MAYA B. MATHUR, PhD

Postdoctoral Research Fellow
Department of Epidemiology
Harvard University
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RESEARCH INTERESTS – Statistics

Evidence synthesis, reproducibility, missing data, causal inference, epidemiology

RESEARCH INTERESTS – Substantive

Psychosocial and behavioral correlates of health, evidence-based behavior interventions, human-technology interaction, experimental cognitive sciences

ACADEMIC POSITIONS

2018 - present   Postdoctoral fellow
Department of Epidemiology
Harvard University
Advisor: Dr. Tyler VanderWeele

EDUCATION

9/15 - 8/18   PhD Biostatistics
Harvard University
Advisor: Dr. Tyler VanderWeele
Dissertation: "Statistical methods for evidence synthesis"

11/11 - 6/13   MS Statistics
Stanford University
(Graduation with Distinction)

9/09 - 6/13   BA Psychology
Stanford University
(Phi Beta Kappa)

SELECTED HONORS AND AWARDS

(Additional honors for specific papers and proceedings appear under "Publications". Grants appear under "Research and Travel Grants".)

2018	Young Investigator Award, ASA Section on Statistics in Epidemiology
2017	Distinction in Teaching, Harvard University
2016	*Science Magazine* Editor's Choice – for Mathur & Reichling (2016)
2013	Psychology One Research Scholar, Stanford University
2012	Excellence in Undergraduate Teaching, Stanford University

EXPERIENCE

Biostatistician	Quantitative Sciences Unit Stanford University School of Medicine Supervisor: Dr. Manisha Desai	6/14 - present

Provided statistical collaboration to principal investigators in the Stanford University School of Medicine, advising on study design, statistical analysis, and interpretation of results. Areas of research included oncology, nutrition, preventive health, infectious diseases, and cardiovascular disease with diverse study designs. Mentored the Stanford Intensive Course in Clinical Research. Collaborated on original statistical research to evaluate and extend imputation methods for longitudinal data with missing data in both time-varying and fixed correlated covariates.

Biostatistician	Pulmonary & Critical Care Medicine Stanford University School of Medicine PI: Dr. Nayer Khazeni	6/13 - 6/14

Was the sole statistician for the research lab of Dr. Nayer Khazeni. Conducted epidemiologic and experimental studies on pandemic influenza (A) H5N1, psychological determinants of health and health behavior, etc. Conceived research questions, designed experimental and observational studies, planned and conducted statistical analyses, and led or coauthored publications.

TEACHING

Spring 2017-19	Harvard University TA for "Quantitative Methods in Population Health Sciences" for first-year doctoral students Distinction in Teaching Award (2017)
Summer 2014	Stanford University Biostatistics mentor for "Intensive Course for Clinical Research" for clinical investigators
2013 - 2017	Directed work of undergraduate and graduate research assistants on multiple research projects
Spring 2012	Stanford University TA for "Introduction to Statistical Methods (Precalculus)" for undergraduates Excellence in Undergraduate Teaching Award

PROFESSIONAL SERVICE – Peer Reviewing

Ad hoc reviewer for:

1. *American Journal of Epidemiology*
2. *Annals of Internal Medicine*
3. *Biological Psychiatry*
4. *BMJ* (×2)
5. *Epidemiology* (×2)
6. *European Journal of Epidemiology*
7. *Journal of Internal Medicine*
8. *Journal of Psychology & Psychotherapy*
9. *International Journal of Human-Computer Studies* (×2)
10. *Liver International* (×2)
11. *Medical Decision-Making*
12. *Open Forum Infectious Diseases*
13. *PLOS One*
14. *Perspectives on Psychological Science*
15. *Psychological Methods*
16. *Psychological Science*
17. *Psychoneuroendocrinology* (×3)
18. *Research Synthesis Methods*
19. *Royal Society Open Science* (×4)
20. *Systematic Reviews* (×2)

PROFESSIONAL SERVICE – Community Service

2018	Animal Help Now (national wildlife emergency response system)
	Statistical advisor (volunteer)
2016-present	Center for Open Science
	Ambassador

