Trent N. Cash

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Employment

2025 - Present: Lupina Foundation Postdoctoral Fellow, School of Psychology, Cognitive Area, University of Waterloo

Supervisors: Drs. Sam Johnson, Evan Risko, Clara Colombatto, Jonathan Fugelsang

Summer 2026: Special Lecturer, School of Psychology, University of Waterloo

Education

2025: Ph.D., Joint Program in Psychology and Social & Decision Sciences (SDS), Carnegie Mellon University

***Advisors**:* Dr. Danny Oppenheimer, Dr. Sharon Carver
Certificate: Future Faculty Program

2022: M.S., Behavioral Decision Research, Carnegie Mellon University

***Advisor**:* Dr. Danny Oppenheimer

2020: B.A., Double Major in Psychology and Public Management, Leadership, and Policy, The Ohio State University

***Minor*:** Economics
Distinctions: Summa Cum Laude, Honors, & Honors Research

Publications

Risko, E. F., **Cash, T. N.**, Kelly, M. O., & Macnamara, B. N. (In Press). The end of thinking? Cognitive offloading in the age of artificial intelligence. *Journal of Applied Research in Memory and Cognition.*

Cash, T. N., & Oppenheimer, D. M. (2026). Beyond introspection: Inferring decision weights from others' multi-attribute choices. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. Advance online publication. https://doi.org/10.1037/xlm0001671

Cash, T. N., & Oppenheimer, D. M. (2026). Resource-rational allocation of metacognitive resources in value-based multi-attribute choice. *Thinking & Reasoning.* Advance online publication. https://doi.org/10.1080/13546783.2026.2722961

**Undergraduate Mentee; **Graduate Student Mentee*

Cash, T. N., Kelly, M. O., Macnamara, B. N., & Risko, E. F. (2026). Is AI making us stupid? *Trends in Cognitive Sciences, 30*(8), 673-675. https://doi.org/10.1016/j.tics.2026.06.004

Cash, T. N., Oppenheimer, D. M., *Christie, S., & *Devgan, M. (2026). Quantifying uncert-AI-nty: Testing the accuracy of LLMs' confidence judgments. *Memory & Cognition, 54*(2), 375-400. https://doi.org/10.3758/s13421-025-01755-4

Lin, T.-J., **Cash, T. N.,** Lee, H. J., Kim, S., Anderman, E. M., Cha, W., Liu, X., & Wen, Z. (2026). School well-being during the COVID-19 pandemic: A study of academic motivation, peer connectedness, and school liking among gifted and nonidentified early adolescents. *Gifted Child Quarterly, 70*(3), 368-387. https://doi.org/10.1177/00169862251392225

Cash, T. N., & Oppenheimer, D. M. (2025). Assessing metacognitive knowledge in subjective decisions: The *Knowledge of Weights* paradigm. *Thinking & Reasoning, 31*(3), 331-373. https://doi.org/10.1080/13546783.2024.2426543

Oppenheimer, D. M., **Cash, T. N**., & Connell Pensky, A. E. (2025). You've got AI friend in me: LLMs as collaborative learning partners. *International Journal of Artificial Intelligence in Education, 35*(6), 3896-3921. https://doi.org/10.1007/s40593-025-00521-6

Cash, T. N., & Oppenheimer, D. M. (2024). Generative chatbots AI-n't experts: Exploring cognitive and metacognitive limitations that hinder expertise in generative chatbots. *Journal of Applied Research in Memory and Cognition, 13*(4), 490-494. https://doi.org/10.1037/mac0000202

Cash, T. N., & Oppenheimer, D. M. (2024). Parental rights or parental wrongs: Parents' metacognitive knowledge of the factors that influence their school choice decisions. *PLOS ONE, 19*(4), e0301768. https://doi.org/10.1371/journal.pone.0301768

Kim, S., Lin, T.-J., Glassman, M., Ha, S. Y., Wen, Z., Nagpal, M., **Cash, T. N.**, & Kraatz, E. (2024). Linking knowledge justification with peers to the learning of social perspective taking. *Journal of Moral Education*, *53*(2), 321-341. https://doi.org/10.1080/03057240.2023.2185597

