

## When DNA is Not Destiny

*Newsweek*, December 1, 2008

By Sharon Begley

“Personality must be accepted for what it is,” Oscar Wilde counseled. “You musn’t mind that a poet is a drunk.” We’ll defer to Wilde on the debt that literature owes to booze, but he was definitely on shakier ground in implying that a man’s personality is what it is and will remain what it is until he is cold in the ground. Although that belief has found support in both casual observation (people seem to retain the same basic personality from childhood) and science (neuroticism, risk-taking, resilience, ruthlessness, social awkwardness, and more have been linked to genes, which, as we all know, don’t change), it suffers from a basic fallacy. Really, people, can we start recognizing that just because something does not change doesn’t mean that it cannot change?

Consider this thought experiment. You measure the blood pressure, heart rate, weight, and other aspects of cardiovascular health of thousands of couch potatoes year after year. The numbers hardly change, so you conclude that they’re unchangeable. Unfortunately, you neglected to test whether a little thing called aerobic exercise might change them. So it is with personality. Just because it seems stable over the years doesn’t mean it’s immutable. Instead, maybe we just haven’t identified what changes it. And that goes for genes, too: with the growing recognition that experiences can silence genes or activate them, it is clear that even traits under genetic influence are in play.

One hint of the mutability of personality comes from the arrival, finally, of long-term studies that follow people for decades. As people age from 20 to 40, a 2006 study reported, they tend to become more conscientious and emotionally stable. After age 40, they tend to become less open to new experiences and ideas, and less outgoing. All of these traits have been linked to genes. But curiously—and here’s hope for anyone who resents his genetic baggage—the influence of genes wanes with age: in middle and later adulthood, environment plays a larger role than genetics in shaping personality, a hint of the power of accumulated experiences.

Such as? Yale students who got a brief course in fitting in became, over their college career, more resilient and motivated, more likely to reach out to professors, and to participate in university life than students who did not have this experience, a recent study found. “Something that seems like a small intervention can have cascading effects on things we think of as stable or fixed,” says psychology researcher Carol Dweck of Stanford University, “including extroversion, openness to new experience, and resilience”—all of which are thought to be partly genetic. “More and more research is suggesting that, far from being simply encoded in the genes, much of personality is a flexible and dynamic thing that changes over the life span and is shaped by experience,” she argues in the December issue of the journal *Current Directions in Psychological Science*.<sup>\*</sup> In particular, traits such as how you cope, how you perceive yourself and others, and how you act in everyday situations are malleable. Even a broad category such as introversion is like Silly Putty once life gets hold of it: a “genetically shy” child whose parents gently encourage her to get herself into the sandbox and mix it up with other kids is more likely to outgrow her shyness by age 12 than a shy child whose parents take her trait as a given.

We can't open up that child's head to see how personality genes in her brain might be affected by this or other experiences. But scientists can do that in other animals, and when they do they are finding that "social information alters gene expression in the brain to change the way an animal behaves," says neuroscientist David Clayton of the University of Illinois. In zebra finches, for instance, hearing the song of a strange male increases the expression of a gene in the auditory forebrain, triggering a cascade of changes that culminate in a neural circuit that guides new behavior—namely, defending his territory from the interloper. In a rat, being licked and groomed by its mother turns off brain genes linked to fear of the unknown and neuroticism. DNA is not an inert set of blueprints; it responds to life experiences.

Ironically, the belief that personality cannot change may be self-fulfilling. "Whether you believe that your core traits, such as intelligence, are fixed, or are things you can develop, matters a great deal," says Dweck. In a recent study, she and colleagues taught a group of students entering junior high that intelligence is malleable, that the brain forges new connections throughout life, and that it grows in response to intellectual challenge. These kids became significantly more conscientious and diligent compared with kids who didn't receive this lesson. "Beliefs about yourself play a causal role in how likely you are to seek out challenges and in how resilient you are," says Dweck. "If you change beliefs, you can change broad traits that many people think of as stable, including openness to experience, conscientiousness, and sociability. Beliefs can be changed, and when they are, so is personality." No one claims that genes play no role in shaping personality. But it's time to junk the old idea that only the part of a trait under environmental, not genetic, control is malleable: the life we lead and the experiences we have reach deep into our double helix.

*\*Current Directions in Psychological Science, Volume 17, Number 6, December 2008*