Chapter 10

Mind the Gap: Social Status and School Quality

Somehow, working-class kids have been cast as both the heroes and the villains in the media's education fairytale. On the one hand there are the few who, in spite of being born and brought up in relatively inauspicious circumstances, get scholarships to selective schools or places at Oxford and Cambridge, Harvard and Princeton – the rags-to-riches stories. Cinderella anyone? Newspapers like photos of these kids almost as much as they like photos of bouncy girls in short skirts waving around their notifications of successful exam results – and that's saying something. On the other hand, many more of these kids don't get good exam results, and the schools they attend are precisely the schools that ambitious middle-class parents are moving house to get away from. Newspapers profess themselves saddened and scared by the photos they choose to print of these young people – usually spotty youths with menacing expressions and hoodies (not the Little Red Riding Hood kind). They are often smoking, pregnant, or both. Find a school that has been designated as failing and you can bet your

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bottom dollar it isn't situated in a leafy suburb, nor populated by the sons and daughters of teachers, doctors, lawyers, and accountants. And when the discussion is narrowed to boys, as it so often is, we're pretty much exclusively in the realm of baddies. Working-class education is, it seems, a slough of despond characterized by low aspirations, low income, low status, and nascent lowlifes.

So what's really going on? Is this impression that does so much to drive the hype about school choice actually a fairytale or just fair and accurate reportage? Do children brought up by parents with few or no educational qualifications, low occupational status, and low income in a tricky neighborhood necessarily do badly at school, and if so, why?

Answering these questions brings up some complicated and uncomfortable truths. The first of these is that socio-economic status (SES), which in this context usually refers to parents' educational qualifications and occupational status, is as good a predictor of academic achievement as IQ (with which it is also correlated). This has been shown in studies all over the world. In spite of all the emphasis on school quality, as measured by Ofsted in the United Kingdom, SES leaves it trailing in the dust when it comes to predicting how well children will achieve in school (Walker, Petrill, and Plomin, 2005). Humble beginnings, it seems, are often associated with lowly outcomes.

The second uncomfortable truth is that SES is partly heritable. Genes can explain approximately half of the differences between people in the educational qualifications they gain, and 40% of the variability in the status of the jobs that they do. It sounds odd to say that an aspect of a child's environment, such as their family's social status, is influenced by genes but really it is unsurprising when one considers genetic influence on academic achievement and how this has to feed into educational and occupational status. We also know that genes can explain 30% of income differences, sometimes included in measures of SES. Other categories of SES have also been proposed based on economic capital (wealth assets), social capital (the people you associate with) and cultural capital (the books you read, concerts you attend, museums you visit etc). There has been

no genetically sensitive study of these additional aspects of SES, but we predict that they are likely to show even greater levels of heritability as they capture more of an individual's achievements, proclivities, and preferences. Given that parental SES is heritable, and that children's academic achievement is also heritable, it is not especially surprising that genetic research has found the links between SES and achievement to be partly mediated by genes. In sum, SES is influenced by genetic as well as environmental factors and this, for many, represents an uncomfortable truth.

Furthermore, in the United Kingdom the social class gap for achievement is one of the widest in the developed world. On the face of it this evidence is depressing. Kids born to low-status parents seem to have the deck stacked against them. Both genes and environment are working against them and their families. They are massively over-represented in estimates of children currently labeled as having special educational needs. The gap between them and their middle-class counterparts is evident long before they start school and it only widens over time. By the same token, though, we know that environmental factors influence SES at least as much as genetic factors and that the environment can be used as an agent for change. We also know that some pupils from low-SES families achieve very high levels of academic success, and we suggest that an important way forward for research is figuring out how and why these children are able to do so well. If we can answer that question we will have more power to promote the environmental influences that make a positive difference to children and young people from economically and socially disadvantaged backgrounds. We will be able to identify new ways of reducing inequality and drawing out potential, by working with rather than against children's genetic makeup.

Behavioral genetic research cannot turn the observable evidence on its head; SES really does predict achievement, partly for genetic reasons. What behavioral geneticists can do, though, is dig a little deeper to uncover the particular genetic and environmental influences at work, and begin to understand how they might work together. It is worth noting here that there is a general consensus that education is the best mechanism for equalizing opportunity and

promoting social mobility. However, some recent sociological work (Goldthorpe, 2012) suggests that the story might not be as simple as this. We may need to look beyond schools for the environmental factors that influence SES and social mobility, and that might be involved in positive genotype–environment correlations. Children learn at home as well as at school, and personalizing all learning environments is likely to enhance genetic potential.

