure handedness There are three different questionnaires commonly used to assess handedness: The Edinburgh handedness inventory is a point questionnaire on the preferred hand left or right for a number of tasks from writing to threading a needle [91]. The Annett and Crovitz's Zener scores ask 12 and 14 questions, respectively, both of which have ten questions that overlap with the Edinburgh inventory [92,93]. A laterality quotient can be derived from these scores, which shows a J-shaped distribution, that is, most people use their right hand for most tasks, a sizeable minority use their left hand for most tasks, and an even spread of low numbers of individuals that lie somewhere in between. Participants are typically subsequently categorized in terms of direction of handedness: Because there are no standard cut-off values for these distinctions, this can potentially lead to post-hoc classifications. Although most people do prefer one hand over the other, handedness is a matter of degree, not type. The peg-board task is a useful phenotype in this respect because it is quantitative, easy and quick to measure, and offers more information about dexterity and degree of handedness than a questionnaire-based assessment of preferred hand. The task measures the time taken to move a row of pegs from one location to another with the left hand L and right hand R separately [18]. This provides a measure of relative hand skill PegQ that is normally distributed with a mean shifted to the right, because most individuals are faster at this task with their right hand. PegQ is highly correlated with hand preference: The LRRTM1 finding suggests that schizophrenia and left-handedness may have overlapping genetic susceptibility factors; it is therefore possible that the same variants that modulate risk for schizophrenia are also associated with handedness. Testing of 16 variants across different genes that have been associated with schizophrenia in a cohort of healthy individuals did not support this hypothesis, finding no associations with handedness or footedness [34]. These susceptibility variants for schizophrenia only have a small effect on risk for developing the disorder, and possibly have an even smaller effect on risk for left-handedness. It is therefore improbable that any one single variant will be strongly associated enough with handedness to be consistently detected in small cohorts. Individuals with dyslexia are slower overall at performing the peg-board task compared with controls but there is no difference in the distribution of their relative hand skills PegQ [35-37]. This pathway is conserved across bilaterians from snails to vertebrates [45,46]. Pcsk6 knockout mice display asymmetry defects such as heterotaxia, which is an abnormal distribution of body organs [39]. Therefore, given its role in LR asymmetry development, PCSK6 is an extremely interesting biological candidate for handedness.

Chapter 2 : Current left handed research |

Although left-handedness had previously been associated with learning disorders and certain other problems, the possible biological significance of the connections had been unappreciated.

But what makes one hand dominate? And why are left-handers in the minority? Curious Cases To find out more: It soon became clear that there was more to the question than we thought: Take your eyes, for instance. You can tell whether you are right or left-eyed by trying the following test: First, look at it with both eyes, then try covering each eye in turn. Your strongest eye is the one which gives the nearest picture to stereo vision. Similarly, you can test your ears: Or to listen, clandestinely, against a wall? Why could this be? Why are left-handers in the minority? From an evolutionary standpoint, specialising with one hand makes sense. Chimpanzees tend to choose a favourite hand for different tasks. After selecting the perfect stick, the chimp pokes it into the termite mound, their sense of touch providing a host of information about how deep, wide and full of tasty termites their house may be. Unbeknown to them, they are about to get chomped by a hungry chimp. By specialising with one hand, chimps become more dexterous, and more termites bite the dust. But when primatologists study chimpanzees in the wild, their patterns of handedness look very different to ours. So where in our evolutionary tree does this 1 in 10 ratio emerge? Neanderthals, it turns out, were clever, but clumsy. Our ancestors used their teeth to anchor slabs of meat, whilst they held a knife in their dominant hand to carve it up. Now and again, they would scratch their teeth. The distinctive pattern of grooves in their front incisors reveals which hand must have been holding the food, and which was grasping the knife. Incredibly, when you compare the number of left- and right-handed Neanderthals, this same ratio of 1 in 10 left-handers that we see today pops out. We know that left- and right-handedness has a genetic origin. However, geneticists are still trying to pinpoint which bits of DNA are involved, and there may well be up to 40 different genes at play. The right side of the brain controls the left hand, and vice versa. And so being left-handed can have knock-on effects on the way the brain is arranged. Dorothy Bishop is Professor of Developmental Neuropsychology at the University of Oxford and she has a personal interest. View image of Children very quickly show a preference for which hand they use Credit: Part of the problem is that when neuroscientists look at various aspects of behaviour, MRI studies are only done on right-handed people, in order to try and minimise the variation between different participants. Only specific studies on left-handedness will invite lefties to take part. He found that nine out of 10 fetuses preferred sucking their right thumb, mirroring the familiar pattern we see in the general population. And when he followed those children up many years later, the babies who were sucking their right thumb in the womb became right-handed, and the ones who preferred their left, stuck with that.

Chapter 3 : Left-handedness - Better Health Channel

Sirui Liu Meihung Lin English November 24, In lots of ways we human distinguished ourselves from other species, such as straight-walking, the invention of language, the use of tools, etc.

