MIT Economics

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DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2025
DISSERTATION: "*Healthy Behavior: Essays in Health and Behavioral Economics*"

DISSERTATION COMMITTEE AND REFERENCES

Professor Sendhil Mullainathan
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Professor Amy Finkelstein
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PRIOR EDUCATION

Harvard University 2016
A.B., Statistics
Summa Cum Laude

CITIZENSHIP USA

GENDER: Male

FIELDS

Primary Fields: Health Economics, Behavioral Economics

Secondary Fields: Applied Econometrics

TEACHING EXPERIENCE

Algorithms and Behavioral Science (graduate, MIT course 14.163) TA to Profs. Sendhil Mullainathan and Ashesh Rambachan	2025
Introduction to Statistical Methods in Economics (undergraduate, MIT course 14.30) TA to Prof. Alberto Abadie	2024
Nonlinear Econometrics (graduate, MIT course 14.385) TA to Profs. Whitney Newey and Alberto Abadie	2021
Econometric Data Science (undergraduate, MIT course 14.32) TAto Professor Anna Mikusheva	2021
Introduction to Theoretical Statistics (undergraduate, Harvard course Statistics 111) TA to Dr. Kevin Rader	2016

RESEARCH ASSISTANCE

To Prof. Tamara Broderick	2022
To Profs. Sendhil Mullainathan, Jens Ludwig, and Jann Spiess	2018-19
To Profs. Sendhil Mullainathan and Ziad Obermeyer	2018-19

EMPLOYMENT

Applied Data Scientist, Civis Analytics	2016-18

FELLOWSHIPS, HONORS, AND AWARDS

Russell Sage Foundation Small Grant in Computational Social Sciences	2020
National Science Foundation Graduate Research Fellowship	2019
Derek Bok Certificate of Distinction in Teaching	2016

PROFESSIONAL ACTIVITIES

Referee: *AER: Insights, Journal of Public Economics, Journal of the European Economic Association*

Conference Reviewing: Early Career Behavioral Economics (2023), NeurIPS Workshop on Behavioral Machine Learning (2024)

Mentorship: Application Assistance and Mentorship Program (2022, 2023)

Presentations:

SITE (Psychology and Economics), Stanford University	2022
Early Career Behavioral Economics, briq Institute	2022
Advances with Field Experiments, University of Chicago	2022

PUBLICATIONS

When Guidance Changes: Government Stances and Public Beliefs (with Charlie Rafkin and Pierre-Luc Vautrey) *Journal of Public Economics,* April 2021.

RESEARCH PAPERS

X-Raying Experts: Decomposing Predictable Mistakes in Radiology (Job Market Paper)

Medical errors are consequential but difficult to study, usually requiring laborious human review of past cases. I apply algorithmic tools to measure the extent and nature of medical error in one of the most common medical decision settings: radiologists interpreting chest x-rays. I use state-of-the-art natural language processing to extract radiologists' claims about cardiac health from their free text reports, and compare these claims to algorithmic predictions of the same. I adjudicate between the two using exogenously administered blood tests that directly measure cardiac health. At least 55 percent of radiologists make mistakes, issuing reports that predictably misrank the severity of patients' cardiac health. In contrast to a leading hypothesis in the medical literature, these errors do not reflect radiologists overweighting salient information; rather, they systematically under-react to signals of patient risk. A decomposition shows that these errors reflect, in roughly equal proportion, individual radiologists falling short of best clinical practice (a "human frontier"), and a further gap between best practice and algorithmic predictions (a "machine frontier"). In principle, reaching the human frontier would reduce radiologists' false negative rates by 20% and false positive rates by 2%; reaching the machine frontier would reduce false negatives by an additional 12% and false positives by 2%. Finally, I find that the mistakes revealed by machine learning do not skew against underrepresented groups in this setting, underscoring the promise of detecting errors algorithmically.

Managing Emotions: The Effects of Online Mindfulness Meditation on Mental Health and Economic Behavior (with Pierre-Luc Vautrey)

Mindfulness meditation has gained popularity, fueled by accessible smartphone apps and rising concerns about mental health. While such apps are claimed to affect mental well-being, productivity, and decision making, existing evidence is inconclusive due to limited sample sizes and high attrition. We address these concerns by conducting a large-scale, low-attrition experiment with 2,384 US adults, randomizing access and usage incentives for a popular mindfulness app. App access improves an index of anxiety, depression, and stress by 0.38 standard deviations (SDs) at two weeks and 0.46 SDs at four weeks, with persistent effects three months later. It also improves earnings on a focused proofreading task by 2 percent. However, we find near-zero effects on a standard cognitive test (a Stroop task), and on decisions over risk and information acquisition where past economics research has indicated that emotions affect choice. This study provides evidence that digital mindfulness improves mental health and can raise productivity, but suggests that these effects do not stem from traditional measures of cognitive skills nor do they accompany more primitive changes in the information and risk preferences we measure.

WORKS IN PROGRESS

Common Functional Decompositions Can Mis-attribute Differences in Outcomes Between Populations (with Manuel Quintero, William Stephenson, and Tamara Broderick)

We often wish to explain why an outcome is different in two populations. For instance, if one expert decision maker proves more accurate than another, is that due to differences in their cases they handle (i.e., covariates) or their skill at judging them (i.e., outcomes given covariates)? The Kitagawa-Oaxaca-Blinder (KOB) decomposition is a standard econometric tool that decomposes a difference in the mean outcomes across two populations into terms that depend on covariates, and those that depend on the relationship between covariates and outcomes. However, the KOB decomposition assumes a linear relationship between covariates and outcomes, while the true relationship may be meaningfully nonlinear. Modern machine learning boasts many nonlinear functional decompositions for the relationship between outcomes and covariates in one population. It seems natural to extend the KOB decomposition using these decompositions. We observe that a successful extension should not attribute the differences to covariates — or, respectively, outcomes given covariates — if those are the same in the two populations. Unfortunately, we demonstrate that two common decompositions — the functional ANOVA and Accumulated Local Effects — can misattribute differences to outcomes given covariates, even in simple examples where they are identical in two populations. We provide a characterization of when functional ANOVA misattributes, as well as a general property that any decomposition should satisfy to avoid misattribution. We show that if the decomposition is independent of its input distribution, it does not misattribute. We further conjecture that misattribution arises in any reasonable additive decomposition that depends on the distribution of the covariates.