

SOCIOLOGY 476: GENETICS AND SOCIETY

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Mondays, 3-5pm, Parkes 222

OVERVIEW

We are in the middle of remarkable advances in the availability of molecular genetic data on individual persons. In the same way that computing had a golden era in which every couple of years you could buy a new computer that was twice as powerful for the same price as your old one, genetic assays continue becoming dramatically cheaper and more powerful. Across every quarter of the academy that concerns itself with contemporary human lives, this has prompted consideration of what these new genetic advances imply for society and social inquiry. Surveying and assessing this work is the objective of this course.

Compared to some other titles in the graduate course catalog, "Genetics and Society" might seem a niche topic. Do not be fooled: the readings and material for this course may be the broadest that you will encounter in a seminar, in terms of the substantive fields and epistemological orientations that are represented. (*Sociologists, especially: there is a whole great big world out there!*) This breadth reflects the manifold ways that new developments in genetics intersect with broad social phenomena and longtime preoccupations of social science. My hope is that, apart from the contribution to thinking about genetics, the breadth of the readings will be a useful guide to the diversity of social inquiry more generally. Whatever else, you will get to see how a broad range of fields lay out arguments.

Social science engagement with developments in genetic research include four broad forms. First, social scientists are trying to figure out how genetic data can be used to help them better understand phenomena they have been long endeavoring to understand. Second, social scientists try to improve understanding of how social environments moderate, amplify, or attenuate genetic influences on outcomes as studying by behavioral or medical genetics. Third, social scientists consider how genetic findings or information affect public opinion or other aspects of culture, broadly conceived. Fourth, social scientists study how advances in genetic medicine affect the experience of patients

and population differences in health outcomes. We will consider work of all these forms, and then some.

Usually also about this topic are the extent to which we will cover matters that are very much unsettled. Progress in the area has been palpable across iterations of the syllabus, and there are works I feel ought to be on this syllabus but are under embargo, etc.. This is precisely what I find so exciting about this area, and, if I may so, a compelling contrast to various areas of sociology that shall remain nameless. However, it does require a certain amount of tolerance for ambiguity, appreciation for the existing of standing puzzles, and willingness to change your mind as the field develops (everybody in the field is wrong about some things, but the whole fun is that nobody knows what we will turn out to be wrong about).

MATERIALS

Readings for each week of the course are presented below. No books need to be purchased for the course, which is fitting given that developing technologies seem likely to make printed books obsolete within ten years anyway. Readings will be made available on Blackboard.

COURSE REQUIREMENTS

As a conscientious participant in good standing in this seminar, you are expected to do the following:

You will be familiar with the basic arguments of each of the readings indicated as required and participate in our class discussion about them.

At least six times during the quarter, you will provide an e-mail to everyone in the course that offers at least three comments, questions, reactions to the reading, by the agreed-upon time on the Sunday before class.

You will help lead/motivate discussion with another person at various times during the quarter, depending on our total enrollment. The comments from others will presumably help you (and me) in this task.

You will write a potentially-relatively-short-by-seminar-standards paper regarding the intersection of human genetics and a matter of your own developing intellectual interests. This paper may be a research proposal, a review, a critique of existing work, a broadside, or an essay.

COURSE SCHEDULE AND READINGS

WEEK ONE (April 2): *Salutations and orientations*

Selections from Plomin, Robert, John C. DeFries, Gerald E. McClearn, and Peter McGuffin. 2008. *Behavioral Genetics, Fifth Edition*. New York, NY: Worth. [Chapters 2-4 provide very basic background; Chapter 5 is suitable even if one can skip Chapters 2-4]

Schaffner, Kenneth F. 2006. "Behavior: Its Nature and Nurture (Parts 1 and 2)" Pp. 3-73 in *Wrestling with Behavioral Genetics: Science, Ethics, and Public Conversation*, edited by E. Parens, A. R. Chapman, and N. Press. Baltimore: Johns Hopkins University Press.

WEEK TWO (April 9): *Why would anybody believe that genes cause _____ ?*

Psychology

Turkheimer, Eric. 2000. "Three laws of behavior genetics and what they mean." *Current Directions in Psychological Science* 9:160-164.

Sullivan, Patrick F., Mark J. Daly, and O'Donovan Michael. 2012. "Genetic architectures of psychiatric disorders: the emerging picture and its implications." *Nature Review Genetics* 13:537-551.

