



# Changing the game

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*There are two classes of people in the world: those who like dichotomies and those who don't. I belong to the second. (Joke told by a friend)*

A generation ago, the common politically progressive (liberatory?) position on homosexuality in the US was that sexual orientation was learned. Today, advocates of homosexual rights are more likely to say that it is innate. In the complex history of this issue, scientific arguments are often bound up with legal and moral ones, as well as more-general attitudes toward biological explanations. Under US law, for instance, certain biologically defined groups have special protections. The "nature" argument is also used to minimize the role of choice in homosexual orientation, to deny it is a sin.

To call something biological (or genetic, natural or innate) is clearly not just to make a bare scientific statement. It is also to pronounce on the relevance of experience and the conditions of life, on the possibility (even the desirability) of change. The same is true for the contrasting terms: cultural, acquired, environmental.

If something is biological, it is reasoned, it is physical, preprogrammed and controlled from the inside; while learning is an accident of personal history, a product of mind, not body. This echo of an ancient dualism should raise suspicions about such contrasts, even if their entanglement with social issues does not. Yet, vehement as the arguments are, there is no coherent set of criteria that can sort traits into the biological and the nonbiological. There is only a plethora of indices, some of them contradictory, some simply unclear. Some criteria refer to populations of organisms, others to individual development. Some have to do with evolution, others with mechanism, and so on.

These controversies build on very old, well-assimilated beliefs about not just mind and body but form and matter, essence and accident, instinct and learning, as well as more recent ones about evolution, genes and environment. Much has been said about such (often infuriating) debates. Much less is made of the inadequacy of their saner-sounding “resolutions,” in which everything is a mixture of nature and nurture, say, so that we must discern the right proportions of each, or in which the genes set the range of possible environmental effects. If the traditional nature-nurture categories are incoherent, as I argued above, then these “reasonable” compromises are no better.

One could conclude that we need to be liberated from biology (or biologists!). I suggest instead that we free ourselves from the whole set of interlaced conceptual habits that keeps these disputes going. Chief among these is the virtual deification of the gene. I don’t mean simple overemphasis. I mean the investment of the DNA with god-like powers to initiate change autonomously (“genes drive development but remain unchanged themselves”), to contain and execute plans of prodigious complexity (“the master program foresees and provides for environmental input”). The gene is said to impart form to inanimate matter. Immortal, it persists across the generations while mere organisms arise and perish. Playing counterpoint to this internal source of form is “the environment” of the traditional debates, supplying raw material and support, detail or perturbation.

What if these beliefs were to change? Suppose the DNA is not a repository of disembodied representations and instructions but is instead, like other body parts, a physical structure. Marvelous to be sure, it functions only by interacting with a host of other structures, different in different places, times and conditions. This is in fact what molecular biology, stripped of its more heated rhetoric, shows us. Suppose further that the operations of the products of these interactions, say proteins, are likewise contingent on higher-level conditions. An organism arises in the crucible of these myriad context-dependent interactions, taking on form and function in intimate interdependence with its surroundings; it is unnecessary, even unintelligible to attribute the sequences, dramatic as they are, to a central unmoved mover. If the effects of other internal structures, and of factors in the world outside the organism’s skin, are similarly contingent on the presence and state of other components of the developmental complex, then there is no independent external source of “information” either, to supply the “nurture” side of the nature-nurture dichotomy. Neither DNA nor any other participant in development operates autonomously or controls the whole: the effects of any factor are jointly caused, dependent on the rest of the complex and defying efforts to allocate responsibility.

All these conceptual changes, I contend, are supported by biological research in a way that the language of coded instructions is not. (Not that everything I’m contesting is subject to simple empirical test: how would you demonstrate that programs literally exist in the DNA? That is part of the problem.) But as is the way of systems, for that is what I am describing, a small change sometimes leads to cascades of others. (Sometimes. And sometimes a host of changes have no significant effect. Many organismic features are stable across a wide variety of conditions.)

One implication of these shifts is that no constituent contains the essence of the organism, or alone sets its fate. It makes no sense to say that some results were already prefigured, inscribed in a nuclear code, even if they appear reliably. Nor can we attribute an individual trait mostly to one interactant and only trivially to others (although research on groups can yield quantitative statements). That is, if the traditional nature-nurture categories are incoherent, as I argued above, then the usual “reasonable” compromises--that everything is a mixture of nature and nurture, say, so we must discern the right proportions of each, or that the genes set the range of possible environmental effects—are no better. All features are “biological” because they characterize a living being. All are “acquired” in the sense that they must develop, and all are “environmental” because particular conditions are needed for them to occur.

Our view of evolution changes, too. The standard dictum that only genes are passed on in heredity is greatly expanded to encompass the rest of the developmental (organism-environment) system. We can then see evolution not just as changes in genetic frequencies but as change in the constitution and distribution of developmental systems.

This reworked perspective doesn't supply automatic answers to the questions that have long kept nature-nurture disputes going (Is it inevitable? Is it natural, or should we try to change it?). It does push us to be clear about the questions themselves, by taking away the all-purpose vocabulary and well-practiced moves that have hidden so much ambiguity for so long. It also blocks the pointless attempt to answer them by finding the right balance of internal and external control (mostly innate? partly environmental?), rather than turning directly toward the complexities of real life and the uncertainties and possibilities that go with them.