Sociogenomic Friction in the Landscape of Neurodiversity

Matthew Kucmanic[1]
[1]Department of Geographical and Sustainability Sciences, University of Iowa

Photo by Marvin van Beek on Unsplash

Sociogenomics Overview:

The coming together of sociology and genetics to understand the the genomic underpinnings of complex social traits (Mills and Tropf 2020)

Moves beyond gene-environment interaction research by studying behavioral traits (Domingue et al. 2020)

Social genomic scientists view the exclusion of genomics as a either:

- Ignoring the biological aspects of bodies (Freese 2018)
- Bias is generated by not including genetic influences (Braudt 2018)
- Falling behind the genomic revolution (Conley and Fletcher 2017)

Potential benefits and harms:

- Can show the complex relationship between genes and environment (Bliss 2018), (Braudt 2018), (D. Martschenko 2020)
- Integrate social science theories (Mills and Tropf 2020)
- Exacerbate existing social disparities (Mills and Tropf 2020) (D. O. Martschenko 2022)
- Can be interpreted as deterministic:
  - Scores leading to discrimination among marginalized groups (Bliss 2020) (Mills and Tropf 2020) (Matthews et al. 2021)
  - Lead to an over-reliance on biological explanations (Bliss 2018)

Neurodiversity Overview:

The idea/fact that there is an assortment of neurotypes whose neurocognitive function differs from both each other and a set norm

These neurotypes diverge from what is considered normal human functionings, and so are neurodivergent

Definitions of neurodiversity can differ by normative context (Ne'eman and Pellicano 2022)

- Is it a movement, an academic approach, a biological reality, or all three?

Challenges the prevention and cure of traits. Sinclair's work (1993)—Autism is not a shell that is covering a normal person

Encompasses a host of neurodivergent traits: autisim, ADHD, dyslexia, bipolar disorder, downs syndrome and many more

Neurodiversity Key Terms Summarized from Walker (2014):

Neurodiversity: neurocognitive variability that affects how humans think, process, and interact with the world. Inspired by ideas of biodiversity, neurodiversity can be thought of as neurobiological differences within humans.

Neurodivergent: neurocognitive function that diverges for set norms and societal constructions for what is deemed 'normal'.

Neurodiversity paradigm/framework/approach: theoretical perspectives for understanding neurological traits.

Neurodiversity movement: An activist movement that advocates for the different lived experiences and rights of neurodivergent peoples.

Neurominority: a constructed category of neurodivergence that represents a pervasive neurocognitive difference to the norms of human functioning that is "intimately related to the formation and constitution of the self" (Chapman 2019, 375).

The Problem:

Sociogenomic researchers are exploring how genes and enviornments come together to influence the development of neurodivergent traits like ADHD and autism.

With neurodiversity appraches pushing against pathologizing narratives, the question becomes:

- Are neurodiversity perspectives and approaches being incorperated into sociogenomic research?
  - Including activist and community members perspectives
- How can neurodiversity approaches impact sociogenomic research traits that are not considered under the neurodiversity umbrella?
- Is sociogenomics compatible with neurodiversity approaches?

How can sociogenomic research impact neurodiversity approaches?

- Neurodiversity (mostly) accepts biological explanations but is against the pathologization of traits
- Neurodiversity is strongly opposed to curative interventions
- Categories are politically useful, but not viewed as biologically valid by the neurodiversity community (Chapman 2020)
- Models rely on a reference group that evaluates what is normal and abnormal function
  - Advocates are already concerned about eugenics
- Understand the role of genetics in diversity, but targeting traits may lead to:
  - Furthering neuronormativity
  - Co-opting traits for gain
  - Re-pathologizing traits

