

*NOTE: The reason this article is so **long** is to allow for breadth of evidence to be presented in the nature-nurture-chance debate.*

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## **Chapter 19 Children**

"THE NATURE-NURTURE DEBATE is over:"

So begins a recent article with a title, "Three Laws of Behavior Genetics and What They Mean," which is as audacious as its opening sentence. The nature-nurture debate is, of course, far from over when it comes to identifying the endowment shared by all human beings and understanding how it allows us to learn. But when it comes to the question of what makes people within the mainstream of a society different from one another—whether they are smarter or duller, nicer or nastier, bolder or shyer—the nature-nurture debate, as it has been played out for millennia, really is over, or ought to be.

In announcing that the nature-nurture debate is over, the psychologist Eric Turl is not just using the traditional mule-trainer's technique of getting his subjects attention, namely whacking them over the head with a two-by-four. He was summarizing a body of empirical results that are unusually robust by the standards of psychology. They have been replicated in many studies, several countries, and over four decades. As the samples grew (often to many thousands), the tools were improved, and the objections were addressed, the results were still there. The three laws of behavioral genetics may be the most important discoveries in the history of psychology. Yet most psychologists have not come to grips with them, and most intellectuals do not understand them, even when they have been explained in the cover stories of newsmagazines. It is not because the laws are abstruse: each can be stated in a sentence, without mathematical paraphernalia. Rather, it is because the laws run roughshod over the Blank Slate, and the Blank Slate is so entrenched that many intellectuals cannot comprehend an alternative to it, let alone argue about whether it is right or wrong.

Here are the three laws:

The First Law: All human behavioral traits are heritable.

The Second Law: The effect of being raised in the same family is smaller than the effect of the genes.

The Third Law: A substantial portion of the variation in complex human behavioral traits is not accounted for by the effects of genes or families.

The laws are about what make us what we are and thus they are about the forces that impinge on us in childhood, the stage of life in which it is thought that our intellects and personalities are formed. "Just as the twig is bent, the tree's inclined;" wrote Alexander Pope. "The child is father of the man;" wrote Wordsworth, echoing Milton's "The childhood shows the man as morning shows the day:" The Jesuits used to say, "Give me the child for the first seven years, and I'll give you the man;" and the motto was used as the tag line of the documentary film series by Michael Apted that follows a cohort of British children every seven years (Seven Up, Fourteen Up, and so on). In this chapter I will walk you through the laws and explore what they mean for nature, nurture, and none of the above.

THE FIRST LAW: All human behavioral traits are heritable. Let's begin at the beginning. What is a "behavioral trait"? In many studies it is a stable property of a person that can be measured by standardized psychological tests. Intelligence tests ask people to recite a string of digits backwards, define words like reluctant and remorse, identify what an egg and a seed have in common, assemble four triangles into a square, and extrapolate sequences of geometric patterns. Personality tests ask people to agree or disagree with statements like "Often I cross the street in order not to meet someone I know;" "I do not blame a person for taking advantage of someone who lays himself open to it;" "Before I do something I try to consider how my friends will react to it;" and "People say insulting and vulgar things about me." It sounds dodgy, but the tests have been amply validated: they give pretty much the same result each time a person is tested, (reliability) and they statistically predict what they ought to predict reasonably well (validity). IQ tests predict performance in school and on the job, and personality profiles correlate with other people's judgments of the person and with life outcomes such as psychiatric diagnoses, marriage stability, and brushes with the law.

In other studies behavior is recorded more directly. Graduate students hang out in a schoolyard with a stopwatch and clipboard observing what the children do. Pupils are rated for aggressiveness by several teachers, and the ratings are averaged. People report how much television they watch or how many cigarettes they smoke. Researchers tally cut-and-dried outcomes such as high school graduation rates, criminal convictions, or divorces.

Once the measurements are made, the variance of the sample may be calculated: the average squared deviation of each person's score from the group mean. The variance is a number that captures the degree to which the members of a group differ from one

another. For example, the variance in weight in a sample of Labrador retrievers will be smaller than the variance in weight in a sample that contains dogs of different breeds. Variance can be carved into pieces. It is mathematically meaningful to say that a certain percentage of the variance in a group overlaps with one factor (perhaps, though not necessarily, its cause), another percentage overlaps with a second factor and so on, the percentages adding up to 100. The degree of overlap may be measured as a correlation coefficient, a number between -1 and + 1 that captures the degree to which people who are high on one measurement are also high on another measurement. It is used in behavioral genetic research as an estimate of the proportion of variance accounted for by some factor.

Heritability is the proportion of variance in a trait that correlates with genetic differences. It can be measured in several ways. The simplest is to take the correlation between identical twins who were separated at birth and reared apart. They share all their genes and none of their environment (relative to the variation among environments in the sample), so any correlation between them must be an effect of their genes. Alternatively, one can compare identical twins reared together, who share all their genes and most of their environment, with fraternal twins reared together, who share half their genes and most of their environment (to be exact, they share half of the genes that vary among the people within the sample - obviously they share all the genes that are universal across the human species). If the correlation is higher for pairs of identical twins, it presumably reflects an effect of the extra genes they have in common. The bigger the difference between the two correlations, the higher the heritability estimate. Yet another technique is to compare biological siblings, who share half their genes and most of their environment, with adoptive siblings, who share none of their genes (among those that vary) and most of their environment.

The results come out roughly the same no matter what is measured or how it is measured. Identical twins reared apart are highly similar; identical twins reared together are more similar than fraternal twins reared together; biological siblings are far more similar than adoptive siblings. All this translates in substantial heritability values, generally between .25 and .75. A conventional summary is that about half of the variation in intelligence, personality, and life outcomes is heritable - a correlate or an indirect product of the genes.

