

Example from Sociology

In spring 2023 asked a group of Norwegian sociologists (RLH) how much does genetics and environmental factors matter for individuals' social class position, and performed a twin study to estimate the relative contributions (van Hootegeem et al., 2024). One of their findings was that environmental factors that are shared between twins matter far less than other environmental factors and genetics. Based on this, RLH published an opinion piece in *sosiologen.no* arguing that revision of theories on social class and mobility is warranted (Rogne et al., 2023). This caused some debate, and opponents of RLH evoked, among other things, arguments based on alternatives to the counterfactual causality paradigm (Heggebo, 2023). Others claim that RLH implicitly legitimizes social inequalities and that we therefore should be extra skeptical of this kind of research (findings) (Flemmen, 2023). The debate contains several more interesting opinion pieces and arguments, but I would like to highlight two key knowledge creation concerns:

- How does causality factor into questions of genetics and environment? Can the *counterfactual* paradigm of causality be applied to understand how genes and/or environmental impact life outcomes? Is a *generative process* - understanding of causality more applicable (Blossfeld, 2009; Goldthorpe, 2001)?
- If true, do will findings that genetics explain most socioeconomic outcomes legitimize social inequality? That is, does it make it natural? And, is what is natural, good? Finally, if yes, should we avoid researching such subjects?

References:

Blossfeld, H.-P. (2009). Causation as a Generative Process. The Elaboration of an Idea for the Social Sciences and an Application to an Analysis of an Interdependent Dynamic Social System. In *Causal Analysis in Population Studies* (pp. 83–109). Springer Netherlands.

Flemmen, M. (2023, May 9). Klasse er ikke natur. *Sosiologen*.
<https://sosiologen.no/debatt/klasse-er-ikke-natur/>

Goldthorpe, J. H. (2001). Causation, Statistics, and Sociology. *European Sociological Review*, 17(1), 1–20.

Heggebo, K. (2023, July 6). Sosiologi med og utan gåseauge. *Sosiologen*.
https://sosiologen.no/debatt/sosiologi-med-og-utan-gaseauge/#_ftn3

Rogne, A. F., Lyngstad, T. H., & Van Hootehem, A. (2023, April 24). Når klasseposisjoner går i arv. *Sosiologen*. <https://sosiologen.no/debatt/nar-klasseposisjoner-gar-i-arv/>

van Hootehem, A., Rogne, A. F., & Lyngstad, T. H. (2024). Heritability of class and status: Implications for sociological theory and research. *Research in Social Stratification and Mobility*, 92, 100940.

<https://doi.org/10.1016/j.rssm.2024.100940>

Psychology

1. **The reproducibility and replication crisis.** This raises questions about methodology, data integrity, and the pressures of “publish or perish” culture. In extreme cases, it has led to the fabrication of data. The inability to replicate findings undermines confidence in the reliability and validity of research. However, the crisis has also led to positive changes such as greater use of open science practices.

Recommended readings:

- Korbmacher, M., Azevedo, F., Pennington, C.R. et al. The replication crisis has led to positive structural, procedural, and community changes. *Commun Psychol* 1, 3 (2023). <https://doi-org.ezproxy.uio.no/10.1038/s44271-023-00003-2>
 - Nuijten, M.B., Hartgerink, C.H.J., van Assen, M.A.L.M. et al. The prevalence of statistical reporting errors in psychology (1985–2013). *Behav Res* 48, 1205–1226 (2016). <https://doi-org.ezproxy.uio.no/10.3758/s13428-015-0664-2>
 - Botvinik-Nezer, R., Holzmeister, F., Camerer, C.F. et al. Variability in the analysis of a single neuroimaging dataset by many teams. *Nature* 582, 84–88 (2020). <https://doi-org.ezproxy.uio.no/10.1038/s41586-020-2314-9>
2. **Statistical Methods: Bayesian vs. Frequentist Debate.** The choice of statistical framework impacts how we interpret data and what is accepted as “evidence”. While frequentist methods dominate (e.g., historical precedent and simplicity), the Bayesian approaches allow for integrating prior knowledge, offering nuanced interpretations of uncertainty (not yet standard e.g., complexity, computational demands, and subjective priors).

