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CORRELATIONS BETWEEN NEONATAL AND ABULT BODY WEIGHT AND HEIGHT

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Longitudinal studies permitting comparisons between the newborn and the adult are known to exist though available data are poor, thus it seems interesting to compare archival data, collected in a Parisian Maternity, and similar data on the same subjects 19 years later in a military Recruting Centre.

Data

We thank Professor *Lepage* and his collaborators, who gave us the opportunity to use the archives of the "Baudelocque" Maternity (Paris, 14è). We gathered a sample comprising 538 males subjects, born in 1952, with a normal delivery after normal pregnancy. Following *Lepage's* advice, we took 2,500 g as the lower limit of normal birth weight. In 1952 no distinction was made between premature newborns and hypotrophics; so our sample includes some babies born before the 40-week period, and also some "small-for-date". We do not know the techniques used to measure the statures of the mothers and the lengths of the newborns.

As a follow-up we found 181 of these subjects, after their having registered at the military Centre, at the age 19½. The percentage of recovered subjects (less than a third) has no significance because we are unable to distinguish between those who died (infantile mortality) or simply who changed their places of residence.

Results

1. Table 1 gives informative data on the newborn studied (and recovered at 19 years). Distinction between the children of primiparae (first born) and those of multiparae (next born) should be noted, because there is a well known rank effect: first born babies are lighter at birth, but heavier and taller when adult; there is an inversion of the rank effect during childhood.

Certain measurements are missing for some subjects, particularly the length of the newborn, so the samples are different. Note the taller stature of mothers primiparae ($t = 2.3^*$); the differences between the babies' weights of primiparae and of multiparae, between the adult statures of first born and next born subjects, are classics and can be seen in Table 1.

2. The correlation study is more interesting. Those between mothers' stature and her newborn's dimensions are:

Table 1

Data of newborns and their mothers

1. táblázat. Az újszülöttek és az anyák adatai

Characters *Jellegek*		n	Mean	S.D.
Mother's stature (cm) *Az anya termete*	Primiparae	64	159.9	5.67
	Multiparae	110	157.7	6.11
	Both *Együtt*	174	158.5	6.03
Birth length (cm) *Születési testhossz*	First born *Elsőszülött*	24	49.46	1.44
	Next born *További szülött*	44	49.89	1.91
	Both *Együtt*	68	49.735	1.76
Birth weight (g) *Születési testsúly*	First born *Első szülött*	65	3320.9	391.7
	Next born *További szülött*	116	3483.4	450.5
	Both *Együtt*	181	3386.6	432.0
Adult stature (cm) *Felnőttkori termet*	First born *Első szülött*	57	174.8	6.78
	Next born *További szülött*	112	171.7	6.46
	Both *Együtt*	169	172.7	6.72
Adult weight (kg) *Felnőttkori testsúly*	First born *Első szülött*	56	65.96	8.23
	Next born *További szülött*	110	61.73	7.44
	Both *Együtt*	166	63.16	7.95
Adult chest circumference *Felnőttkori mellkaskerület*	First born *Első szülött*	52	89.71	5.05
	Next born *További szülött*	102	87.18	5.19
	Both *Együtt*	154	88.03	5.26

Table 2.

Correlations between neonatal and adult body weight and height

2. táblázat. Az újszülöttkori és felnőttkori testsúly és testmagasság közötti korrelációk

Character *Jelleg*	Newborn *Újszülött*	Adult Stature *Felnőttkori termet*	*Testsúly* Weight
Length (cm) *Testhossz*	First born *Első szülött*	(22) 0.373	(22) 0.130
	Next born *További szülött*	(42) 0.244	(41) 0.488**
	Both *Együt*	(64) 0.277*	(63) 0.380**
Weight (g) *Testsúly*	First born *Első szülött*	(62) 0.316*	(62) 0.233
	Next born *További szülött*	(111) 0.250*	(109) 0.434***
	Both *Együtt*	(173) 0.272**	(170) 0.316***

+0.117* with the neonatal weight (n = 511), +0.092 with the neonatal length (n = 195), +0.415** with the adult stature of the sons (n = 160).

This last figure is the only one important, however lower than the expected value (near 0.50). Perhaps the mothers' stature was not well measured. The differences between the numbers of subjects are due to the use of all the data for the first figure, not only of the subjects recovered at 19 years of age.

3. Table 2 gives the correlations between neonatal and adult dimensions. It is difficult to say that the correlations are higher on the first born than on the next born babies, higher for the weight than for the height, since unfortunately the figures are not calculated with the same number of subjects. From the statistical point of view and for the indicated characters, the differences are not significant between the correlation coefficients.

Indeed these coefficients for both subjects (first and next born) seem higher for weight than for length; but is it possible to neglect the rank effect and to combine all the subjects?

