August 2026

JAKE RYAN EMBREY

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EDUCATION

UNSW Sydney 2024
PhD, Cognitive Psychology
Dean's Award for Outstanding Dissertation

University of Sydney 2021
Graduate Certificate in Data Science

UNSW Sydney 2017
Bachelor of Psychological Science (Honours), Major in Philosophy

APPOINTMENTS

University of Chicago, Booth School of Business 2024 – present
Postdoctoral Researcher (Principal Researcher)

RESEARCH INTERESTS

Consumer Search, Judgment and Decision-Making, Cognitive Costs and Bounded Rationality, Computational Modeling

PUBLICATIONS AND WORKING PAPERS

Manuscripts Under Review

Embrey, J. R., Moore, A. K., Ursu, R. M., and Bartels, D. M., "Cognitive costs in consumer search", *Under review at Management Science.*

Ursu, R.M, Rao, A., & **Embrey, J. R.** "The Help Me Search Era: Do We Choose Better With AI" *Under review at Marketing Science.*

Working Papers and Manuscripts in Preparation

Embrey, J. R., Otto, A. R., and Bartels, D. M., "Isolating the costs of errors and demand in effort avoidance," *in preparation (targeting Journal of Experimental Psychology: General).*

Embrey, J. R. and Krefeld-Schwalb, A., "Cognitive ability influences risk perception and risk preference measurement," *Working Paper, ArXiv*

Peer-Reviewed Publications

Embrey, J. R. (in press), "Metabolic constraints may both help and hinder cognitive models," *Behavioral and Brain Sciences*.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B. R. (2025), "On-task errors drive effort avoidance more than opportunity costs," *Journal of Experimental Psychology: General*, 154 (7), 1916–1938.

Embrey, J. R. and Inzlicht, M. (2025), "Are metabolic costs needed to explain cognitive fatigue?" *Trends in Cognitive Sciences*, 29, 1061–1062.

Schulze, C., Aka, A., Bartels, D. M., Bucher, S. F., **Embrey, J. R.**, Gureckis, T. M., Häubl, G., Ho, M. K., Krajbich, I., Moore, A. K., Oettingen, G., Ongchoco, J. D. K., Oprea, R., Reinholtz, N., and Newell, B. R. (2025), "A Timeline of Cognitive Costs in Decision Making," *Trends in Cognitive Sciences*, 29, 827–839.

Embrey, J. R., Garner, K. G., Salim, J., and Watson, P. (2025), "Modelling Pavlovian bias in depressed and healthy adolescents," *Neurobiology of Learning and Memory*, 222, 108092.

Newell, B. R., Bateman, H., Dobrescu, L., **Embrey, J. R.**, Nian, R., and Thorp, S. (2025), "Undefined benefit: Projections and anchors as guides to retirement decumulation," *Journal of Behavioral and Experimental Finance*, 101113.

Embrey, J. R., Mason, A., and Newell, B. R. (2024), "Too hard, too easy, or just right? The effect of context on effort and boredom aversion," *Psychonomic Bulletin & Review*, 31, 2801–2810.

Embrey, J. R., Li, A. X., Liew, S. X., and Newell, B. R. (2024), "The effect of non-instrumental information on reward learning," *Memory & Cognition*, 52 (5), 1210–1227.

Embrey, J. R., Donkin, C., and Newell, B. R. (2023), "Is all mental effort equal? The role of cognitive demand-type on effort avoidance," *Cognition*, 236, 105440.

Liew, S., **Embrey, J. R.**, and Newell, B. R. (2023), "The non-unitary nature of information preference," *Psychonomic Bulletin & Review*, 30, 1966–1974.

Liew, S., **Embrey, J. R.**, Navarro, D., and Newell, B. R. (2023), "Comparing anticipation and uncertainty-penalty accounts of non-instrumental information seeking," *Decision*, 10 (3), 247–267.

Conference Proceedings

Embrey, J. R., Donkin, C., and Newell, B. (2022), "Does mental effort avoidance depend on the 'type of effort'?" *Proceedings of the 44th Annual Conference of the Cognitive Science Society*, 44, 2803–2809.

Embrey, J. R., Liew, S. X., Ghai, I., and Newell, B. (2021), "The effect of uncertainty and outcome probability on non-instrumental information seeking," *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*, 43, 1257–1263.

Embrey, J. R., Liew, S. X., Navarro, D., and Newell, B. R. (2020), "Do you want to know a secret? The role of valence and delay in early information preference," *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*, 42, 273–279.

INVITED TALKS AND SELECTED CONFERENCE PRESENTATIONS

Embrey, J. R., with Antonia Krefeld-Schwalb and Ada Aka (forthcoming), Co-organizer of "Cognitive and motivational confounds of (preference) measurement," Choice Symposium, Vail, Colorado.

Embrey, J. R. (2026, March), "The costs and profits of thinking," Guest lecture, University of Bath.

Embrey, J. R., Moore, A. K., Ursu, R. M., and Bartels, D. M. (2026, February), "Complexity costs in consumer search," Talk presented at the Marketing & Cognition Winter Conference, Colorado.

Embrey, J. R., & Krefeld-Schwalb, A. (2025, November), Cognitive ability influences risk perception and risk preference measurement" Poster presented at the Society for Judgment and Decision-Making, Denver, Colorado.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B. R. (2025, October), "Why is cognition costly?" Talk presented at the Cognition Lab, McGill University.

