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## BIOETHICS OF HANDEDNESS: FROM EVOLUTION TO RESOLUTION?

### BIOETIKA LATERALIZACIJE: OD EVOLUCIJE DO RJEŠENJA?

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#### ABSTRACT

*Departing from historical facts and speculations on the evolution of human right-hand dominance (including theories on the development of right-handedness and cultural and linguistic sequellae of such a phenomenon), the present work stresses the delicate problem of the traditional favouring of one particular subpopulation, escalating into a real eugenic practice present sporadically even in modern times.*

*The major hypothesis of the paper would be that the problem of forced handedness had been neglected by (bio)ethical theory, practice, and literature, and that it was absolved only recently by the results of modern neuroscientific research on handedness. According to that hypothesis, ending the discrimination took too much time precisely because the initial lack of the problem insight, which certainly should invoke cautiousness for any potentially similar phenomena in the future.*

**Key words:** left-right; handedness; bioethics; eugenics

#### INTRODUCTION

One of the major problems in studying consciousness is the so-called "other minds" problem (Farber and Churchland, 1995), that is, the difficulty or impossibility to identify with another mindset. This might be the reason why we are so slowly and inefficient in reacting to acts of notorious

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discrimination in our surroundings. The story of handedness is a paradigm of such neglect of a problem.

### A LEFT-RIGHT SCIENCE PRIMER

Although we have known for a long time that the earliest cave paintings reveal a clear domination of right-handedness (Coren, 1992), we still have no acceptable answer to the questions why asymmetry and why right-handedness is so dominant. Functional lateralization has also been found in some crabs, wild gorilla, captive chimpanzee, and New Caledonian crow populations (Hunt, Corballis, and Gray, 2001), but the hypertrophy in crabs or the dominant arm use in chimpanzees is randomly right or left (Napier, 1993). Theories of human right-side predominance have gone so far as to propose that the reason may be in early men handling sword with the right hand and passively covering the heart with a shield using the left hand, or in early women, holding babies in the left hand, to soothe them with the heart beat, and using the right hand to work in the field at the same time (Fabbro, 1995). I think we can agree that these theories are far too speculative. On the other hand, modern findings of an anatomical asymmetry of the *planum temporale* and some other left-side brain structures, as well as of many functional asymmetries (Bryden, 1982; Corballis, 1983; Beaton, 1985; Kosslyn et al., 1999) do not offer a solution, but only remind of the old question of the chicken and the egg. It seems certain however that handedness determines much more in our everyday functioning than just language and hand motor function.<sup>1</sup>

The real era of lateralization studies began in the 1860s, when Paul Broca, a French surgeon, discovered that a high majority of the patients he had followed, developed speech production difficulties after a left-hemisphere defect. Today, we estimate that between 70% and 95% of humans have a left-hemisphere language specialisation.<sup>2</sup> Most of them also have a left-hemisphere dominance for hand motor function, but there are rare left-handed persons whose speech centre is left.

We also know that left-handedness is either genetic<sup>3</sup> or pathological. Autosomal linkage between handedness and palm pattern D in the fourth interdigital area was one of the first indications in favour of a genetic basis

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<sup>1</sup> <http://www.guardian.co.uk/science/2005/feb/07/neuroscience.highereducation>

<sup>2</sup> <http://www.indiana.edu/~primate/brain.html>

<sup>3</sup> The "G-G theory", hypothesizeing that testosterone might delay the maturation of some parts of the left cerebral hemisphere, can also be considered a genetic - hormonal causation (Geschwind and Galaburda, 1987).

for handedness (Rife and Kloefer, 1941). In 2007, LRRTM1 gene was reported, which appears to be responsible for handedness (Francks et. al., 2007). The other cause of left-handedness seems to be a shift after pathological changes in the right hemisphere (Galaburda and Habib, 1989)<sup>4</sup>. Pathological left-handedness may be considered a marker of decreased survival fitness (Coren and Halpern, 1991), and is often related to other pathologies (epilepsy, paedophilia?), etc.) (Fabbro, 1995; Bogaert, 2001; Cantor, Blanchard, Christensen & Dickey, 2004).