RESEARCH AND TRAVEL GRANTS

Ongoing support

1/19 - 12/20	American Heart Association
	Institutional Research Enhancement Award
	"Psychosocial resources in childhood that protect against cardiovascular risk in adulthood: The 1958 Birth Cohort Study" (Julia Boehm, PI)
	Statistical consultant and analyst, ad hoc (2019 - 2020)
5/19 - 4/22	Templeton World Charity Foundation
	Transition to Scale Grant
	"Building more forgiving communities around the globe through engagement to complete

do-it-yourself REACH Forgiveness Workbooks" (Man Yee Ho, PI)
Statistical consultant and analyst, 10% FTE (2019 - 2021)

Completed support

3/17 - 8/19	Harvard University Mind, Brain, & Behavior Program
	Graduate Student Award
	"Uncanny but not confusing: multisite study of perceptual category confusion
	in the Uncanny Valley"
	Lead investigator
9/15 - 8/18	United States Department of Defense
	National Defense Science & Engineering Graduate Fellowship
	Full support and stipend for PhD studies
4/17	Harvard University Mind, Brain, & Behavior Program
	Graduate Student Award
	For psychology conference attendance
8/12 - 9/13	Stanford University
	Undergraduate Research Grant
	"Spatiotemporal dynamics and a prognostic model of healthcare utilization following
	2009 (H1N1) pandemic in New York state"
	Lead investigator
10/12	Stanford University
	Undergraduate Conference Grant
	For medical conference attendance
6/11 - 8/11	Stanford University
	Psych-Summer Research Grant
	"Using a head-mounted camera to investigate social referencing during naturalistic
	word learning"
	Undergraduate research assistant

STATISTICAL SOFTWARE DEVELOPED

1. R package `PublicationBias`
   Conducts sensitivity analyses for publication bias in meta-analyses.
   Contributors: **Mathur MB** & VanderWeele TJ.

2. R package `MetaUtility`
   Contains functions to estimate the proportion of effects stronger than a threshold of scientific importance, to make various effect size conversions, and to compute and format inference in a meta-analysis.
   Contributors: **Mathur MB** & VanderWeele TJ.

3. Stata module `EVALUE`
   Conducts sensitivity analyses for unmeasured confounding in observational studies.
   Contributors: Linden A, **Mathur MB**, VanderWeele TJ.

4. R package `NRejections`
   Computes metrics of outcome-wide evidence strength for studies testing multiple correlated outcomes.
   Contributors: **Mathur MB** & VanderWeele TJ.

5. R package `EValue`
   Conducts sensitivity analyses for unmeasured confounding or selection bias in observational studies and meta-analyses.
   Contributors: **Mathur MB**, Ding P, Smith L, & VanderWeele TJ.
   [Link to E-value GUI]
   [Link to meta-analysis GUI]

6. R package `Replicate`
   Conducts statistical analyses for multisite replication projects.
   Contributors: **Mathur MB** & VanderWeele TJ.

7. R package `SimTimeVar`
   Simulates a longitudinal dataset with time-varying covariates with user-specified correlation structures across and within clusters.
   Contributors: **Mathur MB**, Kapphahn K, Garcia A, Desai M, Montez-Rath M.

ORGANIZED CONFERENCE SESSIONS

2019 (planned)   Joint Statistical Meetings (Denver, CO)
                 Organizer and chair: "Causal inference with non-traditional designs"

PRESENTATIONS AND SEMINARS – Invited

2020 (planned)   Joint Statistical Meetings (Philadelphia, PA)
                 Discussant for invited session: "Unsupervised learning in latent variable models"

2020 (planned)   Joint Statistical Meetings (Philadelphia, PA)
                 "The E-value: Sensitivity analysis, software, and implementation"

2019 (planned)   Launch conference for the multisite RCT: "Building More Forgiving Communities around the Globe through Engagement to Complete Do-It-Yourself REACH Forgiveness Workbooks"
                 City University of Hong Kong (Hong Kong)
                 "Statistical analysis proposal and discussion points"

2019 12th Annual FDA/AdvaMed Medical Devices and Diagnostics Statistical Issues Conference (Washington, DC)
                 "Confounding and methods for sensitivity analysis in observational studies"

2019   Northwestern University Prevention Science and Methodology Group
                 Virtual Ground Rounds (webinar)
                 "Sensitivity analyses for unmeasured confounding in studies and meta-analyses"

