

A Socio-genomic Analysis of the Intergenerational Transmission of Educational Attainment

Ryan T. Motz, J.C. Barnes PhD, Peter Tanksley, and Hexuan Liu PhD, School of Criminal Justice, University of Cincinnati

Introduction

Researchers have long been interested in the complex pathways that lead to the intergenerational transmission of various outcomes. While most of this research has focused on the social components that underlie this phenomenon, recent advancements in socio-genomics now provide scholars the opportunity to also capture genetic contributions. However, when sorting out the roles of both social and genetic components, it is important to recognize the selection of mating partners is not random. Instead, genotypic and phenotypic assortative mating are likely present. In this paper, we explore the impact of assortative mating on the intergenerational transmission of education. In doing so, we highlight the unique pathways through which educational attainment is transmitted from parent to child.

Research Questions

We explore the role of assortative mating in the transmission of educational attainment from parents to child.

1. Does including the genetic component of improve our understanding of the intergenerational transmission of educational attainment?
2. Does assortative mating (both genotypic and phenotypic) account for intergenerational transmission of education?
3. What are the pathways through which assortative mating influences intergenerational transmission?

Data and Methods

Data

Health and Retirement Study (HRS). Of the collected samples, around 16,000 were put into genotyping production with coverage of approximately 2.5 million single nucleotide polymorphisms (SNPs), and 15,708 passed standardized quality control processes. To minimize confounding effects of population stratification, this study focuses on non-Hispanic whites.

Measures

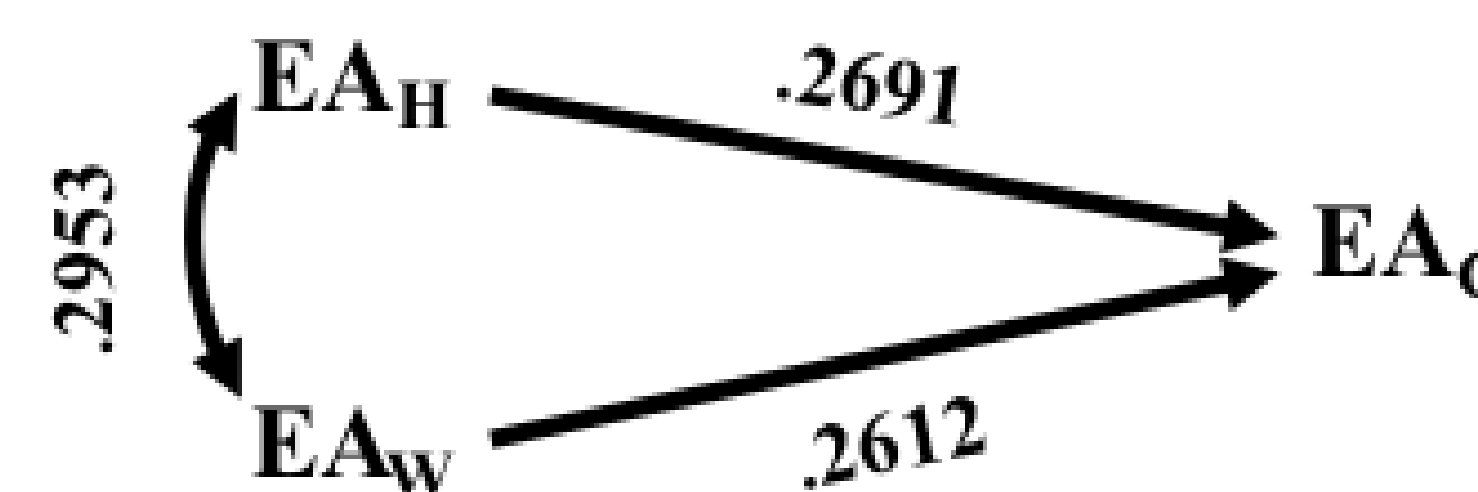
Educational attainment: HRS participants and spouses reported their own educational attainment and provided information about their children's education. For household with multiple children, we selected the oldest child in each household. To account for possible differences in the reporting by parents, we averaged the scores provided by the participant and their spouse on their child's education.

PGS for educational attainment: Computed using summary statistics from recent GWAS on educational attainment (Lee et al. 2018). Scores were standardized to have a mean of 0 and a standard deviation of 1.

