



Polygenic Indices for Health and Psychological Traits Predict Political Participation

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Are Political Orientations Genetically Transmitted?

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We test the possibility that political attitudes and behaviors are the result of both environmental and genetic factors. Employing standard methodological approaches in behavioral genetics—specifically, comparisons of the differential correlations of the attitudes of monozygotic twins and dizygotic twins—we analyze data drawn from a large sample of twins in the United States, supplemented with findings from twins in Australia. The results indicate that genetics plays an important role in shaping political attitudes and ideologies but a more modest role in forming party identification; as such, they call for finer distinctions in theorizing about the sources of political attitudes. We conclude by urging political scientists to incorporate genetic influences, specifically interactions between genetic heritability and social environment, into models of political attitude formation.



Genetic Basis of Political Traits

- ▶ Spawned a subfield combining lessons from behavior genetics, psychology, and political science
 - ▶ Twin and adoption studies
- ▶ Large body of evidence that political attitudes and behaviors are partially genetically transmitted
 - ▶ Orientation and ideology
 - ▶ Left-right scale, issue batteries, individual vs collective, authoritarianism, freedom vs equality, foreign policy stances
 - ▶ Participation
 - ▶ Voter turnout, civic duty, non-voting participation, political efficacy, interest in politics, political knowledge, running for office



Less Success

- ▶ *How* are genetic factors related to political attitudes and behavior?
- ▶ Multivariate twin models
 - ▶ Hard to interpret the relationship (mediation vs pleiotropy)
- ▶ Candidate gene studies
 - ▶ Power issues



Structural Limitations

- ▶ Findings and methods have yet to be integrated into mainstream research
- ▶ Lack of integration
 - 1 Genetically informative samples (twins, adoptees, genotyped individuals) are hard to find
 - 2 Analysis may require unfamiliar methodologies (behavior genetics)
 - 3 To solve 1 and 2, it is often necessary to collaborate across interdisciplinary borders



This Project

- ▶ Two main aims
 - 1 Introduce the political science discipline to the PGI approach
 - ▶ Primer on polygenic indices (the do's and don'ts)
 - ▶ Overcome many of the limitations of the previous research
 - 2 Provide a proof of concept for the fruitfulness of the PGI approach
 - ▶ Examine the relationship between political participation and psychological as well as health related traits
 - ▶ Four samples in two national contexts (U.S. and Sweden)



Psychological Traits and Political Participation

- ▶ Cognitive performance (Deary, Batty, and Gale 2008)
- ▶ Non-cognitive traits
 - ▶ Extraversion (Gerber et al. 2012)
 - ▶ Neuroticism (Gerber et al. 2012)
 - ▶ Risk tolerance (Kam 2012)
 - ▶ Adventurousness (Soto and John 2012)
 - ▶ Chronotype (Zoe, Depow and Inzlicht 2021)



Health and Political Participation

- ▶ Self-rated health (Mattila et al. 2018)
- ▶ Depression (Ojeda 2015)
- ▶ Subjective well-being (Flavin and Keane 2012)
- ▶ Physical activity (Burden et al. 2017)



PGI repository

- ▶ Repository of PGIs (Becker et al. 2021)
 - ▶ 47 different traits in 11 samples
- ▶ Restrictions we impose
 - ▶ Cohorts with information on political participation
 - ▶ Cohorts with a large number of sibling pairs
 - ▶ PGIs that predict 2% of the target trait



Cohorts

- ▶ The Minnesota Twin and Family Study (MTFS)
 - ▶ A population-based multi-wave longitudinal study of same-sex twins and their parents from the Upper Midwest
- ▶ The National Longitudinal Study of Adolescent to Adult Health (Add Health)
 - ▶ A nationally representative multi-wave longitudinal study
- ▶ The Wisconsin Longitudinal Study (WLS)
 - ▶ A long-term multi-wave longitudinal study of a random sample of Wisconsin high school graduates
- ▶ The Swedish Twin Registry (STR)
 - ▶ Contains nearly all twins born in Sweden since 1886



