

Joshua Satya Cetron, Ph.D. | *Curriculum Vitae*

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Data scientist, quantitative social scientist, and research methodologist with a background in psychology, neuroscience, and multivariate statistics.

Current Position

Data Science Specialist, Institute for Quantitative Social Science

Harvard University, Cambridge, MA, *June 2023 - Present*

Consultant on research methods and statistical analyses, collaboratively supporting Harvard and MIT faculty, staff, and students across the sciences. Specializing in experimental methods, exploratory data analysis, and generalized and multilevel regression modeling of empirical data in R and python.

Education

Harvard University, Cambridge, MA, *May 2023*

Ph.D., Psychology

Advisor: Mina Cikara, Ph.D.

Dissertation Committee: Profs. Mina Cikara (chair), Joshua Greene, Talia Konkle, & Susanna Siegel

Dissertation Title: *Representations of social and political attitudes, opinions, and facts in the mind and brain*

Harvard University, Cambridge, MA, *March 2021*

M.A., Psychology

Dartmouth College, Hanover, NH, *September 2012 - June 2016*

B.A., Neuroscience, High Honors, Minors in Education and Spanish

Summa Cum Laude, Phi Beta Kappa, GPA: 3.92

Academic Publications & Preprints

Cetron, J. S. (2023). *Representations of Social and Political Attitudes, Opinions, and Facts in the Mind and Brain* (Order No. 30489198) [Doctoral dissertation, Harvard University]. ProQuest Dissertations & Theses Global. <https://www.proquest.com/docview/2821571348/abstract/D2AB8D88CA7E495FPQ/1>

Cetron, J. S.*, Hillis, M. E.*, Diamond, S. G., May, V. V., & Kraemer, D. J. M. (*Manuscript in preparation*). First-class learning: Neural patterns reflect students' conceptual grasp following an introductory STEM lesson.

Cetron, J. S., Mair, P., Haque, O., & Cikara, M. (2022). Personal relevance of attitude importance predicts costly intergroup behavior. *Preprint*. <https://osf.io/xzpfu>. Preprint DOI: 10.31219/osf.io/xzpfu

Mair, P., **Cetron, J. S.**, & Borg, I. (2022). Using Support Vector Machines for Facet Partitioning in Multidimensional Scaling. *Multivariate Behavioral Research*, 0(0), 1–17. <https://doi.org/10.1080/00273171.2022.2035207> (PDF)

Cetron, J. S., Connolly, A. C., Diamond, S. G., May, V. V., Haxby, J. V., & Kraemer, D. J. M. (2020). Using the force: STEM knowledge and experience construct shared neural representations of engineering concepts. *Nature Partner Journals: Science of Learning*, 5, 6. <https://doi.org/10.1038/s41539-020-0065-x> (PDF)

Lees, J., **Cetron, J. S.**, Vollberg, M. C., Reggev, N., & Cikara, M. (2020). Intentions to comply with COVID-19 preventive behaviors are associated with personal beliefs, independent of perceived social norms. *Preprint*. Preprint available at <https://psyarxiv.com/97jry/>. Preprint DOI: 10.31234/osf.io/97jry

Hayes, J. C., Alfred, K. L., Pizzie, R. G., **Cetron, J. S.**, & Kraemer, D. J. M. (2020). Individual differences in white and grey matter structure associated with verbal habits of thought. *Brain Research*, 1742, 146890. <https://doi.org/10.1016/j.brainres.2020.146890> (PDF)

Alfred, K. L., Connolly, A. C., **Cetron, J. S.**, & Kraemer, D. J. M. (2020). Mental models use common neural spatial structure for spatial and abstract content. *Nature Communications Biology*, 3, 17. <https://doi.org/10.1038/s42003-019-0740-8> (PDF)

Alfred, K. L., Hayes, J. C., Pizzie, R. G., **Cetron, J. S.**, & Kraemer, D. J. M. (2020). Individual differences in encoded neural representations within cortical speech production network. *Brain Research*, 1726, 146483. <https://doi.org/10.1016/j.brainres.2019.146483> (PDF)

Cetron, J. S., Connolly, A. C., Diamond, S. G., May, V. V., Haxby, J. V., & Kraemer, D. J. M. (2019). Decoding individual differences in STEM learning from functional MRI data. *Nature Communications*, 10(1), 2027. <https://doi.org/10.1038/s41467-019-10053-y> (PDF)

Cetron, J. S., & Dartmouth College. (2016). *The role of motor regions in representing engineering concepts*. (Senior Honors Thesis). Retrieved from Dartmouth College Library. (Control No. ocn953695823).