Economics

Benjamin, Daniel J., David Cesarini, Christopher F. Chabris, Edward Glaeser, David Laibson, Vilmundur Gudnason, Tamara B. Harris, Lenore J. Launer, Shaun Purcell, Albert Vernon Smith, Magnus Johannesson, Patrik K. E. Magnusson, Jonathan P. Beauchamp, Nicholas A. Christakis, Craig S. Atwood, Benjamin Hebert, Jeremy Freese, Robert M. Hauser, Taissa S. Hauser, Alexander Grankvist, Christina M. Hultman, and Paul Lichtenstein. 2012. "The Promises and Pitfalls of Genoeconomics." *Annual Review of Economics* 4:627-662.

Political science

Smith, Kevin, John R. Alford, Peter K. Hatemi, Lindon J. Eaves, Carolyn Funk, and John R. Hibbing. 2012. "Biology, ideology, and epistemology: How do we know political attitudes are inherited and why should we care?" *American Journal of Political Science* 56:17-33.

Supplemental: Alford, John R., and John R. Hibbing. 2008. "The New Empirical Biopolitics." *Annual Review of Political Science* 11:183-203.

Sociology

Freese, Jeremy. 2008. "Genetics and the Social Science Explanation of Individual Outcomes." *American Journal of Sociology* 114:S1-S35.

WEEK THREE (April 15): *Why are some people cautious or outright skeptical about heritability estimates?*

Limitations for Policy

Jencks, Christopher. 1980. "Heredity, Environment, and Public Policy Reconsidered." *American Sociological Review* 45:723-736.

Manski, Charles F. 2011. "Genes, Eyeglasses, and Social Policy." *Journal of Economic Perspectives* 25:83-94.

Assumptions and conceptual limitations

Freese, Jeremy. 2006. "The analysis of variance and the social complexities of genetic causation." *International Journal of Epidemiology* 35:534-536.

Johnson, Wendy, Eric Turkheimer, Irving I. Gottesman, and Thomas J. Bouchard. 2009. "Beyond Heritability: Twin Studies in Behavioral Research." *Current Directions in Psychological Science* 18:217-220.

Kendler, Kenneth S. 2005. "'A Gene for...': The Nature of Gene Action in Psychiatric Disorders." *American Journal of Psychiatry* 162:1243-1252.

Limitations in the context of genomics

Maher, Brendan. 2008. "The Case of the Missing Heritability." *Nature* 456:18-21.

Visscher, Peter, William G. Hill, and Naomi R. Wray. 2008. "Heritability in the Genomics Era: Concepts and Misconceptions." *Nature Reviews Genetics* 9:255-266.

Supplemental: Charney, Evan. 2012. "Behavior genetics and postgenomics." Behavioral and Brain Sciences 35:331-358 (plus open commentary [or perhaps especially the open commentary]).

WEEK FOUR (April 22): *Genomic Research and How People Think about Themselves*

Risk

Novas, Carlos and Nikolas Rose. 2000. "Genetic Risk and the Birth of the Somatic Individual." *Economy and Society* 29:485-513.

Ambiguity

Timmermans, Stefan and Mara Buchbinder. 2010. "Patients-in-Waiting: Living Between Sickness and Health in the Genomics Era." *Journal of Health and Social Behavior* 51:408-423.

Watson, Michael S., R. Rodney Howell, and Piero Rinaldo. 2011. "A Disservice to Advances in Newborn Genetic Screening: Comment on Timmermans and Buchbinder." *Journal of Health and Social Behavior* 52:277-278.

Freese, Jeremy. 2011. "Sociology's contribution to understanding the consequences of medical innovations." *Journal of Health and Social Behavior* 52:282-284.

Identity

Hacking, Ian. 2006. "Genetics, Biosocial Groups, and the Future of Identity." *Daedalus*:81-95.

Lock, Margaret M., Julia Freeman, Gillian Chilibeck, Briony Beveridge, and Miriam Padolsky. 2007. "Susceptibility Genes and the Question of Embodied Identity." *Medical Anthropology Quarterly* 21:256-76.

Medicalization

Shostak, Sara, Peter Conrad, and Allan V. Horwitz. 2008. "Sequencing and Its Consequences: Path Dependence and the Relationships Between Genetics and Medicalization." *American Journal of Sociology* 114:S287-S316.