Figure 1: General Descriptions of Disability Approaches

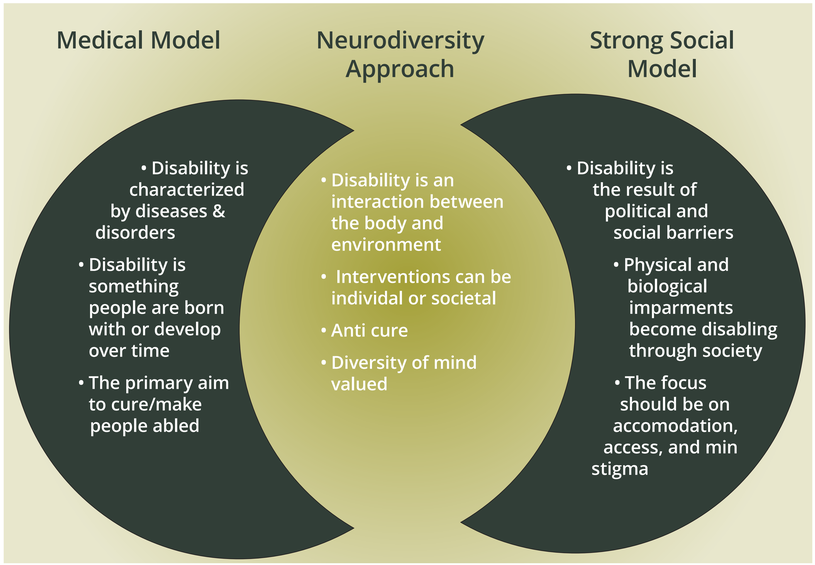

Figure summarized from Dwyer (2022) Table 1.

Answers?:

Pull from geography and Non-Representational Theory (NRT) (summarized from (Hall and Wilton 2017))

- Emphasis on practice, embodiment, and the ethical and political dimensions that create body
- Shifting field of potential from where the body emerges: does not assume a clear biological or social outcome
- Affect & harmonious and disharmonious relations are also crucial
- "How are able-bodiedness and able-mindedness produced as geographically and historically contingent constructs?" (Hall and Wilton 2017 p. 735)

Focus on pathologization instead of medicalization:

- Medicalization and pathologization are oftentimes conflated with one another (Sholl 2017):
  - Medicalization: seeing social phenomena through biomedical terms
  - Pathologization: making a trait as something that can be treated and made into a disease or disorder
- Neurodivergent traits like ADHD have long histories of being medicalized (Conrad 1976)
- In an increasingly molecularized world (Braun 2007) , (bio)medicalization has permeated nearly every aspect of life (Rose 2007)

View traits from a social ecology of mental functioning (Chapman 2021)

- Alternative to physiological and evolutionary models
- Reframes ideas of function and dysfunction at three main levels:
  1. Mental traits contribute to the "persistence propensity of individuals"
     - Traits are not just negative, but there are also benefits (can be both beneficial and disabling)
  2. Cognitions contribute to ecological niches
     - Fit into specific roles, and there is social and ecological value
  3. Functions emerge at the group level
     - Traits exist at the group level and cannot be reduced to the individual
     - There is practical benefit to a diverse group rather than a homogenous one

References:

Belsky, Daniel W., and Salomon Israel. 2014. "Integrating Genetics and Social Science: Genetic Risk Scores." _Biodemography and Social Biology_ 60 (2): 137–55. https://doi.org/10.1080/19485565.2014.946591.

Bliss, Catherine. 2018. _Social by Nature: The Promise and Peril of Sociogenomics_. Stanford University Press.

———. 2020. "Conceptualizing Race in the Genomic Age." _Hastings Center Report_ 50 (S1): S15–22. https://doi.org/10.1002/hast.1151.

Braudt, David B. 2018. "Sociogenomics in the 21st Century: An Introduction to the History and Potential of Genetically Informed Social Science." _Sociology Compass_ 12 (10): e12626. https://doi.org/10.1111/soc4.12626.

Braun, Bruce. 2007. "Biopolitics and the Molecularization of Life." _Cultural Geographies_ 14 (1): 6–28. https://doi.org/10.1177/1474474007072817.

Chapman, Robert. 2019. "Neurodiversity Theory and Its Discontents: Autism, Schizophrenia, and the Social Model." In _The Bloomsbury Companion to the Philosophy of Psychiatry_, edited by Serife Tekin and Robyn Bluhm.

———. 2020. "Neurodiversity, Wellbeing, Disability." In _Neurodiversity Studies: A New Critical Paradigm_, edited by Hanna Bertilsdotter Rosqvist, Nick Chown, and Anna Stenning, 1st ed., 57–72. Routledge. https://doi.org/10.4324/9780429322297.

———. 2021. "Neurodiversity and the Social Ecology of Mental Functions." _Perspectives on Psychological Science_ 16 (6): 1360–72. https://doi.org/10.1177/1745691620959833.

Conley, Dalton, and Jason Fletcher. 2017. _The Genome Factor: What the Social Genomics Revolution Reveals about Ourselves, Our History, and the Future_. Princeton University Press. https://doi.org/10.1515/9781400883240.

