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Sibling rivalry

Why the nature/nurture debate won't go away

By Steven Pinker

WHEN THE BRITISH EDUCATOR Richard Mulcaster wrote in 1582 that "Nature makes the boy toward, nurture sees him forward," he gave the world a euphonious name for an opposition that has been debated ever since. People's beliefs about the roles of heredity and environment affect their opinions on an astonishing range of topics. Do adolescents engage in violence and substance abuse because of the way their parents treated them as toddlers? Are people inherently selfish and aggressive, which would justify a market economy and a strong police, or could they become peaceable and cooperative, allowing the state to wither and a spontaneous socialism to blossom? Is there a universal aesthetic that allows great art to transcend time and place, or are people's tastes determined by their era and culture? With so much at stake, it is no surprise that debates over nature and nurture evoke such strong feelings.

Much of the heat comes from framing the issues as all-or-none dichotomies, and some of it can be transformed into light with a little nuance. Humans, of course, are not exclusively selfish or generous (or nasty or noble); they are driven by competing motives elicited in different circumstances. Although no aspect of the mind is unaffected by learning, the brain has to come equipped with complex neural circuitry to make that learning possible. And if genes affect behavior, it is not by pulling the strings of the muscles directly, but via their intricate effects on a growing brain.

By now most thinking people have come to distrust any radical who would seem to say that the mind is a blank slate that is filled entirely by its environment, or that genes control our behavior like a player piano. Many scientists, particularly those who don't study humans, have gone further and expressed the hope that the nature-nurture debate will simply go away. Surely, they say, all behavior emerges from an inextricable interaction between heredity and environment during development. Trying to distinguish them can only stifle productive research and lead to sterile polemics.

But moderation, like all things, can be taken to extremes. The belief that it's simplistic to distinguish nature and nurture is itself simplistic. The contributions of this opposition to our understanding of mind and society are far from obvious, and many

supposedly reasonable compromises turn out, under closer scrutiny, to be anything but. Let's consider some of the "reasonable" beliefs of the radical moderates.

'*Reasonable'' Belief No. 1: No one believes in the extreme ''nurture'' position that the mind is a blank slate.*

Certainly few people today endorse the blank slate in so many words, and I suspect that even fewer believe it in their heart of hearts. But many people still tacitly assume that nurture is everything when they write opinion pieces, conduct research, and translate the research into policy. Most parenting advice, for example, is inspired by studies that find a correlation between parents and children. Loving parents have confident children, authoritative parents (neither too permissive nor too punitive) have well-behaved children, parents who talk to their children have children with better language skills, and so on. Everyone concludes that to rear the best children, parents must be loving, authoritative, and talkative, and if children don't turn out well, it must be the parents' fault.

But there is a basic problem with this reasoning, and it comes from the tacit assumption that children are blank slates. Parents, remember, provide their children with genes, not just a home environment. The correlations between parents and children may be telling us only that the same genes that make adults loving, authoritative, and talkative make their children self-confident, well behaved, and articulate. Until the studies are redone with adopted children (who get only their environment, not their genes, from their parents), the data are compatible with the possibility that genes make all the difference, the possibility that parenting makes all the difference, or anything in between. Yet in almost every instance, the most extreme position - that parents are everything - is the only one researchers entertain.

Another example: To a biologist the first question to ask in understanding conflict between organisms of the same species is "How are they related?" In all social species, relatives are more likely to help each other, and nonrelatives are more likely to hurt each other. (That is because relatives share genes, so any gene that biases an organism to help a close relative will also, some of the time, be helping a copy of itself, and will thereby increase its own chances of prevailing over evolutionary time.)
But when the psychologists Martin Daly and Margo Wilson checked the literature on child abuse to see whether stepparents were more likely to abuse their children than biological parents, they discovered not only that no one had ever tested the possibility, but that most statistics on child abuse did not even record the information -stepparents and biological parents were lumped together, as if the difference couldn't possibly matter. When Daly and Wilson did track down the relevant statistics, their hunch was confirmed: Having a stepparent is the largest risk factor for child abuse ever examined.

