Jonathan Nicholas, Ph.D.

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Employment History

2023 – now **Postdoctoral Researcher**, Mattar Lab, New York University
2015 – 2017 **Research Software Developer**, Stanford Cognitive and Systems Neuroscience Lab

Education

2017 – 2023 **Ph.D., Columbia University**, Psychology (Cognitive Neuroscience)
2011 – 2015 **B.Sc., Brown University**, Cognitive Neuroscience

Honors and Awards

2024 Best Talk Award, Society for Neuroeconomics
NYU Postdoctoral Travel Award
2022 Edward E. Smith Memorial Award in Cognitive Neuroscience
2021 Leo Rubinstein Endowed Fellowship
2017-2020 NSF Graduate Research Fellowship
2015 Kling Premium in Psychology
Election to Sigma Xi
2014 Karen T. Romer Undergraduate Teaching and Research Award
1st Prize Brown Institute for Brain Sciences Neural Decoding Competition

Research

Preprints

1. **Nicholas, J.** and Mattar, M.G., *Episodic memory facilitates flexible decision making via access to detailed events*, 2025. DOI: 10.1101/2025.03.13.643066.

Journal Articles

1. Montaser-Kouhsari, L.*, **Nicholas, J.***, Gerraty, R.T., and Shohamy, D., "Differentiating reinforcement learning and episodic memory in value-based decisions in parkinson's disease," *Journal of Neuroscience*, 2025, ***Denotes co-first author**. DOI: 10.1523/JNEUROSCI.0911-24.2025.
2. **Nicholas, J.**, Daw, N.D., and Shohamy, D., "Proactive and reactive construction of memory-based preferences," *Nature Communications*, 2025. DOI: 10.1038/s41467-025-56183-4.
3. Luo, X., Rechard, A., Sun, G., N. Yanez, F., Yilmaz, B., Lee, K., Cohen, A.O, Borghesani, V., Pashkov, A., Marinazzo, D., **Nicholas, J.**, …, and Love, B.C., "Large language models surpass human experts in predicting neuroscience results," *Nature Human Behaviour*, 2024. DOI: 10.1038/s41562-024-02046-9.
4. **Nicholas, J.**, Amlang, C.J., Lin, C.Y., Desai, N., Montaser-Kouhsari, L., Kuo, S.H., and Shohamy, D., "The role of the cerebellum in learning to predict reward: Evidence from cerebellar ataxia," *The Cerebellum*, 2024. DOI: 10.1007/s12311-023-01633-2.

5. Grossman, I., Rotella, A., Hutcherson, C.A., …, **Nicholas, J.**, …, and Wilkening, T, "Insights into accuracy of social scientists' forecasts of societal change," *Nature Human Behaviour*, 2022. DOI: 10.1038/s41562-022-01517-1.

6. **Nicholas, J.**, Daw, N.D., and Shohamy, D., "Uncertainty alters the balance between incremental learning and episodic memory," *eLife*, 2022. DOI: 10.7554/eLife.81679.

7. Chen, L., Iuculano, T., Mistry, P., **Nicholas, J.**, Zhang, Y., and Menon, V., "Linear and nonlinear profiles of weak behavioral and neural differentiation between numerical operations in children with math learning difficulties," *Neuropsychologia*, 2021. DOI: 10.1016/j.neuropsychologia.2021.107977.

8. Iuculano, T., Padmanabhan, A., Chen, L., **Nicholas, J.**, Mitsven, S., de los Angeles, C., and Menon, V., "Neural correlates of cognitive variability in childhood autism and relation to heterogeneity in decision-making dynamics," *Developmental Cognitive Neuroscience*, 2020. DOI: 10.1016/j.dcn.2020.100754.

9. Dimsdale-Zucker, H.* and **Nicholas, J.***, "Is spatial context privileged in the neural representation of events?" *Journal of Neuroscience*, 2018, ***Denotes co-first author**. DOI: 10.1523/JNEUROSCI.0949-18.2018.

10. Taghia, J., Cai, W., Ryali, S., Kochalka, J., **Nicholas, J.**, Chen, T., and Menon, V., "Uncovering hidden brain state dynamics that regulate performance and decision-making during cognition," *Nature Communications*, 2018. DOI: 10.1038/s41467-018-04723-6.

