Dept. of Anthropology, University of Delhi (India)

R-L Symmetry of Cummins' Summational Main Line Index (1936) and Peculiarites of Asymmetric R-L Combinations[1]

A. Sharma

Problem

The aim of this study is to investigate whether trends of R/L Symmetry of Main Line Index (MLI) in the Burman males and females are statistically significant, and the peculiarities of R/L combinations of MLI, if any.

Material

The material consisted of bilateral inked palmar prints of 400 Burman males (BM) and 71 females (BF) collected *without any bias* (Sharma 1962 : 5-12) from Rangoon while the author was there on a teaching assignement (1953-55).

Methods

Cummins' recommendations (1936, vide Cummins 1942: 2; Cummins and Midlo 1943 & 1961: 114-115) have been followed in calculating the values of summational MLI, though in the case of A_6 and A_7 numerical values 7 and 8 respectively have been substituted (Sharma 1959-61: 18-21; Sharma 1961: E 111; Sharma 1962: 38-42; Sharma 1963: 1532-33). Two-fold groupings of MLI have been used in investigating the peculiarities of asymmetric R/L combinations: 6 or $>$ 6 and 5 or $<$ 5.

Terminology

As explained in an earlier paper (Sharma 1960-63: 21-31), the expression "R/L-Symmetry" is preferred to that of "concordance"

R/L-Symmetry of MLI

Tab. 1 shows the R/L Combinations of MLI in the same person. Burman females (20/71 or 28.17% $\pm$5.28) show a higher incidence of Symmetry, as compared to

[1] The present paper is based on a part of Art. VII of the unpublished Doctoral Thesis (Sharma 1962).

Ricevuto il 11. V. 1964

Tab. 1. Symmetry of MLI as shown by R/L combinations of MLI in the same person in Burman Males (400) and Females (71)

R/L combination of MLI	♂ (400)	♀ (71)	R/L combination of MLI	♂ (400)	♀ (71)
12/12	3	—	7/7	27	3
11/11	12	1	5/5	45	11
9/9	13	5	4/4	1	—
1. (Total showing symmetry)	(101) (25.25% ±2.27)	(20) (28.17% ±5.28)	(See mid-totals to the L.M.S.)		
16/11	1	—	9/4	2	—
16/9	1	—	9/3	4	1
12/11	6	2	8/11	1	—
12/9	6	1	8/9	2	—
12/7	3	—	8/7	2	—
11/12	1	—	8/5	3	—
11/10	1	—	8/4	2	—
11/9	19	7	8/3	1	1
11/8	4	—	7/9	2	1
11/7	29	6	7/6	3	1
11/5	9	2	7/5	56	10
11/3	1	—	7/4	7	—
10/11	1	—	7/3	9	—
10/9	2	—	6/7	1	—
10/7	2	—	6/5	1	—
10/5	1	—	6/3	2	1
9/12	1	—	5/7	9	3
9/11	1	1	5/6	2	—
9/8	5	—	5/4	5	2
9/7	47	5	5/3	11	2
9/6	5	—	3/5	1	—
9/5	26	4			
2. (Total showing asymmetry)	(298) (74.50%)	(50) (70.42%)	(See mid-totals to the L.M.S.)		
N	1*	1**			
3. (Total showing indeterminate cases)	(1)	(1)			
Total (1+2+3)	101+298+1 =400	50+20+1 =71			

* Case no. 333L (♂) shows MLF X.5″.5′ 3″. ("N" is because of X).
** Case no. 65L (♀) shows MLF O. 5′. 3u. 1. ("N" is because of O).

that of Burman males (101/400 or 25.25% ±2.17), the incidence of Asymmetry being 298/400 or 745.0% in males and 50/71 or 70.42% in females. These differential trends in a 2 × 2 table are not significant ($\chi^2 = 0.324 : 0.70 > P > 0.50$). The role

of different MLI values can be gauged from the following gradation orders, based on the principle of preponderance in Burman males and females:

Burman males: 5 — 7 — 9 — 11 — 12 — 4
Burman females: 5 — 9 — 7 — 11

In other words, MLI value like 5 (followed by 7 and 9) is the most involved in contributing to the symmetrical R/L combinations of MLI, both in males and females. MLI values 11 and 12 are relatively less responsible for Symmetry of MLI.