Selected Honors, Awards, Fellowships, & Research Funding

National Science Foundation Graduate Research Fellow

National Science Foundation, 2019 - Present

Award recipient for the NSF Graduate Research Fellowship Program (GRFP) beginning 2019.

Presidential Scholar, Graduate School of Arts and Sciences

Harvard University, Cambridge, MA, September 2018 - Present

Awarded by the Harvard Graduate School of Arts and Sciences in special recognition of a commitment to public service and intellectual excellence. Nominated by the Harvard Department of Psychology.

Certificates of Distinction in Teaching, Derek Bok Center for Teaching and Learning

Harvard University, Cambridge, MA, Fall 2020, Fall 2021, Spring 2022

Award for teaching excellence in PSY 1950: Intermediate Statistical Analysis in Psychology and PSY 1952: Multivariate Analysis in Psychology. Received award for every semester of teaching.

Fellow, Kavli Summer Institute in Cognitive Neuroscience

University of California, Santa Barbara, Summer 2019

Fellow at the 2019 Kavli Summer Institute in Cognitive Neuroscience (SICN).

High Honors Award, Neuroscience Honors Thesis

Dartmouth College, Hanover, NH, June 2016

For undergraduate Neuroscience Honors Thesis in the Department of Psychological and Brain Sciences.

Citations for Meritorious Performance

Dartmouth College, Hanover, NH, 2014 - 2016

Formal personal commendations from faculty (recorded on official transcript) for exceptional contributions to an academic course. Received on four occasions, each for a course in distinct department.

James O. Freeman Presidential Scholar

Dartmouth College, Hanover, NH, January 2015 - June 2015

Funded third-year undergraduate research assistantship for two academic terms.

Kaminsky Family Fund Award Grant Researcher

Dartmouth College, Hanover, NH, Fall 2014 & Summer 2015

Dartmouth College Dean of the Faculty Undergraduate Research Grant for full-time research work.

Rufus Choate Scholar

Dartmouth College, Hanover, NH, 2012 - 2013, 2013 - 2014

Annual award recognizing students in the top 5% of their class each academic year.

Sophomore Science Scholar

Dartmouth College, Hanover, NH, September 2013 - March 2014

Funded second-year undergraduate research assistantship for two academic terms.

Conference Presentations

Cetron, J.S., Blair, J., & Cikara, M. (2022, May). Psychological and neural representations of political attitudes, opinions, and facts. Virtual poster and 5-minute talk presented at the 2022 annual meeting of the Social and Affective Neuroscience Society (online virtual conference). Presentation URL: <https://www.youtube.com/watch?v=GcnB1cIglZM>

Cetron, J. S., Blair, J., Siegel, S., & Cikara, M. (2020, December). How opinions become represented as knowledge. Invited talk for the Psychology of Knowledge and Opinion symposium at the Southern Society for Philosophy and Psychology Annual Meeting (virtual conference due to COVID-19).

Cetron, J. S., Hayes, J.C., Connolly, A. C., Diamond, S. G., May, V. V., Haxby, J. V., Kraemer, D. J. M. (2019, March). Comparing neural and behavioral representations of engineering concept learning for lab-based and computer-based instructional methods. Poster presented at the 2019 annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Cetron, J. S., Connolly, A. C., Diamond, S. G., May, V. V., Haxby, J. V., Kraemer, D. J. M. (2018, March). A neural score for engineering concepts: predicting STEM learning with multivariate pattern analysis of functional neuroimaging data. Poster presented at the 2018 annual meeting of the Cognitive Neuroscience Society, Boston, MA.

Hayes, J. C., Alfred, K. L., **Cetron, J. S.**, Pizzie, R. G., Kraemer, D. J. M. (2018, March). Individual differences in information processing predict distinct structural connectivity patterns. Poster presented at the 2018 annual meeting of the Cognitive Neuroscience Society, Boston, MA.

Alfred, K. L., Connolly, A. C., **Cetron, J. S.**, Kraemer, D. J. M. (2017, March). Does the brain have a domain-general mechanism for representing mental models? Poster presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Cetron, J. S., Connolly, A. C., Diamond, S. G., May, V. V., Kraemer, D. J. M. (2016, May). The role of motor regions in representing engineering concepts. Poster presented at the inaugural meeting of the Psychonomics Society International, Granada, Spain.

