

Laterality Newsletter 2014 issue 2

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1 Introductory

- Do please e-mail any stories you would like the others to see.
- As always I am particularly indebted for material to MARIANNE SCHULTZ of COPENHAGEN.

I am more than happy with Linux so still using the LyX front-end to L^AT_EX (I continue more interested in mathematics than psychology, and even laterality!). The prevalence estimate for left-handedness seems to be going up, from one in ten to one in nine. At this rate it will soon be the genetically very interesting one in eight.

2 The Puzzle of Left-handedness

This is the title of a recent book[1] by RIK SMITS, a 2011 translation from Dutch of a revised and expanded version of a book originally published in 1993.

It ranges far and wide over literature, history and folklore as well as science, but the 24-page chapter *Thinking about Brains* is full of interest, as are those on *The Polymorphism of One-sidedness* and *Genetic Left-handedness*. A view is taken about *The Myth of High Left-handed Mortality*. There is a brief review of NOR-

MAN GESCHWIND'S hormonal theory, and plenty on the role of dichotomies in human outlooks. Altogether there are 38 chapters in a book of 285 pages, so little in laterality fails to get any mention at all. Its range is both a strength and a weakness, because coverage of some important topics is rather thin. The original 1993 title was *The Left-handed Picador* referring to an etching by PABLO PICASSO. PICASSO engraved a right-handed picador but he turned out left-handed in the mirror-reversed etching and the artist made a virtue of necessity by entitling the work *El Zurdo* - the left-handed man.

3 Ultrasound scanning

LYNNE MCTAGGART in *What Doctors Don't Tell You*[2] refers (p. 54) to a Norwegian study of 2,000 babies, performed by the National Centre for Foetal Medicine in Trondheim. Those subjected to routine ultrasound scanning were 30% more likely to be left-handed than those who weren't scanned. The effect was for boys. In a later analysis of 177,000 Swedish men, those whose mothers had scans were 32% more likely to be left-handed. She cites other evidence about scanning, focussing upon potentially harmful effects.

A meta-analytic review of subsequent studies[3] confirmed the finding, though the excess was only 15% and it was in the non-right-handed rather than the left-handed. The data covered 8865 children aged 8-14 years but the difference between boys and girls had evaporated, unless exposure before 19-22 weeks gestation was isolated for analysis.

4 More on finger length

Having in the last issue lauded the statistical package R I have been setting it to work on my finger length data, expanded by the addition of two participants to make five females and three males. The means of the index:ring ratio for the two sexes with standard deviations in brackets are given in this Table.

F	M	
1.034 (0.018)	0.998 (0.010)	Right hand only
1.026 (0.021)	0.999 (0.011)	Both hands

The right hand is presented in a separate row because JOHN MANNING in *The Finger Book*[4] (p. 5) says that is the hand to use for this sort of research. His view is borne out by my data. The sex difference in the ratio has for the right hand $p=0.018$ on a one-tailed MANN-WHITNEY test, for the left hand $p=0.273$ (though this is reduced by ties) and for both hands $p=.036$.

Both for right hand and for both hands the effect size on COHEN d is large (1.7) but so is it because of the small sample size for the left hand. The reason for the sex difference is that the ring finger measures pre-natal testosterone

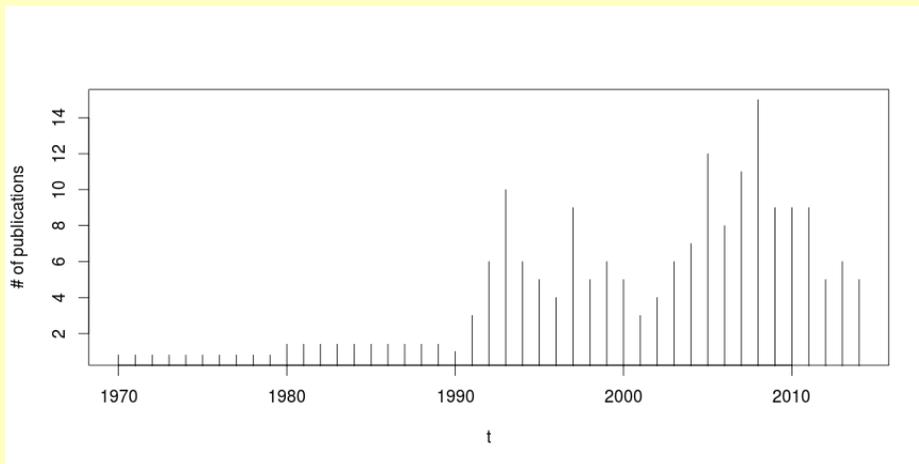
To my surprise there was, in spite of the smaller female body size, no sex difference in the average length of the fingers. The four fingers measured intercorrelated for length at least 0.75 on nonparametric tests.