It's hard to be much more precise than that, because heritability values vary within this range for a number of reasons. One is whether measurement error (random noise) is included in the total variance to be explained or is estimated and pulled out of the equation. Another is whether all the effects of the genes are being estimated or only the additive effects: the ones that exert the same influence regardless of the person's other

genes (in other words, the genes for traits that breed true). A third is how much variation there was in the sample to begin with: samples with homogeneous environments give large heritability estimates, those with varied environments give smaller ones. A fourth is when in the person's lifetime a trait is measured. The heritability of intelligence, for example, increases over the lifespan, and can be as high as 0.8 late in life. Forget "As the twig is bent"; think, "Omigod, I'm turning into my parents!"

"All traits are heritable" is a bit of an exaggeration, but not by much. Concrete behavioral traits that patently depend on content provided by the home or culture are, of course, not heritable at all: which language you speak, which religion you worship in, which political party you belong to. But behavioral traits that reflect the underlying talents and temperaments are heritable: how proficient with language you are, how religious, how liberal or conservative. General intelligence is heritable, and so are the five major ways in which personality can vary (summarized by the acronym OCEAN): open-ness to experience, conscientiousness, extroversion-introversion, antagonism-agreeableness, and neuroticism. And traits that are surprisingly specific turn out to be heritable, too, such as dependence on nicotine or alcohol, number of hours of television watched, and likelihood of divorcing. Finally there are the Mallifert brothers in Chas Addams's patent office and their real-world counterparts: the identical twins separated at birth who both grew up to be captains of their volunteer fire departments, who both twirled their necklaces when answering questions, or who both told the researcher picking them up at the airport (separately) that a wheel bearing in his car needed to be replaced.

I once watched an interview in which Marlon Brando was asked about the childhood influences that made him an actor. He replied that identical twins separated at birth may both use the same hair tonic, smoke the same brand of cigarettes, vacation on the same beach, and so on. The interviewer, Connie Chung, pretended to snore as if she were sitting through a boring lecture, not realizing that he was answering her question—or, more accurately, explaining why he couldn't answer it. As long as the heritability of talents and tastes is not zero, none of us has any way of knowing whether a trait has been influenced by our genes, our childhood experiences, both, or neither. Chung is not alone her failure to understand this point. The First Law implies that any study that measures something in parents and something in their biological children and then draws conclusions about the effects of parenting is worthless, because the correlations may simply reflect their shared genes (aggressive parents may breed aggressive children, talkative parents talkative children). But these expensive studies continue to be done and continue to be translated into parenting advice as if the heritability of all traits were zero. Perhaps Brando should be asked to serve on grant review panels.

Behavioral genetics does have its critics, who have tried to find alternative interpretations for the First Law. Perhaps children separated at birth are deliberately placed in similar adoptive families. Perhaps they have contact with each other during their separation. Perhaps parents expect identical twins to be more alike and so treat them more alike. Twins share a womb, not just their genes, and identical twins sometimes share a chorion (the membrane surrounding the fetus) and a placenta as well. Perhaps it is their shared prenatal experience, not their shared genes, that makes them more alike.

These possibilities have been tested, and though in some cases they may knock down a heritability estimate by a few points, they cannot reduce it by much. The properties of adoptive parents and homes have been measured (their education, socioeconomic status, personalities, and so on), and they are not homogeneous enough to force identical twins into the same personalities and temperaments. Identical twins are not earmarked for homes that both encourage twirling necklaces or sneezing in elevators. More important, the homes of identical twins who were separated at birth are no more similar than the homes of fraternal twins who were separated at birth, yet the identical twins are far more similar. And most important of all, differences in home environments do not produce differences in grown children's intelligence and personality anyway (as we shall see in examining the Second Law), so the argument is moot.

As for contact between separated twins, it is unlikely that an occasional encounter between two people could revamp their personality and intelligence, but in any case the amount of contact turns out to have no correlation with the twins' degree of similarity. What about the expectations of parents, friends, and peers? A neat test is provided by identical twins who are mistakenly thought to be fraternal until a genetic test shows otherwise. If it is expectations that make identical twins alike, these twins should not be alike; if it is the genes, they should be. In fact the twins are as alike as when the parents know they are identical. And direct measures of how similarly twins are treated by their parents do not correlate with measures of how similar they are in intelligence or personality. Finally, sharing a placenta can make identical twins more different, not just more similar (since one twin can crowd out the other), which is why studies have shown little or no consistent effect of sharing a placenta. But even if it were to make them more similar, the inflation of heritability would be modest. As the behavioral geneticist Matt McGue noted of a recent mathematical model that tried to use prenatal effects to push down heritability estimates as much as possible, "That the IQ debate now centers on whether IQ is 50% or 70% heritable is a remarkable indication of how the nature-nurture debate has shifted over the past two decades." In any case, studies comparing adoptees with biological siblings don't look at twins at all, and they come to

the same conclusions as the twin studies, so no peculiarity of twinhood is likely to overturn the First Law. .

Behavioral genetic methods do have three built-in limitations. First, studies of twins, siblings, and adoptees can help explain what makes people different, but they cannot explain what people have in common, that is, universal human nature. To say that the heritability of intelligence is .5, for example, does not imply that half of a person's intelligence is inherited (whatever that would mean); it implies only that half of the variation among people is inherited.

Second, behavioral genetic methods address variation within the group of people being examined, not variation between groups of people. If the twins or adoptees in a sample are all middle-class American whites, a heritability estimate can tell us about why middle-class American whites differ from other middle-class American whites, but not why the middle class differs from the lower or upper class, why Americans differ from non-Americans, or why whites differ from Asians or blacks.

