

Born to SUCCEED?

EVERY TEACHER WANTS TO HELP CHILDREN REACH THEIR FULL POTENTIAL, SAYS DAVID DIDAU. BUT WE NEED TO BE REALISTIC ABOUT WHAT THAT MEANS...

What influences children more: nature or nurture? As teachers we like to believe we can see the good in all children. Schools are intended to be nurturing environments, which shape and socialise young minds. We're deeply aware of the need to close the attainment gap between the haves and the have nots, and social disadvantage is seen as the single biggest problem for us to overcome.

But, the problem that no one really wants to talk about is that there's no real way to close the attainment gap in schools. Attainment is distributed normally, and there is always going to be a spread of ability and attainment across any population sample, no matter what we do.

The study of behaviour genetics and epigenetics (the interaction of heritable factors with environmental factors) reveals our destinies are to a very real extent written in our DNA. But to what extent precisely?

Twin and adoption studies have allowed behaviour geneticists to estimate the contributions of genes and environments to a wide range of traits and behaviours including general intelligence (IQ), personality traits, autism, alcoholism etc. In almost every case genetic heritability accounts for at least 50% (often much higher) of the differences between people.

Another important and highly counter-intuitive finding is that the shared environment, while it often accounts for a significant proportion of the variance in traits when measured in childhood, has almost no effect when these traits are measured in adulthood. This suggests that whilst families are important when we are young, their effects wear off by the time we reach adulthood. This surprising finding is repeated in almost every single trait studied using behaviour genetic methods. In the long run, we are like our families because of our shared genes, not our shared experiences.

Under the influences

In G is for Genes, Kathryn Asbury and Robert Plomin present some potentially troubling

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information. They estimate, for instance, that genetic heritability accounts for between 60-80% of reading ability. This leaves as little as 20% down to the nurturing effects of our environments. While it's not really possible to isolate such percentages in individuals, twin studies and adoption studies have allowed researchers to estimate the genetic and environmental influences on reading, mathematics, GCSE results and a host of other factors for population groups.

Admittedly, this is horribly oversimplified, and Asbury says:

Genetic variation exists from the moment we are born, but is multiplied and magnified as our

genes interact with each other and our environment. It is likely that some environmental effects are hidden within our heritably estimates because they are effective indirectly, via their interplay with genes.

Researchers comparing children's reading ability in Colorado, New South Wales and Scandinavia investigated this interplay. In each of these territories there are different environmental factors at play. In both America and Australia children are required to attend school from the age of five. In New South Wales, children attend school from 9 - 3 every day and the state decrees that 35% of this time be devoted to mandated literacy instruction, but in Colorado, children only attend kindergarten for 3-4 hours a day and the curriculum is left entirely in the hands of individual schools. And in Scandinavia children do not begin reading instruction until the age of seven.

Unsurprisingly, researchers found enormous differences in the relationships of genetic and environmental factors:

AGED 5

	GENETIC INFLUENCES	SHARED ENVIRONMENTAL INFLUENCES	NON-SHARED ENVIRONMENTAL INFLUENCES
AUSTRALIA	80%	20%	
NORTH AMERICA	66%	33%	
EUROPE	33%	66%	

But, after each of the different population groups had received 1 year of reading instruction, differences largely disappeared:

AFTER FIRST GRADE

	GENETIC INFLUENCES	SHARED ENVIRONMENTAL INFLUENCES	NON-SHARED ENVIRONMENTAL INFLUENCES
AUSTRALIA	80%	0%	10-20%
NORTH AMERICA	80%	0%	10-20%
EUROPE	80%	0%	10-20%

* Please note: these figures have been rounded up

“MORE SCHOOL – THAT IS, MORE ENVIRONMENTAL INPUT – LEADS TO GREATER GENETIC INFLUENCE RATHER THAN GREATER ENVIRONMENTAL INFLUENCE...”

Astonishingly, when environmental factors are broadly similar, genes account for the vast majority of the difference in reading ability. And very interestingly, shared environment (growing up in the same household with the same parental influences) practically vanishes as a source of influence.

This is deeply counterintuitive. As Asbury puts it, *“More school – that is, more environmental input – leads to greater genetic influence rather than greater environmental influence.”* As children’s environmental influences become more similar, genetic differences become more noticeable. This might sound a bit fatalist and dispiriting, but actually there is a positive message that can be taken from these findings.

Opportunities for all

Reading is a very useful indicator of heritability because it’s so unnatural; genetically speaking, it’s a very recent development in human communication. We all pick up speech without formal instruction, but nobody ‘just learns’ to read, no matter how genetically predisposed they might be having a high reading ability. So if we look at samples of children before they have started to receive formal reading instruction at school, it seems reasonable to infer that the greater part of their reading ability comes from their environments. Parents who value reading and read to their children are more likely to have children who can read. The ad hoc reading instruction in Colorado results in some non-shared environmental reading influence whereas the lack of any formal instruction in Scandinavia before the age of seven suggests that reading ability is most likely attributable to shared environmental influences.

But, education is the great leveller. When all children have received similar reading instruction, the differences between them are explained by genetic influences, resulting in a bell curve with a normal distribution of reading ability.

This goes to show the huge importance non-shared environmental influence (schooling) has. While the differences between children are mainly accounted for by genetic

influences, education accounts for the fact that children learning to read is not left to chance. Although schools cannot eliminate these genetic differences, they can attempt to move the entire bell curve further to the right.

“Genes, and therefore human potential, cannot grow in a vacuum.”

This is, I think, cause for some optimism. All children are different. We each have our own gifts, talents and potential, and no two people are exactly alike. But school provides, or should provide, the opportunity for all children to excel to the best of their ability. We cannot all be geniuses, we cannot all be wonderful readers, but we can all be better (and often significantly better) than we currently are. This then is the power and the possibility of the growth mindset. Blaming or rewarding children for their genetic inheritance is clearly ludicrous, but demonstrating that hard work, effort, practice and a willingness to learn from making mistakes might help us to achieve our genetic

potential is a much fairer and more practical approach to take.

Politicians and education reformers may be guilty of labouring under the misapprehension that better environments lead to success, and that if we could replicate those environments, achievement gaps would disappear. But individual differences in intelligence and academic outcomes are largely a result of genes, not environments. If we expend our efforts on trying to close the gap we will surely fail. Instead, the energies of the education system should be directed towards trying to shift the entire bell curve to the right.

