CORRELATION MATRICES
FOR PALMAR DERMATOGLYPHIC TRAITS IN TWINS

A. SHARMA, A. GUHA

Department of Anthropology, University of Delhi, India

Intraclass correlation values have been studied in a sample of 50 MZ and 50 DZ twins with respect to fourteen palmar dermatoglyphic metric traits in binary combinations. The results confirm the general trends already shown in singleton studies. The shape of the palmar surface does not appear to be significantly correlated with other metric traits. Generally speaking, a large independence has been found between the various traits.

Sapra (1971: unpublished doctoral thesis) examined linear correlation matrices between different palmar dermatoglyphic metric traits in 400 singletons of both sexes and found a high correlation between t-index and BHI^t and between b-perpendicular and c-perpendicular (see below for definitions).
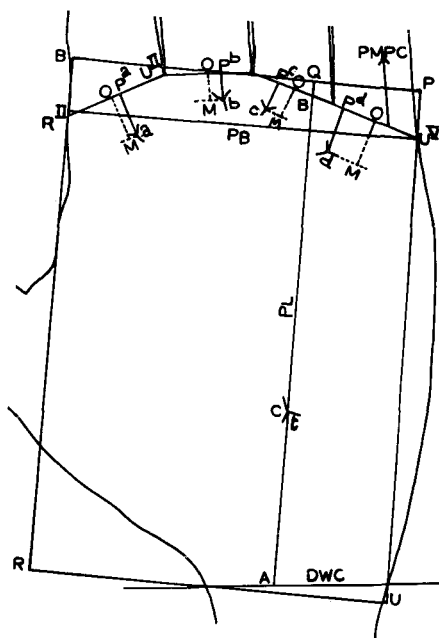
The study has now been extended to a twin sample. The following traits, as also shown on the Figure, have been analyzed in 50 MZ and 50 DZ adult twins from Poona (India) and also compared, where possible, with the data for singletons.

VAR001. Palmarprint Form Index, PFI = (Palmar Breadth, PB)/(Palmar Length, PL) × 100.
VAR002. Perpendicular Deviation for Digital Triradius d, or: d-perpendicular (cf. OM on the Figure).
VAR003. c-perpendicular.
VAR004. b-perpendicular.
VAR005. a-perpendicular.
VAR006. Modified Breadth-Height Index at Axial Triradius, BHI^t = (Projective PB)/[Perpendicular upon PB (tQ) or Height] × 100
VAR007. Intetriradial Distance ct.
VAR008. t-Index = (Distance of Axial Triradius c from A)/(Length AB) × 100.
VAR009. Positional Index for Digital Triradius d, PI^d = (R^v — p^d)/(R^v — U^v) × 100.
VAR010. PI^c = (R^{IV} — p^c)/(R^{IV} — U^{IV}) × 100.
VAR011. PI^b = (R^{III} — p^b)/(R^{III} — U^{III}) × 100.
VAR012. PI^a = (R^{II} — p^a)/(R^{II} — U^{II}) × 100.
VAR013. Modified Positional Index at Axial Triradius, PI^t = [Radial shifting of t from radial limit of PB to the perpendicular projection of t(QB)/(PB) × 100.
VAR014. Main-Line Index, MLI.

The results are shown in the Table and may be briefly summarized as follows.

PFI: Except for intertriradial distance ct in MZ and for BHI^t, most metric traits show a low correlation with PFI, thereby confirming previous results.

Perpendiculars: The four perpendiculars appear to be generally correlated to each other (in

Figure

Table. *Correlation matrices of binary combinations of different metric traits in MZ & DZ twins and a series of unrelated males*

