

Nature-Nurture Problem/Issue: What is It?

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It is the long-standing controversy/debate over the relative roles/contributions/influences of *heredity* (nature) and *environment* (nurture) in the development and expression of behavior (and now also cognition). *Nativists* would argue that genes specify everything. *Empiricists*, in contrast, would argue that the brain starts off as a blank slate, and it's wiring is subsequently specified by the environment, including culture.

In reality, the roots of all behavior and cognition are to be found in both our *biology*, due to *genetic inheritance* (nature), and in *experience*, due to our *environment* (nurture).

Thus, it is misguided to ask whether some behavior or ability is inherited, i.e., *instinctual*, or whether it is *learned*--in other words, whether it is *biological or psychological*. This is a false dichotomy. Nature and nurture are actually two ways of doing the same thing. Indeed, *evolution* has endowed us with many *biological, behavioral, and cognitive biases*, or inherited tendencies, each of which may have its own built in *mechanism of modifiability* (leaning).

We now also know that genetics and learning are not the only factors that influence the development and expression of behavior and cognition--there is also, e.g., the *fetal environment, nutrition*, and the *current external and internal environments*. Thus the debate has shifted from *genetics*

versus learning, to genetics versus experience; and from either one or the other, to how much of each? It is not simply one or the other. Can you bake a cake without both the recipe (genetic program) and the ingredients (environment)? Moreover, the most current understanding of the nature-nurture problem recognizes that genetic and experiential factors do not simply combine in an additive fashion--they also interact.

Probably the best way to phrase the nature-nurture question is: *What proportion of the variance* in some characteristic (across different species, or members of a single species) is due to 1) variation in genetics (which is influenced by evolution), 2) variation in past experience (which influences learning), 3) variation in the current environment (both external and internal), and 4) the interactions among these determinants? (This is the linear model of analysis of variance: sum of the main effects and interactions.) It is the *variance* that we should explain, since when baking a cake, is either the recipe or ingredients more important? You cannot make a cake without both. But the *variance in* characteristics among cakes might be more dependent on one or the other, or their interaction.