2019   University of Copenhagen (Copenhagen, DK)
                 "The E-value: Practical sensitivity analysis and technical considerations"

2019   Danish Epidemiology Society (Copenhagen, DK)
                 "Sensitivity analysis for unmeasured confounding in studies and meta-analyses"

2019   University of Alabama at Birmingham biostatistics seminar (Birmingham, AL)

"Sensitivity analysis for unmeasured confounding in studies and meta-analyses"

2018   Joint Statistical Meetings (Vancouver, BC)
                "The E-value: Sensitivity analysis, software, and implementation"

2017   University of Massachusetts at Amherst epidemiology seminar (Amherst, MA)
                "The E-value: Sensitivity analysis, software, and implementation"

2009   Centers for Disease Control National Immunization Conference (Dallas, TX)
                "Predictors of human papillomavirus vaccination and participation
                in vaccine decision-making among high school girls"
                [Link to presentation]

2008   American Public Health Association National Meeting (San Diego, CA)
                "Inspiring a new generation to address global health"

2008   California Medical Association Foundation HPV Vaccine Summit Meeting
                (Sacramento, CA)
                "Predictors of human papillomavirus vaccination and participation in vaccine
                decision-making among high school girls"

2005   NASA Jet Propulsion Laboratories Mars Mission Control Team (Pasadena, CA)
                "Exploring the Uncanny Valley: Quantitative test of a theory on emotional
                responses to humanoid robotic faces"

PRESENTATIONS AND SEMINARS – Teaching

2020 (planned) Harvard University (Boston, MA)
                Five guest lectures for the PhD course: "Quantitative methods for the population
                health sciences"

PRESENTATIONS AND SEMINARS – Other

2019   Harvard University Applied Statistics Workshop (Boston, MA)
                "Sensitivity analysis for publication bias and selective reporting in meta-analyses"

2018   Joint Statistical Meetings (Vancouver, BC)
                "Multiple imputation strategies for handling missing data when generalizing
                randomized clinical trial findings through propensity score-based methodologies"

2018   Joint Statistical Meetings (Vancouver, BC)
                "Sensitivity analysis for unmeasured confounding in meta-analysis"

2017   Berkeley Institute for Transparency in the Social Sciences
                Annual Meeting (Berkeley, CA)
                "New statistical metrics for multisite replications"
                [Link to video]

PEER-REVIEWED PUBLICATIONS – Original Research

⋆: Describes contribution to middle-authored papers.

1. **Mathur MB** & VanderWeele TJ (7/2019). Finding common ground in meta-analysis "wars" on violent video games. *Perspectives on Psychological Science*, 14(4), 705-708.

   - Covered by *The New York Times*, *CNN*, *PCMag*, *Association for Psychological Science*, *Politifact*, *CapeTalk* radio, etc.

2. **Mathur MB** & Reichling DR (6/2019). Open-source software for mouse-tracking in Qualtrics to measure category competition. *Behavior Research Methods*. Epub ahead of print: https://doi.org/10.3758/s13428-019-01258-6

3. Desai M, Montez-Rath M, Kapphahn K, Joyce V, **Mathur MB**, Garcia A, et al (6/2019). Missing data strategies for time-varying confounders in comparative effectiveness studies of non-missing time-varying exposures and right-censored outcomes. *Statistics in Medicine*, 38(17), 3204-3220.

   ⋆: Derived theoretical results and contributed to simulation study design and writing.

4. **Mathur MB** & VanderWeele TJ (4/2019). Sensitivity analysis for unmeasured confounding in meta-analyses. *Journal of the American Statistical Association*. Epub ahead of print: https://www.tandfonline.com/doi/full/10.1080/01621459.2018.1529598.

5. **Mathur MB** & VanderWeele TJ (4/2019). New metrics for meta-analyses of heterogeneous effects. *Statistics in Medicine*, 38, 1336-1342.

6. **Mathur MB**, Ding P, Riddell CA, VanderWeele TJ (9/2018). Web site and R package for computing E-values. *Epidemiology*, 29(5), e45-e47. [Research letter]

7. Hardwicke TE, **Mathur MB**, MacDonald K, Nilsonne G, Banks GC, Kidwell MC, et al. (8/2018). Data availability, reusability, and analytic reproducibility: Evaluating the impact of a mandatory open data policy at the journal *Cognition*. *Royal Society Open Science*, 5, 180448.