Political Participation Measures

- ▶ Self reported turnout
- ▶ Validated turnout
 - ▶ First-order/high salience elections (presidential elections and elections to the national parliament)
 - ▶ Second-order/low salience elections (midterm elections and elections to the European Parliament)
- ▶ Political participation index
 - ▶ Contacted a government official
 - ▶ Contributed money to a political cause
 - ▶ Attended a political rally or march



Summary Statistics

	MTFS	Add Health	WLS	STR
Self-Reported	0.742	0.424		
Presidential	0.878		0.862	
National				0.934
Midterm	0.573		0.810	
EP				0.631
Participation		0.028		0.084
Birth Year	1982.7	1979.0	1939.5	1968.3
<i>N</i>	2,333–7,525	4,791-5,652	8,534–8,937	9,598-43,669



Analysis

- ▶ Baseline (between-family)
 - ▶ Do the PGLs predict political participation?
- ▶ Within-family
 - ▶ The extent to which associations between the PGLs and participation are *causal* and not confounded by
 - ▶ Population stratification
 - ▶ Common family environment (genetic nurture)
- ▶ Note:
 - ▶ All samples pooled together
 - ▶ Benjamini-Hochberg procedure to control for false discovery rate

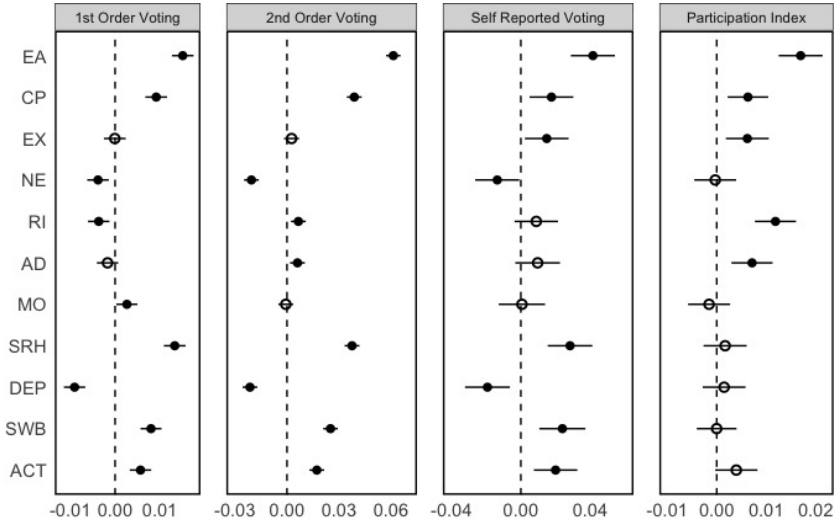


Baseline Results

- ▶ Regress political participation measures on each of the 10 PGs (separately) controlling for
 - ▶ 10 genetic principal components
 - ▶ Birth-year dummies
 - ▶ Gender dummy
 - ▶ Birth-year gender interactions
 - ▶ Sample fixed effects
- ▶ OLS with standard errors clustered at the family-level
- ▶ Include educational attainment (EA) as a benchmark based on Dawes et al. (2021) and Aarøe et al. (2021)



Baseline Results



Baseline Results

- ▶ A majority of the PGIs are significantly related to voter turnout in first- and second-order elections
 - ▶ Direction consistent with previous research
 - ▶ Results for self reported voting are less precise but follow the same patterns
- ▶ Magnitudes are non-negligible
 - ▶ A one standard deviation increase in the PGI for cognitive performance increases the likelihood of voting in a second-order election by 4 percentage points
- ▶ Results for non-voting participation point to PGIs related to sociability