Third, behavioral genetic methods can show only that traits correlate with genes, not that they are directly caused by them. The methods cannot distinguish traits that are relatively direct products of the genes—the result of genes that affect the wiring or metabolism of the brain—from traits that are highly indirect products, say, the result of having genes for a certain physical appearance. We know that tall men on average are promoted in their jobs more rapidly than short men, and that attractive people on average are more assertive than unattractive ones. (In one experiment, subjects undergoing a fake interview had to cool their heels when the interviewer was called out of the room by a staged interruption. The plain-looking subjects waited nine minutes before complaining; the attractive ones waited three minutes and twenty seconds.) Presumably people defer to tall and good-looking people, and that makes them more successful and entitled. Height and looks are obviously heritable, so if we didn't know about the effects of looks, we might think that these people's success comes directly from genes for ambition and assertiveness instead of coming indirectly from genes for long legs or a cute nose. The moral is that heritability always has to be interpreted in the light of all the evidence; it does not wear its meaning on its sleeve. That having been said, we know that the heritability of personality cannot, in fact, be reduced to genes for appearance. The effects of looks on personality are small and limited; blond jokes notwithstanding, not all attractive women are vain and entitled. The heritability of personality traits, in contrast, is large and pervasive, too large to be explained away as a by-product of looks. With the completion of the Human Genome Project, it is likely that geneticists soon will be discovering more of those linkages.

The First Law is a pain in the neck for radical scientists, who have tried unsuccessfully to discredit it. In 1974, Leon Kamin wrote that 'there exist no data which should lead a prudent man to accept the hypothesis that IQ test scores are in any degree heritable' : a conclusion he reiterated with Lewontin and Rose a decade later. Even in the 1970s the argument was tortuous, but by the 1980s it was desperate and today it is a historical curiosity. As usual, the attacks have not always come in dispassionate scholarly analyses. Thomas Bouchard, who directed the first large-scale study of twins reared apart, is one of the pioneers of the study of the genetics of personality. Campus activists at the University of Minnesota distributed handouts calling him a racist and linking him to German fascism: spray-painted slogans calling him a Nazi, and demanded that he be fired. The psychologist Barry Mehler accused him of "rehabilitating" the work of Josef Mengele, the doctor who tormented twins in the Nazi death camps under the guise of research. As usual, the charges were unfair not just intellectually but personally: far from being a fascist, Bouchard was a participant in the Berkeley Free Speech Movement of the 1960s, was briefly jailed for his activism, and says he would do it again today. These attacks are transparently political and easy to discount. More pernicious is the way that the First Law is commonly interpreted: "So you're saying it's all in the genes:' or, more angrily, "Genetic determinism!" I have already commented on this odd reflex in modern intellectual life: when it comes to genes, people suddenly lose their ability to distinguish 50 percent from 100 percent, "some" from "all:" "affects" from "determines." More misunderstood, however, are the effects of the environment.

THE SECOND LAW: The effect of being raised in 'the same family is smaller than the effect of the genes. By now you appreciate that our genes play a role in making us different from our neighbors, and that our environments play an equally important role. At this point everyone draws the same 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. 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 in the sample). The nonshared or unique environment is everything else: anything that impinges on one sibling but not another, including parental favoritism (Mom always liked you best), the presence of the other siblings, unique experiences like falling off a bicycle or being infected by a virus, being in a different school and for that matter anything that happens to us over the course of our lives that does not necessarily happen to our siblings.

The effects of the shared environment can be measured in twin studies by subtracting the heritability value from the correlation between the identical twins. The rationale is

that identical twins are alike (measured by the correlation) because of their shared genes (measured by the heritability) and their shared environment, so the effects of the shared environment can be estimated by subtracting the heritability from the correlation. Alternatively, the effects can be estimated in adoption studies simply by looking at the correlation between two adoptive siblings: they do not share genes, so any similarities (relative to the sample) must come from the experiences they shared growing up in the same home. A third technique is to compare the correlation between siblings reared together (who share genes and a home environment) with the correlation between siblings reared apart (who share only genes).

The effects of the unique environment can be measured by subtracting the correlation between identical twins (who share genes and an environment) from 1 (which is the sum of the effects of the genes, the shared environment, and the unique environment). By the same reasoning, it can be measured in adoption studies by subtracting the heritability estimate and the shared-environment estimate from 1. In practice all these calculations are more complicated, because they may try to account for nonadditive effects, where the whole is not the sum of the parts, and for noise in the measurements. But you now have the basic logic behind them.

So what do we find? The effects of shared environment are small (less than 10 percent of the variance), often not statistically significant, often not replicated in other studies, and often a big fat zero. Turkheimer was cautious in saying that the effects are smaller than those of the genes. Many behavioral geneticists go farther and say that they are negligible, particularly in adulthood. (IQ is affected by the shared environment in childhood, but over the years the effect peters out to nothing.)

Where do these conclusions come from? The actual findings are easy to understand. First, 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 are no more similar than one would expect from the effects of their shared genes. As with the First Law, the sheer consistency of the outcome across three completely different methods (comparisons of identical with fraternal twins, of siblings raised together with siblings raised apart, of adoptive siblings with biological siblings) emboldens one to conclude that the pattern is real. Whatever experiences siblings share by growing up in the same home makes little or no difference in the kind of people they turn out to be. An important proviso. Differences among homes don't matter within the samples of homes netted by these studies, which tend to be more middle-class than the population as a whole. But differences between those samples and other kinds of homes could matter. The studies exclude cases of criminal neglect, physical and sexual abuse, and abandonment in a bleak orphanage, so they do not show

that extreme cases fail to leave scars. Nor can they say anything about the differences between cultures - about what makes a child a middle-class American as opposed to a Yanomamo warrior or a Tibetan monk or even a member of an urban street gang. In general, if a sample comes from a restricted range of homes, it may underestimate effects of homes across a wider range. Despite these caveats, the Second Law is by no means trivial. The "middle class" (which includes most adoptive parents) can embrace a wide range of lifestyles, from fundamentalist Christians in the rural Midwest to Jewish doctors in Manhattan, with very different home environments and childrearing philosophies. Behavioral geneticists have found that their samples of parents in fact span a full range of personality types. And even if adoptive parents are unrepresentative in some other way, the Second Law would survive because it emerges from large studies of twins as well. Though samples of adoptive parents span a narrower (and higher) range of IQs than the population at large, that cannot explain why the IQs of their adult children are uncorrelated, because they were correlated when the children were young. Before exploring the revolutionary implications of these discoveries, let's turn to the Third Law.