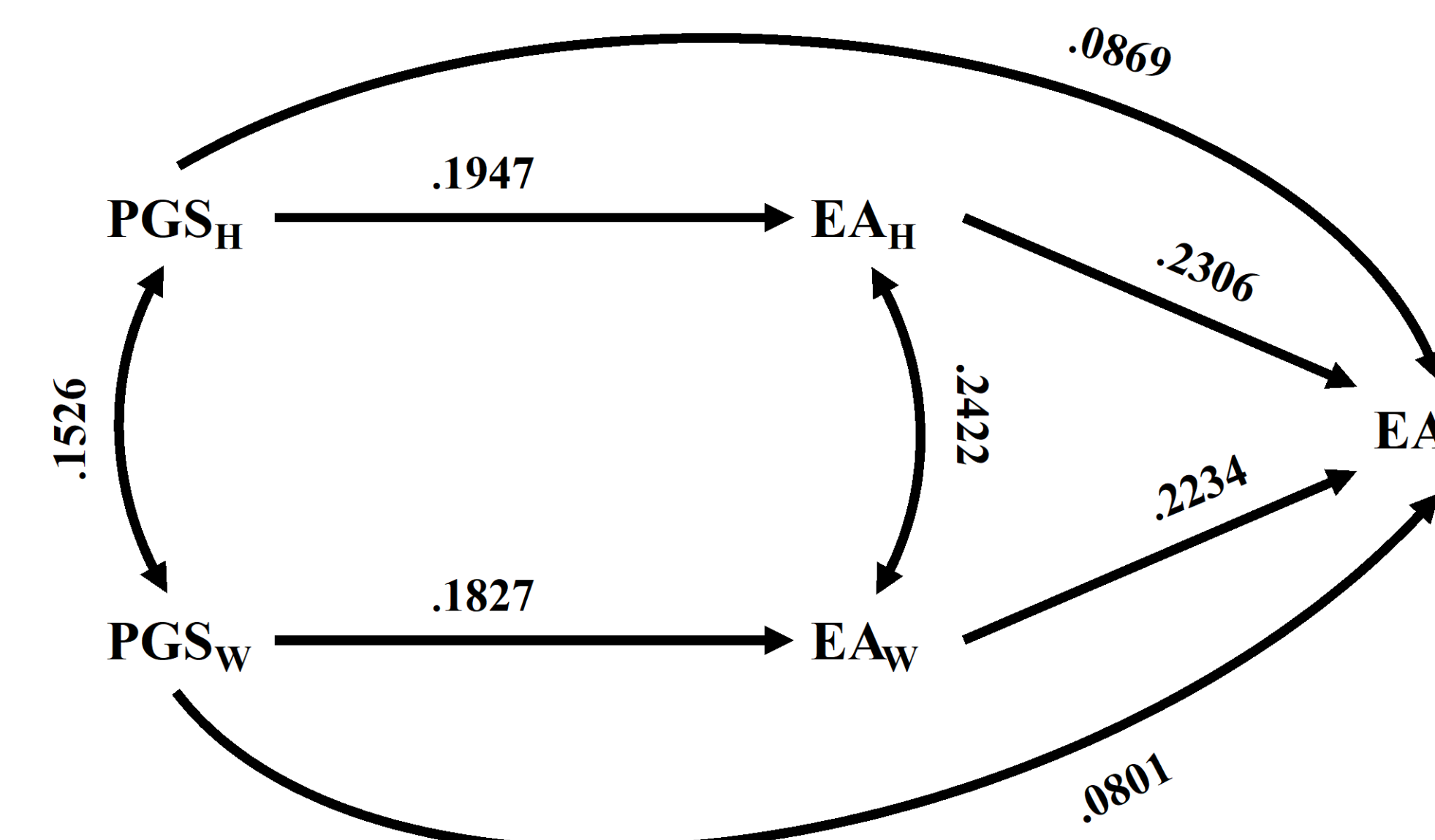
Methods

Estimated all associations through path analysis using a structural equation modeling (SEM) framework.