In the left hand, however, fingers and thumb tend to force right-handed blades apart, so that, rather than being sheared, the work-material is merely hacked, as by a knife, or slips between the blades uncut. Some computer set-ups have the mouse placed on the right side of the keyboard and unable to be repositioned to the left. The mouse itself is also sometimes shaped to fit the right hand better. The functions of mouse buttons, even on mice shaped to fit both hands, default to right-hand use. On two-button mice, the left button "under the index finger of a right-handed person" is the primary button, while the right button performs secondary functions. The on-screen pointers themselves are also configured for right-handed people. Most desktop operating systems allow a user to reverse the functionality of mouse buttons to accommodate left-handed use, but left-handed cursors sometimes need to be specially downloaded. Even with the ability to change the functionality of buttons, these devices may be difficult for left-handed use. For a left handed person there are computer mice designed for left handed use, but they are a much smaller segment of the marketplace. In first-person shooters, many games default to the right pointer-finger being used to fire, simulating a right-handed person pulling the trigger of the weapon. Cameras predominantly have the hand grip, shutter release, film wind lever and commonly used selection buttons, switches and dials controlled by the right hand. Lens controls where present tend to be accessible by either hand. When an unskilled left-handed person uses a right-handed camera the hand control can be less steady and hence produce camera shake leading to poorer pictures at low shutter speeds. Left-handed string instruments are produced, including guitars and violins. Inverted trumpets are made, too. The French horn , for example, is played with the left hand, yet most horn players are right-handed. Left handed drummers also set up drum kits the exact opposite to conventional right-handed setup i. Sports[edit] A left-handed individual may be known as a southpaw, particularly in a sports context. It is widely accepted that the term originated in the United States, in the game of baseball. Baseball is an exception since batters, pitchers, and fielders in certain scenarios are physically advantaged or disadvantaged by their handedness. For this reason, many baseball teams include a left-handed specialist pitcher, who is brought into the game specifically to pitch to dangerous left-handed batters in crucial situations. A left-handed first baseman uses a more fluid motion to tag out a baserunner returning to first base during a pickoff attempt by the pitcher and has less difficulty avoiding baserunners while presenting their mitt as a target for other fielders to throw to. It is very uncommon to see a left-handed player playing any infield position other than pitcher or first basemen due to the counterclockwise flow of the game when throwing the ball around the bases. Left-handed bowlers are usually at an advantage during ten-pin bowling competition when hooking the ball into the pins from the left side of the lane. In boxing , someone who boxes left-handed is frequently referred to as southpaw. The term is also used to refer to a stance in which the boxer places the right foot in front of the left, so it is possible for a right-handed boxer to box with a southpaw stance. Most boxers, southpaw or otherwise, tend to train with sparring partners who adopt an orthodox stance which gives southpaws an advantage. Manny Pacquiao is an example of a southpaw although he writes with his right hand. In the popular boxing film series Rocky , the main character Rocky Balboa is a southpaw. Southpaw is also a term in professional wrestling, often giving them the advantage. Although commonly asserted that left-handed fencers have an advantage over right-handed opponents because the line of defence favors their sword arm, this assertion describes both fencers in a mixed-handed duel, so neither competitor has a unique physical advantage. The game of golf is most commonly played right-handed, and left-handed players typically must provide their own special golf clubs. Professional golfer Phil Mickelson plays left-handed though he is naturally right-handed. Because of this, their grip of the handle is supposedly adjusted in a slightly different style from right-handed players. Often the playing cards have their pips printed only in the upper left corner assuming holding them with right hand. Such design may be uncomfortable for left-handed people who may prefer all four corners of the card to be used. Also, scopes and sights may be mounted in such a way as to