**THE THIRD LAW:** A substantial portion of the variation in complex human behavioral traits is not accounted for by the effects of genes or families. This is around 50 percent, depending as always on what is being measured and exactly how it is estimated. Concretely, this means that identical twins reared together (who share both their genes and a family environment) are far from identical in their intellects and personalities. There must be causes that are neither genetic nor common to the family that make identical twins different and, more generally, make people what they are. As with Bob Dylan's Mister Jones, something is happening here but we don't know what it is.

A handy summary of the three laws is this: Genes : 40-50 percent, Shared Environment : 0-10 percent, Unique Environment : 50 percent). A simple way of remembering what we are trying to explain is this: identical twins are 50 percent similar whether they grow up together or apart.

**THOUGH BEHAVIORAL GENETICISTS** have known about the heritability of mental traits (First Law) for decades, it took a while for the absence of effects of the shared environment (Second Law) and the magnitude of the effects of the unique environment (Third Law) to sink in. Robert Plomin and Denise Daniels first sounded the alarm in a 1987 article called "Why Are Children in the Same Family So Different from One Another?" The enigma was noted by other behavioral geneticists such as Thomas Bouchard, Sandra Scarr, and David Lykken and spotlighted again by David Rowe in his 1994 book *The Limits of Family Influence*. It was also the springboard for the historian Frank Sulloway's widely discussed 1996 book on birth order and revolutionary

temperament, Born to Rebel. Still, few people outside behavioral genetics really appreciated the importance of the Second and Third Laws.

It all hit the fan in 1998 when Judith Rich Harris, an unaffiliated scholar (whom the press quickly dubbed "a grandmother from New Jersey"), published 'The Nurture Assumption', A Newsweek cover story summed up the topic: "Do Parents Matter? A Heated Debate About How Kids Develop." Harris brought the three laws out of the journals and tried to get people to recognize their implications: that the conventional wisdom about childrearing among experts and laypeople alike is wrong. It was Rousseau who made parents and children the main actors in the human drama. Children are noble savages, and their upbringing and education can either allow their essential nature to blossom or can saddle them with the corrupt baggage of civilization. Twentieth-century versions of the Noble Savage and the Blank Slate kept parents and children at center stage. The behaviorists claimed that children are shaped by contingencies of reinforcement, and advised parents not to respond to their children's distress because it would only reward them for crying and increase the frequency of crying behavior. Freudians theorized that we are shaped by our degree of success in weaning, toilet training, and identification with the parent of the same sex, and advised parents not to bring infants into their beds because it would arouse damaging sexual desires. Everyone theorized that psychological disorders could be blamed on mothers: autism on their coldness, schizophrenia on their "double binds;" anorexia on their pressure on girls to be perfect. Low self-esteem was attributed to "toxic parents" and every other problem to "dysfunctional families." Patients in many forms of psychotherapy while away their fifty minutes reliving childhood conflicts, and most biographies scavenge through the subject's childhood for the roots of the grownup's tragedies and triumphs.

By now most well-educated parents believe that their children's fates are in their hands. They want their children to be popular and self-confident, to get good grades and stay in school, to avoid drugs, alcohol, and cigarettes, to avoid getting pregnant or fathering a child while a teenager, to stay on the right side of the law, and to become happily married and professionally successful. A parade of parenting experts has furnished them with advice, ever changing in content, never changing in certitude, on how to attain that outcome. The current recipe runs something like this. Parents should stimulate their babies with colorful toys and varied experiences. ("Take them outside. Let them feel tree bark;" advised a pediatrician who shared a couch with me on a morning television show.) They should read and talk to their babies as much as possible to foster their language development. They should interact and communicate with their children at all ages, and no amount of time is too much. ("Quality time;" the idea that working parents could spend an intense interlude with their children between

dinner and bedtime to make up for their absence during the day, quickly became a national joke; it was seen as a rationalization by mothers who would not admit that their careers were compromising their children's welfare.) Parents should set firm but reasonable limits, neither bossing their children around nor giving them complete license. Physical punishment of any kind is out, because that perpetuates a cycle of violence. Nor should parents belittle their children or say that they are bad, because that will damage their self-esteem. On the contrary, they should shower them with hugs and unconditional affirmations of love and approval. And parents should communicate intensively with their adolescent children and take an interest in every aspect of their lives.

A few parents have begun to question the imperative to become round-the-clock parenting machines. A recent cover story in Newsweek entitled "The Parent Trap" reported on the frazzled mothers and fathers who devote every nonworking minute to entertaining and chauffeuring their children for fear that they will otherwise turn into ne'er-do-wells or cafeteria snipers.

The humorist Dave Barry comments on the experts' advice to parents of adolescents:

In addition to watching for warning signs, you must "keep the lines of communication open" between yourself and your child. Make a point of taking an interest in the things your child is interested in so that you can develop a rapport, as we see in this dialogue:

FATHER: What's that music you're listening to, son?

SON: It's a band called "Limp Bizkit," Dad.

FATHER: They suck.

Backlash aside, is it possible that the experts' advice might be sound? Perhaps the parent trap is the mixed blessing of scientists' knowing more and more about the effects of parenting. Parents can be forgiven for carving out some time for themselves, but if the experts are right they must realize that every such decision is a compromise.

