Moderation of Gene-Phenotype Associations May Be Socially Instructive Even When Psychologically Ambiguous

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genes
embodied characteristics
choices/actions
attainments

developmental environments
decision environments
allocation environments

Freese 2008 “Genetics and the Social Science Explanation...” *Am J Sociology*
Genotypic data: what’s in it for social science?

1. New leverage for estimating effects of environmental causes
2. Reveal importance of and serve as proxies for individual traits
3. Leverage to understanding how trait development varies over environments
4. Reveal information about nature of attainment processes in societies
Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene

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Alan Taylor,¹ Ian W. Craig,¹ HonaLee Harrington,²
Joseph McClay,¹ Jonathan Mill,¹ Judy Martin,³
Antony Braithwaite,⁴ Richie Poulton³

Science, 2003
Environmental Contingencies and Genetic Propensities: Social Capital, Educational Continuation, and Dopamine Receptor Gene DRD2¹

Partisanship, Voting, and the Dopamine D2 Receptor Gene

Research Article
Moderating effects of DRD2 on depression

The interaction of DRD2 and violent victimization on depression: An analysis by gender and race
A Dopamine Gene (DRD2) Distinguishes Between Offenders Who Have and Have Not Been Violently Victimized

Research

A gene × gene interaction between DRD2 and DRD4 is associated with conduct disorder and antisocial behavior in males

ALL IN THE FAMILY

Gene × Environment Interaction Between DRD2 and Criminal Father Is Associated With Five Antisocial Phenotypes

International Journal of Offender Therapy and Comparative Criminology, 2010

Behavioral and Brain Functions, 2007

Biodemography and Social Biology, 2009

Criminal Justice and Behavior, 2009
MAOA and delinquency, Add Health males (Wave 1)

3R, 3.5R, 4R, 5R  
(N = 1200)  

2R  
(N = 12)
% voted by church attendance

% “long” 5-HTT by self-identified race
% voted by church attendance and presence of “long” variant of 5-HTT

% voted by church attendance and presence of “long” variant of 5-HTT

all

white
most environmental *moderators* of interest to social scientists are also commonly studied as *outcomes*
TaqIA ANKK1 and Biological Parents’ Continuing Education Beyond High School Add Health (Whites, Wave 1)

Add Health respondents’ fathers

Add Health respondents
Interaction Between the Serotonin Transporter Gene (5-HTTLPR), Stressful Life Events, and Risk of Depression
A Meta-analysis

Genetic Sensitivity to the Environment: The Case of the Serotonin Transporter Gene and Its Implications for Studying Complex Diseases and Traits

The Serotonin Transporter Promoter Variant (5-HTTLPR), Stress, and Depression Meta-analysis Revisited
Evidence of Genetic Moderation

A Critical Review of the First 10 Years of Candidate Gene-by-Environment Interaction Research in Psychiatry

JAMA, 2009
Am J Psychiatry, 2010
Arch Gen Psychiatry, 2011
Am J Psychiatry, 2011
Examples of Heritability Estimates Differing over Within-Sample Gro

Boardman et al. 2009 State Level Moderation of Genetic Tendencies to Smoke. *Am J Pub Health*
Turkheimer et al. 2003, “Socioeconomic status modifies heritability of IQ in young children” *Psy Sci*
why collect MZ and DZ correlations for educational attainment?

• sibling correlations of attainments have history of being used as indicators of social mobility
• heritability has been suggested as indicator of meritocracy of society
• heritability of realized abilities and attainments has been posited to increase in more advantaged environments
results from meta-analysis of educational attainment in twin samples

• “shared environment” component nearly as large as heritability

• heritability lower ($\approx$ .07) and shared environment higher ($\approx$ .10) in female subsamples

• heritability higher ($\approx$ .09) and shared environment lower (.10) in younger cohorts

• more heterogeneity in estimates in Scandanavian vs. US samples
• Diversity of samples in consortium possible detriment in finding loci
• Risk scores and cumulative measures provide way this diversity may address questions about social processes
• Moderation across samples or broad subgroups can be informative at this stage without being causally decisive