require the shooter to place the rifle against the right shoulder. A related issue is ocular dominance, due to which left-handed people may wish to shoot right-handed, and vice versa. Ocular dominance plays more of a role in shooting accuracy than does left versus right handedness. Therefore, ocular dominance will cause a preference on how a shooter chooses to hold a gun. Some modern firearms are ambidextrous. The British L85 Assault Rifle must be fired right-handed, placing left-handed soldiers at a disadvantage. The M and its variants have a fixed ejection port, but being a conventional i. Circa, with the introduction of the M16A2 version, a case deflector was incorporated adjacent to the ejector port to direct discarded shells in a more forward direction, making the rifle even more left hand operator friendly. Lever action and pump action firearms present fewer difficulties for left-handers than bolt action weapons do. Many weapons with adjustable sights allow for left-handed use, but for a right eye dominant shooter it is necessary to adjust. Machinery[edit] Power tools, machinery and other potentially dangerous equipment is typically manufactured with the right-handed user in mind. This makes it difficult for a left-handed operator to guide the material being cut, as it must be pushed to the right side to align with the fence to avoid kickback. On bandsaws, the blade teeth are on the left side of the blade, necessitating the material being cut to be pushed from the left side of the machine. Handheld circular saws are made almost exclusively for right-handers, with the motor and grip on the right side. If held in the left hand, it is impossible for the operator to see what they are cutting. Tool manufacturer Porter-Cable produces a left-handed circular saw that can be purchased relatively inexpensively. Notice how the cutting surface, fence, etc. The word "left" itself derives from the Anglo-Saxon word *lyft*, "weak". Alternatively, *sinister* comes from the Latin word *sinus* meaning "pocket": The right hand has historically been associated with skill: Even the word "ambidexterity" reflects the bias. Its intended meaning is "skillful on both sides". However, since it keeps the Latin root *dexter*, which means "right", it ends up conveying the idea of being "right-handed on both sides". This bias is also apparent in the lesser-known antonym "ambisinistrous", which means "left-handed [i. Cyprus, requests an eagle-diviner from the Pharaoh of Egypt. Meanings gradually developed from use of these terms in the ancient languages. In many modern European languages, including English, the word for the direction "right" also means "correct" or "proper", and also stands for authority and justice. In Polish, the word *prawo* means "right" as well as "law", *prawy* means: In French, *droit* e cognate to English *direct* means both "right" and "straight", as well as "law" and the legal sense of "right", while *gauche* means "left" and is also a synonym of *maladroit*, literally "not right", meaning "clumsy". Spanish, Italian, Portuguese and German have similar constructs. The Spanish term *diestro* and the Italian term *destro* mean both "right-handed" and "skillful". The contemporary Italian word *sinistra* has both meanings of *sinister* and left the masculine adjective for *sinister* being *sinistro*, and *maldestro* means "clumsy". The Spanish *sinistra* has both, too, although the "left" meaning is less common and is usually expressed by *izquierda*, [48] a Basque word that made its way into Portuguese as well. In some Spanish-speaking countries, to do something *por izquierda* means to engage in corrupt conduct or employ illegitimate means, whereas *por derecha* or *a derechas* means to do it the right legitimate way. The word for "left" is *links*, and is closely related to both *link* underhand, questionable, and *linkisch* clumsy. The adjective *link* means "cunning, shifty" or "risky". A *linkerd* is a "crafty devil". To look at someone over the left shoulder *iemand over de linkerschouder aanzien* is to regard him or her as insignificant. In Welsh, the word *chwith* means "left", but can also mean "strange", "awkward", or "wrong". The Scots term for left-handedness is *corrie fistit*. The term can be used to convey clumsiness. In Finnish, the word *oikea* means both "right" okay, correct and "right" the opposite of left. In Hungarian, the word for right is *jobb*, which also means "better". The word for left is *bal*, which also means "bad". In Estonian, the word *pahem* stands for both "left" and "worse" and the word *parem* stands for both "right" and "better". The word for left is *sol*, which means "discolor", "die", "ill". In Chinese culture, the adjective "left" Chinese character: The left hand symbolized the power to shame society, and was used as a metaphor for misfortune, natural evil, or punishment from the gods. Expressions and colloquialisms[edit] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. August Learn how and when to remove this template message The left side is often associated with awkwardness and clumsiness. The Spanish expression "tener dos pies izquierdos", in English, the expression

"to have two left feet", refers to clumsiness in the domains of football or dancing. A "left-handed compliment" is considered one that is unflattering or dismissive in meaning. The Welsh phrase "tu chwith allan" left side out refers to an object being inside-out. There are many colloquial terms used to refer to a left-handed person, e. Some are just slang or jargon words, while other references may be offensive or demeaning, either in context or in origin. In some parts of the English-speaking world, "cack-handed" is slang for left-handed, and is also used to mean clumsy. The origin of this term is disputed, but some suggest it is derived from the Latin *caecare*, in reference to the habit of performing ablutions with the left hand, leaving the right hand "clean". A less common Australian slang word for a left-handed individual is the term *Molly-Dooker*, whose origins cannot be determined with certainty. The right-to-left nature of these languages prevents left-handers from running their hand on the ink as happens with left-to-right languages. Furthermore, it is considered more difficult to write legible Chinese characters with the left hand than it is to write Latin letters, though difficulty is subjective and depends on the person in question. It is also possible to do calligraphy in this posture with the left hand, but using right-handed pen nibs.

Chapter 4 : Why Are Some People Left-Handed? | Science | Smithsonian

In human biology, handedness is a better, faster, or more precise performance or individual preference for use of a hand, known as the dominant hand; the less capable or less preferred hand is called the non-dominant hand.

If you discover any interesting research relating to left-handedness that we have not covered, please let us know about it, and we will add a link to this page. Are left handed people more inhibited? This article appeared in the New Scientist – click here for original article Lefties face a daily battle with a world designed for right-handers. Now it seems that left-handed people face a similar struggle in the mental sphere: When about to do something, left-handers tend to dither, says Lynn Wright, a behavioural psychologist at the University of Abertay Dundee, UK, who led the study. Right-handers tend to jump in a bit. Women, too, tended to rack up higher scores on the tests of reticence. Wright and her colleagues uncovered these predilections by giving subjects a behavioural test that gauges both personal restraint and impulsiveness, qualities which seem to emanate from opposite hemispheres of our brains. The results could be due to wiring differences in the brains of left-handers and right-handers, she says. But in left-handers the right half of the brain is dominant, and it is this side that seems to control negative aspects of emotion. In right-handers the left brain dominates. However, he says handedness is not so much a predictor of personality as a great way to understand how emotions are handled in our brains. It could act as a blessing. An international group of scientists, led by a team from the Wellcome Trust Centre for Human Genetics at Researchers at Oxford University find gene for left-handedness An international group of scientists, led by a team from the Wellcome Trust Centre for Human Genetics at the University of Oxford, have discovered a gene that increases the chance of being left handed. The study is published on-line today by the journal Molecular Psychiatry. The research, which involved over 40 scientists from 20 research centres around the world, revealed a gene called LRRTM1; the first to be discovered which has an effect on handedness. Although little is known about LRRTM1, the Oxford team suspects that it modifies the development of asymmetry in the human brain. Asymmetry is an important feature of the human brain, with the left side usually controlling speech and language, and the right side controlling emotion. In left-handers this pattern is often reversed. The Left-Handers Club welcome these new findings, as a genetic link has long been considered the most likely cause of left-handedness yet a specific gene has until now remained elusive. This is the first potential genetic influence on human handedness to be identified, and the first putative genetic effect on variability in human brain asymmetry. LRRTM1 is a candidate gene for involvement in several common neurodevelopmental disorders, and may have played a role in human cognitive and behavioral evolution. The researchers also discovered that LRRTM1 might slightly increase the risk of developing schizophrenia. People with schizophrenia often have unusual patterns of brain asymmetry and handedness, so the researchers were not surprised when LRRTM1 also showed a possible effect on the risk of developing schizophrenia. Schizophrenia is a disorder of the brain which results in impaired perception and thought. It affects roughly one percent of adults worldwide. There has not, however, been any assumption that left-handedness and schizophrenia are linked. The study leader, Dr Clyde Francks, said: There are many factors which make individuals more likely to develop schizophrenia and the vast majority of left-handers will never develop a problem. Asymmetry is a fundamental feature of the human brain that is disrupted in many psychiatric conditions. The study, published online by the British Medical Journal, found left-handed women were more than twice as likely to develop premenopausal breast cancer as non-left handed women. The researchers, from the University Medical Center Utrecht, looked at the relationship between handedness and cases of breast cancer in more than 12, middle aged women born between and As part of their examination, t he researchers also took body measurements and assessed risk factors such as economic status, smoking habits, family history of breast cancer and reproductive background. Even when taking into account all risk factors, the study found that the overall association was hardly affected The team of Dutch researchers believe the common link may be exposure to high levels of sex hormones testosterone in the womb. Previous research has suggested that exposure to high levels of sex hormones before birth may induce left-handedness. This exposure can also