The finding was by no means banal: Many parenting experts insist that the hostile stepparent is a myth originating in Cinderella stories, and that parenting is a "role" that anyone can take on. For agencies that monitor and seek to prevent child abuse the finding of a greater risk with stepparents could be critical information. But because of the refusal to entertain the idea that human emotions are products of evolution, no one had ever thought to check.

''*Reasonable'' Belief No. 2: For every question about nature and nurture, the correct answer is ''Some of each.''*

Not so. Take the question, "Why do people in England speak English, and people in Japan Japanese?" The "reasonable compromise" would be that the Japanese have genes that make it easier for them to learn Japanese (and vice versa for the English), but both groups must be exposed to the language to acquire it fully. This compromise, of course, is not reasonable at all; it's false. Immigrant children acquire the language of their adopted home perfectly, showing that people are not predisposed to learn the language of their ancestors (though they may be predisposed to learn language in general). The explanation for why people in different countries speak different languages is 100 percent environmental.

And sometimes the answer goes the other way. Autism, for example, used to be blamed on "refrigerator mothers" who did not emotionally engage with their children. Schizophrenia was thought to be caused by mothers who put their children in "double binds" (such as the Jewish mother who gave her son two shirts for his birthday, and when he turned up wearing one of them, said, "The other one you didn't like?"). Today we know that autism and schizophrenia are highly heritable, and though they are not completely determined by genes, the other likely contributors (toxins ,pathogens, chance events in brain development) have nothing to do with parenting. Mothers don't deserve "some" of the blame if their children have these disorders, as a nature-nurture compromise would imply; they deserve none of it.

''Reasonable'' Belief No. 3: Disentangling nature and nurture is a hopeless task, so we shouldn't even try.

On the contrary, perhaps the most unexpected and provocative discovery in 20th-century psychology came from an effort to distinguish nature and nurture in human development. For a long time, psychologists have studied individual differences in intellect and personality. They have assessed cognitive abilities using IQ tests, statistics on performance in school and on the job, and measurements of brain activity. They have assessed people's personalities using questionnaires, ratings by other people who know them well, and tallies of actual behavior such as divorces and brushes with the law. The measures suggest that our

personalities differ in five major ways. We are to varying degrees introverted or extroverted, neurotic or stable, incurious or open to experience, agreeable or antagonistic, and conscientious or undirected.

Where do these differences come from? Recall those flawed studies that test for the effects of parenting but forget to control for genetic relatedness. Behavioral geneticists have done studies that remedy those flaws and have discovered that intelligence, personality, overall happiness, and many other traits are partly (though never completely) heritable. That is, some of the variation in the traits among people in a given culture can be attributed to differences in their genes. The conclusion comes from three different kinds of research, each teasing apart genes and environment in a different way. First, identical twins reared apart (who share their genes but not their family environment) are far more similar to each other than randomly selected pairs of people. Second, identical twins reared together (who share their environment and all their genes) are more similar than fraternal twins reared together (who share their environment but only half their genes). Third, biological siblings reared together (who share their environment and half their genes) are more similar than adoptive siblings (who share their environment but none of their genes).

In each comparison, the more genes a pair of people share (holding environment more or less constant), the more similar they are. These studies have been replicated in large samples from many countries, and have ruled out the alternative explanations that have been proposed. Of course, concrete traits that patently depend on content provided by the home or culture are not heritable at all, such as the language you speak, the religion you worship in, and the political party you belong to. But the underlying talents and temperaments are heritable: how proficient with language you are, how receptive to religion, how hidebound or open to change.

So genes play a role in making us different from our neighbors, and our environments play an equally important role. At this point most people leap to the following conclusion: We are shaped both by our genes and by our family upbringing: how our parents treated us and what kind of home we grew up in.

Not so fast. "The environment" and "our parents and home" are not the same thing. Behavioral genetics allows us to distinguish two very different ways in which our environments might affect us. The shared environment is what impinges on us and our siblings alike: our parents, our home life, and our neighborhood (as compared with other parents and neighborhoods). The unique environment is everything else: anything that happens to us over the course of our lives that does not necessarily happen to our siblings.

