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The Gene Responsibility

Once, parents were given all the credit -- and all the blame -- for how their children turned out. Then researchers told us that heredity determines who we are. The latest take: parents can work with their children's innate tendencies to rear happy, healthy kids. It's a message many parents will find reassuring -- but it may make others very nervous.

David Reiss, M.D., didn't want to believe it. The George Washington University psychiatrist had worked for more than 12 years on a study of adolescent development -- just completed -- and its conclusions were a surprise, to say the least. "I'm talking to you seven or eight years after the initial results came out, so I can sound very calm and collected now," says Reiss. "But I was shocked." This, even though other scientists had previously reached similar conclusions in many smaller scale studies. "We knew about those results, but we didn't believe it," says Reiss, speaking of himself and one of his collaborators, E. Mavis Heatherington, Ph.D. "Now we've done the research ourselves, so..." He sighs. "We're not ever going to believe it, but we're going to have to act as if we do."

What Reiss and his colleagues discovered, in one of the longest and most thorough studies of child development ever attempted, was that parents appear to have relatively little effect on how children turn out, once genetic influences are accounted for. "The original objective was to look for environmental differences," says Reiss. "We didn't find many." Instead, it seems that genetic influences are largely responsible for how "adjusted" kids are: how well they do in school, how they get along with their peers, whether they engage in dangerous or delinquent behavior. "If you follow the study's implications through to the end, it's a radical revision of contemporary theories of child development," says Reiss. "I can't even describe what a paradigm shift it is."

The only member of the research team who wasn't surprised by the results, Reiss recalls, was Robert Plomin, Ph.D., a researcher at the Institute of Psychiatry in London. Plomin is a behavioral geneticist, and he and others in his field have been saying for years what Reiss has just begun to accept: genes have a much greater influence on our personalities than previously thought, and parenting much less. The work of behavioral geneticists has been the focus of considerable controversy among psychologists, but it has been mostly ignored by parents, despite ample attention from the media. That may be because such coverage has rarely described just how genes are thought to wield their purported influence. Behavioral geneticists don't claim that genes are blueprints that direct every detail of our personality and behavior; rather, they propose that heredity reveals itself through complex interactions with the environment. Their theories are far more subtle, and more persuasive, than the simple idea of heredity as destiny. It is by participating in these very interactions, some scientists now say, that parents exert their own considerable influence -- and they can learn to exert even more.

NATURE MEETS NURTURE

As behavioral geneticists understand it, the way heredity shapes who we are is less like one-way dictation and more like spirited rounds of call and response, with each phrase spoken by heredity summoning an answer from the environment. Scientists' unwieldy name for this exchange is "evocative gene-environment correlations," so called because people's genetic makeup is thought to bring forth particular reactions from others, which in turn influence their personalities. A baby with a sunny

disposition will receive more affection than one who is difficult; an attractive child will be smiled at more often than a homely one. And the qualities that prompt such responses from parents are likely to elicit more of the same from others, so that over time a self-image is created and confirmed in others' eyes.

Even as genes are calling forth particular reactions, they're also reaching out for particular kinds of experience. That's because each person's DNA codes for a certain type of nervous system: one that feels alarm at new situations, one that craves strong sensations, or one that is sluggish and slow to react. Given an array of opportunities, some researchers say, children will pick the ones that are most suited to their "genotype," or genetic endowment. As they grow older, they have more chances to choose -- friends, interests, jobs, spouses -- decisions that both reflect and define personality.

In order for genes and environment to interact in this way, they need to be in constant conversation, back and forth. Since parents usually raise the children to whom they have passed on their genes, that's rarely a problem: they are likely to share and perhaps appreciate the qualities of their offspring. And the environment they provide their children with may further support their natural abilities: highly literate parents might give birth to an equally verbal child, then raise her in a house full of books.

Developmental psychologists call this fortunate match "goodness of fit." But problems may arise if nurture and nature aren't on speaking terms -- if a child's environment doesn't permit or encourage expression of his natural tendencies. That may happen when children's abilities don't match their parents' expectations; when their genetically-influenced temperament clashes with that of their parents; or when their environment offers them few opportunities to express themselves constructively, as is often the case with children who grow up in severe poverty. Research has shown that a poor person-to-environment match can lead to decreased motivation, diminished mental health, and rebellious or antisocial behavior.