   ⋆: Co-led design and statistical analyses, contributed to data collection, and contributed to writing.

8. Afghahi A, Purington N, Han S, Desai M, Pierson E, **Mathur MB**, et al. (6/2018). Higher absolute lymphocyte counts predict lower mortality from early-stage triple-negative breast cancer. *Clinical Cancer Research*, 24(12), 2851-2858.

   ⋆: Contributed to design and conduct of statistical analyses and contributed to writing.

9. Boehm JK, Chen Y, Koga H, **Mathur MB**, Vie LL, & Kubzansky LD (4/2018). Is optimism associated with healthier cardiovascular-related behavior? Meta-analyses of three health behaviors. *Circulation Research*, 122(8), 1119-1134.

   ⋆: Advised on design and statistical analyses, performed sensitivity analyses, and contributed to writing.

10. **Mathur MB** & VanderWeele TJ (1/2018). R function for additive interaction measures. *Epidemiology*, 29(1), e5-e6. [Research letter]

11. Mummah S, Robinson TN, **Mathur MB**, Farzinkhou S, Sutton S, Gardner CD (9/2017). Effect of a mobile app intervention on vegetable consumption in overweight adults: a randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 125-135.

    ⋆: Contributed to design of intervention, advised on statistical analyses, and contributed to writing.

12. Montez-Rath ME, Kapphahn K, **Mathur MB**, Mitani AA, Hendry DJ, Desai M (5/2017). Guidelines for generating right-censored outcomes from a Cox model extended to accommodate time-varying covariates. *Journal of Modern Applied Statistical Methods*, 16(1), 86-106.

    ⋆: Contributed to simulation study design and to writing.

13. **Mathur MB**, Gould M, Khazeni N (10/2016). Direct-to-consumer drug advertisements can paradoxically increase intentions to adopt lifestyle changes. *Frontiers in Psychology*, 7(1533).

14. Charytan DM, Desai M, **Mathur MB**, Stern NM, Brooks MM, Krzych LJ, et al. (8/2016). Coronary artery bypass grafting compared with percutaneous coronary intervention in chronic kidney disease: an individual patient meta-analysis of randomized trials. *Kidney International*, 90(2), 411-421.

    ⋆: Co-led and co-conducted statistical analyses.

15. Afghahi A†, **Mathur MB**†, Thompson C, Mitani A, Rigdon J, Desai M, et al. (6/2016). Use and impact of gene expression profiling in early-stage breast cancer: a study of linked electronic medical record, cancer registry and genomic data across two healthcare systems. *Journal of Oncology Practice*, 12(6), e697-e709.

    †: Joint first authors

    ⋆: Co-led and co-conducted statistical analyses; contributed to writing.

16. Mummah S, **Mathur MB**, King AC, Gardner CD, Sutton S (5/2016). Mobile technology for vegetable consumption: a randomized controlled pilot study in overweight adults. *Journal of Medical Internet Research: mHealth and uHealth*, 4(2), e51.

    ⋆: Co-led and co-conducted statistical analyses, contributed to design of intervention, and contributed to writing.

17. Low YS, Daugherty AC, Schroeder EA, Chen W, Seto T, Weber S, et al., including **Mathur MB** (5/2016). Synergistic drug combinations from electronic health records and gene expression. *Journal of the American Medical Informatics Association*, 24 (3), 565-576.

    ⋆: Advised on statistical analyses.

18. **Mathur MB**, Epel E, Kind S, Desai M, Parks CG, Sandler DP, Khazeni N. (5/2016a). Perceived stress and telomere length: A systematic review, meta-analysis, and methodologic considerations for advancing the field. *Brain, Behavior, and Immunity*, 56(413), 158-169.

19. **Mathur MB** & Reichling DB (1/2016). Navigating a social world with robot partners: A quantitative cartography of the Uncanny Valley. *Cognition*, 146, 22-32.

    - Selected as Editors' Choice by *Science Magazine*, 350(6260)
    - Covered by *Slate*, *The Guardian*, *Discover*, *Psychology Today*, *New York Magazine*, *New Scientist*, *Rolling Stone*, etc.

