

HERITABILITY = (H²)

(overton)

QUESTION OF “DETERMINENTS” OR “CAUSES” OF BEHAVIOR OR DEVELOPMENT.

MORE SPECIFIC QUESTION OF: “HOW MUCH?” OF ANY BEHAVIOR OR DEVELOPMENT IS CAUSED BY HEREDITY.

HERE, ANSWERED BY A STATISTICAL (QUANTITATIVE) FORMULA, CALLED THE HERITABILITY INDEX, THAT ATTEMPTS TO DIVIDE UP THE % OF THE VARIANCE (BETWEEN PERSON VARIATION) THAT IS UNDER THE CONTROL OF (CAUSED BY) HEREDITARY FACTORS:

To apply this formula you give a test of the behavior that you are interested in (e.g., intelligence, personality traits, language, etc) to Identical Twins (MZ) and to Non Identical Twins(DZ). Then correlate (getting an r score) the Identical twins scores and correlate (another r) the Fraternal Twins scores. Then put those r (correlation) scores into the following Heritability formula:

$$H^2 = \frac{\begin{array}{c} \text{(Same Genes, Same Environment)} \\ r \text{ (Identical Twins)} \end{array} \quad \begin{array}{c} \text{Minus} \\ \text{Minus} \end{array} \quad \begin{array}{c} \text{(Different Genes, Same Environment)} \\ r \text{ (Fraternal Twins)} \\ r \text{ (Fraternal Twins)} \end{array}}{1 \quad \text{Minus} \quad 1}$$

Example. $\frac{\begin{array}{c} .75 \\ 1 \end{array} \quad \begin{array}{c} \text{Minus} \\ \text{Minus} \end{array} \quad \begin{array}{c} .20 \\ .20 \end{array}}{1 \quad \text{Minus} \quad 1} = \frac{.55}{.80} = .687 \text{ or } 69\%$

So, the claim is that, for the behavior in question (intelligence, language, personality traits etc.) 69% of the between individual variation is accounted for (explained by) hereditary factors. Since there is 100% of the variation to be explained this means that the other 29% is due to (a) error and (b) environment. (Environment can be further divided up into “Shared” and “Non-Shared” components).

NOTE: BASIC IDEA IS THE SAME AS THAT IN OTHER KINSHIP STUDIES. THE ENVIRONMENT IS ASSUMED TO BE THE SAME IN BOTH GROUPS AND SO IF THERE IS ANY DIFFERENCE THE DIFFERENCE MUST BE DUE TO THE ONLY THING THAT IS DIFFERENT IN THE TWO GROUPS, I.E., THE GENES.

NOTE ALSO:

- (1). **THE ASSUMPTION THAT THE ENVIRONMENT IS THE SAME IN THE TWO GROUPS IS A VERY BIG AND WEAK ASSUMPTION.**
- (2). THERE IS NOTHING IN USING THIS STATISTICAL FORMULA THAT IN ANY WAY ACTUALLY IMPLICATES “GENES.” SO, DESPITE THE FACT THAT THE GROUP THAT USES THIS TECHNIQUE CALL THEMSELVES “BEHAVIOR GENETICISTS” THEY DO NOT DIRECTLY EXPLORE THE EFFECT OF GENES ON BEHAVIOR.
- (3). ALL OF THIS IS ABOUT DIFFERENCES “BETWEEN” PEOPLE AND HAS NO DIRECT APPLICATION TO ANY GIVEN PERSON (WITHIN PERSON), I.E., IT DOES NOT SUGGEST THAT FOR ANY GIVEN PERSON THEIR PERSONALITY IS 69% DUE TO HEREDITY.
- (4). THERE IS A PARADOX HERE IN THAT THE MORE YOU MAKE THE ENVIRONMENT SIMILAR IN GROUPS, THE MORE THE BEHAVIOR WILL BE SHOWN TO BE UNDER THE CONTROL OF HEREDITY.