**Undergraduate Mentee; **Graduate Student Mentee*

Cash, T. N., & Lin, T.-J. (2022). Psychological well-being of intellectually and academically gifted students in self-contained and pull-out gifted programs. *Gifted Child Quarterly, 66*(3), 188-207. https://doi.org/10.1177/00169862211032987

Papers Under Review at Peer-Reviewed Journals

Cash, T. N., & Oppenheimer, D. M. (Revision Submitted). Artificial intelligence and metacognitive knowledge: LLMs can report decision weights as faithfully as humans in multi-attribute choice. Preprint: https://doi.org/10.31234/osf.io/zq6md_v2

Betts, L. R., Laursen, S., **Cash, T. N., & Risko, E. F. (Under Review). The effects of informative AI cues on judgments of learning.

Works in Progress

Cash, T. N., & Oppenheimer, D. M. (In Preparation). Metacognitive control of attribute weights in multi-attribute choice.

*Sierra, S., **Cash, T. N.**, & Risko, E. F. (In Preparation). Consensuality in human and AI confidence judgments.

Xu, W., **Cash, T. N.,** & Downs, J. S. (In Preparation). Strategic anticipation in voluntary disclosure decisions.

*Bauman, J., *Pinchak, M., **Cash, T. N.**, & Johnson, S. G. B. (In Progress). Human and LLM confidence judgments under risk, ambiguity, and radical uncertainty.

Cash, T. N., Johnson, S. G. B., & *Hu, L. (In Progress). Perceived objectivity of human and AI judgments.

Cash, T. N., Johnson, S. G. B., & Colombatto, C. (In Progress). How we think we know ourselves: Investigating meta-meta knowledge in decision making.

Cash, T. N., Oppenheimer, D. M., Johnson, S. G. B., & *Smith, L. (In Progress). Framing effects in multi-attribute choice: Attribute weights shift without metacognitive awareness.

Book Chapters

Cash, T. N., & Oppenheimer, D. M. (Submitted). Metacognition and value-based choice. In L. J. Ball & B. H. Richardson (Eds.), *International Handbook of Meta-reasoning*. Routledge.

**Undergraduate Mentee; **Graduate Student Mentee*

Cash, T. N., & Risko, E. F. (Submitted). Distributed judgment and decision-making. In P. Ayton, G. B. Chapman, E. Reutskaja, & G. Vallee-Tourangeau (Eds.), *Handbook of Judgment and Decision Making*. Cambridge University Press.

Grants & Research Fellowships

2025: Lupina Foundation Postdoctoral Research Fellowship, Faculty of Arts, University of Waterloo, $70,000

Project*:* Medical metacognition: Using LLMs to improve patients' knowledge of their medical preferences

2024: Doctoral Dissertation Research Improvement Grant (DDRIG), National Science Foundation, $29,900

Project: Knowing less than we can tell: Assessing metacognitive knowledge in subjective, multi-attribute choice (Award No. 2333553)

2023: Lorraine D. Eyde Fund Grant, American Psychological Foundation, $3,350

Project: The impact of opting out of standardized tests on college admissions: An experimental investigation

2023: Graduate Student Small Research Grant, Center for Behavioral and Decision Research, $2,450

Project: Equilibrium in voluntary disclosure: Opting out of standardized test scores in college admissions

2023: Graduate Student Small Research Grant, Center for Behavioral and Decision Research, $2,500

Project: Evaluating metacognitive knowledge in subjective decisions

2022: Esther Katz Rosen Fund Grant, American Psychological Foundation, $49,985

Project: The impact of the COVID-19 pandemic on gifted students' academic competence and socioemotional well-being during the middle school transition

2021: Graduate Student Small Research Grant, Center for Behavioral and Decision Research, $2,500

Project: How do school rating websites' ratings impact parents' preferences between schools?