5 A handedness bibliography

In the last issue I subjected the bibliography of my 1980 DPhil dissertation to analysis, now I focus on a collection of 191 documents on handedness specifically, accumulated since then in Mendeley. In 1990 ROBERT EFRON published a book entitled *The Decline and Fall of Hemispheric Specialization*[5] but my analysis shows that when it comes to handedness it has been very far from a story of decline and fall. Between 1970 and

2014 there is a clear linear trend of increasing number of publications, particularly apparent when smoothing the plot by taking a running average.

The peak is actually in 2008, with some fall-off since then, but this is because useful work takes some time to come to my attention. Analysis with R shows (using the linear regression model command `lm()`) a t of 8.21 $p < .001$ for the linear trend, whereas the quadratic trend due to late fall-off is t of 0.21 not significant. The multiple R^2 of number of publications on year of publication is 0.616.



6 Journal Corner

A letter to *Bipolar Disorders* concerns elevated prevalence of non-right-handedness in this condition: “Consistent with previous findings in adults, we found approximately double the rate of non-right handedness in individuals with bipolar disorder (15.4%), compared to rates reported in healthy comparison individuals, and demonstrated a higher non-right-handedness rate (20%) in adolescents with bipo-

lar disorder.” Van Dyck, L. I., Pittman, B. P., & Blumberg, H. P. (2012). Non-right-handedness in adolescents and adults with bipolar disorder. *Bipolar Disorders*, 14(5), 571–2. doi:10.1111/j.1399-5618.2012.01037.x

My comments are that the normal prevalence reported is rather low (and based on one old study with rather low N) and also that the bipolar study with an N of only 155 is very vulnerable to misclassifications of handedness.

Andrew Ng, C. R., & Leong, W. Y. (2014). An EEG-based approach for left-handedness detection. *Biomedical Signal Processing and Control*, 10, 92–101. doi:10.1016/j.bspc.2014.01.005

This paper illustrates a left-handedness sensing and detection system to classify the handedness of a person. The recruited test subjects were required to rest or exposed to a graphical stimulus, the electroencephalogram (EEG) signals at the homologous occipital regions were then captured. Using a simple game as a testing module, handedness can be determined from the EEG data captured and recognized. In this work, the EEG signals were obtained from three locations namely A1, O1 and O2. The signals extracted from these locations were then classified into four different frequency bands: Alpha, Beta, Delta and Theta. The analyses and classification results were used to determine the Mean EEG Coherence of these sig-

nals. From our observation, the left handed person has higher Mean EEG Coherence which means that there are more connections between the left and right hemisphere of cerebrums through the corpus callosum. Based on the research, we realized that non-right handers have an association with both increased corpus callosum size and increased functional interaction between cerebral hemispheres. We also realized that the increased size of corpus callosum, which somehow passes information between the two sides of the brain, allows greater inter-hemispheric communication. [Abstract altered for English].

My comment is that this is quite reminiscent of some visual half-field work by NICHOLAS CHERBUIN finding that non-right-handers could match across the vertical meridian faster. Also it would be very useful if natural left-handedness really could be determined from the EEG.

References

- [1] Smits, Rik (2011). *The Puzzle of Left-Handedness*. London: Reaktion Books.
- [2] McTaggart, Lynne (1999). *What Doctors don't Tell you: The Truth about the Dangers of Modern Medicine*. New York: Avon.
- [3] Salvesen, K. Å. (2011). Ultrasound in pregnancy and non-right handedness: meta-analysis of randomized trials. *Ultrasound in Obstetrics and Gynecology* 38 (3), 267-271.
- [4] Manning, John (2008). *The Finger Book: Sex, Behaviour and Disease Revealed in the Fingers*. London: Faber and Faber.
- [5] Efron, Robert (1990). *The Decline and Fall of Hemispheric Specialization*. London: Routledge.