On the other hand, values like 16, 12, 11, 10, 9, 8, 7, and 6, i. e. 6 or $>$ 6, are involved in contributing to the incidence of Asymmetry in Burman males (281/400 or 70.25%) as well as females (46/71 or 64.79%) in combination with the *other values*. These *other values* are worth a further investigation, and for this purpose MLI values are being grouped into the following two categories:

Category (a) ..... 5 or $<$ 5
Category (b) ..... 6 or $>$ 6

In R/L combinations of MLI values, these categories (a) and (b) combine in three different ways (cfr. tab. 2): (*a*) & (*a*), (*a*) & (*b*) and (*b*) & (*b*).

Tab. 2

	(a) & (a)	(a) & (b)	(b) & (b)	Total
BM	17	135	146	298
BF	4	21	25	50
Total	21	156	171	348

$\chi^2 = 6.46$: $0.05 > P > 0.02$: D. F. = 2

Total 2 shows that the R/L Asymmetry of MLI is contributed most preponderantly by combination of two MLI values belonging to the combination of categories (*b*) & (*b*) closely followed by another pattern in which R/L combination is either (*a*) & (*b*) or (*b*) & (*a*). These two combinations account for as many as 281/400 or 70.25% cases in Burman males and 46/71 or 64.79% in females, leaving (a) & (a) combination with only 17/400 cases in Burman males and 4/71 in females. Statistically speaking, these male-female differences, pertaining to the incidence of symmetry as contributed by MLI values combining as shown in tab. 2 [(*a*) & (*a*), (*a*) & (*b*), (*b*) & (*b*)] are statistically significant.

Summary and conclusion

Differential trends of R/L Symmetry as shown by the incidences of Symmetry (S) and Asymmetry (A) in Cummins' summational Main Line Index, as based on the Burman material (400 ♂ & 71 ♀) are slightly higher in females than in males. However, these are not statistically significant.

By grouping MLI values in two categories, (a)-5 or < 5 and (b)-6 or > 6, it is found that MLI values above 6 are largely involved (relative to 5 or < 5) in contributing to the incidence of asymmetric R/L combinations of MLI. Further, the male-female differences in the three combinations (a) & (a), (a) & (b), (b) & (b) are statistically significant.

Acknowledgements

My grateful thanks go to Daw Khin Khin U, head of the Dept. of Anthropology of the University of Rangoon (1953-55), to Prof. Dr. P. C. Biswas (1955) for being helpful in my research undertaking, as well as to Dr. L. Oschinsky (1954) for his co-operation in completing " Project Dermatoglyphics ".

References

1. Cummins H.: Bimanual asymmetry of the palmar main lines (pp. 1-8). Reprinted from Quart. Phi Beta Pi Medical Fraternity 39: 4-10, 1942.
2. Cummins H. & Midlo C.: Finger prints, palms and soles: An introduction to dermatoglyphics (Blakiston, Philadelphia), 1943.
3. Cummins H. & Midlo C.: Unabridged and corrected republication of Cummins & Midlo (1943), 1961.
4. Sharma A.: A methodological note on the geometric basis of MLI determination. Anthropologist 6: 10-21, 1959-61.
5. Sharma A.: Symmetry of four palmar main lines collectively and of modal types in the Burman series. Anthropologist 7: 21-32, 1960-63.
6. Sharma A.: The geometric basis of MLI determination. " *Abs. No.* 240 ". *In* Excerpta Medica Foundation International Congress Series No. 32: E 111, 1961.
7. Sharma A.: A study of palmar dermatoglyphics of Burmans: Certain fresh methodologic approaches as based on Burman data. Unpublished Doctoral Thesis (typescript): 1-503, 1962.
8. Sharma A.: The geometric basis of MLI determination. *In* Proceed. of the Second Intern. Cong. of Human Genet., publ. by Gregor Mendel Institute - Rome, 1963: 15, 32-33.

* * *

ERRATA-CORRIGE

Sharma A.: Suggested two-fold groupings of main lines D, C, B, A terminations and locations of axial triradius. A. Ge. Me. Ge. 12: 369-373, 1963.

Read the fourth line on page 370 as follows:
of triradius c and so of line C; also C_7, C_8, C_9.

