

Should We Really Say Goodbye to the Effects of Nurture on Development?

A book by Robert Plomin, "Blueprint. How DNA Makes Us Who We Are"¹ makes some readers suggest that we have to say goodbye to previous optimism about what a loving family environment can do for a family member with "wrong" genes. And indeed, based on figures arising from the literature, multiple geneticists seem to be quite pessimistic regarding the influence of "nurture" on the physical and psychological development of children. For example, using "polygenic scores," Plomin calculated that no less than 70% of our weight is determined by our genes.¹ But is it really the case that our genes predispose who we can be and can we throw all efforts to try and influence the development of children on the scrap heap? I don't think so; even 70% genetic load still leaves room for other influences.

One of the finest studies of environmental influences is still the British-Romanian research² led by the always resourceful Michael Rutter. After the fall of the Ceausescu regime in 1990, Romanian children were adopted from their neglectful orphanage environments into British families. The later the adoption (>6 months old) the greater the damage to their neurological and cognitive development compared to non-neglected British and early-adopted Romanian adoptees. Early adoption actually protected them. This natural experiment circumvented the problem of gene-environment correlation. After all, the same genes that make the child vulnerable are also responsible for the behavior of the caregivers. However, in this study, the genetic influence itself was not measured. Rutter and colleagues^{3,4} noted already more than two decades ago that, to understand influences on the development of psychopathology, we need to understand the effects of both genes and environment and their interplay. However, we need to go beyond family and twin designs that dominated quantitative genetic studies of mental health.

Recent developments in behavioral genetics research make it possible to demonstrate the cooperation between genes and the environment, especially in longitudinal research. Since the deciphering of the entire human genome, it has become clear that the genetic influence on psychological phenomena such as school performance, intelligence, depression, and anxiety comes from multiple small genetic influences, summarized in a so-called "polygenic score."⁵ This allows us to more accurately estimate the relative influence of genes and (reliably and objectively measured) environmental influences and understand how they work together (for example, via gene-environment correlation and gene-environment interaction).

For example, 21% of alcohol use by young adults can be explained by environmental effects and less than 2% by polygenic effects.⁶ Su and others⁷ showed that polygenic scores for depression in adolescents help determine what their mothers know about them, which in turn influences the adolescents' depressive and behavioral disorders. Interaction effects have also been found in adolescents. The genetic susceptibility to depression mainly manifests itself in families with over-critical parents⁸ and genetic susceptibility for social anxiety is mainly visible in families with a lot of psychological control and little autonomy support.⁹

In other words, isn't the truth about nature and nurture more in the middle? And didn't the Perry Preschool Project have cumulative, positive effects well into adulthood,¹⁰ suggesting that it is possible to have a long-lasting influence on child development by changing its immediate environment? So shouldn't the message from the most recent research into genetic effects on psychological functioning be that we need to invest in preventive interventions, especially in genetically burdened families?



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