Does Genetic Selection Help Explain Differences in Health Across Occupations?

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Research Questions

1. Is there genetic selection into occupation?

2. Does genetic selection explain a portion of the occupational health gradient?

Background

Health is distributed unequally across occupations. One possibility is that work environments themselves make people sicker. An alternative, and non-mutually exclusive explanation is that individuals in poorer health select into jobs in lower occupational classes. Testing this hypothesis is difficult, as health at the start of employment history is often unobserved. We propose using polygenic scores to help disentangle the effects of unhealthy worker selection into lower-class occupations.

Data/Methods

• 7,273 EA genotyped respondents from HRS with linkages to SSA and O*Net

Measures

Occupation: Blue/White collar using 2-digit Census code for longest held job

Health Phenotypes: Memory recall, depressive symptoms , myocardial infarction, BMI, ever smoked

Polygenic Risk Scores: Cognition (CHARGE), Ed attain (SSGAC), CESD (PGC), MI, BMI, CVD (CardioGram), ever smoked (TAG)

Job Demand: Degree of control, management practices, environmental hazards

Is there genetic selection into occupation?

Figure 1: Distribution of PGS for Education and Myocardial Infarction

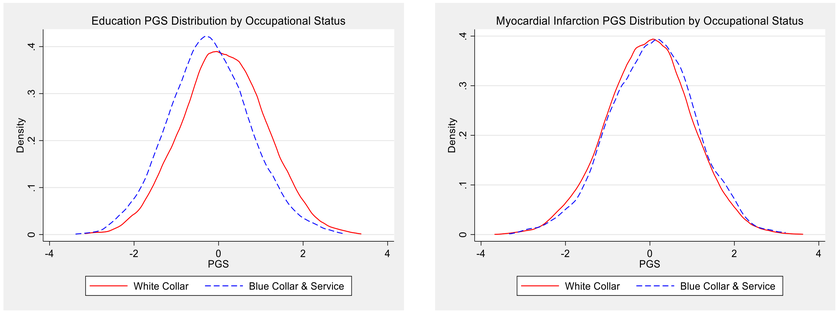

Table 1: T-test of Difference in Means of Polygenic Risk Scores for White vs. Blue Collar/Service Occupations (Blue Collar- White Collar)

PGS	Edu Attain	Cognitive Function	Depressive Symptoms	MI	BMI	Ever Smoke
All	-0.338***	-0.137***	0.100***	0.089***	0.073**	-0.013
Men	-0.383***	-0.217***	0.107**	0.132***	0.075*	-0.010
Women	-0.346***	-0.066	0.095*	0.070	0.094*	-0.000

* p<0.05, ** p<0.01, ***p<0.001

Summary and Next Steps

There is evidence of selection into occupation by genetics for most phenotypes, except smoking. Genetic risk does little to explain the occupational-health gradient and appears to be mediated through childhood SES, which largely explains health differences in white vs. blue collar/service. Job demand largely explains the remaining difference for blue collar jobs.

Next steps include:

- Test for mortality selection
- Test for selection in younger sample
- Explore whether changes in health within occupation over time are moderated by genetics

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Does genetic selection explain the gradient?

Does the health gradient remain after controlling for: 1) Base covariates, 2) PGS, 3) Childhood SES, lifetime earnings, education and 4) Job demands?

Figure 2: Occupational Health Gradient for Memory

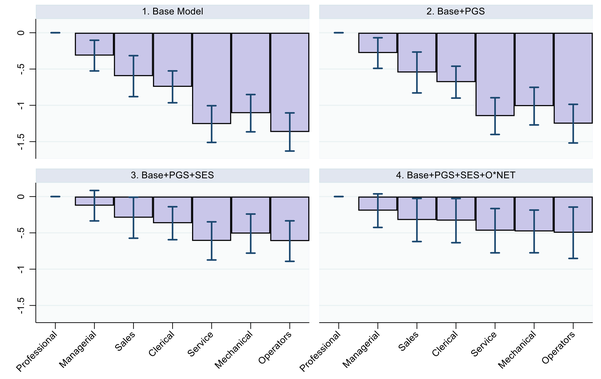


Figure 3: Occupational Health Gradient for Depressive Symptoms

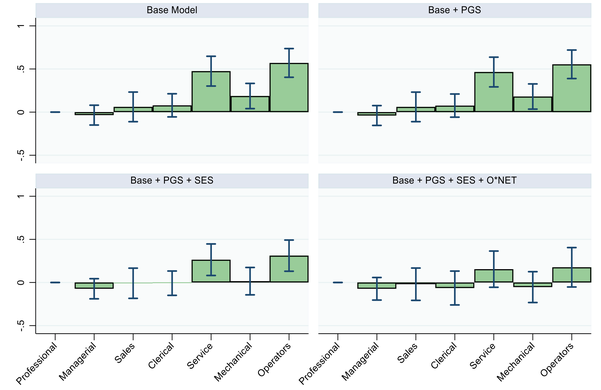
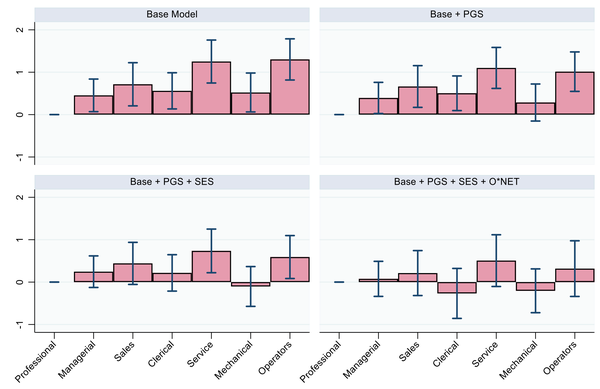


Figure 4: Occupational Health Gradient for BMI



Similar results are found for heart disease (using MI PGS), and smoking (using TAG PGS)