Cetron, J. S., Connolly, A. C., Diamond, S. G., May, V. V., Kraemer, D. J. M. (2016, April). The role of motor regions in representing engineering concepts. Poster presented at the annual meeting of the Cognitive Neuroscience Society, New York, NY.

Kean, L., Sen, S., Felder, M. A., Tangpricha, V., Adisa, O., JAMES-Herry, A., Buchanan, I., Ziegler, T., Alvarez, J., Beus, J., Worthington-White, D., Robertson, J., George, J., **Cetron, J.**, Ofori-Acquah, S. F., & Osunkwo, I. (2011). Evidence for Quantitative and Functional Immune Deviation in Pediatric Patients with Sick Cell Disease. *Blood*, 118(21), 1054. Contributed to basic data analysis for poster as a research intern. Retrieved from <http://www.bloodjournal.org/content/118/21/1054>.

Teaching & Mentorship

Research Advisor to Award-Winning Neuroscience Thesis Student

Harvard University, Cambridge, MA, Fall 2020 - Spring 2022

Advisee: Jacob Blair

Collaborated with, supervised, and mentored a Harvard undergraduate neuroscience thesis student (Jacob Blair) from Fall 2020 through Spring 2022 to develop and implement a research project on the psychological representations of opinion and factual statements. Jacob's resulting neuroscience honors thesis, *We Can't All Be Right: The Neural Correlates of Distinguishing Between Fact and Opinion Statements in a Political Context*, was awarded the 2022 Thomas Temple Hoopes Prize, a Harvard-wide award for excellent undergraduate work and excellence in the art of teaching, as well as the inaugural Robert J. Glushko Undergraduate Thesis Prize in Cognitive Science by the Mind, Brain, and Behavior Interfaculty Initiative at Harvard.

Teaching Fellow, PSY 1952: Multivariate Analysis in Psychology

Harvard University, Cambridge, MA, Spring 2022

Lead instructor: Patrick Mair

Teaching Fellow for the required advanced graduate statistics course for Harvard Psychology doctoral students. Material covered: generalized additive models, path regression models, missing values analysis, advanced Bayesian regression modeling, causal inference. Designed all laboratory materials and problem sets, teaching weekly 90-minute sections providing individualized written feedback on assignments.

Teaching Fellow, PSY 1950: Intermediate Statistical Analysis in Psychology

Harvard University, Cambridge, MA, Fall 2020, Fall 2021

Lead instructor: Patrick Mair

Teaching Fellow for the introductory graduate statistics course required of all Harvard Psychology doctoral students. Material covered: introduction to R statistical software, linear regression, mixed-effects modeling, and generalized linear (mixed-effect) models. Designed all laboratory materials and problem sets, teaching two weekly 90-minute sections providing individualized written feedback on assignments. Awarded the Derek Bok Center Certificate of Distinction in Teaching on both occasions for instruction in this course.

Research Advisor to NSF Leadership Alliance Student

Harvard University, Cambridge, MA, Summers 2019 & 2020

Advisee: Onyul Haque

Collaborated with, supervised, and mentored a visiting undergraduate student (Onyul Haque) for two consecutive summers in the development, administration, analysis, and presentation of a new research project on intergroup attitude importance, culminating in a manuscript that has been submitted for peer-reviewed publication (see Current Projects above). Student also presented work at a national conference each summer.

Skills

Computational Skills

Programming Languages: Advanced R and Python for statistical modeling and data visualization, Unix shell scripting, Markdown, Slurm (high-performance cluster computing).

Computational Tools & Software: Posit (formerly RStudio), Jupyter notebooks, iPython, PsychoPy, Git, Atom, Qualtrics, Slurm.

Statistical Skills

Analyses: linear and generalized linear fixed-effects, mixed-effects, and additive modeling (incl. ordinal multilevel modeling) fitted using frequentist and Bayesian implementations; multivariate cluster analysis incl. hierarchical clustering (standard and bootstrapped), density-based clustering; dimensionality reduction (multidimensional scaling, principal components analysis); machine learning and classification analyses incl. support vector machine classification (with tuning, cross-validation).

Neuroimaging Skills

Functional MRI Scanning: Scanner operation and safety training (Philips 3.0 T Achieva Intera, Siemens PRISMA 3T).