Low SES: What Does It Look Like?

We begin by trying to describe a small part of what it means to label a family as low-SES; and how the experiences of such families are likely to differ, on average, from those with higher social status. Who hasn't watched a posh politician talking about "the underprivileged" on the news and wished for some genuine, non-cartoonish understanding of the complexities and contradictions involved in people's lives?.

A working-class family is likely to be poorer, in terms of money coming into the house, than a middle-class family. This relative poverty can affect all aspects of a home environment and has an impact on the children growing up in it. A recent UK study, for example, found a strong and significant effect of income poverty on cognitive function in 5-year-olds (Schoon, Jones, Cheng, and Maughan, 2012). Low income, we know, has knock-on effects, including parental stress and a lack of resources to pay for extras such as swimming or music lessons, educational trips and outings, IT equipment, books, and sports kit. Children growing up in income-poor families therefore do not experience equality of opportunity in this regard. This is true throughout their education, so they are less likely to be exposed to resources such as private tutors when they struggle with a subject, constraining their achievement and their future prospects. While stress is certainly not the sole preserve of low-SES families, the resources we mention are routinely available to well-off children, affording them more chance to develop and find their talents. It is no coincidence that

the pony-club set tend to look and sound very middle class and are not usually the children of cleaners, call-centre workers, or the unemployed. Equalising these opportunities may represent one way of leveling the playing field. It is worth noting though that equalizing environments will not decrease heritability estimates. On the contrary, as we argued in Chapter 3, heritability can be seen as an index of equality. When the environmental playing field is level then genetic differences between individuals will be more, not less, visible. In Chapter 1 we made a case that this seems, at worst, a small price to pay if all children are receiving equal opportunities to fulfill their potential. At the moment, children from low-SES families do not experience equal opportunities: that is a problem we can perhaps do something about, to the benefit of disadvantaged children and young people.

Research has shown that, as well as being poorer, children in low-SES families are talked to less than children in higher-SES families, and often start school with significantly less linguistic knowledge (Purcell-Gates, McIntyre, and Freppon, 1995). Parents in working-class families, on average, spend less time with their children and are less responsive to their needs than better-off, more educated parents. This could reflect lack of time, an excess of stress, or a different approach to parenting, but it does appear to be linked with their children's cognitive development. A genetically sensitive study of this phenomenon could tell us more about how the link works. This finding has led some researchers in psychology and economics to advance the argument that disadvantage is more about a lack of stimulation than a simple lack of financial resources. This is one avenue for future genetically sensitive research. For instance, a home-based Portage-like service, currently only offered to preschool children with diagnosed special educational needs, could perhaps be offered to children in disadvantaged families. Portage home visitors could focus on modeling useful ways of stimulating child development through play and communication. The benefits of this could be assessed in an experimental trial.

Other aspects of the home environment that have been shown to have a negative impact on cognitive ability and school

achievement – and that are more commonly found among low-SES families – are chaos and crowding (Melki *et al*., 2004). The US Census Bureau considers homes occupied by more than one person per room to be crowded, and in 2000 more than 5% of US households met this criterion; according to the 2001 UK Census, the figure in England and Wales was 7%. By this definition a home with a living room, kitchen, bathroom, and two bedrooms is crowded if it is occupied by six people or more, but is adequate for a couple with three children. Even after controlling statistically for the effects of SES, children from crowded homes were found to experience high levels of stress, behavior problems, and delayed cognitive development. We also know that parents in crowded homes are less responsive to their children. Researchers have hypothesized that this may reflect adults unintentionally withdrawing from their children as they try to cope with constant and noisy demands for their attention. A recent study (Evans *et al*., 2010) showed that residential crowding in early childhood can predict cognitive development at 3 years of age and that the link was largely mediated by mothers not responding very well to their children. We know that parental responsiveness matters and that crowding is harmful to children, in both the home and day-care settings.