So what do we really know about the long-term effects of parenting? Natural variation among parents, the raw material of behavioral genetics, offers one way of finding out. In any large sample of families, parents vary in how well they adhere to the ideals of parenting (if some didn't stray from the ideal, there would be no point in offering advice). Some mothers stay at home, others are workaholics. Some parents lose their tempers, others are infinitely patient. Some are garrulous, others taciturn; some unreserved in their affection, others more guarded. (As one academic said to me after

pulling out a picture of her toddler, "We virtually adore her:") Some homes are filled with books, others with blaring TV sets; some couples are lovey-dovey, others fight like Maggie and Jiggs. Some mothers are like June Cleaver, others are depressed or histrionic or disorganized. According to the conventional wisdom, these differences should make a difference. At a bare minimum, two children growing up in one of these homes - with the same mother, father, books, TV s, and everything else - should turn out more similar, on average, than two children growing up in different homes.

But they don't. Remember the discoveries behind the Second Law. Siblings reared together end up no more similar than siblings separated at birth. Adopted siblings are no more similar than strangers. And the similarities between siblings can be completely accounted for by their shared genes. All those differences among parents and homes have no predictable long-term effects on the personalities of their children. Not to put too fine a point on it, but much of the advice from the parenting experts is flapdoodle.

But surely the expert parenting advice is grounded in research on children's development? Yes, from the many useless studies that show a correlation between the behavior of parents and the behavior of their biological children and conclude that the parenting shaped the child, as if there were no such thing as heredity. And in fact the studies are even worse than that. As any parent of more than one child knows, children are not indistinguishable lumps of raw material waiting to be shaped. They are little people, born with personalities. And people react to the personalities of other people, even if one is a parent and the other a child. The parents of an affectionate child may return that affection and thereby act differently from the parents of a child who squirms and wipes off his parents' kisses. The parents of a quiet, spacey child might feel they are talking to a wall and jabber at him less. The parents of a docile child can get away with setting firm but reasonable limits; the parents of a hellion might find themselves at their wits' end and either lay down the law or give up. In other words, correlation does not imply causation. A correlation between parents and children does not mean that parents affect children; it could mean that children affect parents, that genes affect both parents and children, or both.

It gets worse. In many studies, the same parties (in some studies the parents, in others the children) supply the data on both the parents' behavior and the child's. Parents tell the experimenter how they treat their children and what their children are like, or adolescents tell the experimenter what they are like and how their parents treat them. Those studies-suspiciously-show much stronger correlations than ones in which a third party assesses the parents and the child. The problem is not just that people tend to look at themselves and at their families through the same rose-colored or jaundiced lenses, but also that the relationship between parents and adolescents is a two-way street.

Yet another problem crops up when researchers direct all their questions to the parents rather than to the offspring. People behave differently in different settings. That includes children, who tend to behave differently inside and outside the home. So even if parents' behavior does affect how their children behave with them, it may not affect how their children behave with other people. When parents describe their children's behavior, they describe the behavior they see in the home. To show that parents shape their children, then, a study would have to control for genes (by testing twins or adoptees), distinguish between parents affecting children and children affecting parents, measure the parents and the children independently, look at how children behave outside the home rather than inside, and test older children and young adults to see whether any effects are transient or permanent. No study that has claimed to show effects of parenting has met these standards.

What about studies that compare radically different childhood milieus? The results again, are bracing. Decades of studies have shown that, all things being equal, children turn out pretty much the same way whether their mothers worked or stayed home, whether they were placed in day care or not, whether they have siblings or are only children, whether their parents have a conventional or open marriage, whether they grow up in an Ozzie and Harriet home or a hippy community.

Even growing up without a father in the house, which does correlate with troubles such as dropping out of school, remaining idle, and having babies while a teenager, may not cause the troubles directly. Children with experiences that should make up for the missing father, such as having a stepfather, a live-in grandmother, or frequent contact with the birth father, are no better off. The number of years that the father was in the house before leaving makes no difference. And children whose fathers died do not have the poor outcomes of children whose fathers walked out or were never there. The absence of a father may not be a cause of adolescent problems but a correlate of the true

causes, which may include poverty, neighborhoods with lots of unattached men (who live in de facto polygyny and hence compete violently for status), frequent moves (which force children to start from the bottom of the pecking order in new peer groups), and genes that make both fathers and children more impulsive and quarrelsome.

So nothing in the research on family environments contradicts the behavioural geneticist's Second Law which says that growing up in a particular family has little or no systematic effect on one's intellect and personality. And this leaves us with a maddening puzzle. No, it's not all in the genes; around half the variation in personality, intelligence, and behavior comes from something in the environment. But whatever that something is, it cannot be shared by two children growing up in the same home with the

same parents. And that rules out all the obvious somethings. What is the elusive Mister Jones factor?

REFUSING TO GIVE up on parents, some developmental psychologists have trained their sights on the only remaining possibility that gives parents a starring role. The impotence of the shared environment says only that what parents do to all their children is powerless to shape them. But obviously parents don't treat their children alike. Perhaps the individualized parenting that mothers and fathers adapt to each child does have the power to shape them. It is the interaction between parents and children that affects them, not a one-size-fits-all parenting philosophy.

Here is what would have to happen if the effects of the unique environment are to be explained by an interaction between parents and children (using the statistician's technical sense of the word "interaction;" which is the one relevant to our puzzle). A given practice would have to affect some children one way, and other children another way, and the two effects would have to cancel out. For example, sparing the rod would have to spoil some children (making them more violent) and teach others that violence is not a solution (making them less violent). Displays of affection would have to make some children more affectionate (because they identify with their parents) and others less affectionate (because they react against their parents). The reason the effects have to go in opposite directions is that if a parenting practice had a consistent effect, on average, across all children, it would turn up as an effect of the shared environment. Adopted siblings would be similar, sibs growing up together would be more similar than sibs growing up apart-neither of which happens. And if it was applied successfully to some kinds of children and was avoided, or was ineffective, with other kinds, that would turn up as an effect of the genes. The problems with the parent-child interaction idea now become obvious. It is implausible that any parenting process would have such radically different effects on different children that the sum of the effects (the shared environment) would add up to zero. If hugging merely makes some children more confident and has no effect on others, then the huggers should still have more confident children on average (some becoming more confident, others showing no change) than the cold fish. But, holding genes constant, they don't. (To put it in technical terms familiar to psychologists: it is rare to find a perfect crossover interaction, that is, an interaction with no main effects.) This is also, by the way, one of the reasons that heritability itself almost certainly cannot be reduced to child-specific parenting. Unless parents' behavior is completely determined by their child's inborn traits, some parents will behave somewhat differently from others across the board, and that would turn up in effects of the shared environment-which in fact are negligible. The moral would be that across-the-board parenting advice is useless. Anything that parents do to make some children better will make an equal number of children worse.