Neuroimaging Analysis Tools: AFNI, SUMA, FSL, FreeSurfer, fMRIPrep, nilearn, PyMVPA.

Neuroimaging Analysis Procedures: General linear modeling (subject- and group-level), whole-brain searchlight multivariate pattern analysis (MVPA), representational similarity analysis (RSA).

Other Skills

Media Processing: Amateur audio editing, recording, and mixing (Logic Pro X), image editing (Photoshop, GIMP), video editing (DaVinci Resolve, Final Cut Express).

Engineering: Electronics soldering, basic woodworking, amateur luthier.

Language Skills: Fluent in Spanish.

Musical Training: 20+ years of multi-instrumental training, songwriting, and performance experience.

Research Experience

Doctoral Student, Harvard Intergroup Neuroscience Lab

Harvard University, Cambridge, MA, September 2018 - May 2023

Advisors: Mina Cikara, Ph.D., Joshua Greene, Ph.D.

Post-Baccalaureate Researcher and Lab Manager, Cognitive Neuroscience of Learning Lab
Dartmouth College, Hanover, NH, September 2016 - September 2018
Advisor: David J. M. Kraemer, Ph.D.

Undergraduate Research Assistant & Honors Thesis Student, Cognitive Neuroscience of Learning Lab
Dartmouth College, Hanover, NH, July 2013 - June 2016
Advisor: David J. M. Kraemer, Ph.D.

Laboratory Intern and Research Assistant, Emory University Transplant Centers
Emory University and Yerkes International Primate Research Center, Atlanta, GA, Summers 2010 - 2012
Advisor: Leslie Kean, M.D./Ph.D.

Community Engagement & Leadership

Inaugural Member, Harvard Psychology Departmental Climate Committee
Cambridge, MA, 2019 - 2021
Graduate student representative on the first committee to evaluate, address, and support the Psychology Department on issues relating to the departmental climate.

Committee Member, Harvard Psychology Graduate Mental Health Initiative
Cambridge, MA, 2019 - 2020
Contributed to the specification, administration, analysis, reporting, and presentation of a departmental mental health survey as part of a university-wide mental health initiative to evaluate and intervene on graduate student mental health issues at Harvard.

Organizer, Harvard Psychology Methods Dinners
Cambridge, MA, Fall 2019 - Spring 2020
Organized visiting speakers, journal club discussions, and student-led workshops as part of a student-initiated weekly dinner discussion series about current methods in psychology, alongside another student co-organizer.

Organizer, Harvard Psychology Graduate Program Orientation
Cambridge, MA, Fall 2019
Planned, organized, and ran a two-day departmental orientation program with a co-organizer for the incoming doctoral student cohort, including faculty and staff introductions, student panels, and health information sessions.

Additional Work & Leadership Experience

Director, Dartmouth Outing Club (DOC) First-Year Trips Program
Hanover, NH, November 2015 - November 2016
Directed the 2016 DOC First-Year Trips program, the largest College outdoor orientation program in the country. Designed and oversaw 139 five-day, student-led trips across New Hampshire for ~1000 incoming students. Interviewed and hired a 20-person Directorate; selected and managed a student volunteer staff of 350+ (278 trip leaders + 56 support crew members on 6 teams) from an applicant pool of 600+.

Program Facilitator, Pearson Seminar on Youth Leadership
Lester B. Pearson United World College of the Pacific, Victoria, B.C., Canada, Summers 2010 - 2011
Designed and implemented a month-long summer leadership program on social justice, global citizenship, environmental sustainability, and community-building for 100 high school students from 20+ countries, alongside 16 other facilitators and 8 program coordinators.

References

Steven Worthington, Ph.D. | sworthington@iq.harvard.edu Director of Data Science Services, Institute for Quantitative Social Science, Harvard University, Cambridge, MA

Mina Cikara, Ph.D. | mcikara@fas.harvard.edu

Professor, Department of Psychology, Harvard University, Cambridge, MA

Joshua Greene, Ph.D. | jgreene@wjh.harvard.edu

Professor, Department of Psychology, Harvard University, Cambridge, MA

Patrick Mair, Ph.D. | mair@fas.harvard.edu

Senior Lecturer in Statistics, Department of Psychology, Harvard University, Cambridge, MA

David J. M. Kraemer, Ph.D. | david.j.m.kraemer@dartmouth.edu

Associate Professor, Department of Psychological and Brain Sciences; Chair, Cognitive Science Program,
Dartmouth College, Hanover, NH