trigger changes in the breast tissue that make tumour growth more likely in later life. It accounts for one in three of all cancer cases in women, while the lifetime risk for women is one in nine. Emma Taggart, director of policy and campaigns at charity Breakthrough Breast Cancer, said: Eighty per cent of breast cancers occur in women over the age of fifty. The results of this study are based on an extremely small sample, as out of the 12, women initially included in the study, only women studied in the final sample were left-handed. The causal link between exposure to high levels of testosterone in the womb and subsequent left-handedness has not been conclusively proven, and indeed more recent research strongly suggests a genetic link to left-handedness being far more likely. However, if we accept the hypothesis the research was based on, these initial findings would certainly indicate a need for further and more detailed studies to establish a possible link. If these results are conclusive, left-handedness would be a valuable signal to encourage early screening.

The loneliness of the left handed surgeon Jan Source: They also have considerable difficulty handling some instruments. One in 10 left handed surgeons was also uncomfortable with the idea of being operated on by a left handed surgeon, says a report in Current Surgery Six per cent also reported concerns by patients about their laterality. The perils and pitfalls of being left handed emerge from a survey of surgeons in New York city, Manhattan, and Brooklyn; there were 68 responses from clinicians aged 27 to The report says there is a lack of laterality related mentoring for left handed surgical residents: Laterality-related guidance was reported to be minimal in medical school. Provision of a left-handed mentor and other environmental modifications could be used to minimise the recurring difficulties for left-handed learners. Laparoscopic surgery involves more static posture of the neck and trunk with more frequent awkward movements of the upper extremities than open surgery. Unfortunately, our survey did not have the provision to inquire into the reasons for this perception. Scientists have found we lefties often have the upper hand in combat. The endurance of left-handedness has puzzled researchers, considering the links to disadvantages including an increased risk of some diseases. But researchers at the University of Montpellier in France believe left-handers continue to thrive because they do well in combat. The team, who have today published the results of their study in Proceedings of the Royal Society B, saw that left-handers had the advantage in sports such as fencing, tennis and baseball. This led them to speculate the same advantage may persist in more aggressive contexts, such as war, so societies which are more violent would have a higher frequency of left-handers. The suggestion that left-handers have an advantage in combat is not new. It has long been thought that, in the days when arguments were resolved by hand-to-hand combat, being left-handed gave people the benefit of surprise against a right-handed opponent. This advantage, however, would only have persisted if left-handers remained in the minority. Otherwise, right handers would soon get accustomed to fighting with left-handed opponents. Charlotte Faurie and Michel Raymond compared homicide rates which includes murders and executions and the frequency of left-handedness, and found they appeared to be linked. This indicates that fighting can be an important selection pressure in the evolution of left-handedness. More generally, it points to the importance of violence in understanding the evolution of handedness in humans. The explanation must be much more complex than that. The suggestions that left-handers have good combative skills is not unreasonable, and has been proven many times by the high number of successful left-handers in combative sports such as fencing, tennis, and boxing. What is interesting in this study is the suggestion that the instance of left-handers increases in a more violent society. There is no suggestion that the left-handers are the perpetrators of the violence, only that they are good fighters. Perhaps this is the key to their success, since they will have a kudos and elevated position in society, as well as longevity, enabling them to breed more successfully and pass on the left-handed genetic trait to more offspring. Even if this were the case, however, the random nature by which left-handedness passes through generations as detailed by Prof. McManus would inhibit left-handers becoming the majority of the population, and thus losing their combative advantage. Whilst this is an interesting hypothesis, the size and nature of the study do, as pointed out by Dr Chris McManus, undermine its credibility and a more controlled study on a far wider range of societies would be most welcome, to provide more reliable results.