WEEK FIVE (April 29) - *Gene-Environment Interdependence, I*

Gene-environment interplay

Selections from Rutter, Michael. 2006. *Genes and Behavior: Nature-Nurture Interplay Explained*. Malden, MA: Blackwell.

Shanahan, Michael J. and Scott M. Hofer. 2005. "Social context in gene-environment interaction: Retrospect and prospect." *Journals of Gerontology: Series B* 60B:65-76.

Flynn effect, population change, and concept of multipliers

Selection from Flynn, James R. 2007. *What is intelligence?* Cambridge, UK: Cambridge University Press.

Interdependence in intellectual development

Turkheimer, Eric, Andreana Haley, Mary Waldron, Brian D'Onofrio, and Irving I. Gottesman. 2003. "Socioeconomic Status Modifies Heritability of IQ in Young Children." *Psychological Science* 14.

Tucker-Drob, Elliot M. and K. Paige Harden. 2012. "Early childhood development and parental cognitive stimulation: evidence for reciprocal gene-environment transactions." *Developmental Science* 15:250-259.

Tucker-Drob, Elliot M., Mijke Rhemtulla, K. Paige Harden, Eric Turkheimer, and David Fask. 2011. "Emergence of a Gene x Socioeconomic Status Interaction on Infant Mental Ability Between 10 Months and 2 Years." *Psychological Science* 22:125-133.

Tucker-Drob, Elliot M. and K. Paige Harden. 2012. "Intellectual interest mediates gene x socioeconomic status interaction on adolescent academic achievement." *Child Development* 83:743-757.

Supplemental: Guo, Guang and Elizabeth Stearns. 2002. "The Social Influences on the Realization of Genetic Potential for Intellectual Development." *Social Forces* 80:881-910.

WEEK SIX (May 6) - *Gene-Environment Interdependence, II*

Gene-environment interaction and inter/transdisciplinarity

Dick, Danielle M. 2011. "An interdisciplinary approach to studying gene-environment interactions: From twin studies to gene identification and back." *Research in Human Development* 8:211-226.

Pescosolido, Bernice, Brea L. Perry, J. Scott Long, Jack K. Martin, John I. Nurnberger Jr., John Kramer, and Victor Hesselbrock. 2008. "Under the Influence of Genetics: How Transdisciplinarity Leads Us to Rethink Social Pathways to Illness." *American Journal of Sociology*.

Debate about gene-environment interaction and depression

Caspi, Avshalom, Karen Sugden, Terrie E. Moffitt, Alan Taylor, Ian W. Craig, HonaLee Harrington, Joseph McClay, Jonathan Mill, Judy Martin, Antony Braithwaite, and Richie Poulton. 2003. "Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene." *Science* 301:386-389.

Horwitz, Allan V. 2005. "Media portrayals and health inequalities: A case studies of characterizations of gene x environment interactions." *Journal of Gerontology: Series B* 60B:48-52.

Risch, Neil, Richard Herrell, Thomas Lehner, Kung-Yee Liang, Lindon J. Eaves, Josephine Hoh, Andrea Griem, Maria Kovacs, Jurg Ott, and Kathleen Ries Merikangas. 2009. "Interaction Between the Serotonin Transporter Gene (5-HTTLPR), Stressful Life Events, and Risk of Depression: A Meta-Analysis." *JAMA* 301:2462-2471.

Caspi, Avshalom, Ahmad R. Hariri, Andrew Holmes, Rudolf Uher, and Terri E. Moffitt. 2010. "Genetic sensitivity to the Environment: The Case of the Serotonin Transporter Gene and Its Implications for Studying Complex Diseases and Traits." *American Journal of Psychiatry* 167:509-527.

Karg, Katja, Margit Burmeister, Kerby Shedden, and Srijan Sen. 2011. "The serotonin transporter promoter variant (5-HTTLPR), stress, and depression meta-analysis revisited: evidence of genetic moderation." *Archives of General Psychiatry* 68:444-454.

Duncan, Laramie E. and Matthew C. Keller. 2011. "A critical review of the first 10 years of candidate gene-by-environment interaction research in psychiatry." *American Journal of Psychiatry* 168:1041-1049.

WEEK SEVEN (May 13): *Geneticization, Essentialism, Reductionism, and Race/Ethnicity*

Geneticization

ten Have, Henk A. M. J. 2001. "Genetics and culture: The geneticization thesis." *Medicine, Health Care, and Philosophy* 4:295-304.