Remarkably, study after study has failed to turn up appreciable effects of the shared environment - often to the shock and dismay of the researchers themselves, who started out convinced that the nongenetic variation in personality had to come from the family. First, they've found, adult siblings are equally similar whether they grew up together or apart. Second, adoptive siblings are no more similar than two people plucked off the street at random. And third, identical twins who grew up in the same home are no more similar than one would expect from the effects of their shared genes. Whatever experiences siblings share by growing up in the same home in a given culture makes little or no difference in the kind of people they turn out to be.

The implications, drawn out most clearly by Judith Rich Harris in her 1998 book "The Nurture Assumption," are mind-boggling. According to a popular saying, "as the twig is bent, so grows the branch." Patients in traditional forms of psychotherapy while away their 50 minutes reliving childhood conflicts and learning to blame their unhappiness on how their parents treated them. Many biographies scavenge through the subject's childhood for the roots of the grown-up's tragedies and triumphs. "Parenting experts" make women feel like ogres if they slip out of the house to work or skip a reading of "Goodnight Moon. " All these deeply held beliefs will have to be rethought. It's not that parents don't matter at all. Extreme cases of abuse and neglect can leave permanent scars. Skills like reading and playing a musical instrument can be imparted by parents. And parents affect their children's happiness in the home, their memories of how they were treated, and the quality of the lifelong relationship between parent and child. But parents don't seem to mold their children's intellects, personalities, or overall happiness for the rest of their lives.

The implications for science are profound as well. Here is a puzzle: Identical twins growing up together have the same genes, family environments, and peer groups, but the correlations in their traits are only around 50 percent. Ergo, neither genes nor families nor peer groups, nor the interactions among these factors, can explain what makes them different. Researchers have hunted for other possible causes, such as sibling rivalry or differential treatment by parents, but none has panned out. As with Bob Dylan's Mister Jones, something is happening here but we don't know what it is.

My own hunch is that the differences come largely from chance events in development. One twin lies one way in the womb and stakes out her share of the placenta, the other has to squeeze around her. A cosmic ray mutates a stretch of DNA, a neurotransmitter zigs instead of zags, the growth cone of an axon goes left instead of right, and one person's brain might gel into a slightly different configurationfrom another's, regardless of their genes.

If chance in development is to explain the less-than-perfect similarity of identical twins, it says something interesting about development in general. One can imagine a developmental process in which millions of small chance events cancel one another out, leaving no difference in the end product. One can imagine a different process in which a chance event could derail development entirely, or send it on a chaotic path resulting in a freak or a monster. Neither of these results occurs with a pair of identical twins. They are distinct enough that our instruments can pick up the differences, yet both are healthy instances of that staggeringly improbable, exquisitely engineered system we call a human being. The development of organisms must use complex feedback loops rather than prespecified blueprints. Random events can divert the trajectory of growth, but the trajectories are confined within an envelope of functioning designs for the species.

These profound questions are not about *nature vs. nurture*. They are about *nurture vs. nurture*: about what, exactly, are the nongenetic causes of personality and intelligence. But the questions would never have come to light if researchers had not first taken measures to factor out the influence of nature, by showing that correlations between parents and children cannot glibly be attributed to parenting but might be attributable to shared genes. That was the first step that led them to measure the possible effects of parenting empirically, rather than simply assuming that those effects had to be all-powerful.

The human brain has been called the most complex object in the known universe. No doubt many hypotheses that pit nature against nurture as a dichotomy, or that fail to distinguish the ways in which they might interact, will turn out to be simplistic or wrong. But that complexity does not mean we should fuzz up the issues by saying that it's all just too complicated to think about, or that some hypotheses should be treated a priori as necessarily true, necessarily false, or too dangerous to mention. As with other complex phenomena like inflation, cancer, and global warming, when it comes to the development of a human being we have no choice but to try to disentangle the causes.

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http://www.psychology.iastate.edu/~dgentile/Psy101_notes/nature%20or%20nurture.htm