The dialogue between genes and environment becomes more complicated when a sibling adds another voice. Although siblings share an average of 50 percent of their genes, the half that is different -- and the kaleidoscopic ways that genes can combine -- leads their genotypes to ask different questions and get different answers from what would seem to be the same environment. In fact, siblings create individual environments of their own by seeking out different experiences and by evoking different responses from parents, friends, and others. Like the proverbial blind men touching the leg, the trunk, or the tail of an elephant, they "see" different parts of the same animal. "Our studies show that parents do indeed treat their children differently, but that they are in large measure responding to differences that are already there," says Robert Plomin. "Family environment does have an effect on personality development, but not in the way we've always thought. It's the experiences that siblings don't share that matter, not the ones they do."

KIDS IN CHARGE?

One intriguing implication of behavioral genetic research is that children are in many ways driving their own development, through the choices they make, the reactions they elicit, even the friends they pick (see "The Power of Peers," below). But parents are crucial collaborators in that process, and that means that their role in shaping their children may actually be larger than it first appears. How a parent responds to a child's genetically-influenced characteristics may make all the difference in how those traits are expressed, says David Reiss. In his formulation, the parent-child relationship acts as a sort of

translator of genetic influence: the genotype provides the basic plot, but parenting gives it tone and inflection, accent and emphasis. He calls this conception of gene-environment correlation "the relationship code," and says that it returns to parents some of the influence his study would seem to give to genes. "Our data actually give the role of parents a real boost -- but it's saying that the story doesn't necessarily start with the parent," says Reiss. "It starts with the kid, and then the parent picks up on it."

To Reiss, parents' role as interpreters of the language of heredity holds out an exciting possibility. "If you could intervene with parents and get them to respond differently to troublesome behavior, you might be able to offset much of the genetic influence" on those traits, he says. In other words, if genes become behavior by way of the environment, then changing the environment might change the expression of the genes. Although such intervention studies are years away from fruition, small-scale research and clinical experience are pointing the way toward working with children's hereditary strengths and weaknesses. Stanley Greenspan, M.D., a pediatric psychiatrist at George Washington Medical School and author of *The Growth of the Mind*, is actively applying the discoveries of genetics to parenting. "Genes do create certain general tendencies, but parents can work with these by tailoring their actions to the nervous system of the child," says Greenspan. He believes that the responses children "naturally" elicit may not be in their best interests -- but that parents can consciously and deliberately give them the ones that are. "You have to pay attention to what you're doing intuitively, and make sure that is what the kids really need," he says.

A baby with a sluggish temperament, for example, won't respond as readily to his parents' advances as a child with a more active nervous system. Disappointed at their offspring's lack of engagement, parents may respond with dwindling interest and attention. Left to his own devices, the baby may become even more withdrawn, failing to make crucial connections and to master developmental challenges. But if the parents resist their inclinations, and engage the baby with special enthusiasm, Greenspan has found that the child will change his own behavior in response. The same principle of working against the grain of a child's genotype applies to those who are especially active or oversensitive, suggests Greenspan, comparing the process to a right-handed baseball player who practices throwing with his left hand. "It feels funny at first, but gradually you build up strength in an area in which you would naturally be weak," he says.

Of course, honing a right-handed pitch is important, too. Parents can improve on their children's hereditary strengths by encouraging their tendency to seek out experiences in tune with their genes. "Parents should think of themselves as resource providers," says Plomin. "Expose the child to a lot of things, see what they like, what they're good at, and go with that." By offering opportunities congenial to children's genetic constitutions, parents are in a sense improving their "goodness of fit" with the environment.

WILL YOUR KID GO TO YALE -- OR TO JAIL?

For those traits that could easily become either assets or liabilities, parenting may be especially critical to the outcome. "The same temperament that can make for a criminal can also make for a hot test pilot or astronaut," says David Lykken, Ph.D., a behavioral geneticist at the University of Minnesota. "That kind of little boy -- aggressive, fearless, impulsive -- is hard to handle. It's easy for parents to give up and let him run wild, or turn up the heat and the punishment and thereby alienate him and lose all

control. But properly handled, this can be the kid who grows up to break the sound barrier." Lykken believes that especially firm, conscientious, and responsive parents can make the difference -- but not all behavioral geneticists agree. David Rowe, Ph.D., a University of Arizona psychologist and author of *The Limits of Family Influence*, claims that "much of the effort of 'superparents' may be wasted, if not counter-productive." And as for exposing children to a variety of experiences, Rowe thinks that this can give genetically talented children the chance they need, "but not many children have that much potential. This may not be so in Lake Wobegon [where every child is "above average"], but it is true in the rest of the world."