In any case, the parent-child interaction theory can be tested directly. Psychologists can measure how parents treat the different children within a family, and see if the treatments correlate with how the children turn out, holding genes constant. The answer is that in almost every case they don't. Virtually all the differences in parenting within a family can be explained as reactions to genetic differences that the children were born with. And parental behavior that does differ among children for nongenetic reasons, such as marital conflict triggered by some siblings but not by others, or more parenting effort directed at one sibling than at another, has no effect. The leader of a recent heroic study, who had hoped to prove that differences in parenting do affect how children turn out, confessed that he was "shocked" by his own results.

There is another way that a home environment could differ among children in the same family for reasons having nothing to do with their genes: birth order. A firstborn usually has several years of undivided parental attention with no annoying siblings around. Laterborns have to compete with their siblings for parental attention and other family resources, and have to figure out how to hold their own against stronger and more entrenched competitors. In *Born to Rebel*, Sulloway predicted that firstborns should parlay their advantages into a more assertive personality. And because they identify with their parents, and by extension with the status quo, they should grow up to be more conservative and conscientious. Laterborns, in contrast, should be more conciliatory and open to new ideas and experiences. Though family therapists and laypeople have had these impressions for a long time, Sulloway tried to explain them in terms of Trivers's theory of parent-offspring conflict and its corollary, sibling rivalry. He found some support for these ideas in a meta-analysis (a quantitative literature review) of studies of birth order and personality.

Sulloway's theory, however, also requires that children use the same strategies outside the home-with their peers and colleagues-as the ones that served them well inside the home. Tactics that work on a sibling or parent may not work so well on a colleague or stranger. And in fact subsequent analyses have shown that any effects of birth order on personality turn up in the studies that ask siblings or parents to rate one another, or to rate themselves with respect to a sibling, which of course can assess only their family relationships. When personality is measured by neutral parties outside the family, birth-order effects diminished or disappear. Any difference in the parenting of firstborns and laterborns-novice or experienced parents, divided or undivided attention, pressure to carry on the family legacy or indulgent babying-seem to have little or no effect on personality outside the home. Similarities within a home don't shape children; differences within a home don't shape children. Perhaps, Harris says, we should look outside the home.

IF YOU GREW up in a different part of the world from where your parents grew up, consider this question: Do you sound like your parents, or like the people you grew up with? What about the way you dress, or the music you listen to, or the way you spend your free time? Consider the same question about your children if they grew up in a different part of the world from where you grew up-or for that matter, even if they didn't. In almost every case, people model themselves after their peers, not their parents.

This is Harris's explanation of the elusive environmental shaper of personality, which she calls Group Socialization theory. It's not all in the genes, but what isn't in the genes isn't from the parents either. Socialization-acquiring the norms and skills necessary to function in society-takes place in the peer group. Children have cultures, too, which absorb parts of the adult culture and also develop values and norms of their own. Children do not spend their waking hours trying to become better and better approximations of adults. They strive to be better and better children, ones that function well in their own society. It is in this crucible that our personalities are formed. Multidecade, child-obsessed parenting, Harris points out, is an evolutionarily recent practice. In foraging societies, mothers carry their children on their hips or backs and nurse them on demand until the next child arrives two to four years later. The child is then dumped into a play group with his older siblings and cousins, switching from being the beneficiary of almost all of the mother's attention to almost none of it. Children sink or swim in the milieu of other children.

Children are not just attracted to the norms of their peers; to some degree they are immune to the expectations of their parents. The theory of parent- offspring conflict predicts that parents do not always socialize a child in the child's best interests. So even if children acquiesce to their parents' rewards, punishments, examples, and naggings for the time being-because they are smaller and have no choice-they should not, according to the theory, allow their personalities to be shaped by these tactics. Children must learn what it takes to gain status among their peers, because status at one age gives them a leg up in the struggle for status at the next, including the young-adult stages in which they first compete for the attention of the opposite sex.

In traditional cultures, mothers don't say much to their children until they are old enough to hold up their end of the conversation; the children pick up language from other children. People's accents almost always resemble the accents of their childhood peers, not the accents of their parents. Children of immigrants acquire the language of their adopted homeland perfectly, without a foreign accent, as long as they have access to native speaking peers. They then try to force their parents to switch to the new language, and if they succeed, they may forget the mother tongue entirely. The same is

true of hearing children of deaf parents, who learn the spoken language of their community without a hitch. Children thrown together without a common language from the grownups will quickly invent one; that is how creole languages, and the signed languages of the deaf, came into being. Children of immigrants soak up not just the language of their adopted homeland but the culture as well. For their entire lives, my shtetl-born grand- parents were strangers in a strange land. Cars, banks, doctors, schools, and the urban concept of time left them baffled, and if the term "dysfunctional family" had been around in the 1930s and 1940s it would surely have applied to them. Nevertheless, my father, growing up in a community of immigrants who had arrived in different decades, gravitated to other children and families who knew the ropes, and ended up happy and successful. Such stories are common in chronicles of the immigrant experience. So why do we insist that children's parents are the key to how they turn out? Studies also confirm what every parent knows but what no one bothers to reconcile with theories of child development: that whether adolescents smoke, get into scrapes with the law, or commit serious crimes depends far more on what their peers do than on what their parents: "If teenagers wanted to be like adults they wouldn't be shoplifting nailpolish from drugstores or hanging off overpasses to spray I LOVE YOU LI2A on the arch. If they really aspired to 'mature status' they would be doing boring adult things like sorting the laundry and figuring out their income taxes."

