

Issue 69

In a nutshell

Three new twin and adoption studies reinforce the strong influence of genetics in determining weight.

However, these studies also show the complexity of the 'environment', making it extremely difficult in research studies to adequately control for the multitude of variables involved.

Genetics and weight

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NUTRITION RESEARCH REVIEW

Study one: food preferences

There is a genetic factor in relation to food preferences, as well as environmental influence, according to the results of a Swedish twin study.

Subjects: 98 monozygotic and 176 dizygotic adult twin pairs analysed over an 11 year period.

Method: Food frequency data was collected for 11 common foods, and BMI measured twice at the beginning and end of the 11 year period. Data was collected both for twins reared together and twins reared apart.

Results: There was a stronger correlation between food preferences amongst monozygotic twins than dizygotic for some foods, but not others, and this was seen in both twins reared apart and in those reared together. However, it was not possible to establish a statistical relationship between the combination of genetic factors, food habits and ultimate BMI.

Ref: *AJCN* 1999;69: 597-602

Study two: physical activity

Another study involving several of the same authors tried to disentangle the interrelationships between genetics and environment in relation to the impact of physical activity on weight.

The authors concluded that the relationship works both ways. Genetics modifies the impact of physical activity on weight, but at the same time a sedentary lifestyle may have a particularly obesity-promoting effect in those men who already have a genetic predisposition to weight gain.

Subjects: 1,571 monozygotic and 3,029 dizygotic, same-sex Finnish twin pairs.

Method: Physical activity was assessed and weight monitored over the following 6 years.

Results: As expected, monozygotic twins had significantly greater correlation in their weight change than did dizygotic twins, and this was true at all levels of physical activity.

However, physical activity did impact on the strength of the correlation in weight change between twins. The association between twins' BMI change was three times stronger in those with highest physical activity than in those with lowest physical activity (beta = 0.40 compared with 0.15, p = 0.002).

Ref: *AJCN* 1997;66, 672-678

Study three: general environment

Adopted children were used as another way of examining how much environment impacts on the ultimate weight status of adults in a Danish study.

Subjects: 3,651 subjects adopted by non-related families between the years 1924 and 1947

Method: BMI was measured in the adopting parents, natural parents, siblings and the adoptees themselves. As well, lifestyle factors were assessed in the adopting and the natural family. For the adopting family, these

included: age of the adoptee at adoption, where they lived. For the adopting parents: year of birth, age at time of adoption, occupational rating, smoking habits and BMI.

Results: There was a significant correlation between the adoptees' current and maximum BMI and that of their natural parents and siblings ($p < 0.001$). There was no consistent significant correlation between the adoptees' weight status and the various environmental indicators.

Ref: Int J Obes & Rel Metab Dis 1998; 22: 73 - 81

Comments

The debate about nature versus nurture in relation to obesity attracts continuing attention. Although the powerful influence of genetics in determining ultimate weight status is no longer in dispute, research such as these three studies is endeavoring to tease out the exact contribution of lifestyle to the end result, for example in relation to food preferences and physical activity levels.

All three studies in their own way reinforce the strong influence of genetic disposition. However, what these studies also show is that it will not be easy to get a clear result on this issue. The 'environment' is a highly complex, multi-dimensional thing, and finding a way to control for the multitude of variables that are potentially involved is almost impossible. So we are left to make what we can out of twin and adoption studies.

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