Chapter 5 : Handedness - Wikipedia

They wonder if left-hand dominance is a sign of a learning disability. Rest assured, in most cases left-handedness is a normal part of child development and can even be an advantage in some aspects. In other cases, however, left-handedness can coexist with learning problems.

Left-handers are the odd ones out. Sure, lefties make up about 10 percent of the population – but, frankly, it seems like society has forgotten about them. Just consider all of the right-handed gadgets, awkwardly designed desks, and cooking tools that fit comfortably only in your right hand. What causes someone to become a southpaw? And researchers have found different brain wirings in righties vs. But no matter what it is that drives someone to use their antipodal paw, science has also uncovered a particular set of personality traits that left-handed people tend to have. But researchers have found that in populations with certain mental disorders, that rate goes up. Previous studies have found that people with psychosis had a 20 percent likelihood of being left-handed, though a small study in the journal *SAGE* found the rate of psychotic lefties may be even higher. For those with mood disorders such as depression or bipolar disorder, the rate of left-handedness was close to average, at 11 percent. Researchers theorize brain laterality plays a role. Your Handedness May Determine Your Health Scientists have also found an increased risk for dyslexia, ADHD, and certain mood disorders in left-handed people, according to a study published in *Pediatrics*. Your noggin is divided into two halves: But about 30 percent of left-handed folks are either partial to the right hemisphere or have no dominant hemisphere at all. According to scientists, having one hemisphere dominate is much more efficient, which is why some left-handers are at increased risk for learning impairments and brain disorders. But lefties may be in luck when it comes to other health conditions: Results of a large survey published in the journal *Laterality* found that left-handers had lower rates of arthritis and ulcers. Lefties Hear Speeches Differently People who use their left hands when listening may more easily hear slowly-changing sounds than those who use their right hands, according to a study from Georgetown University Medical Center. The researchers who conducted the study, presented at *Neuroscience*, found that the left and right hemispheres of the brain specialize in different kinds of sounds. The left hemisphere, which controls the right hand, likes rapidly-changing sounds like consonants, while the right hemisphere, which controls the left hand, likes slowly-changing sounds like syllables or intonation. The research could ultimately result in better treatment for stroke and language disorders. An earlier version of this post stated that people who use their left hands may more easily hear rapidly-changing sounds than those who use their right hands. In fact, left-handers hear slow-changing sounds better. University of Kansas researchers recently determined the handedness of ancient humans by studying – oddly enough – their teeth. The study, which was published in the journal *Laterality*, found that when our great-great-great-great- you get the point -grandfathers processed animal hides, they would hold one side of the carcass in one hand and the other in their mouth. By locating the wear and tear on those prehistoric chompers, scientists were able to determine whether our prehistoric ancestors were using their left hand or right hand more dominantly "All you need to have is a single tooth, and you can tell if our assumptions are right – if the individual is right- or left-handed," study researcher David Frayer, Ph. According to research published in the *American Journal of Psychology*, there is some evidence that left-handed people have the upper hand in at least one creative facet: But that may also add up to lower paychecks: A surprisingly high percentage of recent U. The lengthy list of left-handed leaders includes four of the last seven commanders in chief – President Obama, Bill Clinton, George H. Should right-handed presidential wannabes fake it? But one recent Dutch study suggests that left-handed politicians actually have an advantage in televised debates. Actually, left-handers may have the advantage in sports that involve two opponents facing each other, such as in tennis, boxing, and baseball, according to an MSNBC review of the book *The Puzzle of Left-Handedness*, by Rik Smits. The author chalks it up to the fact that left-handed athletes get a lot more opportunity to practice against right-handed opponents than vice versa since there are so many more righties out there. Lefties Are Scaredy-Cats Boo! For the study, participants watched an eight-minute clip from the frightening film *Silence of the Lambs*. When asked to recall events from the

segment, lefties were far more likely to show signs of post-traumatic stress disorder than righties, including giving fragmented descriptions and making more mistakes. According to a small study published in the *Journal of Nervous and Mental Disease*, lefties are more prone to having negative emotions. In addition, they seem to have a more difficult time processing their feelings. Again, this seems to be related to the brain-hand connection. Compared to righties, left-handed participants in the study showed an imbalance in activity between the left and right hemispheres when trying to process their moodiness. For years, myth has held that left-handers are more likely to become alcoholics. Research into the topic was murky, however, and relied on small samples. But a survey of more than 25,000 people from 12 countries has cleared things up a bit. While lefties are not more prone to alcoholism, they do drink more often. Researcher Kevin Denny, who examined the data for a paper published in the *British Journal of Health Psychology*, says the main takeaway should be debunking that whole left-handedness-alcoholism link. August 13 is International Left-Handers Day. Lefties across the globe celebrate the annual event, which was launched in by the UK-based Left-Handers Club to increase awareness about the left-handed lifestyle. And that rule also extends to any right-handers who happen to enter the leftie zone. In fact, some researchers believe that when it comes to survival of the fittest, lefties come out on top. In one-on-one combat, using the left-hand is like throwing a curveball. To dig deeper, Laurie and her colleague Michel Raymond studied nine different primitive societies. Looks like the left hand has the upper hand after all.

Chapter 6 : Left-Handers and Health Risks: 12 Little-Known Facts - Everyday Health

The existence of associations between left-handedness and various health problems have often led to a distinction being made between pathological left-handedness, which would arise from developmental stresses and familial left-handedness, which would be due to genotype (Harris & Carlson). This hypothesis considered that some people are.