Children who grow up in the same home tend to resemble each other in their vulnerability to delinquency, regardless of how closely related they are. But that similarity only holds if they are close in age and spend time together outside the home- which suggests they belong to the same peer group. And in a large Danish adoption study, the biological children of convicts were somewhat more likely to get into trouble than the biological children of law-abiding citizens, which suggests a small across-the-board effect of the genes. But the susceptibility to crime was multiplied if they were adopted by parents who were criminals themselves and who lived in a large city, which suggests that the genetically at-risk children grew up in a high-crime neighborhood.

It's not that parents "don't matter." In many ways parents matter a great deal. For most of human existence, the most important thing parents did for their children was keep them alive. Parents can certainly harm their children by abusing or neglecting them. Children appear to need some kind of nurturing figure in their early years, though it needn't be a parent, and possibly not even an adult: young orphans and refugees often turn out relatively well if they had the comfort of other children, even if they had no parents or other adults around them. (This does not mean that the children were happy, but contrary to popular belief, unhappy children do not necessarily turn into dysfunctional adults.) Parents select an environment for their children and thereby select a peer group. They provide their children with skills and knowledge, such as

reading and playing a musical instrument. And they certainly may affect their children's behavior in the home, just as any powerful people can affect behavior within their fiefdom. But parents' behavior does not seem to shape their children's intelligence or personality over the long term.

HAS HARRIS solved the mystery of the Third Law, the unique environment that comes neither from the genes nor from the family? Not exactly. I am convinced that children are socialized-that they acquire the values and skills of the culture-in their peer groups, not their families. But I am not convinced, at least not yet, that peer groups explain how children develop their personalities: why they turn out shy or bold, anxious or confident, open- minded or old-school. socialization and the development of personality are not the same thing, and peers may explain the first without necessarily explaining the second.

One way that peers could explain personality is that children in the same family may join different peer groups-the jocks, the brains, the preppies, the punks, the Goths-and assimilate their values. But then how do children get sorted into peer groups? If it is by their inborn traits-smart kids join the brains, aggressive kids join the punks, and so on-then effects of the peer group would show up as indirect effects of the genes, not as effects of the unique environment. If it is their parents' choice of neighborhoods, it would turn up as effects of the shared environment, because siblings growing up together share a neighborhood as well as a set of parents. In some cases, as with delinquency and smoking, the missing variance might be explained as an interaction between genes and peers: violence-prone adolescents become violent only in dangerous neighborhoods, addiction-prone children become smokers only in the company of peers who think smoking is cool. But those interactions are unlikely to explain most of the differences among children. Let's return to our touchstone: identical twins growing up together. They share their genes, they share their family environments, and they share their peer groups, at least on average. But the correlations between them are only around 50 percent. Ergo, neither genes nor families nor peer groups can explain what makes them different

. Harris is forthcoming about this limitation, and suggests that children differentiate themselves within a peer group, not by their choice of a peer group. Within each group, some become leaders, others foot soldiers, still others jesters, loose cannons, punching bags, or peacemakers, depending on what niche is available, how suited a child is to filling it, and chance. Once a child acquires a role, it is hard to shake it off, both because other children force the child to stay in the niche and because the child specializes in the skills necessary to prosper in it. This part of the theory, Harris notes, is untested, and

difficult to test, because the crucial first step-which child fills which niche in which group-is so capricious.

The filling of niches in peer groups, then, is largely a matter of chance. But once we allow Lady Luck into the picture, she can act at other stages in life. When reminiscing on how we got to where we are, we all can think of forks in the road where we could have gone on very different life paths. If I hadn't gone to that party, I wouldn't have met my spouse. If I hadn't picked up that brochure, I wouldn't have known about the field that would become my life's calling. If I hadn't answered the phone, if I hadn't missed that flight, if only I had caught that ball. Life is a pinball game in which we bounce and graze through a gantlet of chutes and bumpers. Perhaps our history of collisions and near misses explains what made us what we are. One twin was once beaten up by a bully, the other was home sick that day. One inhaled a virus, the other didn't. One twin got the top bunk bed, the other got the bottom bunk bed.

We still don't know whether these unique experiences leave their finger-prints on our intellects and personalities. But an even earlier pinball game certainly could do so, the one that wires up our brain in the womb and early childhood. As I have mentioned, the human genome cannot possibly specify every last connection among neurons. But the "environment," in the sense of information encoded by the sense organs, isn't the only other option. Chance is another. 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 identical twin's brain might gel into a slightly different configuration from the other's. We know this happens in the development of other organisms. Even genetically homogeneous strains of flies, mice, and worms, raised in monotonously controlled laboratories, can differ from one another. A fruit fly may have more or fewer bristles under one wing than its bottlemates. One mouse may have three times as many oocytes (cells destined to become eggs) as her genetically identical sister reared in the same lab. One roundworm may live three times as long as its virtual clone in the next dish. The biologist Steven Austad commented on the roundworms' lifespans: "Astonishingly, the degree of variability they exhibit in longevity is not much less than that of a genetically mixed population of humans, who eat a variety of diets, attend to or abuse their health, and are subject to all the vagaries of circumstance-car crashes, tainted beef, enraged postal workers-of modern industrialized life." And a roundworm is composed of only 959 cells! A human brain, with its hundred billion neurons, has even more opportunities to be buffeted by the outcomes of molecular coin flips.