Chaos is related to crowding, and to SES, but research has shown that chaos predicts academic achievement even when the effects of SES have been controlled for. The children who do well at school tend to come from relatively quiet, orderly homes with predictable routines. It has been shown that children in noisy, chaotic, disorganized homes tend to withdraw from academic challenges and show low expectations and low levels of persistence with their schoolwork (Brown and Low, 2008). The more chaotic children perceive their homes to be, the poorer their performance in school.

A recent and genetically sensitive study of this phenomenon asked whether the correlation between chaos and achievement is mediated by genes or by the home environment. This research, carried out by Ken Hanscombe of the TEDS team, started from the premise that genes influence achievement but that they might also influence children's subjective perceptions of the level of chaos

in their own homes. This turned out to be true. When we asked our 12-year-old twins about chaos in their homes and families, identical twins gave more similar responses than non-identical twins, suggesting that perceptions of the home environment were influenced by genes. This led to a hypothesis that nature as well as nurture may perhaps mediate the relationship between chaos and achievement. Analysis of the data confirmed this hypothesis. Two-thirds of the relationship was mediated environmentally and one-third genetically. The environmental influence here makes intuitive sense. A child in a chaotic home may not have a quiet tidy space in which to do their homework, or may not have been supported in establishing a routine for getting it done. They may not be able to find the books and other resources that they need when they need them. They may be tired if they do not have a consistent bedtime routine and may not be able to concentrate because of fatigue or because the noise of the TV or of shouting makes it difficult. But how does the genetic part work? Well, we don't exactly know, but we suggest that it is very likely to depend on whose genes are mediating the link between high levels of chaos and low levels of achievement, something we will explore in future research.

So, if the parents' genes are to blame then we have an example of passive genotype–environment correlation. Parents who create chaotic home environments may not encourage high achievement in school and may not take an interest in homework, at least partly because of a genetic predisposition not to do so. Their children will be at risk from both the genes they inherit from these parents and the non-educational environment they create. However, given that the children in this study were 12 years old and attending high school, it seems unlikely that their own genes are not implicated to some extent. In this case we may be seeing an active genotype–environment correlation in which if children are uncooperative about going to bed, turning off the TV, or sitting down to work, then their parents may give up trying to impose structure, and teachers may have to spend more time on managing their behavior than on actually teaching them. Either or both genetic pathways make intuitive sense and further research is

needed to fully understand how the genetic link between chaos and achievement actually works.

So far, we have seen how the home environment – and SES in particular – can have an impact on a child's achievement at school. But how can this be counteracted by a genetically sensitive education system? In Part Two of this book, we will propose a radical new way to bridge the divide between home and school – one that could perhaps help inform the way that teachers interact with individual pupils, and encourage better practices at home by focusing on equal opportunities. It is a method that takes into account the reality and power of genotype–environment correlations in order to improve children's levels of engagement and motivation. We think it could ease the burden on teachers and boost the achievement levels of otherwise vulnerable children. Some of the inspiration for this approach will be discussed later in this chapter.

What Does the Heritability of SES Mean?

So, SES is influenced by genes as well as experiences, and the relationship between SES and achievement is partly genetic in origin. The two things are linked by a person's DNA. This means that the children of parents who themselves did not succeed at school and went on to achieve low status in society are likely to resemble their parents as much for genetic reasons as for environmental reasons. In essence, it is likely that children growing up in low-income families – the families targeted by projects like Sure Start and Head Start – are genetically as well as environmentally vulnerable. The question facing us, therefore, is what can be done to support the more vulnerable members of society, to promote social mobility on the far left-hand-side of the bell-shaped curve where it is most sorely needed? We don't have definitive answers, but we can make some tentative suggestions; and we can state unequivocally that this is a question in need of an answer. We have seen that there are many ways in which disadvantaged children are not exposed to equal opportunities, a phenomenon that is manifestly unfair.

One way to tackle the problem of some families getting stuck in a low-SES rut may be to focus on equalizing opportunities for the most vulnerable families. However, it is worth reminding ourselves that while this may have a very beneficial effect it will not reduce heritability estimates for either SES or achievement. Rather, access to new opportunities might nurture natural potential that would otherwise have lain dormant.