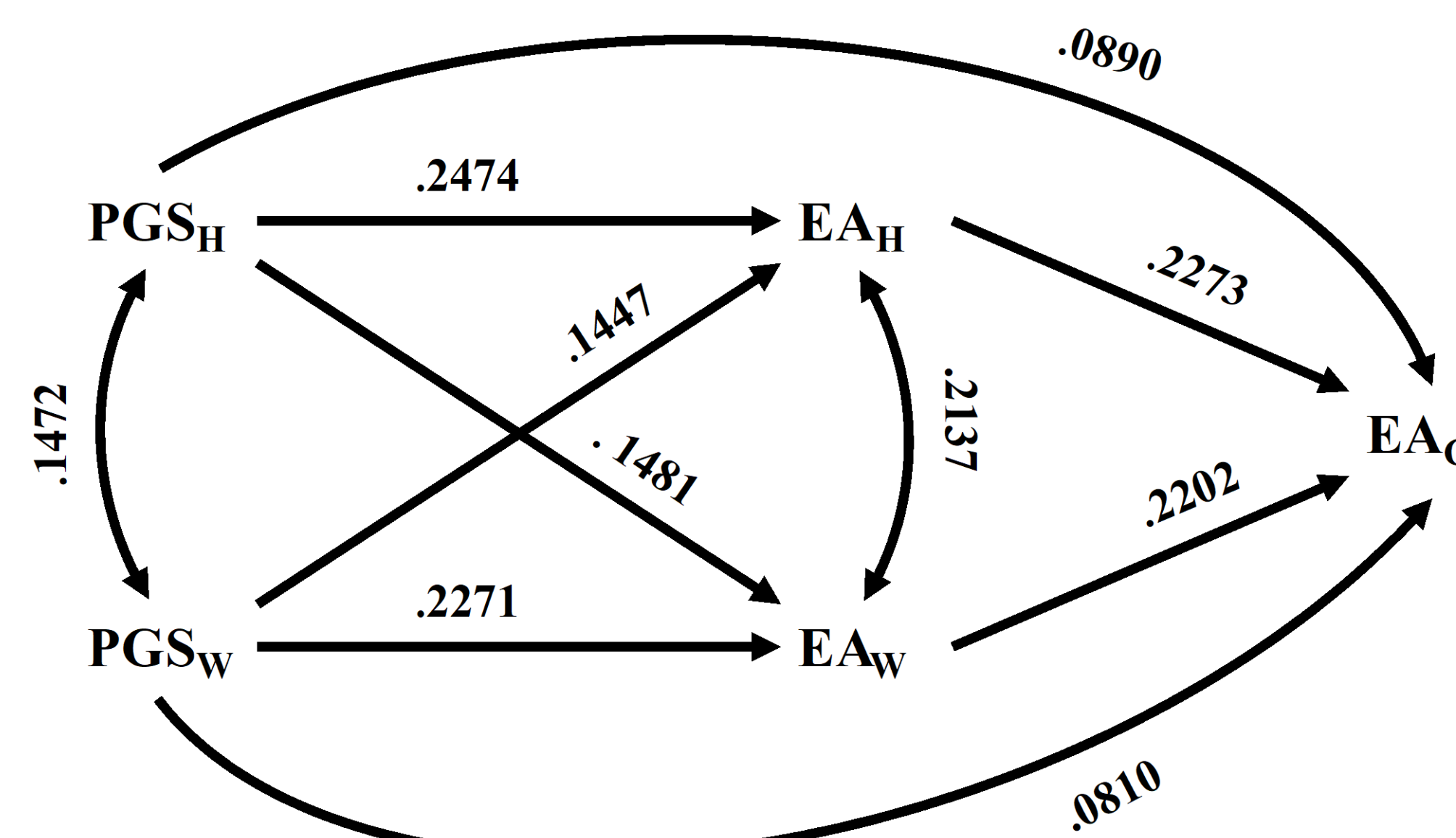
Results



The typical sociological model of the impact of parent's observed education on their child's educational attainment.



The inclusion of parent's PGS for educational attainment and covariances to account for assortative mating improves model fit and provides information on significant pathways through which both genetic and social components of parent's education impact their child's educational attainment.



Allowing each spouse's PGS to predict the other's observed educational attainment opens a substantively meaningful pathway through which each parent's PGS can influence the educational attainment of their child.

Conclusions

- Consistent with socio-genomic theory, both phenotypic and genotypic assortative mating account for a portion of the intergenerational transmission of educational attainment.
- Genotypic assortative mating also accounts for a portion of within-generation educational attainment, such that one's own PGS predicts their spouses educational attainment even after controlling for their spouses own PGS and their own educational attainment. This suggests there are pathways other than education through which genotypic assortative mating operates.
- Future research should attempt to unpack these pathways and the ways in which PGSs indirectly influence the outcomes of one's children (e.g., "genetic nurture").
- Such findings have important implications for the transmission of social opportunity from generation to generation. They may also help us understand social mobility and transmission of wealth across generations.

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