Types[edit] Right-handedness is the most common type. Right-handed people are more skillful with their right hands when performing tasks. Left-handed people are more skillful with their left hands when performing tasks. Those who learn it still tend to favor their originally dominant hand. Occurrences during prenatal development may be important; researchers studied fetuses in utero and determined that handedness in the womb was a very accurate predictor of handedness after birth. Since speaking and handiwork require fine motor skills, its presumption is that it would be more efficient to have one brain hemisphere do both, rather than having it divided up. Since in most people, the left side of the brain controls speaking, right-handedness predominates. This theory also predicts that left-handed people have a reversed brain division of labor. Left-handed individuals have a heterogeneous brain organization in which their brain hemispheres are either organized in the same way as right-handers but with the hemispheres reversed or even such that both hemispheres are used for verbal processing. When the average is taken across all types of left-handedness, it shows that left-handers are less lateralized. However, the growing weight of evidence from linkage and genome-wide association studies suggests that genetic variance in handedness cannot be explained by a single genetic locus. Nodal signaling and ciliogenesis also play a role in the development of brain asymmetry handedness is an outward reflection of brain asymmetry for motor function. Diethylstilbestrol animal studies "suggest that estrogen affects the developing brain, including the part that governs sexual behavior and right and left dominance". About two-thirds of fetuses present with their left occiput back of the head at birth. This partly explains why prematurity results in a decrease in right-handedness. Previc argues that asymmetric prenatal positioning creates asymmetric stimulation of the vestibular system, which is involved in the development of handedness. In fact, every major disorder in which patients show reduced right-handedness is associated with either vestibular abnormalities or delay, [31] and asymmetry of the vestibular cortex is strongly correlated with the direction of handedness. Research on this topic suggests there may exist a weak association between ultrasound screening sonography used to check on the healthy development of the fetus and mother during pregnancy and left-handedness. This is especially shown when observing hand dominance in one versus two-handed grasping tasks. Between 36 and 48 months, variability between handedness in one handed grasping begins to decline significantly. This difference can be seen earlier in bi-manual manipulation tasks. Children aged 18 to 36 months showed more hand preference when performing bi-manipulation tasks than simple grasping. The increase in required single hand grasping activities such as writing or coloring can force children to develop a hand preference. Handedness and mathematical ability and List of musicians who play left-handed In his book *Right-Hand, Left-Hand*, Chris McManus of University College London argues that the proportion of left-handers is increasing and left-handed people as a group have historically produced an above-average quota of high achievers. Also, a slightly larger number of left-handers than right-handers are especially gifted in music and math. A study of musicians in professional orchestras found a significantly greater proportion of talented left-handers, even among those who played instruments that seem designed for right-handers, such as violins. Similarly, studies of adolescents who took tests to assess mathematical giftedness found many more left-handers in the population. Goodman also found that left-handers were overrepresented at the low end of the cognitive spectrum, with the mentally disabled being twice as likely to be left-handed compared to the general population, as well as generally lower cognitive and non-cognitive abilities amongst left-handed children. In the article they assessed 38 infants and followed them through to 12 months and then again once they became toddlers from 18 to 24 months. What they discovered was that when a child developed a consistent use of its right or left hand during infancy such as using the right hand to put the pacifier back in, or grasping random objects with the left hand , it was more likely to have superior language skills as a toddler. Children who

became lateral later than infancy i. Health[edit] Lower-birth-weight and complications at birth are positively correlated with left-handness. However, left-handers enjoy an advantage in fighting and sports increasing their likelihood of reproduction. Goodman attributes this disparity to higher rates of emotional and behavioral problems in left-handed people. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. January See also: Southpaw stance Interactive sports such as table tennis, badminton and cricket have an overrepresentation of left-handedness, while non-interactive sports such as swimming show no overrepresentation. Smaller physical distance between participants increases the overrepresentation. In fencing , about half the participants are left-handed. Historical batting averages show that left-handed batters have a slight advantage over right-handed batters when facing right-handed pitchers. This gives left-handers a slight advantage in beating throws to first base on infield ground balls. Historically, there have been few left-handed catchers because of the perceived disadvantage a left-handed catcher would have in making the throw to third base, especially with a right-handed hitter at the plate. In doing so, he can lose the opportunity to brace himself for an impending collision. A left-handed catcher would be able to catch the pitch moving into the strike zone and create a better target for the umpire. In four wall handball , typical strategy is to play along the left wall forcing the opponent to use their left hand to counter the attack and playing into the strength of a left-handed competitor. In water polo the centre forward position has an advantage in turning to shoot on net when rotating the reverse direction as expected by the centre of the opposition defence and gain an improved position to score. Ice hockey typically uses a strategy in which a defence pairing includes one left-handed and one right-handed defender. A disproportionately large number of ice hockey players of all positions, 62 percent, shoot left, though this does not necessarily indicate left-handedness. While uncommon, there have been several notable left-handed quarterbacks. Gender[edit] According to a meta-analysis of studies, totaling 1., participants, the best estimate for the male to female odds ratio was 1. Handedness and sexual orientation A number of studies examining the relationship between handedness and sexual orientation have reported that a disproportionate minority of homosexual people exhibit left-handedness, [59] though findings are mixed. A study analyzing the sexual fantasies of males found "elevated paraphilic interests were correlated with elevated non-right handedness". Bias against left-handed people Many tools and procedures are designed to facilitate use by right-handed people, often without realizing the difficulties incurred by the left-handed. Santrock has written, "For centuries, left-handers have suffered unfair discrimination in a world designed for right-handers. This would have made left-handers more visible and at the same time appear less capable and more clumsy. During this era, children were taught to write with a dip pen. While a right-hander could smoothly drag the pen across paper from left to right, a dip pen could not easily be pushed across by the left hand without digging into the paper and making blots and stains. In many European languages, including English, the word for the direction "right" also means "correct" or "proper". Throughout history, being left-handed was considered negative. There are many negative connotations associated with the phrase "left-handed": A "left-handed compliment" is considered one that is unflattering or dismissive in meaning. In French , gauche means both "left" and "awkward" or "clumsy", while droit e cognate to English direct and related to "adroit" means both "right" and "straight", as well as "law" and the legal sense of "right". The name "Dexter" derives from the Latin for "right", as does the word "dexterity" meaning manual skill. As these are all very old words, they would tend to support theories indicating that the predominance of right-handedness is an extremely old phenomenon. Black magic is sometimes referred to as the " left-hand path ". Until very recently in Taiwan and still in Mainland China , Japan and both North and South Korea , left-handed people were strongly encouraged to switch to being right-handed, or at least switch to writing with the right hand. Due to the importance of stroke order , developed for the comfortable use of right-handed people, it is considered more difficult to write legible Chinese characters with the left hand than it is to write Latin letters, though difficulty is subjective and depends on the writer. Conversely, right-to-left alphabets, such as the Arabic and Hebrew, are generally considered easier to write with the left hand in general. Again according to the club, "in the U. Left-handedness was particularly apparent in the red kangaroo *Macropus rufus* and the eastern gray kangaroo *Macropus giganteus*. There was less evidence for handedness in arboreal species.