20. Pargaonkar VS, Perez MV, Jindal A, **Mathur MB**, Myers J, Froelicher VF. (11/2015). Long-term prognosis of early repolarization with J-wave and QRS slur patterns on the resting electrocardiogram: a cohort study. *Annals of Internal Medicine*, 163(10), 747-755.

    ⋆: Conducted secondary statistical analyses.

21. Pless E, Queirolo J, Pinter-Wollman N, Crow S, Allen K, **Mathur MB**, Gordon DM (11/2015). Interactions increase forager availability and activity in harvester ants. *PLOS ONE*, 10(11), e0141971.

    ⋆: Advised on statistical analyses.

22. Open Science Collaboration, including **Mathur MB** (8/2015). Estimating the reproducibility of psychological science. *Science*, 349(6251), aac4716. DOI: 10.1126/science.aac4716

    ⋆: Led design, conduct, and analysis of one of the replication studies.

- Runner-up for Breakthrough of the Year, *Science Magazine*
- Top 100 Stories of the Year, *Discover Magazine*
- Top Science Stories of the Year, *Nature Magazine*
- #5 in Altmetric100

23. **Mathur MB**†, Patel RB†, Gould M, Uyeki TM, Bhattacharya J, Xiao Y, et al. (9/2014). Seasonal patterns in human (A) H5N1 virus infection: analysis of global cases. *PLOS ONE*, 9(9), e106171.
    †: Joint first authors

24. De Jesus Perez VA, Yuan K, Lyuksyutova MA, Dewey F, Orcholski ME, Shuffle EM, et al., including **Mathur MB** (5/2014). Whole exome sequencing reveals TopBP1 as a novel gene in idiopathic pulmonary arterial hypertension. *American Journal of Respiratory and Critical Care Medicine*, 189(10), 1260-1272.
    ⋆: Advised on statistical analyses.

25. Patel RB†, **Mathur MB**†, Gould M, Uyeki TM, Bhattacharya J, Xiao Y, Khazeni N (3/2014). Demographic and clinical predictors of mortality from highly pathogenic avian influenza A (H5N1) virus infection: CART analysis of international cases. *PLOS ONE*, 9(3), e91630.
    †: Joint first authors

    ⋆: Led and conducted statistical analyses, co-led design and manuscript writing, and contributed to data collection.

26. **Mathur MB**, Mathur VS, Reichling DB (1/2010). Participation in the decision to become vaccinated against human papillomavirus by California high school girls and the predictors of vaccine status. *Journal of Pediatric Health Care*, 24(1), 14-24.

    - Covered in the *Centers for Disease Control Newsletter*

PEER-REVIEWED PUBLICATIONS – Commentaries and Editorials

27. VanderWeele TJ, **Mathur MB**, Chen Y (5/2019). Media portrayals and public health: Effects on suicide and other behaviors. *JAMA Psychiatry*. Epub ahead of print. DOI:10.1001/jamapsychiatry.2019.0842. [Invited editorial]
    ⋆: Led and conducted statistical analyses and contributed to writing.

28. VanderWeele TJ & **Mathur MB** (3/2019). Some desirable properties of the Bonferroni correction: Is the Bonferroni correction really so bad? *American Journal of Epidemiology*, 188(3), 617-618. [Research letter]
    ⋆: Contributed to conceptualization and writing.

29. VanderWeele TJ, **Mathur MB**, Ding P (1/2019). Correcting misinterpretations of the E-value. *Annals of Internal Medicine*, 170, 131132. [Invited commentary]
    ⋆: Contributed to conceptualization and writing.

30. **Mathur MB**, Epel E, Kind S, Desai M, Parks CG, Sandler, DP, Khazeni N (8/2016b). Toward a mechanistic understanding of psychosocial factors in telomere degradation. *Brain, Behavior, and Immunity*, 56, 413. [Invited commentary]

PAPERS IN PRESS

31. VanderWeele TJ, **Mathur MB**, Chen Y (in press). Outcome-wide longitudinal studies: a new template for empirical studies. *Statistical Science.* [Preprint link]

    ⋆: Conducted statistical analyses, wrote publicly available R code, and contributed to writing.

32. Ebersole, CA, **Mathur MB**, Chartier CA, Hartshorne JK, Ijzerman H, Ropovik I, et al (provisionally accepted). Testing pre-data collection peer review as an intervention to increase replicability. *Advances in Methods and Practices in Psychological Science.*

    ⋆: Co-led statistical analyses and led design and conduct of one of the multisite replications.