But with an optimism worthy of Garrison Keillor, advocates of parental influence insist that genes aren't the end of the story. "The old idea is that you tried to live up to a potential that was set by genes," says Greenspan. "The new idea is that environment helps create potential." His view is supported by recent research that suggests a baby is born with only basic neural "wiring" in place, wiring whose connections are then elaborated by experience. Both sides will have to await the next chapter of genetic research, which may reveal even more complicated interactions between the worlds within and without. In the long-running debate between genes and the environment, neither one has yet had the last word.

THE POWER OF PEERS

It's a world out of a fanciful children's book: a place where parents and teachers don't matter, where the company of other kids is most meaningful, where nothing much would change if we left children in their homes and schools "but switched all the parents around." That doesn't describe an imagined never-never land, however, but the environment that every one of us grows up in, contends Judith Rich Harris. The maverick writer and theoretician believes that peers, not parents, determine our personalities, and her unorthodox views have made the very real world of psychology sit up and take notice.

Harris, who is unaffiliated with any university or institution, laid out her radical theory in a 1995 *Psychological Review* paper, which was later cited as one of the year's outstanding articles by the American Psychological Association. Like behavioral geneticists, Harris believes that heredity is a force to be reckoned with. But she sees another powerful force at work: group socialization, or the shaping of one's character by one's peers.

Central to this theory is the idea that behavior is "context-specific": we act in specific ways in specific circumstances. "Children today live in two different worlds: home and the world outside the home," says Harris. "There is little overlap between these two worlds, and the rules for how to behave in them are quite different." Displays of emotion, for example, are often accepted by parents but discouraged by teachers or friends. Rewards and punishments are different too. At home, children may be scolded for their failures and praised for their successes; outside the home, they may be ridiculed when they make a mistake or ignored when they behave appropriately.

As children grow older and peer influence grows stronger, says Harris, they come to prefer the ways of peers over those of their parents. She likes to use language as an example: the children of immigrants, she notes, will readily learn to speak the language of the new country without an accent.

They may continue to speak in their parents' tongue when at home, but over time the language of their

peers will become their "native" language. Adopting the ways of their contemporaries makes sense, says Harris, because children will live among them, and not among older adults, for the greater part of their lives. "Parents are past, peers are future," she says.

It's evolutionarily adaptive, too. "Humans were designed to live not in nuclear families, but in larger groups," observes Harris. "The individuals who became our ancestors succeeded partly because they had the ability to get along with the other members." The group continues to influence us in a number of ways: we identify ourselves with it, and change our behavior to conform to its norms. We define our group by contrasting it with other groups, and seek to distinguish our group by our actions and appearance. Within the group, we compare ourselves to others and jockey for higher status. We may receive labels from our peers, and strive to live up (or down) to them. Finally, we may be most lastingly affected by peers by being rejected by them. People who were rejected as children often report long-term self-esteem problems, poor social skills, and increased rates of psychopathology.

Our personalities become less flexible as we grow older, says Harris, so that "the language and personality acquired in childhood and adolescent peer groups persist, with little modification, for the remainder of the life span." It's a startling conclusion, but Harris claims that her greatest challenge lies not in persuading people that peers matter, but in convincing them that parents don't. She calls the belief in parents' enduring importance "the nurture assumption," and her forthcoming book by that title will argue that it's simply a myth of modern culture. She doesn't deny that children need the care and protection of parents, and acknowledges that mothers and fathers can influence things like religious affiliation and choice of career. But, she maintains, "parental behaviors have no effect on the psychological characteristics their children will have as adults."

In fact, she says, "probably the most important way that parents can influence their children is by determining who their peers are. The immigrants who move their children to another country have provided them with a completely different set of peers. But a less dramatic shift -- simply deciding which neighborhood to live in -- can also make a difference." From one area to another, she notes, there are substantial variations in the rates of delinquency, truancy, and teen pregnancy -- problems parents can try to avoid by surrounding their offspring with suitable friends. Beyond that, however, children will make their own choices. "It's pretty easy to control the social life of a three-year-old," says Harris. "But once the kids are past age 10 or 12, all bets are off."

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