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 developmental path resulting in a freak or a monster. Neither of these happens to identical twins. They are distinct enough that our crude 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. Biologists refer to such developmental dynamics as robustness, buffering, or canalization.

If the nongenetic component of personality is the outcome of neurodevelopmental roulette, it would present us with two surprises. One is that just as the "genetic" term in the behavioral geneticist's equation is not necessarily genetic, the "environmental" term is not necessarily environmental. If the unexplained variance is a product of chance events in brain assembly, yet another chunk of our personalities would be "biologically determined" (though not genetic) and beyond the scope of the best-laid plans of parents and society.

The other surprise is that we may have to make room for a pre-scientific explanatory concept in our view of human nature-not free will, as many people have suggested to me, but fate. It is not free will because among the traits that may differ between identical twins reared together are ones that are stubbornly involuntary. No one chooses to become schizophrenic, homosexual, musically gifted, or, for that matter, anxious or self-confident or open to experience. But the old idea of fate-in the sense of uncontrollable fortune, not strict predestination-can be reconciled with modern biology once we remember the many openings for chance to operate in development. Harris, quotes a woman living in a remote area of India in the 1950's. When asked what kind of man she hoped her child would grow into, she shrugged and replied, "It is in his fate, no matter what I want."

NOT EVERYONE IS so accepting of fate, or of the other forces beyond a parent's control, like genes and peers. "I hope to God this isn't true," one mother said to the Chicago Tribune. "The thought that all this love that I'm pouring into him counts for nothing is too terrible to contemplate."?! As with other discoveries about human nature, people hope to God it isn't true. But the truth doesn't care about our hopes, and sometimes it can force us to revisit those hopes in a liberating way.

Yes, it is disappointing that there is no algorithm for growing a happy and successful child. But would we really want to specify the traits of our children in advance, and never be delighted by the unpredictable gifts and quirks that every child brings into the world? People are appalled by human cloning and its dubious promise that parents can design their children by genetic engineering. But how different is that from the fantasy that parents can design their children by how they bring them up? Realistic parents would be less anxious parents. They could enjoy their time with their children rather than constantly trying to stimulate them, socialize them, and improve their characters. They could read stories to their children for the pleasure of it, not because it's good for their neurons.

Many critics accuse Harris of trying to absolve parents of responsibility for their children's lives: if the kids turn out badly, parents can say it's not their fault. But by the same token she is assigning adults responsibility for their own lives: if your life is not going well, stop moaning that it's all your parents' fault. She is rescuing mothers from fatuous theories that blame them for every misfortune that befalls their children, and from the censorious know-it-alls who make them feel like ogres if they slip out of the house to work or skip a reading of *Goodnight Moon*. And the theory assigns us all a collective responsibility for the health of the neighborhoods and culture in which peer groups are embedded.

Finally: "So you're saying it doesn't matter how I treat my children?" What a question! Yes, of course it matters. Harris reminds her readers of the reasons. First, parents wield enormous power over their children, and their actions can make a big difference to their happiness. Childrearing is above all an ethical responsibility. It is not OK for parents to beat, humiliate, deprive, or neglect their children, because those are awful things for a big strong person to do to a small helpless one. As Harris writes, "We may not hold their tomorrows in our hands but we surely hold their todays, and we have the power to make their to- days very miserable."

Over the course of a lifetime the balance of power shifts, and children, complete with memories of how they were treated, have a growing say in their dealings with their parents. As Harris puts it, "If you don't think the moral imperative is a good enough reason to be nice to your kid, try this one: Be nice to your kid when he's young so that he will be nice to you when you're old." There are well-functioning adults who still shake with rage when recounting the cruelties their parents inflicted on them as children. There are others who moisten up in private moments when recalling a kindness or sacrifice made for their happiness, perhaps one that the mother or father has long forgotten. If for no other reason, parents should treat their children well to allow them to grow up with such memories.

I have found that when people hear these explanations they lower their eyes and say,

somewhat embarrassedly, "Yes. I knew that." The fact that people can forget these simple truths when intellectualizing about children shows how far modern doctrines have taken us. They make it easy to think of children as lumps of putty to be shaped instead of partners in a human relationship. Even the theory that children adapt to their peer group becomes less surprising when we think of them as human beings like ourselves. "Peer group" is a patronizing term we use in connection with children for what we call "friends and colleagues and associates" when we talk about ourselves. We groan when children obsess over wearing the right kind of cargo pants, but we would be just as mortified if a very large person forced us to wear pink overalls to a corporate board meeting or a polyester disco suit to an academic conference. "Being socialized by a peer group" is another way of saying "living successfully within a society:" which for a social organism means "living." It is children, above all, who are alleged to be blank slates, and that can make us forget they are people.

## **Questions on TheBlank Slate**

1. What may be the most important discovery in the history of psychology?
2. Explain Wordsworth's quote. Do you agree with it?
3. Using your own words, explain how variance is measured. (do not go over the process, just the score). Also give one example of how statistics could be collected.
4. What percentage does Steven Pinker think of our behavioural traits can be ascribed to the genes of a person (nature)? How does he justify this?
5. What six broad categories of behavioural traits do psychologists seem to think are heritable?

6. What does Pinker think a lot of these expensive studies in parenting? Which actor does he agree with?
7. What are three shortcomings of behavioural genetics? Very briefly explain each.
8. Explain the difference between 'shared' environment and 'unique' environment.
9. What percentage do the effects of shared environment have on behavioural traits? What support does he give? (be brief)
10. What percentage do the effects of unique environment have?
11. When and where did the shit hit the fan concerning the implications of these percentages?
12. Give the strongest criticism of the parenting studies.
13. What are the limitations of the effects of birth order on behaviour?
14. Give three lines of support for group socialization theory.
15. What are some theories on how unique environment may affect personality?
16. What does Pinker think about chance/ fate?