Essentialism

Dar-Nimrod, Ilan and Steven J. Heine. 2011. "Genetic essentialism: On the deceptive determinism of DNA." *Psychological Bulletin* 137:800-818.

Turkheimer, Eric. 2011. "Genetics and Human Agency: Comment on Dar-Nirod and Heine." *Psychological Bulletin* 137:825-828.

Reductionism and race/ethnicity

Selections from Duster, Troy. 2003. *Backdoor to Eugenics*, Second Edition. New York: Routledge.

Selections from Bliss, Catherine. 2012. *Race Decoded: The Genomic Fight for Social Justice*. Palo Alto, CA: Stanford University Press.

El-Haj, Nadia Abu. 2007. "The Genetic Reinscription of Race." *Annual Review of Anthropology* 36:283-300.

Fujimura, Joan and Ramya Rajagopalan. 2011. "Different differences: The use of 'genetic ancestry' versus race in biomedical human genetic research." *Social Studies of Science* 41:5-30.

WEEK EIGHT (May 20) - Elaborations of design

[Note: This week is still a work in progress.]

Visscher, Peter M., Matthew A. Brown, Mark I. McCarthy, and Jian Yang. 2012. "Five Years of GWAS Discovery." *American Journal of Human Genetics* 90:7-24.

Plomin, Robert, Claire M. A. Haworth, Emma L. Meaburn, Thomas S. Price, Wellcome Trust Case Control Consortium 2, and Oliver S. P. Davis. 2013. "Common DNA Markers Can Account for More Than Half of the Genetic Influence on Cognitive Abilities." *Psychological Science* xx:xx.

Benjamin, Daniel J., David Cesarini, Matthijs J. H. M. van der Loos, Christopher T. Dawes, Philipp D. Koellinger, Patrik K. E. Magnusson, Christopher F. Chabris, Dalton Conley, David Laibson, Magnus Johannesson, and Peter M. Visscher. 2012. "The genetic architecture of economic and political preferences." *Proceedings of the National Academy of Sciences* 109:8026-8031.

de Moor, M. H., Costa, P. T., Terracciano, A., Krueger, R. F., De Geus, E. J. C., Toshiko, T., ... & Metspalu, A. (2010). Meta-analysis of genome-wide association studies for personality. *Molecular psychiatry*, 17(3), 337-349.

WEEK NINE (TBD, June 3 by default) - Genome-wide data

Complementary studies of nicotine use

Boardman, Jason D. 2009. "State-level moderation of genetic tendencies to smoke." *American Journal of Public Health* 99:480-486.

Fletcher, Jason M. 2012. "Why Have Tobacco Control Policies Stalled? Using Genetic Moderation to Examine Policy Impacts." *PLoS ONE* 7:e50576.

Neighborhood-level interaction

Boardman, Jason D., Lisa L. Barnes, Robert S. Wilson, Denis A. Evans, and Carlos F. Mendes de Leon. 2012. "Social disorder, APOE-e4 genotype, and change in cognitive function among older adults." *Social Science & Medicine* 74:1584-1590.

Using twins as their own controls

Schnittker, Jason. 2008. "Happiness and Success: Genes, Families and the Correlates of Well-Being." *American Journal of Sociology* 114:S233-S259.

Genes as instrumental variables (Mendelian randomization)

Lawlor, Debbie A., Roger M. Harbord, Jonathan A. C. Sterne, Nic J. Timpson, and George Davey Smith. 2008. "Mendelian Randomization: Using genes as instruments for making causal inferences in epidemiology." *Statistics in Medicine* 27:1133-1163.

Measures of genetic diversity: recent controversy in economics/anthropology

Ashraf, Quamrul and Oded Galor. 2013. "The "Out of Africa" Hypothesis, Human Genetic Diversity, and Comparative Economic Development." *American Economic Review* 103:1-46.

d'Alpoim Guedes, Jade Theodore C. Bestor, Theodore Carrasco, Rowan Flad, Ethan Fosse, Michael Herzfeld, Carl C. Lamberg-Karlovsky, Cecil M. Lewis, Matthew Liebmann, Richard Meadow, Nick Patterson, Max Price, Meredith Reiches, Sarah Richardson, Heather Shattuck-Heidorn, Jason Ur, Gary Urton, and Christina Warinner. 2013. "Is Poverty in Our Genes?: A Critique of Ashraf and Galor" *Current Anthropology* 54:71-79.