Embrey, J. R., Moore, A. K., Ursu, R. M., and Bartels, D. M. (2025, October), "Complexity costs in consumer search," Poster presented at the Association for Consumer Research conference, Washington D.C.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B. R. (2024, March), "The costs of thinking," Talks presented at: the Experimental Psychology Lab, University College London; Behavioural Science Lab, Warwick Business School; and Cognitive Psychology Lab, University of Zurich.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B. R. (2024, March), "The effect of opportunity costs on cognitive effort," Talk presented at TeaP 2024, Regensburg, Germany.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B. R. (2024, February), "The effect of opportunity costs on cognitive effort," Talk presented at the Australian Mathematical Psychology Conference, University of Western Australia, Perth.

Embrey, J. R., Donkin, C., and Newell, B. R. (2022, February), "Does mental effort avoidance depend on the 'type of effort'?" Talk presented at the Australian Mathematical Psychology Conference, Brisbane (Virtual).

AWARDS AND HONORS

Thaler-Tversky Independent Research Grant	2026
Dean's Award for Outstanding PhD Thesis, UNSW Sydney	2024
Douglas Vickers Outstanding Presentation Award — Australasian Mathematical Psychology Conference	2024
3-Minute Thesis (3MT) Competition, UNSW — Finalist	2023
1-Minute Thesis (1MT) Competition, UNSW — Winner, Best Talk in School of Psychology	2023

Travel Awards

Development and Research Training Grant	2024
Development and Research Training Grant	2022

TEACHING

UNSW Sydney 2021 – 2024
Cognitive Science (Tutor / Seminar Lead)
Psychology Capstone Course (Head Tutor / Seminar Lead)
Research Methods 2 (Tutor / Seminar Lead)
Developmental Psychology (Tutor / Seminar Lead), 2023–2024
Undergraduate R Coding Course (Head Tutor / Seminar Lead), 2023

PROFESSIONAL SERVICE

Ad Hoc Manuscript Reviewer: Journal of Experimental Psychology: General, Psychological Science, Neuropsychopharmacology, Nature Communications Psychology, Motivation and Emotion, Cognition, Psychonomic Bulletin & Review, Consciousness and Cognition, Computers in Human Behaviour, PLOS One, Acta Psychologica, Cognitive Research: Principles and Implications.

Conference reviewer: Society for Judgment & Decision-Making

TECHNICAL SKILLS AND TRAINING

Programming: R (incl. JAGS, Stan), JavaScript, jsPsych, Python.

Technical: Computational modelling (incl. hierarchical Bayesian methods and reinforcement learning); strong frequentist and Bayesian statistics skillset.

Workshops: Bounded Rationality Summer Institute (Max Planck Institute, Berlin, 2022); Computational Modeling of Cognition Summer School (Poland, 2022).

SELECTED ABSTRACTS

Embrey, J. R., Moore, A. K., Ursu, R. M., and Bartels, D. M., "Cognitive costs in consumer search," *Job Market Paper, Under Review at Management Science.*

Online shopping and home delivery have minimized the physical and financial costs consumers experience while shopping. Nevertheless, consumers behave as if searching for products is costly, examining fewer products than they should if search were free. Existing models of consumer search incorporate `search costs', but it is unclear what aspects of search are experienced as costly by the consumer and whether cognitive costs (such as the costs of attention and memory) are part of the equation. Across three multi-stage incentivized lab experiments (N = 549) we assess how changes in the complexity of the search environment affect how consumers search for products in an online shopping task. We manipulate two aspects of the shopping task: the number of relevant attributes of each product (placing greater demands on attention), and whether information about searched products needs to be remembered (or remains on screen). We use conjoint choice tasks to estimate participants' true preferences, in addition to a task where explicit preferences and rules (which govern utility and payoffs) are provided. In our experiments we find manipulating complexity, via the number of relevant attributes and the memory demands of the task, impacts search: consumers search fewer unique products as complexity rises. We fit the behavioral data to the Weitzman sequential search model to quantify how these behavioral changes map onto the `search cost' parameter in such models.

Embrey, J. R., Mason, A., Donkin, C., and Newell, B.R. (2025) "On-Task Errors Drive Effort Avoidance More Than Opportunity Costs" *Journal of Experimental Psychology: General*

While trying to complete arduous tasks (e.g., emails, grading), our attention is often mired by the desire to disengage. Opportunity cost theories of mental effort argue that rather than our "sense of effort" being a cognitive limitation, it is an adaptive signal which repels us from unrewarding tasks toward worthwhile alternatives; in short, this signal ensures our cognitive resources are not spent on fruitless pursuits. The current work tests the primary predictions of the opportunity cost theory of effort: That our phenomenology during a cognitively demanding task (sense of effort and boredom), and subsequent on-task behavior (response times and accuracy), are affected by the value of the available alternatives. Over three experiments, manipulating both the extrinsic value (i.e., monetary reward) and intrinsic value of alternative tasks (i.e., how enjoyable the task is), we find no strong evidence in favor of opportunity cost theories. In Experiment 1, we observe no effect of the extrinsic value of an alternative on participants' subjective ratings or behavior during a primary task. In Experiments 2 and 3, while participants'

subjective ratings of a primary task (e.g., sense of effort and boredom) may be affected by the intrinsic value of an alternative, we observe no commensurate changes in participants' performance, as measured by accuracy and response times. We explore the consequences of these results for theories of cognitive effort aversion and detail plausible alternative models, such as error aversion.

REFERENCES

Daniel Bartels (Postdoctoral Advisor)
Professor, University of Chicago, Booth School of Business

Raluca Ursu (Coauthor)
Associate Professor, New York University, Stern School of Business

Ben Newell (PhD Advisor)
Professor, University of New South Wales, Sydney