Experiencing an environment that is impoverished, either literally or figuratively, because of parental status is unfair and stands in the way of maximizing individual as well as social and economic potential. Therefore, low-SES families should be prime candidates for extra resources and carefully targeted interventions. And to an extent they have been given them – in the form of programs such as Head Start in the United States and Sure Start in the United Kingdom. However, these initiatives are vulnerable because of their failure to make lasting changes to children's IQ levels, and this is of particular concern in a time of global recession and widespread funding cuts. Also, it can be argued that these programs do not actually manage to access the most vulnerable families either at the right time or in the right way. Indeed the groups run by Sure Start, although often excellent, are also often full of middle-class mums and their babies, while the disadvantaged families they are designed to help are in the minority.

Notwithstanding these problems, solutions for which can be found, the strategy of investing in young children as a means of leveling the playing field and improving life-long outcomes for disadvantaged children has been championed by Nobel Laureate and University of Chicago Economics Professor James J. Heckman. Heckman is interested in what he calls the origins and remediation of human inequality. In one of his many articles on the subject he states that:

> Investing in disadvantaged young children is a rare public policy initiative that promotes fairness and social justice and at the same time promotes productivity in the economy and in society at large.
>
> (Heckman, 2006.)

Heckman uses economic arguments to support the theory that we under-invest in preschoolers. He has described a series of core concepts for social policy in early childhood, all of which make genetic sense. The first is that genotype–environment interplay influences brain architecture and skill formation. In other words, the dance between genes and experience makes a difference to developing brains, which are very plastic and particularly susceptible to environmental influence in early childhood. Secondly, skill mastery follows hierarchical rules. Basic skills have to be mastered before the next level of skill can be approached. This concept lies at the heart of our recommendations for education in Part Two. Thirdly, skills are interdependent and affected by experience. And fourthly, there are sensitive periods when the brain is most plastic. Heckman's four concepts fit neatly with our behavioral genetic finding that shared environmental influence has most impact in the preschool years.

We have already touched on the problem that Head Start and Sure Start are considered failed projects in some quarters because they do not improve IQ in the long term. However, Heckman argues that this interpretation misses the bigger picture. To illustrate his case he refers to the Perry Preschool Program. This was a two-year experimental intervention carried out in the early 1960s for 3- and 4-year-old disadvantaged African American children identified as being at risk for school failure. It was a case-control study in which the subjects attended nursery for 2 1/2 hours every weekday morning and once each week had a 1 1/2-hour afternoon visit from their teacher at home. This was designed to involve the mother in the educational process and to help to implement the preschool curriculum at home. The children learned through play rather than formal instruction, and the focus was on developing noncognitive skills. By age 10 the case children's IQs were no higher than those of the control children. However, their achievement test scores were significantly higher because, argues Heckman, they were more motivated to learn. This is interesting given that achievement shows higher heritability than cognitive ability (and genotype–environment correlations are often hidden

within heritability estimates). The program had no long-term effect whatsoever on IQ, but the effects on achievement and wellbeing were significant. These children were followed up at age 40 and the treated group had higher rates of high school graduation, higher salaries, higher percentages of home ownership, were in receipt of fewer welfare benefits, and had fewer criminal charges than the controls (Schweinhart *et al*., 2005). In sum, they had higher SES than the controls, and their new and improved SES is what will predict their own children's achievement, rather than the social status they were born into: social mobility in action. There is no doubt that their genes still resembled those of their parents but the environment was used in a way that appears to have given them a leg up, provided them with new experiences with which their genes could interact in a positive way.

Behavioral genetic research supports Heckman's argument that the best time to invoke shared environmental influences to affect children's achievement, perhaps via their self-confidence, motivation, and aspirations, is before school begins. From this point onward the influences of shared environment tend to diminish. We can also say that one correlate of SES which shows promise for improving the chances of disadvantaged children is sensitive, responsive parenting and that preschool initiatives can usefully focus their attention on this, as was done in the Perry Preschool Program. Interventions in which educators bring education into the real-world home environments of disadvantaged children may seem expensive, but the evidence suggests that, over the course of a life, they might pay for themselves. Nurturing natural potential in the preschool years needs further consideration as a strategy for promoting social mobility and drawing out individual potential.