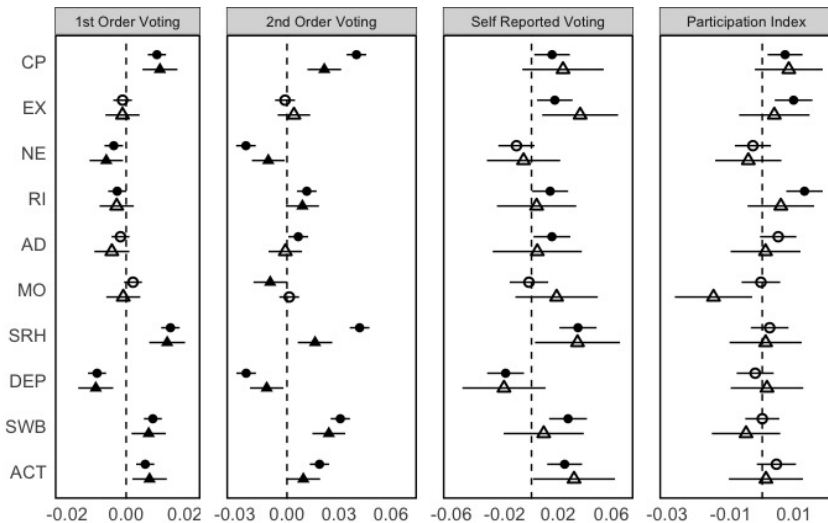


Within-Family Results

- ▶ Two regression models
 - ▶ Between-family (baseline)
 - ▶ Model with sibling-fixed effects
- ▶ Restricted to sibling pairs



Within-Family Results



Within-Family Results

- ▶ Significant within-family estimates for voter turnout in first- and second-order elections
 - ▶ PGIs are causally related to voter turnout
 - ▶ Based on a comparison of within- and between-family results suggest possible confounding for second-order elections
- ▶ Results for self-reported voting and non-voting participation are less precise

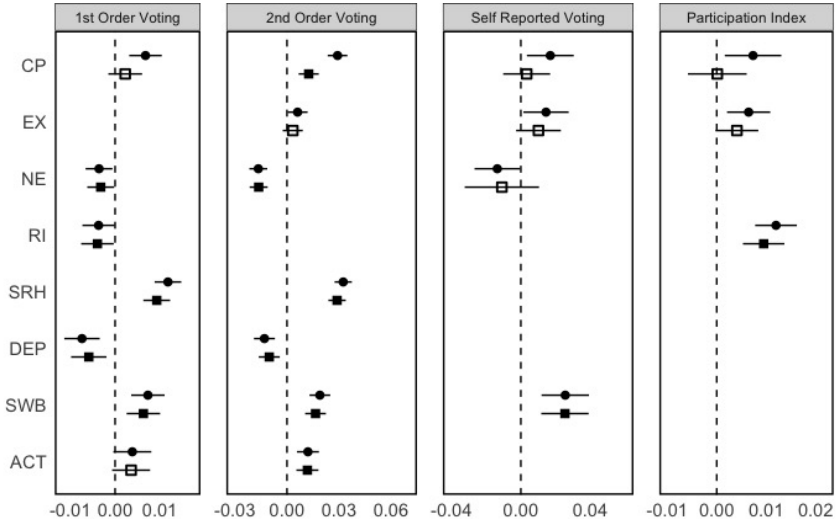


Discussion

- ▶ Based on almost 40,000 individuals in four samples from the US and Sweden we showed that *genes linked to health and psychological traits* predict voter turnout and engagement in non-electoral political acts
 - ▶ Within-family models represent strongest causal evidence
 - ▶ The estimated effects are substantially meaningful
- ▶ Contributions of integrating genetic information into political behavior research
 - 1 Include PGLs as control variables
 - 2 Useful for researchers with a primary interest in understanding the genetic underpinnings of political attitudes and behavior
 - 3 Enrich political socialization research
 - 4 Powerful source of latent heterogeneity (gene-by-environment interaction)



Example - Mediation



Example - GxE