2020: Academic Software Grant, Sawtooth Software, $21,000 (in kind)
Project: A choice-based analysis of alignment between parents' school preferences and online school ranking formulas

Invited Talks

2026: Natural Sciences Colloquium Series, Colgate University

2026: Lupina Foundation Research Showcase, University of Waterloo

2026: Coffee Chats Research Seminar, Brain-Mind Institute, Western University

2025: Psychology Colloquium Series, University of Waterloo

2025: Cognitive Research Seminar, University of Waterloo

Conference Talks

Cash, T. N., Johnson, S. G. B., & Colombatto, C. (2026, November). *How we think we know ourselves: Investigating meta-meta knowledge in decision making* [Oral Presentation]. To be presented at the 67th Annual Meeting of the Psychonomic Society, San Diego, CA.

Cash, T. N., & Oppenheimer, D. M. (2025, November). *Metacognitive knowledge of attribute weights: Investigating the value of internal and external cues* [Oral Presentation]. 66th Annual Meeting of the Psychonomic Society, Denver, CO.

Cash, T. N., & Oppenheimer, D. M. (2024, November). *Metacognitive monitoring and metacognitive control in subjective, multi-attribute choice* [Oral Presentation]. 65th Annual Meeting of the Psychonomic Society, New York, NY.

Cash, T. N., & Oppenheimer, D. M. (2024, June). Metacognitive knowledge in multi-attribute choice: Assessing the role of decision complexity. In V. Thompson (chair), *Meta-Reasoning: What do metacognitive judgments tell us about reasoning?* [Symposium]. International Conference on Thinking, Milan, Italy.

Cash, T. N., & Oppenheimer, D. M. (2024, June). *Evaluating the accuracy of LLMs' confidence judgments: A study of NFL predictions* [Oral Presentation]. International Conference on Thinking, Milan, Italy.

Cash, T. N., & Oppenheimer, D. M. (2023, November). *Evaluating metareasoning in subjective, multi-attribute choice decisions* [Oral Presentation]. 64th Annual Meeting of the Psychonomic Society, San Francisco, CA.

Cash, T. N., & Oppenheimer, D. M. (2022, December). *Metacognitive knowledge of preferences in policy relevant decisions* [Oral Presentation]. First Metareasoning Conference, Israel Institute for Advanced Studies, Jerusalem, Israel.

Tonissen, A., **Cash, T. N.,** Lin, T.-J., & Anderman, E. (2021, April). *Math anxiety and cheating in classrooms serving gifted and non-identified students: Expectancy and value mediations* [Paper Session]. Annual Meeting of the American Educational Research Association, Virtual.

Cash, T. N., Lin, T.-J., Tonissen, A., & Anderman, E. (2020, November). *Psychological well-being of students in self-contained and cluster gifted programs* [On-Demand Session]. 67th Annual Convention of the National Association for Gifted Children, Virtual.

Conference Posters

Cash, T. N., & Oppenheimer, D. M. (2026, November). *LLMs faithfully report decision weights in value-based, multi-attribute choice* [Poster Session]. To be presented at the Annual Meeting of the Society for Judgment and Decision Making, San Diego, CA.

Betts, L. R., Laursen, S., **Cash, T. N., & Risko, E. F. (2026, November). *The effects of informative AI cues on judgments of learning* [Poster Session]. To be presented at the 67th Annual Meeting of the Psychonomic Society, San Diego, CA.

Cash, T. N., & Oppenheimer, D. M. (2026, June). *Modern LLMs faithfully report decision weights in multi-attribute choice* [Poster Session]. Canadian Society for Brain, Behavior, and Cognitive Science, Toronto, ON.

Cash, T. N., & Oppenheimer, D. M. (2026, June). *Beyond introspection: Inferring decision weights from others' multi-attribute choices* [Poster Session]. Canadian Society for Brain, Behavior, and Cognitive Science, Toronto, ON.

Cash, T. N., Johnson, S. G. B., & Colombatto, C. (2026, April). *How we think we know ourselves: Investigating meta-meta knowledge in decision making* [Poster Session]. Psychology Discovery Conference, Waterloo, ON.

Betts, L. R., Laursen, S., **Cash, T. N., & Risko, E. F. (2026, April). *The effects of informative algorithmic cues on judgments of learning* [Poster Session]. Psychology Discovery Conference, Waterloo, ON.