School Quality

Failing schools are usually situated in deprived areas. Therefore, school quality is inextricably linked with SES. In the United Kingdom this problem has led to a policy of competition and the

marketization of education in which parents are given choice, or at least the illusion of choice, about the school their child attends. Researchers uniformly conclude that this has been a rather unsuccessful solution to the inequality problem. In fact it actively works against closing the social gap because the middle classes have been shown to have greater purchasing power and more ability to "play the game" in successfully applying to the school of their choice – whether that involves moving house, hiring a tutor, becoming more visible in church, saying the right things on a form, or developing a child's talent for sport or music. The same conclusion has been reached in research that has looked into the issues of school choice, school quality in relation to pupil demographics, and achievement according to SES background. The bottom line is that, in this instance, diversity of opportunity actually appears to exacerbate inequality of opportunity – a cautionary tale which reminds us not to be too gung-ho or generalist with our recommendations for a genetically sensitive education system.

In reality there has not been a great deal of genetically sensitive research into school quality as an environmental influence. However, there has been a lot of nongenetically sensitive research on this subject, which concludes that school quality may be a red herring that has little or no causal relationship with academic achievement. So, when a school is named and shamed as "failing" because pupils are failing to succeed academically it does not necessarily follow that this failure is entirely the fault of the school *per se*. If the same school were filled with pupils from high-SES families with a genetic predisposition towards academic achievement it is highly unlikely that, even with no changes whatsoever made to the staff or the curriculum, the school would qualify as "failing." However, although the circumstances may be difficult, it is clear that these schools for deprived communities are not succeeding in their task of educating their pupils well.

The landmark Coleman Report, published in 1966, was a massive, 700-page, exploration of educational equality in the United States. Coleman, a sociologist, concluded that pupil background and SES was far more important to achievement than differences

in school resources. The report suggested, contrary to current expensive UK approaches such as the Academies and Free Schools programs, that throwing money at schools and increasing blanket per-pupil spending would not make a whole lot of difference, and that interventions should be targeted at families rather than at schools. In TEDS we, too, have found that school quality explains only a tiny proportion of the differences between children in terms of achievement, and that SES at the family level is the heavy hitter in terms of influence (Walker, Petrill, and Plomin, 2005).

Coleman's report does leave room for teacher quality to contribute to individual differences in achievement even though resources don't – a lead supported by economic as well as psychological and sociological researchers (e.g., Hanushek, 2010). Teacher quality tends to be variable even within a school, something that any parent watching their child go through consecutive classes in a single school will recognize. Also, it is likely that even the very best teachers are not similarly effective for all children and that genotype–environment correlations are at play here unless the teacher is completely sensitive to individual needs and leads a fully personalized classroom. This, of course, is the ideal and the more we strive to achieve the ideal the closer we will get. The evidence from nongenetic studies suggests that teacher quality matters significantly more than quality of school buildings or resources, or complex admissions arrangements. The message coming forward is that interventions focused on active learning between parent and child, and teacher and child, are the most promising.

Proximal processes between adults such as teachers and parents, and the children they teach and nurture, are the most fertile ground for genotype–environment correlations to flourish and for children to learn in an environment that recognizes their needs and their strengths. SES matters, and this has to be addressed in any equitable education policy. School quality doesn't matter all that much but the interface between genes and experience, between a mother and her language-learning toddler, or a teacher and her math-averse student, really does. These lessons are drawn from educational, economic, and sociological research as well as our own field, and

will be borne in mind as we design our own version of a genetically sensitive education system that offers equal opportunities to all pupils.

The take home message is that although socio-economic status *does* predict school achievement and *is* influenced by genes, building interventions around environmental influences that negate the effects of poverty, reduced stimulation, crowding and chaos is the best way forward if we are to create equal opportunities for all.

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Further Reading

For more information on Ken Hanscombe's genetically sensitive research into the nature and nurture of family chaos we suggest the following two papers: Hanscombe, K. B., Haworth, C., Davis, O. S., Jaffee, S. R., and Plomin, R. (2010). The nature (and nurture) of children's perceptions of family chaos. *Learning and Individual Differences*, 20(5), 549–553; and Hanscombe, K. B., Haworth, C., Davis, O. S., Jaffee, S. R., and Plomin, R. (2011). Chaotic homes and school achievement: a twin study. *Journal of Child Psychology and Psychiatry*, 52(11), 1212–1220.

For a different take on the implications of relationships between genes, social status and achievement Charles Murray's book makes for an interesting read: Murray, C. (2008). *Real Education: Four Simple Truths for Bringing America's Schools Back to Reality*. New York: Three Rivers Press.