

# Rohit Batra

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RESEARCH INTERESTS	Differential Equation (Continuous-Time) Models; Multiple Timescale Dynamics; Translating Theories into Formal Models; Longitudinal Structural Equation Modeling	
CURRENT POSITION	<i>Postdoctoral Scholar</i> Department of Psychology University of California, Davis	Aug. 2025 - Jul. 2026
EDUCATION	<i>PhD, Quantitative Psychology</i> Dissertation Title: <i>Formalizing Psychological Processes Using Differential Equation Models: A Study of Translation, Sampling and Timescales</i> <i>MA, Psychology</i> Department of Psychology University of California, Davis Advisor: Dr. Emilio Ferrer	Sep. 2019 - Jun. 2025  Mar. 2022
	<i>MSc, Statistics</i> Department of Statistics & Applied Probability National University of Singapore, Singapore	Aug. 2017 - Dec. 2018
	<i>BSc (Honours), Statistics</i> Department of Statistics University of Delhi, India	Aug. 2014 - Jul 2017
AWARDS AND FELLOWSHIPS	Provost's Dissertation Year Fellowship in the Arts, Humanities and Social Sciences Psychology Dissertation Enhancement Fellowship Community Cultivation Award Psychology Summer Research Fellowship Psychology Graduate Student Award for Outstanding Teaching Psychology Dukes Travel Award First-Year Research Fellowship	2024-2025 Winter, 2024 Fall, 2023 2023 2023 2024, 2023, 2022, 2021 Fall, 2019
ACADEMIC OR COMMUNITY SERVICE	Letters and Science Committee for Community and Inclusive Excellence LEAP Fellowship Steering Committee Psychology Quantitative Faculty Search Committee Psychology Mentoring Steering Committee Member Research Assistant, Department of Strategy and Policy Data Mining Intern, Tan Tock Seng Hospital Consumers' India Summer Internship Program Asmat India Summer Volunteer Work	UC Davis, 2024-2026 UC Davis, 2024-2025 UC Davis, 2022 UC Davis, 2021-22 NUS, 2017-18 Singapore, Fall 2017 India, 2016 India, 2015
ARTICLES IN PREPARATION	Batra, R. & Ferrer, E. (Planned Submission, 2026) Modeling timescales coupling for dynamic processes using differential equations	

Park, J., Batra, R., Cho, YW. & Ferrer, E. (Planned Submission, 2025) Approximating continuous-time models with discrete-time results

Springstein, T., Batra, R. & Beck, E. (Planned Submission, 2025) Emotion regulation as an idiographic dynamic system: Individual differences in success of goal-directed regulation in daily life

PEER-REVIEWED  
ARTICLES

**Batra, R.**, Beck, E., Chen, M. & Ferrer, E. (Conditionally Accepted) SimDE App: Simulating and visualizing formal theories using differential equations. *Psychological Methods*  
Preprint: <https://doi.org/10.31234/osf.io/sh4e7>  
SimDE link: <https://simde.ucdavis.edu/>

**Batra, R.\***, Chen, M.\*, Beck, E. & Ferrer, E. (Under Review) Translating psychological verbal theories into formal models of change with differential equations. *Psychological Methods*  
Preprint: <https://doi.org/10.31234/osf.io/kqyxa>

**Batra, R.\***, Johal, S.K.\*, Chen, M. & Ferrer, E. (2023). Consequences of sampling frequency on the estimated dynamics of AR processes using continuous-time models. *Psychological Methods*, 30(4), 843–865. <https://doi.org/10.1037/met0000595>

Sun, H. & **Batra, R.** (2024). Contextualized and decontextualized questions on bilinguals' heritage language learning and reading engagement. *Reading and Writing*, 37, 973–1009 <https://doi.org/10.1007/s11145-022-10332-z>

**Batra, R.**, Bunge, S. A., & Ferrer, E. (2021). Modeling retest effects in developmental processes using latent change score models. *Structural Equation Modeling: A Multidisciplinary Journal*, 1–15. <https://doi.org/10.1080/10705511.2021.1946807>

BOOK CHAPTERS

**Batra, R.\***, Johal, S.K.\* & Ferrer, E. (2023). Collecting longitudinal data: Present issues and future challenges. In H. Cooper, M. N. Coutanche, L. M. McMullen, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology: Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 385–408). American Psychological Association. <https://doi.org/10.1037/0000319-018>

\* Denotes joint-first authorship.