Those less favoured conditions obviously have not impeded many left-handers from excellent achievements: at least eight American presidents (including some from the most recent history – Reagan, Bush Sr., Clinton and Obama) were left-handers, as well as Benjamin Franklin, Alexander the Great, Charlemagne, Julius Caesar, Fidel Castro, Henry Ford, David Rockefeller, Helen Keller, Albert Schweitzer, criminals John Dillinger and Jack the Ripper, writers Johann Wolfgang Goethe, Lewis Carroll, Mark Twain, H.G. Wells, musicians Ludwig van Beethoven, Niccolò Paganini, Jimmy Hendrix, Paul McCartney, artists Albrecht Dürer, Michelangelo, Raphael, Leonardo da Vinci, Pablo Picasso, philosopher Ludwig Wittgenstein, actors Charlie Chaplin, Robert DeNiro, Greta Garbo, Nicole Kidman, Marilyn Monroe, tennis players Goran Ivanišević, John McEnroe, etc. (Fabbro, 1995)<sup>5</sup>.

The right predominance, however, has led the humankind to accept it as a rule and, typically, to ban aberrations from that rule. Linguistics presents an abundant spectrum of discriminatory uses: *right* in English, *Recht* in German, and of corresponding terms in many other languages which use *right* in the sense of orientation and *right* in the sense of straightness, moral integrity, intellectual correctness, common sense, happiness, beauty, and judicial norm (Fabbro, 1995). On the other hand, Greek *laíos* and Latin *laevus*, the root of modern Slavic words *lijevi*, *levi*, *ljavi*, etc., or German *links* and English *left*, originally meant “deviated, bent toward the earth” (Skok, 1972, p. 376-377), as well as English *sinister*, meaning wrong, weird, irregular.<sup>6</sup> These terms, nevertheless, are only the reflections of everyday prac-

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<sup>4</sup> On a hypothesis explaining pathological lefthandedness, see: Markow, T.A., 1992. Human handedness and the concept of developmental stability. *Genetica* 87, no. 2: 87-9

<sup>5</sup> <http://www.indiana.edu/~primate/left.html>

<sup>6</sup> Several excellent studies exist treating cultural-anthropological aspects of the left-right phenomenon. Except for the already quoted work by Fabbro 1995, see also the paper by Peters, M. 1997. Left and right in classical Greece and Italy. *Laterality* 2, no. 1: 3-6.

tice: utensils, musical instruments, sports equipment, etc. have mostly been designed for the right-handed. Moreover, a general attitude that has prevailed in our society and in many undereducated families in particular, has quite actively fought against “the aberration” of left-handedness; in extreme situations, left-handed children were accused of being possessed by the devil, or of being Communist; and the left hand of a left-handed child used to be tied behind the back.<sup>7</sup> According to our knowledge, the extreme eugenic practice in the Third Reich did not include elimination of left-handers: one is tempted to speculate that the reason was that some of the leading Nazi ideologists were left-handers.

There are, of course, nobler tendencies to oppose the discrimination of the left-handers in the modern world. However, despite of a series of monographs and studies (Clark, 1957; 1959), how many primary-school teachers actually know how to teach left-handed children to write?

## CONCLUSION

One has to be honest and admit that ethics and bioethics had failed to stress the problem of left-hander discrimination, and therefore, the resolution of the problem had to wait until neurology found evidence that forcing a (pathological) left-hander to switch the hand might provoke serious disturbances in brain functioning and that left-handers can achieve success as well as right-handers, if not outdo them (Fabbro, 1995)<sup>8</sup>.

Next time we witness discrimination, let us not wait for neurology to act.

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<sup>7</sup> <http://handedness.org/action/leftwrite.html>

<sup>8</sup> <http://www.indiana.edu/~primate/left.html>

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#### SAŽETAK

*Krenuši od povijesnih činjenica i nagađanja o nastanku dominacije dešnjaka (uključujući teorije o razvoju desne lateralizacije i njezinih kulturnih odnosno jezičnih posljedica), u ovome se članku naglašava osjetljivi problem davanja prednosti određenoj populacijskoj skupini koja je dovela do eugeničke prakse čiji se ostaci primjećuju i u sadašnjici.*

*Glavna je hipoteza ovoga članka da je forsiranje desne lateralizacije bilo zapostavljeno od bioetičke teorije, prakse i literature te da je tek nedavno razriješeno zahvaljujući otkrićima moderne neuroznanosti. Prema ovoj hipotezi, trebalo je i previše vremena da se okonča diskriminacija, i to upravo zato što je od samoga početka nedostajao uvid u problem, a to bi svakako trebalo pozvati na oprez pri razmatranju eventualnih sličnih pojava u budućnosti.*

**Ključne riječi:** lijeva i desna lateralizacija, bioetika, eugenika