33. **Mathur MB** & VanderWeele TJ (in press). A simple, interpretable conversion from Pearson's correlation to Cohen's d for continuous exposures. *Epidemiology.* [Research letter]

34. VanderWeele TJ, Ding P, **Mathur MB** (in press). Technical considerations in the use of the E-value. *Journal of Causal Inference.* [Preprint link]

    ⋆: Contributed to conceptualization and writing.

35. **Mathur MB**, Bart-Plange DJ, Aczel B, Bernstein MH, Ciunci A, Ebersole CR, et al. (in press). Many Labs 5: Registered multisite replication of tempting-fate effects in Risen & Gilovich. *Advances in Methods and Practices in Psychological Science.*

36. **Mathur MB** & VanderWeele TJ (in press). Challenges and suggestions for defining replication "success" when effects may be heterogeneous: Comment on Hedges & Schauer (2019). *Psychological Methods.*

PAPERS UNDER REVIEW

1. **Mathur MB** & VanderWeele TJ. (submitted 8/2019). Comment on Held (2020): "A new standard for the analysis and design of replication studies". [Invited commentary for *Journal of the Royal Statistical Society: Series A*]

2. **Mathur MB**, Robinson TN, Reichling DB, Gardner CD, Nadler JN, Bain PA, Peacock J. (submitted 7/2019). Reducing meat consumption by appealing to animal welfare: protocol for a systematic review and meta-analysis. [Preprint link]

3. **Mathur MB**, Reichling DB, Lunardini F, Geminiani A, Antonietti A, Ruijten PAM, et al. (under revision 8/2019). Uncanny but not confusing: Multisite study of perceptual category confusion in the Uncanny Valley. [Preprint link]

4. Ling A, Montez-Rath MR, **Mathur MB**, Kapphahn K, Desai M. (submitted 4/2019). How to apply multiple imputation in propensity score matching with partially observed confounders: A simulation study and practical recommendations.

    ⋆: Advised on simulation study design and contributed to writing.

5. Linden A, **Mathur MB**, & VanderWeele TJ (under revision 8/2019). Conducting sensitivity analysis for unmeasured confounding in observational studies using E-values.

    ⋆: Contributed to design of software and to writing.

6. **Mathur MB** & VanderWeele TJ (submitted 3/2019). New metrics for multiple testing of correlated outcomes. [Preprint link]

7. **Mathur MB** & VanderWeele TJ (under revision 8/2019). New statistical metrics for multisite replication projects. [Preprint link]

8. **Mathur MB** & VanderWeele TJ (submitted 1/2019). Sensitivity analysis for publication bias in meta-analyses. [Preprint link]

PEER-REVIEWED CONFERENCE PROCEEDINGS

(Proceedings corresponding to work appearing under "Peer-Reviewed Publications" or "Papers Under Review" are omitted.)

1. Montez-Rath ME, Kapphahn K, **Mathur MB**, Purington N, Joyce V, Desai M (2017). Simulating real-world data with time-varying variables. *American Statistical Association Conference on Statistical Practice.*

2. Pargaonkar V, Kobayashi Y, Tanaka S, **Mathur MB**, Nguyen P, Lee D, Fearon W, Yeung A, Tremmel J (2015). Sex differences in coronary pathophysiology in patients with angina in the absence of obstructive coronary artery disease. *Proceedings of the American College of Cardiology 2015.*

3. Ha LD, **Mathur MB**, Pargaonkar V, Pickham D, Tremmel J, Froelicher V, Khandelwal A (2015). Sex differences in the prevalence and prognostic value of risk parameters on resting electrocardiogram. *Proceedings of the American College of Cardiology 2015.*

4. Kapphahn K, Montez-Rath M, **Mathur MB**, Desai M (2015). Feasibility of reformatting data for multiple imputation of clustered data. *Joint Statistical Meetings 2015.*

5. **Mathur M** and Reichling D (2008). A critical analysis of the efficacy of equine joint supplements. *Veterinary Orthopedic Society 35th Annual Conference Proceedings 2008: 81* and *Veterinary and Comparative Orthopaedics & Traumatology 2008.*