		VAR001	VAR002	VAR003	VAR004	VAR005	VAR006	VAR007	VAR008	VAR009	VAR010	VAR011	VAR012	VAR013	VAR014
VAR001	MZ	—													
	DZ	—													
	MS	—													
VAR002	MZ	−0.1273													
	DZ	−0.1773													
	MS	−0.0580													
VAR003	MZ	−0.1621	+0.3840												
	DZ	−0.1684	+0.3740												
	MS	+0.0930	+0.4890												
VAR004	MZ	−0.1445	+0.4673	+0.3927											
	DZ	−0.1693	+0.5010	+0.3141											
	MS	+0.0390	+0.4100	+0.5142											
VAR005	MZ	−0.1311	+0.5455	+0.5962	+0.5466										
	DZ	−0.1823	+0.4361	+0.3230	+0.4966										
	MS	+0.0670	+0.4320	+0.3870	+0.4270										
VAR006	MZ	+0.5103	+0.1655	−0.1163	−0.1517	−0.1044									
	DZ	+0.3887	−0.2635	−0.2571	−0.2883	−0.2510									
	MS	—	—	—	—	—									
VAR007	MS	−0.3636	+0.5289	+0.3388	+0.3772	+0.4342	−0.6451								
	DZ	−0.2354	+0.4846	+0.3750	+0.5330	+0.5323	−0.5021								
	MS	—	—	—	—	—	—								
VAR008	MZ	−0.0044	−0.1481	−0.0996	−0.1328	−0.0697	+0.6310	−0.5018							
	DZ	−0.0076	−0.2081	−0.1754	−0.1846	−0.1853	+0.4300	−0.4584							
	MS	+0.1630	+0.0490	+0.0420	+0.0120	+0.0310	+0.7130	—							
VAR009	MZ	−0.1396	+0.1372	+0.1340	+0.1169	−0.0966	−0.1778	+0.0544	−0.1682						
	DZ	−0.1331	+0.2276	+0.1613	+0.1654	−0.0018	−0.2067	+0.1080	−0.1580						
	MS	−0.0540	+0.3290	+0.1080	+0.2500	+0.1430	—	—	+0.0010						
VAR010	MZ	−0.0789	−0.1436	+0.3176	+0.1414	−0.1151	−0.1572	−0.1232	−0.1137	+0.3275					
	DZ	+0.0767	+0.1648	+0.1328	+0.1785	+0.0807	−0.0862	+0.0678	−0.1526	+0.2563					
	MS	+0.0210	+0.0820	+0.0920	−0.0440	+0.0030	—	+0.0900	+0.1410						
VAR011	MZ	+0.0370	−0.2403	−0.2180	−0.1659	−0.0868	−0.0748	+0.0558	−0.1243	−0.2154	−0.2497				
	DZ	−0.1869	−0.1044	+0.1050	−0.1079	+0.1258	+0.1101	+0.0596	+0.1078	−0.1705	−0.1101				
	MS	+0.0080	−0.1120	−0.1430	−0.2280	+0.0191	—	+0.0170	+0.0530	+0.1130					
VAR012	MZ	−0.0091	−0.2086	−0.2780	−0.1445	−0.1513	−0.1505	+0.1560	−0.1259	−0.1880	−0.2402	+0.3290			
	DZ	+0.1190	−0.1383	−0.1434	−0.0091	−0.1876	+0.1169	+0.0778	+0.1206	−0.1919	−0.1451	+0.1800			
	MS	+0.0200	−0.2170	−0.2180	−0.0700	−0.1479	—	+0.0779	−0.0262	−0.1310	+0.2080				
VAR013	MZ	+0.0996	+0.1490	−0.1315	+0.1804	+0.1274	+0.1817	−0.1083	+0.2511	−0.0751	+0.0020	+0.1212	+0.0470		
	DZ	+0.1090	+0.0991	+0.1054	+0.1379	+0.1310	+0.2150	−0.1605	+0.3058	+0.1144	+0.2570	+0.2314	+0.1104		
	MS	+0.0650	+0.0440	+0.0940	+0.0090	+0.0021	+0.2361	—	+0.2451	+0.0260	+0.0630	+0.0320	+0.0390		
VAR014	MZ	−0.1630	−0.1788	−0.3113	−0.1334	−0.1132	−0.2367	+0.1591	−0.0816	−0.0016	−0.3001	+0.1003	+0.2448	−0.0827	
	DZ	+0.1442	−0.1041	−0.0040	+0.1198	+0.0904	−0.0405	+0.1070	+0.0837	−0.1926	−0.2096	−0.1160	+0.1564	+0.1020	
	MS	—	—	—	—	—	—	—	—	—	—	—	—	—	
		VAR001	VAR002	VAR003	VAR004	VAR005	VAR006	VAR007	VAR008	VAR009	VAR010	VAR011	VAR012	VAR013	VAR014

* SIGNIFICANT AT 5% LEVEL   ** SIGNIFICANT AT 1% LEVEL   *** SIGNIFICANT AT 0.1% LEVEL

the area of 0.5), but not to the various Positional Indexes, t-Index, and MLI.

BHI^t: Intetriradial distance ct, t-Index and PFI appear to be highly correlated with BHI^t, while other traits are not.

Intetriradial Distance ct: BHI^t, t-Index and most of the perpendiculars appear to be highly correlated with ct.

t-Index: Except for BHI^t and ct, other traits show only a low correlation with t-Index.

Positional Indexes: The five Positional Indexes, indicative of anatomical localization of the respective triradii transversally, invariably show low correlations with other traits.

MLI: Almost all metric traits show low correlations with MLI.

In conclusion, the results of this twin study practically confirm those of the singleton study. With the exception of the four perpendiculars, most of the fourteen traits studied appear to be independent from each other and they all seem to indicate a high degree of independence from the shape of the palm as expressed by PFI.

Dr. A. Sharma, Department of Anthropology, University of Delhi, Delhi 110007, India.