RIASSUNTO

Le tendenze alla simmetria destra-sinistra (R-L), indicate dalle frequenze di simmetria (S) ed asimmetria (A) nell'indice delle linee principali di Cummins (MLI), studiate su di un campione di 400 maschi e 71 femmine di Burma, risultano leggermente più elevate nei maschi che nelle femmine. Tali differenze non sono tuttavia statisticamente significative. Raggruppando i valori MLI in due categorie: (a), 5 o <5 e (b), 6 o $>$ 6, si trova che i valori MLI $>$ 6 hanno maggiore importanza degli altri nel determinare combinazioni R-L asimmetriche del MLI. Inoltre, le differenze fra maschi e femmine nelle tre combinazioni (a) ed (a), (a) e (b), (b) e (b) sono statisticamente significative.

RÉSUMÉ

Chez un échantillon de 400 mâles et 71 femelles de Bourme, les tendances à la symétrie droite-gauche (R-L), indiquées par les fréquences de symétrie (S) et asymétrie (A) dans l'index des lignes principales de Cummins (MLI), sont plus élevées chez les mâles, les différences n'étant toutefois pas statistiquement significatives. Groupant les valeurs MLI en deux classes: (a), 5 ou <5 et (b), 6 ou $>$ 6, l'on trouve que les valeurs MLI >6 son plus importantes des autres dans la détermination des combinaisons R-L asymétriques du MLI. Enfin, les différences entre mâles et femelles dans les trois combinaisons (a) et (a), (a) et (b), (b) et (b) sont statistiquement significatives.

ZUSAMMENFASSUNG

An einer Gruppe von 400 männlichen und 71 weiblichen Birmanen wurde der Hauptlinienindex nach Cummins (MLI) untersucht. Es zeigte sich dabei, daß die durch die Häufigkeit von Symmetrie (S) und Asymmetrie (A) aufgezeigten Tendenzen zur R-L – Symmetrie bei Männern etwas höher sind als bei Frauen. Diese Unterschiede sind jedoch nicht von statistischer Bedeutung. Wenn man die MLI – Werte in zwei Kategorien – (a), 5 oder <5 und (b) — 6 oder <6 – einteilt, so stellt man fest, daß bei der Bestimmung der asymmetrischen R-L – Kombinationen die MLI – Werte$>$ 6 größere Bedeutung als die anderen haben. Außerdem sind die Unterschiede zwischen den Geschlechtern bei den drei Kombinationen (a) und (a), (a) und (b), (b) und (b) statistisch bedeutungsvoll.

A. S. Wiener

Raffronto dei Tre Sistemi Correnti di Notazioni del Fenotipo Rh, rh

(da: Fundamentals of Immunogenetics, *in* Medical Proceed., South Africa, X, 26, 1964)

Rh-Hr (Wiener)	C-D-E (Fischer e Race)	Numerata (Rosenfield)*
Rh_1rh	1. + + + —or+ — + +, *etc.*	Rh: 1, 2, — 3,
	2. C + D + E — c + d ? e + + + — + +	4, 5, 6, 7, — 8, — 9,
	3. CDe/cde *o* CDe.cde, *etc.*	— 10,
	4. $\frac{CDe}{cde}$	— 11, 12,
	5. CDe/cde CDe/cDe cDe/Cde	13, 14, 15, 16, 17, 18,
	6. CcDee *o* CDece	19, — 20,
	7. CDce	21
	8. Ccd	
	9. DCc	
	10. DCe/dce *o* DCe.dce. *etc.*	
	11. DCcee	
	12. D–Ccee, Ccd–ee, *etc.*	
	13. CDc/ce, DCe/ce, *etc.*	
	14. CDe/c–e	
	15. CdeF/cdef, DCeF/dcef, *etc.*	
	16. CcDeef, *etc.*	
	17. CcDeefG, *etc.*	
	18. C (A + B +), D (A +), E (A — B +), F (A +) « Abbreviazione » R_1r	

* Tale notazione proviene dall'uso di una lista dei fattori sanguigni Rh–Hr disposta in un ordine particolare. Poiché l'ordinamento dei fattori sanguigni è soprattutto questione di preferenze e non ha una base scientifica, 6 diversi fattori sanguigni potrebbero dar luogo a 240 sistemi diversi di notazioni. Con più di 20 fattori, quanti se ne conoscono attualmente, il numero delle possibilità diviene astronomico!