Chapter 7 : Bias against left-handed people - Wikipedia

23 Soul-Crushing Problems Only Left-Handed People Understand. Lefties unite.

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Approximately 10 percent of the human population is left-handed and probably has been since the beginning of our species. For most of human history, including much of the planet today, left-handedness has been stigmatized. Despite the fact that males are more likely to be left-handed, left-handedness has been gendered female in most cultures. These prejudices are reflected and reinforced in practices aimed at restricting the use of the left hand to the most disdained, but necessary, human tasks such as cleaning oneself after elimination of waste. Yet for all the attention left-handedness has received, almost every basic question about its origin, extent, function, and consequences remains unanswered. Although numerous observers have attempted to uncover the cause of left-handedness, so far none have been able to solve the mystery. This divide is most apparent between those who have approached the problem of left-handedness from the perspective of neuro psychology and those who have examined it in the context of the history and culture. Solving the mysteries of handedness, however, may require bringing humanities into conversation with the sciences and medicine. Because individual researchers generally do not possess the training or knowledge to cross disciplinary boundaries, collaborations are particularly useful. Although in science and medicine such collaborations are normal, they are less often encouraged in the humanities, and, in any case, rarely will humanists be included in scientific investigations. Indeed, external funding protocols often exclude humanists. I begin with the findings of science and medicine and then place them in historical and cultural context. In , the influential Italian criminologist Cesare Lombroso claimed that left-handedness was connected with feeble-mindedness, mental illness, and criminality. Following Geschwind, a number of studies claimed that left-handedness was either the cause or result of disorders such as schizophrenia, autism, attention deficit disorders, dyslexia, stuttering, and Tourette syndrome. These associations continue to be debated in current studies. Like so many other human behaviors, the explanations for handedness have been divided between notions that it is learned versus inherited. By the late twentieth century, a consensus had emerged that handedness was best understood from a genetic perspective. Investigations ever since have focused on which genetic model best explains the incidence of left-handedness. Given the combination of stigmatization and the putative relationship between left-handedness and learning disorders, why are there any left-handers at all? This question has led a number of researchers to assume that there must be a selective advantage to left-handedness. They point to persistent reports that left-handers display greater creativity and intellectual prowess than right-handers. So is left-handedness a deficit or an enhancer of creativity—or both? Since the mid-nineteenth century, most researchers have assumed that left-handers are right-brained in terms of both motor and language function. This is not so. Imaging studies reveal that only 18 percent of left-handers are localized to the right hemisphere for language and speech, while 12 percent are bilateral, having language in both hemispheres. Thus, for 70 percent, language and speech are located in the left hemisphere. Complicating matters, 5 percent of right-handers also have right-hemisphere language dominance, with 95 percent being left-hemisphere dominant. This anomaly—that the majority of left-handers are left-brained for language and only 18 percent of left-handers are right-brained localized—must be taken into account in reexamining the claims that left-handers are at greater risk for learning disabilities than right-handers. Although the classification and etiology of learning disorders themselves remain contested, there is general agreement that autisms, attention deficit disorders, schizophrenias, and dyslexias are neurological conditions that are intimately tied to language. While it is true that other disabilities, especially Tourette syndrome and stuttering, involve motor functions as well as speech and language, they too are understood and treated as neuropsychiatric conditions that at bottom are the result of cerebral malfunctions. The claims that left-handers also have an increased probability of being talented and creative are related to brain function. Although the associations between handedness and learning disorders and talent lately have been viewed in a neurobiological frame, placing them in historical and cultural context provides a deeper understanding of the relationship between learning disorders and handedness. In the

