

Tapas Ranjan Rath

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RESEARCH PROFILE

Computational cognitive scientist studying context effects, bounded rationality, and human-AI interaction. My work combines behavioral experiments, Bayesian and mixed-effects modeling, agent-based simulation, and reinforcement-learning benchmarks. I am extending this program toward AI alignment questions involving sense of agency, value conflict, moral cognition, cooperation, norm formation, and multi-agent systems aligned to plural human values.

EDUCATION

Indian Institute of Technology Kanpur

2019–2026

Ph.D., Cognitive Science

Submission: June 2026

- Thesis: *When and Why Context Matters: Establishing Boundary Conditions and Mechanisms of the Attraction Effect in Decision-Making*
- Supervisors: Prof. Narayanan Srinivasan and Prof. Nisheeth Srivastava

SRM University, Chennai

2008–2012

B.Tech., Electronics and Instrumentation Engineering

RESEARCH EXPERIENCE

Ph.D. Researcher, Cognitive Science

2019–2026

Indian Institute of Technology Kanpur

Kanpur, India

- Designed behavioral experiments in PsychoPy and JavaScript to study attraction effects, pairwise comparison, subjective equivalence, and trade-off difficulty in multi-attribute choice.
- Built simulation frameworks and Bayesian/mixed-effects models to evaluate the robustness of standard decision metrics under heterogeneous preferences.
- Implemented reinforcement-learning agents, including DRQN/POMDP models in PyTorch, to benchmark human adaptive decision-making and cognitive flexibility.
- Developing the KARMA architecture and computational testbed for proxy agency, plural-values alignment, and role-invariant representation interventions in multi-agent reinforcement learning; M0 commons ecology calibrated, M1 pilot supports the Empathy Gap mechanism, M2 intervention configured.

PUBLICATIONS

Refereed Journal Articles

- Rath, T., Srinivasan, N., & Srivastava, N. (2025). **The attraction effect in perceptual decision-making: A case of dominance asymmetry.** *Frontiers in Psychology*. [Link]

Refereed Conference Proceedings

- Rath, T., Srivastava, N., & Srinivasan, N. (2026). **A self-directed expanded judgment paradigm: Isolating the pairwise mechanism of the attraction effect.** *Proceedings of the 48th Annual Meeting of the Cognitive Science Society (CogSci 2026)*. Accepted for oral presentation (140/1511; 9.3%).
- Rath, T., & Marupudi, V. (2025). **Re-evaluating the numerical-perceptual distinction in the attraction effect.** *Proceedings of the 47th Annual Meeting of the Cognitive Science Society (CogSci 2025)*. [Link]

Preprints

- Rath, T., Srivastava, N., & Srinivasan, N. (2025). **Unmasking the flaws of triplet-triplet attraction effect measures: Via mathematical analysis and agent-based simulations.** *PsyArXiv*. Target journal: *Journal of Mathematical Psychology*. [DOI]

Manuscripts in Preparation

- Rath, T. (in preparation). **The Proxy Agency Moral Shield: Extended Self, Semantic Fluency, and the Ethics of Agentic AI.** Target journal: *Minds and Machines*.

- Rath, T., Srivastava, N., & Srinivasan, N. (in preparation). **Pairwise comparison architecture in context-dependent choice.** Target journal: *Judgment and Decision Making*.
- Rath, T., Srivastava, N., & Srinivasan, N. (in preparation). **When difficult trade-offs make decoys work: Subjective equivalence geometry in the attraction effect.** Target journal: *Judgment and Decision Making*.
- Rath, T. (in preparation). **When decoys are easy to reject: Comparative asymmetry and context effects in consumer product-pack choice.** Target journal: *Journal of Consumer Psychology* (Short Reports).

AWARDS AND HONORS

- **PhD Institute Assistantship, IIT Kanpur (MoE/MHRD)** (2019–2026) – Awarded by the Ministry of Education (formerly MHRD), Government of India, for doctoral study support.
- **Student Travel Grant, Cognitive Science Society (CogSci 2026)** – \$1,500 USD. Awarded to a first author on a highly rated paper accepted for oral presentation.
- **Psychonomic Society Student Travel Award from Developing Nations (2026)** – \$2,000 USD. Awarded for the abstract *Deliberation Eliminates Decoys Rather Than Amplifying Attraction*.

SELECTED TALKS AND PRESENTATIONS

- Rath, T. (2026). **Deliberation eliminates decoys rather than amplifying attraction.** Poster to be presented at the 67th Annual Meeting of the Psychonomic Society, San Diego.
- Rath, T., Srivastava, N., & Srinivasan, N. (2024). **Perceptual stimuli with difficult-to-trade-off attribute values show a positive attraction effect.** Poster presented at the Society for Judgment and Decision Making Annual Meeting, New York City.
- Rath, T., Srivastava, N., & Srinivasan, N. (2024). **De-obfuscating context effects in decision-making: A simulation study.** Paper presented at Virtual MathPsych/ICCM 2024. [Link]
- Rath, T., Srivastava, N., & Srinivasan, N. (2024). **Attribute trade-off difficulty modulates the asymmetric-dominance of the decoy.** Presented at the Annual Conference of Cognitive Science, IIT Bombay.

TECHNICAL SKILLS

- **Statistics and modeling:** R (lme4, brms, BayesFactor, ggplot2); Python (Pandas, NumPy, SciPy, Statsmodels, Seaborn, Matplotlib); Bayesian modeling; mixed-effects models; agent-based simulation.
- **AI and computational methods:** PyTorch, reinforcement learning, DRQN, POMDPs, multi-agent simulation, computational modeling of decision processes.
- **Experimental methods:** PsychoPy, OpenSesame, JavaScript, online/offline behavioral experiments, psychophysics, eye tracking with Eyelink 1000 Plus.

SELECTED RESEARCH CODE

- **Situated Agency Alignment (KARMA):** Public MARL codebase for proxy agency, plural-values alignment, commons conflict, and role-invariant representation interventions. [GitHub]
- **Robust Context Metrics:** Agent-based simulations testing attraction-effect measures under heterogeneous preferences. [GitHub]

TEACHING AND PROFESSIONAL SERVICE

- Teaching Assistant, Human-Centered Computing (CGS616), IIT Kanpur Jan–Jul 2024
- Teaching Assistant, Introduction to Cognitive Science (CGS401), IIT Kanpur Jul–Dec 2023
- Professional memberships: Society for Judgment and Decision Making; Society for Mathematical Psychology; Psychonomic Society; Cognitive Science Society.

PRIOR INDUSTRY AND TEACHING EXPERIENCE

- Senior Software Engineer, Accenture, Pune 2012–2014
Led QA strategy for enterprise telecom systems and designed automated testing frameworks.
- Physics Instructor/Teacher, Chaitanya's Academy and DPS Kalyanpur 2014–2017
Designed curriculum and assessments for high-school and competitive-exam physics; mentored 500+ students.