Conrad, Peter. 1976. "Identifying Hyperactive Children: The Medicalization of Deviant Behavior."

Domingue, Benjamin, Sam Trejo, Emma Armstrong-Carter, and Elliot Tucker-Drob. 2020. "Interactions between Polygenic Scores and Environments: Methodological and Conceptual Challenges." _Sociological Science_ 7: 365–86. https://doi.org/10.15195/v7.a19.

Dwyer, Patrick. 2022. "The Neurodiversity Approach(Es): What Are They and What Do They Mean for Researchers?" _Human Development_ 66 (2): 73–92. https://doi.org/10.1159/000523723.

Freese, Jeremy. 2018. "The Arrival of Social Science Genomics." _Contemporary Sociology_ 47 (5): 524–36. https://doi.org/10.1177/0094306118792214a.

Hall, Edward, and Robert Wilton. 2017. "Towards a Relational Geography of Disability." _Progress in Human Geography_ 41 (6): 727–44. https://doi.org/10.1177/0309132516659705.

Martschenko, Daphne. 2020. "The Train Has Left the Station': The Arrival of the Biosocial Sciences in Education." _Research in Education_, 107 (1): 3–9. https://doi.org/10.1177/0034523720914636.

Martschenko, Daphne Oluwaseun. 2022. "The Elephant in the Room': Social Responsibility in the Production of Sociogenomics Research." _BioSocieties_, 17 (4): 713–31. https://doi.org/10.1057/s41292-021-00239-3.

Matthews, Lucas J., Matthew S. Lebowitz, Ruth Ottman, and Paul S. Appelbaum. 2021. "Pygmalion in the Genes? On the Potentially Negative Impacts of Polygenic Scores for Educational Attainment." _Social Psychology of Education_, 24 (3): 789–808. https://doi.org/10.1007/s11218-021-09632-zhttps://doi.org/10.1007/s11218-021-09632-z.

Mills, Melinda C., and Felix C. Tropf. 2020. "Sociology, Genetics, and the Coming of Age of Sociogenomics." _Annual Review of Sociology_, 46 (1): 553–81. https://doi.org/10.1146/annurev-soc-121919-054756https://doi.org/10.1146/annurev-soc-121919-054756.

Ne'eman, Ari, and Elizabeth Pellicano. 2022. "Neurodiversity as Politics." Human Development 66 (2): 149–57. https://doi.org/10.1159/000524277.

Pellicano, Elizabeth, and Marc Stears. 2011. "Bridging Autism, Science and Society: Moving toward an Ethically Informed Approach to Autism Research." _Autism Research_, 4 (4): 271–82. https://doi.org/10.1002/aur.201https://doi.org/10.1002/aur.201.

Rose, Nikolas. 2007. "Beyond Medicalisation." The Lancet 369 (9562): 700–702.

Sholl, Jonathan. 2017. "The Muddle of Medicalization: Pathologizing or Medicalizing?" _Theoretical Medicine and Bioethics_, 38 (4): 265–78. https://doi.org/10.1007/s11017-017-9414-zhttps://doi.org/10.1007/s11017-017-9414-z.

Sinclair, Jim. 2012. "Don't Mourn for Us." _Autonomy, the Critical Journal of Interdisciplinary Autism Studies_, 1 (1). https://philosophy.ucsc.edu/SinclairDontMournForUs.pdfhttps://philosophy.ucsc.edu/SinclairDontMournForUs.pdf.

Trejo, Sam, and Benjamin W. Domingue. 2018. "Genetic Nature or Genetic Nurture? Introducing Social Genetic Parameters to Quantify Bias in Polygenic Score Analyses." _Biodemography and Social Biology_, 64 (3–4): 187–215. https://doi.org/10.1080/19485565.2019.1681257https://doi.org/10.1080/19485565.2019.1681257.

Walker, Nick. 2014. "NEURODIVERSITY: SOME BASIC TERMS & DEFINITIONS • NEUROQUEER." 2014. https://neuroqueer.com/neurodiversity-terms-and-definitions/https://neuroqueer.com/neurodiversity-terms-and-definitions/.

Acknowledgements: Support was provided by NHGRI (#R01HG012402 Cadigan and Prince, MPIs). The content does not necessarily represent the official view of NHGRI or the NIH. Thank you to the entire Beyond the Medical: The ELSI of Polygenic Scores Team for your guidance and support on throughout my research, especially Anya Prince.