French anthropologist Robert Hertz insisted that whatever its biological substrate, the predominance of right-handedness ultimately was a cultural artifact driven by a primitive human urge to divide the world into binary oppositions in which the right was viewed as sacred and the left as profane. Influenced by the popular early twentieth-century British ambidextrous culture society, Hertz argued that ending discrimination against left-handedness would unleash the power of both hands and, thus, both cerebral hemispheres. The results, he insisted, would allow repressed talents and creativity to flourish. Historical and cultural discrimination against left-handers has played an important role in the identification and perhaps even in the etiology of some learning disorders. For instance, many twentieth-century British and American educators, psychologists, and psychiatrists advocated forcing left-handed children to write with their right hands. In contrast, those who saw left-handedness as inherited but natural not only disapproved of forced switching, but also often warned of its putative negative consequences, especially stuttering. These claims were given credence in the 1960s and 1970s by University of Iowa researchers and their students who published detailed case studies of patients whose stuttering was cured by switching them back to their original dominant hand. Despite robust statistical and clinical evidence, the connection between forced hand switching and stuttering has largely been forgotten. Similar to the Iowa researchers, recent imaging studies have suggested that stuttering is tied to disturbed signal transmission between the hemispheres. Finding answers to the most interesting questions about the connections between disabilities and handedness will require a biologically informed historical and cultural approach. Further Reading Geschwind, N. Implications for the Evolution of Handedness in Hominins. *The Rise and Fall of an Intriguing Theory. Hemispheric Asymmetry, Interaction, and Creativity. Right Hand, Left Hand:*

Chapter 8 : The Puzzle of Left-handedness by Rik Smits

Causes of left-handedness Just why one in 10 people favour their left hand is a mystery. A straightforward genetic link hasn't been proven, and it is possible for two right-handed parents to have a left-handed child.

Messenger The belief that there is a link between talent and left-handedness has a long history. Leonardo da Vinci was left-handed. But is it really true that left-handers are more likely to be geniuses? While a few of these people are equally comfortable using either hand, the vast majority are left-handed. Hand preference is a manifestation of brain function and is therefore related to cognition. Left-handers exhibit, on average, a more developed right brain hemisphere, which is specialised for processes such as spatial reasoning and the ability to rotate mental representations of objects. This suggests that some left-handers have an enhanced connectivity between the two hemispheres and hence superior information processing. Why that is, however, is unclear. One theory argues that living in a world designed for right-handers could be forcing left-handers to use both hands – thereby increasing connectivity. This opens up the possibility that we could all achieve enhanced connectivity by training ourselves to use both hands. These peculiarities may be the reason why left-handers seem to have an edge in several professions and arts. For example, they are over-represented among musicians, creative artists, architects and chess players. Needless to say, efficient information processing and superior spatial skills are essential in all these activities. Handedness and mathematics But what about the link between left-handedness and mathematical skill? Unsurprisingly, the role played by handedness in mathematics has long been a matter of interest. More than 30 years ago, a seminal study claimed left-handedness to be a predictor of mathematical precociousness. The study found that the rate of left-handedness among students talented in mathematics was much greater than among the general population. However, the idea that left-handedness is a predictor of superior intellectual ability has been challenged recently. Several scholars have claimed that left-handedness is not related to any advantage in cognitive skills, and may even exert detrimental effects on general cognitive function and, hence, academic achievement. For example, one study discovered that left-handed children slightly under-performed in a series of developmental measures. Also, a recent review reported that left-handers appear to be slightly over-represented among people with intellectual disabilities. Another large study found that left-handers performed more poorly in mathematical ability in a sample of children aged five to Carefully designed experiment Interestingly, these past studies, just like many others, differed from each other in how handedness was measured and how participants were categorised – some of them simply asked people what their hand preference was in general. And, most importantly, they had different approaches to measuring mathematical ability – ranging from simple arithmetic to complex problem solving. These discrepancies in the experimental design may be the cause of the mixed observed results. To get more reliable results, we decided to carry out a whole series of experiments including more than 2, students in primary school and high school. These experiments varied in terms of type and difficulty of mathematical tasks. To assure comparability, we used the same questionnaire – the Edinburgh Inventory – to assess handedness in all the experiments. This questionnaire asks people which hand they prefer for writing, drawing, throwing, brushing and other things. This specific feature allowed us to build more reliable and powerful statistical models. Could training to use both hands boost mathematical ability? This pattern of results was particularly clear in male adolescents. By contrast, when the task was not so demanding, such as when doing simple arithmetic, there was no difference between left- and right-handers. We also discovered that extreme right-handers – individuals who said they prefer to use their right hand for all items on the handedness test – under-performed in all the experiments compared to moderate right-handers and left-handers. Left-handers seem to have, on average, an edge when solving demanding mathematical tasks – at least during primary school and high school. Also, being strongly right-handed may represent a disadvantage for mathematics. Taken together, these findings show that handedness, as an indicator of connectivity between brain hemispheres, does influence cognition to some extent. That said, handedness is just an indirect expression of brain function. For example, only a third of the people with a more developed right hemisphere are left-handed. So plenty of right-handed people will have a similar brain structure as

left-handers.

Chapter 9 : BBC - Future - The mystery of why left-handers are so much rarer

The Evolutionary Mystery of Left-Handedness and What It Reveals About How the Brain Works From Medieval sword-fighters to Broca's brains, or why the hand may hold the key to the link between creativity and mental illness.