PRESENTATIONS OR  
WORKSHOPS

Batra, R. (2025, June) SimDE App: Simulating and visualizing formal theories as differential equations. Invited journal club discussion at the *Pacific Quant Psychometrics Conference (PQPC)*.

Batra, R. (2025, May) Formalizing Psychological Processes Using Differential Equation Models. Invited talk at the *Quant Family Collective*, UNC-Chapel Hill

Batra, R. (2025, May) Formalizing Psychological Processes Using Differential Equation Models. Invited talk at *Biostatistics Seminar*, UC, Davis.

Batra, R., Chen, M., Beck, E. & Ferrer, E. (2024, July) SimDE App: Simulating and visualizing formal theories as differential equations. Paper presented at *International Meeting of the Psychometric Society (IMPS)*.

Batra, R., Chen, M., Beck, E. & Ferrer, E. (2024, May) SimDE App: Utilizing formal theories of differential equations and their visualizations as a tool to understand verbal hypotheses. Flash talk presented at *Association for Psychological Science (APS)*.

Batra, R., Hang, S., McLaughlin, R., Risbud, R. (2024, May) Careers in Psychology: Applying to

Graduate School. Workshop held for UC Davis undergraduate students.

Batra, R., Johal, S.K., Chen, M. & Ferrer, E. (2023, June) Consequences of sampling frequency on the estimated dynamics of AR processes using continuous-time models. Paper presented at the *Modern Modeling Methods (M3) Conference*.

Batra, R., Johal, S.K., Chen, M. & Ferrer, E. (2022, July) Consequences of sampling frequency on the estimated dynamics of AR processes using continuous time models. Paper presented at the *International Meeting of the Psychometric Society (IMPS)*.

Batra, R. (2022, June) Consequences of sampling frequency on the estimated dynamics of AR processes using continuous time models. Invited talk at the *Hector Research Institute Methods Group*, University of Tübingen.

Batra, R., Bunge, S. A., & Ferrer, E. (2021, October) Modeling retest effects in developmental processes using latent change score models. Poster presented at the *Society of Multivariate Experimental Psychology (SMEP)*.

Batra, R., Bunge, S. A., & Ferrer, E. (2021, July) Modeling retest effects in developmental processes using latent change score models. Paper presented at the *International Meeting of the Psychometric Society (IMPS)*.

TEACHING  
EXPERIENCE

**Instructor**

PSC 103A - *Statistical Analysis of Psychological Data* (Fall 2022)

**Teaching Assistant**

PSC 204A - *Graduate Course on Statistical Analysis of Psychological Experiments* (Fall 2023)

PSC 103A - *Statistical Analysis of Psychological Data* (Winter 2023, Fall 2021, Winter 2021, Fall 2020, Winter 2020)

PSC 001 - *General Psychology* (Spring 2024, Spring 2023, Spring 2022, Spring 2021, Spring 2020)

PSC 041 - *Research Methods in Psychology* (Winter 2022)

PEDAGOGICAL  
TRAINING

*Course on Teaching Psychology*  
University of California, Davis

Fall, 2022

*Workshop on Becoming a Mentor*

GradPathways Institute for Professional Development

Fall, 2023

RELEVANT SKILLS

**Specialized Training**

Statistics: Statistical Inference, Structural Equation Modeling, Causal Inference, Multivariate Analysis, Psychometrics

Time Series: State-Space Modeling, Stochastic Differential Equations

Simulation: Theoretical Modeling, Model Validation

Manuscript writing and scientific illustration

Preparation of instructional materials and teaching programming

**Programming**

Softwares: R (*shiny*, *lavaan*, *openmx*, *dynr*, *ctsem*, *nlme*, *ggplot2*), Julia (*DifferentialEquations.jl*), *Mplus*, Amazon EC2, SPSS

Presentation: LaTeX, Quarto, RMarkdown, Microsoft Office

AD-HOC REVIEWER

Psychological Methods; Multivariate Behavioral Research (MBR); Child Development; Journal of Research in Personality (JRP); Nature (NPP) Digital Psychiatry and Neuroscience; British Journal

of Mathematical and Statistical Psychology (BJMSP); Emotion

#### REFERENCES

**Emilio Ferrer, Ph.D.**

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