Exploring Genetics Influences on Birth Weight

A large body of research in the social sciences documents that environmental exposures in utero affect an individual's birth weight, and that birth weight in turn predicts economic, educational, and health outcomes later in life. However, genetic sources of variation in birth weight, as well as their relationship to downstream development, remain largely unexplored. In this paper, we leverage the recent identification of specific genetic variants that predict birth weight (Warrington et al., 2019) to construct polygenic scores in two longitudinal studies and empirically unpack the molecular genetic correlates of birth weight. We find that a one standard deviation increase in an individual's birth weight polygenic score is associated with a ~100 gram increase in their birth weight; within family analyses leveraging genetic differences between siblings show that a large portion of this association represents the causal effect of genes. The relationship between polygenic score and birth weight is increased for children who spend longer in the womb and children born to mothers with high maternal body mass index. The birth weight polygenic score also predicts social and cognitive outcomes later in life, suggesting that birth weight is not simply an index of prenatal environmental exposures but relevant to healthy human development in and of itself. Our findings support the idea that GWAS has identified a relatively accurate, albeit noisy, map linking an individual's DNA sequence to their genetic predisposition to weigh more at birth, but that nonetheless an individual's genetic predisposition varies across contexts.