Is significance threshold $p < 0.05$ arbitrary? Also, statistical corrections can influence the results. We can demonstrate differences regardless of significance. It

is argued that the brain processes information in a Bayesian manner so it should be analyzed as such (e.g., **sensory integration** and **predictive coding**). How do we manage uncertainty in scientific claims?

Recommended readings:

- Vallverdú, J. (2016). And the Winner Is.... In J. Vallverdú, *Bayesians Versus Frequentists* (pp. 101–107). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-48638-2_8
- Eklund, A., Nichols, T. E., & Knutsson, H. (2016). Cluster failure: Why fMRI inferences for spatial extent have inflated false-positive rates. *Proceedings of the National Academy of Sciences*, 113(28), 7900–7905. <https://doi-org.ezproxy.uio.no/10.1073/pnas.1602413113>
- Kording, K. P. (2014). Bayesian statistics: Relevant for the brain? *Current Opinion in Neurobiology*, 25, 130–133. <https://doi.org/10.1016/j.conb.2014.01.003>

3. **The Crisis of Representation.** Current tools (e.g., fMRI, psychometrics) are critiqued for their inability to fully capture dynamic and context-dependent phenomena like emotions or thoughts. Attempts to define “neural signatures” of emotions often ignore individual variation and the influence of external factors, oversimplifying complex processes.

Recommended readings:

- Lindquist KA, Wager TD, Kober H, Bliss-Moreau E, Barrett LF. The brain basis of emotion: A meta-analytic review. *Behavioral and Brain Sciences*. 2012;35(3):121-143. <https://doi.org/10.1017/S0140525X11000446>
 - Baker, B., Lansdell, B., & Kording, K. P. (2022). Three aspects of representation in neuroscience. *Trends in Cognitive Sciences*, 26(11), 942–958. <https://doi.org/10.1016/j.tics.2022.08.014>
 - Poldrack, R. A. (2011). Inferring mental states from neuroimaging data: From reverse inference to large-scale decoding. *Neuron*, 72(5), 692–697. <https://doi.org/10.1016/j.neuron.2011.11.001>
 - Hutzler, F. (2014). Reverse inference is not a fallacy per se: Cognitive processes can be inferred from functional imaging data. *NeuroImage*, 84, 1061–1069. <https://doi.org/10.1016/j.neuroimage.2012.12.075>
4. **Reductionism vs. Holism.** There is an ongoing debate about whether psychological and cognitive phenomena should be reduced to neural processes or studied

holistically. For example, localizing mental processes (e.g., memory in the hippocampus) risks oversimplifying the intricate system-level interactions across the brain.

Recommended readings:

- MacKinnon, N. J. (2022). Reductionism: Friend or Foe of an Integrative Social Psychology? *Social Psychology Quarterly*, 85(1), 6-22. <https://doi-org.ezproxy.uio.no/10.1177/01902725221081948>
- van Riel, R. (2014). Theory Reduction and Holism. In: The Concept of Reduction. Philosophical Studies Series, vol 121. Springer, Cham. https://doi-org.ezproxy.uio.no/10.1007/978-3-319-04162-9_8

5. **Context and Culture in Research.** Findings from psychology and cognitive neuroscience studies often reflect cultural and contextual biases, limiting generalizability. The overrepresentation of WEIRD (Western, Educated, Industrialized, Rich, Democratic) samples skews research conclusions. For example, cultural differences influence neural processes, as East Asian participants show different brain activation patterns than Western participants when processing visual scenes (Gutchess et al., 2006).

Recommended readings:

- Gutchess, A.H., Welsh, R.C., Boduroğlu, A. et al. Cultural differences in neural function associated with object processing. *Cognitive, Affective, & Behavioral Neuroscience* 6, 102–109 (2006). <https://doi-org.ezproxy.uio.no/10.3758/CABN.6.2.102>
 - Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33(2-3), 61–83. <https://doi.org/10.1017/S0140525X0999152X>
 - Kim, H. S., & Sasaki, J. Y. (2014). Cultural neuroscience: Biology of the mind in cultural contexts. *Annual Review of Psychology*, 65, 487–514. <https://doi-org.ezproxy.uio.no/10.1146/annurev-psych-010213-115040>
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