Our figures are lower than that of LELLOUCH and PATOIS (1974) for stature ($r = 0.48$). But they are quite similar to those of MILLER, BILLEWICZ and THOMSON (1972): $r = 0.25$ for heights and $r = 0.26$ for weights. And they are not very different from those of TANNER et al. (1956): $r = 0.25$ and $r = 0.38$ in their femous Aberdeen follow-up study. However, because their small number of subjects, there is only a significant correlation between neonatal and adult weights ($r = 0.38$). So, for TANNER, the foetal environment plays a dominant part and inhibits the normal hereditary manifestations for lengths; next birth sets heredity free and then the normal correlations between linear dimensions of child and adult progressively appears. It is the reason why SCHREIDER (1970) wrote "The newborn babies are not very genetic". Nevertheless, birth does not change the rate of prenatal growth (OLIVER and PINEAU, 1960). And, if we agree that the correlations between weights are usually slightly higher than those between heights, the difference with the correlation for heights is very small and not statistically significant. This incites us to restrain TANNER's opinion and to account that foetal milieu plays a quite similar role on adult's stature and weight. Therefore, the newborn baby bears some adult characteristics, slightly indeed; but there are growth channels: babies born heavy or tall remain the same at adult age, in the majority of the cases anyway.

There are some little errors in our work (and of those of others authors): some primiparae are not primigests (they had abortions before the first birth). To avoid the rank effect, it would be necessary to make a distinction between the second birth (secundiparae) and the next ones (true multiparae), as equalization of average birth weight starts at the third pregnancy. But many authors have neglected the subdivision between primiparae and multiparae, which is an error in our opinion. Lastly the mother's age has not been taken in account, when it interferes in primiparae (THOMSON and BAIRD 1967). All this explains perhaps the negative correlations found by SCHREIDER (1970) between birth weight (without distinction of rank order) and some indicators of biological development.

We can add that we do not find any difference according the mother's social level, like Mrs. PINEAU (1970) does, probably because this social milieu is not so contrasted than formerly. Also there is so selective effect of emigration: no neonatal differences appears according the place of birth of the mother.

Conclusions

Comparisons of weight and stature of the same subjects at birth and at a nearly adult age shows similar correlations between neonatal and adult values, for those two kinds of characteristics. The foetal milieu does not seem to play a specially inhibiting role on the length of the newborn nor on the weight; its role is similar on these two measurements, without statistical differences between the correlation coefficients. At birth the releasing of manifestation of heredity does not appear clearly in our data. Thus the newborn child manifests some of the later anthropometric characteristics of the future adult, though slightly of course.

Summary

The comparison between weight and stature of the same subjects at birth and at adult age shows that the newborn child bears potentially some future anthropometrical characteristics. Correlations between neonatal and adult values are similar for stature and for weight and the influence of the foetal milieu does not appear to be different for these two measures.

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REFERENCES

Miller, F. J. W.—Billewicz, W. Z.—Thomson, A. M. (1972): Growth from birth to adult life of 442 Newcastle upon Tyne children. — Brit. J. Prev. Soc. Med. *26;* 224—230.

Olivier, G. (1977): The secular change in birth height (from 1910 to 1972 in Paris). — J. Hum. Evol. *6;* 293—296.

Olivier, G.—Pineau, H. (1960): Considérations sur la biomètrie de la croissance. — Z. Morph. Anthrop. *50;* 349—368.

Pineau, H. (1970): Poids de naissance. Variations saisonnières, ordre de naissance, puberté. — Biomètrie humaine *5;* 47—62.

Schreider, E. (1970): Le poids du nouveau-né comme illustration des phénomènes multifactoriels en biologie. — Biomètrie humaine *5;* 1—46.

Tanner, J. M.—Healy, M. J. R.—Lockhart, R. M.—Mackenzie, J. D.—Whitehouse, R. H. (1956): Aberdeen growth study. I. The prediction of adult body measurements from measurements taken each year from birth to 5 years. — Arch. Dis. Childh. *31;* 372—381.

Thomson, B.—Baird, D. (1967): Some impressions of childbreading in tropical areas. — J. Obstet. Gynaec. Brit. Cwlth. *74;* 499—509.

AZ ÚJSZÜLÖTTKORI ÉS A FELNŐTTKORI TESTSÚLY ÉS TESTMAGASSÁG KORRELÁCIÓJA

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(Összefoglalás)

Ugyanazon személy születéskori és felnőttkori testsúlyának és testmagasságának összehasonlítása azt mutatja, hogy az újszülött potenciálisan magában hordozza bizonyos antropometriai jellegeit. Az újszülöttkori és a felnőttkori értékek közötti korreláció a termet és a testsúly esetében hasonló, és úgy tűnik, hogy a magzati környezet hatása e két jellegre nézve nem különböző.

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