

Two-Generation Confirmation of Crown-Size Body-Size Relationships in Human Beings

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Although the existence of a relationship between crown size and body size has previously been questioned (S. M. GARN, and A. B. LEWIS, *Amer Anthrop* 60:894-880, 1958; H. A. BAILIT and J. S. FRIEDLAENDER, *Amer Anthrop* 68:665-672, 1966), recent studies show that there are systematic, positive, but low-order, correlations between crown size and various body dimensions (R. FILIPSSON and L. GOLDSON, *Acta Odont Scand* 21:359-365, 1963; S. M. GARN ET AL, *Arch Oral Biol* 13:129, 1968). The question then arises as to whether such relationships are purely developmental, operating only within individuals, or whether they persist over the generations and have a genetic basis.

Correlating the standard height of 137 parents (66 fathers and 71 mothers) with crown sizes of 117 of their offspring (60 sons and 57 daughters), it is clear that taller parents do have children with systematically larger mesiodistal and buccolingual dental crown dimensions. This was true for all classes of teeth

and for both jaws. In all, 44 out of 112 sex-, tooth-, and dimension-specific correlations were significant at $p=0.05$ or better, in contrast to the five correlations that would be expected by chance. Father-son and father-daughter correlations for body size versus crown size were systematically higher than were corresponding mother-son and mother-daughter correlations, however, and included a larger number that are significant at $p=0.05$ or better (19 and 14 versus seven and four, $\chi^2=12.5$ against the chance 11:11:11:11 hypothesis).

In this study, aging effects on stature were eliminated by the use of a narrow parental age range. There was minimum spread of socio-economic classes, and the population sample exceeded most USA stature norms (S. M. GARN and C. G. ROHMANN, *Pediat Clin N Amer* 13:359-379, 1966). The two-generation findings therefore indicated that stature in one generation and dental crown size in the next are slightly, but significantly, related within and across sexes. Idiosyncratic, prenatal, placental, and nutritional effects therefore may be excluded. The hierarchy of communality values, indicating greater dimensional relationships between fathers and their progeny than between mothers and their sons or daughters, cannot be explained by any known mode of inheritance, however.

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PARENTAL BODY SIZE AND CROWN DIAMETERS OF THEIR CHILDREN

Tooth	Diameter	Father's Stature vs Crown Size				Mother's Stature vs Crown Size			
		No.	Sons r	No.	Daughters r	No.	Sons r	No.	Daughters r
P	buccolingual	110	0.33*	109	0.16	116	0.15	113	0.02
	mesiodistal	113	0.13	97	0.17	119	-0.02	97	0.01
P ²	buccolingual	106	0.55*	101	-0.03	110	0.34*	105	0.00
	mesiodistal	111	0.27*	95	-0.07	117	0.19	95	-0.16
C	buccolingual	75	0.50*	76	0.04	77	0.03	79	-0.07
	mesiodistal	89	0.15	79	0.32*	94	0.12	79	0.14
P ¹	buccolingual	107	0.40*	100	0.38*	113	0.23*	104	0.26*
	mesiodistal	104	0.11	92	0.33*	110	0.20*	92	0.24*
P ²	buccolingual	107	0.49*	89	0.04	113	0.16	93	0.12
	mesiodistal	99	0.10	77	0.31*	105	0.20*	77	0.23*
M ¹	buccolingual	113	0.24*	106	0.33*	119	-0.04	110	0.08
	mesiodistal	109	0.09	94	0.29*	115	0.14	94	0.06
M ²	buccolingual	67	0.47*	55	0.40*	69	0.28*	56	0.15
	mesiodistal	68	0.09	56	0.01	69	0.15	56	0.03
I ₁	buccolingual	104	0.43*	106	0.01	110	0.25*	110	-0.05
	mesiodistal	109	0.22*	97	0.23*	115	0.08*	97	0.07
I ₂	buccolingual	107	0.27*	108	0.16	113	0.00	112	-0.05
	mesiodistal	111	0.25*	94	0.25*	117	0.03	94	0.20*
C	buccolingual	97	0.39*	94	-0.04	103	0.02	97	-0.13
	mesiodistal	105	0.30*	91	0.24*	111	-0.08	91	0.08
P ₁	buccolingual	108	0.50*	101	0.24*	114	0.07	105	0.16
	mesiodistal	103	0.45*	92	0.25*	109	0.25*	92	0.11
P ₂	buccolingual	99	0.58*	83	0.26*	105	0.05	83	0.08
	mesiodistal	97	0.04	83	0.14	103	-0.11	83	-0.07
M ₁	buccolingual	107	0.34*	107	0.27*	113	-0.18	111	0.17
	mesiodistal	103	0.11	84	0.01	109	-0.05	84	0.09
M ₂	buccolingual	47	0.57*	41	0.25	49	0.25	41	-0.24
	mesiodistal	54	0.08	39	-0.17	56	0.21	39	-0.18
No. of significant r 's			19		14		7		4

* Significant at $p=0.05$ or better for the number of pairs of teeth indicated.