11. Ryali, S., Supekar, K., Chen, T., Kochalka, J., Cai, W., **Nicholas, J.**, Padmanabhan, A., and Menon, V., "Temporal dynamics and developmental maturation of salience, default and central-executive network interactions revealed by variational bayes hidden markov modeling," *PLOS Computational Biology*, 2016. DOI: 10.1371/journal.pcbi.1005138.

Conference Proceedings

1. **Nicholas, J.** and Mattar, M.G., "Humans use episodic memory to access features of past experience for flexible decision making," in *46th Proceedings of the Annual Meeting of the Cognitive Science Society*, Rotterdam, The Netherlands, 2024. URL: https://escholarship.org/uc/item/9x22d800.

Presentations

Invited and Selected Talks

2025 **UCL Max Planck Computational Psychiatry Seminar Series,** Virtual

Johns Hopkins Ocular Motor & Vestibular Lecture Series, Virtual

2024 **Annual Meeting of the Cognitive Science Society**, Rotterdam, Netherlands

Society for Neuroscience, Chicago, IL

Society for Neuroeconomics, Cascais, Portugal

2022 **5th Multidisciplinary Conference on Reinforcement Learning and Decision Making**, Providence, RI

Society for Neuroeconomics, Arlington, VA

2019 **Columbia Interdisciplinary Decision Making Meeting**, New York, NY

Manhattan Area Memory Meeting, Princeton, NJ

Posters

2025 **6th Multidisciplinary Conference on Reinforcement Learning and Decision Making**, Dublin, Ireland

Presentations (continued)

2024 **Cognitive Computational Neuroscience**, Boston, MA
2022 **Society for Neuroscience**, San Diego, CA
Neurobiology of Reward and Decision Making, Lake Arrowhead, CA
18th Annual Context and Episodic Memory Symposium, Philadelphia, PA
International Congress of Parkinson's Disease and Movement Disorders, Madrid, Spain
International Congress for Ataxia Research, Dallas, TX
2019 **Society for Neuroscience**, Chicago, IL
Cognitive Neuroscience Society, San Francisco, CA
2016 **Fourth Annual Flux Congress**, St. Louis, MO
2014 **Brown Summer Research Symposium**, Providence, RI

Academic Service

Organizing

2024-2025 **Organizer**, NYU ConCats Seminar Series
2022 **Research Mentor**, Columbia Summer Internship Program in Psychological Science
2020-2021 **Instructor**, Columbia University Introduction to Programming Bootcamp
2020 **Organizer**, Columbia Interdisciplinary Decision Making Meeting
Scientific Computing Support Staff, Columbia Psychology Department
2019 **Organizer**, Columbia University Introduction to Programming Bootcamp
Organizer, Manhattan Area Memory Meeting

Teaching

2022 **Teaching Fellow**, Science of Psychology, Columbia University
Teaching Fellow, Cognitive Neuroscience, Columbia University
2020 **Teaching Fellow**, Statistics for Behavioral Scientists, Columbia University
2019 **Teaching Fellow**, Cognitive Neuroscience, Columbia University
2018 **Teaching Fellow**, Experimental Methods, Columbia University
2017 **Teaching Fellow**, Behavioral Neuroscience, Columbia University
2015 **Teaching Assistant**, Computational Cognitive Science, Brown University

Mentoring

Undergraduate Honors Theses
2019-2020 Nicole van Amerongen
2018-2020 Jessica Hecht

Undergraduate Research Assistants
2023-2025 Yifei Deng
2022 Annie Xu
Sukriti Gupta
2020 Jesse Eiseman

Academic Service (continued)

2019	Natasha King

High School Research Assistants

2022	Andy Feng
	Hitomi Nakamura
2021-2022	Pradnya Rajalakshmi
2021	Loc Nguyen
	Brad Ji

Peer Review

Nature Communications, PLOS Computational Biology, Journal of Experimental Psychology: General, Cognitive Science, Scientific Reports, PLOS One

Technical Skills

Research Methods

Task design, Bayesian modeling, Reinforcement learning, Eyetracking, fMRI

Programming Languages

Proficient: Python, Matlab, Javascript

Competent: Stan, R, Unity/C, Bash, HTML/CSS