Cash, T. N., Colombatto, C., & Johnson, S. G. B. (2026, February). *Meta-knowledge: How do decision-makers think they know their preferences?* [Poster Session]. Annual Conference of the Lake Ontario Visionary Establishment, Niagara Falls, ON.

Betts, L. R., Laursen, S., **Cash, T. N., & Risko, E. F. (2026, February). *The effects of informative algorithmic cues on judgments of learning* [Poster Session]. Annual Conference of the Lake Ontario Visionary Establishment, Niagara Falls, ON.

Cash, T. N., & Oppenheimer, D. M. (2025, November). *Framing effects in multi-attribute choice: Attribute weights shift without metacognitive awareness* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, Denver, CO.

*Christie, S., **Cash, T. N.**, & Oppenheimer, D. M. (2025, April). *Quantifying uncert-AI-nty: Testing the accuracy of LLMs' confidence judgements using private datasets* [Poster Session]. Carnegie Mellon University's Meeting of the Minds, Pittsburgh, PA.

Cash, T. N., Oppenheimer, D. M., & *Christie, S. (2024, November). *Can LLMs tell you when they might be wrong? Evaluating the accuracy of LLMs' confidence judgments* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, New York, NY.

Xu, W., **Cash, T. N.,** & Downs, J. S. (2024, November). *Development and validation of an individual-differences measure of k-level strategic anticipation* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, New York, NY.

Lin, T.-J., **Cash, T. N.,** Lee, H. J., Kim, S., Anderman, E. M., Cha, W., Liu, X., & Wen, Z. (2024, April). *Impacts of the COVID-19 pandemic on gifted and non-identified early adolescents' academic and social-emotional development* [Poster Session]. Annual Meeting of the American Educational Research Association, Philadelphia, PA.

Xu, W., **Cash, T. N.,** & Downs, J. S. (2024, February). *Validation of an individual-differences measure of k-level strategic reasoning* [Poster Session]. Annual Meeting of the Society for Personality and Social Psychology, San Diego, CA.

**Undergraduate Mentee; **Graduate Student Mentee*

Cash, T. N., & Oppenheimer, D. M. (2023, November). *Evaluating metacognition in subjective, multi-attribute choice* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, San Francisco, CA.

Xu, W., **Cash, T. N.,** & Downs, J. S. (2023, November). *Strategic thinking in disclosing and unraveling of hidden information* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, San Francisco, CA.

Kim, S., **Cash, T. N.**, Lin, T.-J., & Anderman, E. (2023, August). *A person-centered approach to understanding early adolescents' purpose in academic and civic realms* [Poster Session]. Annual Meeting of the American Psychological Association, Washington, D.C.

Cash, T. N., & Oppenheimer, D. M. (2022, November). *Do cognitive aids improve metacognitive knowledge in school choice decisions?* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, San Diego, CA.

Kim, S., **Cash, T. N.,** Lin, T.-J., & Anderman, E. (2022, August). *When you intend to help others, you learn better: Exploring the beneficial effects of purpose on early adolescents' learning using self-determination theory* [Poster Session]. Annual Meeting of the American Psychological Association, Minneapolis, MN.

Cash, T. N., & Oppenheimer, D. M. (2022, February). *How well do parents know their own preferences when making school choice decisions?* [Poster Session]. Annual Meeting of the Society for Judgment and Decision Making, Virtual.

Kim, S., Lin, T.-J., Ha, S. Y., Glassman, M., **Cash, T. N.**, Wen, Z., & Nagpal, M. (2020, August). *Direct evidence for the influence of collaborative small group discussions on social perspective taking* [Poster Session]. Annual Convention of the American Psychological Association, Virtual.

Cash, T. N., & Lin, T.-J. (2019, November). *Differential effects of two gifted programs on gifted students' psychological well-being* [Poster Session]. 66th Annual Convention of the National Association for Gifted Children, Albuquerque, New Mexico.

Cash, T. N., & Lin, T.-J. (2019, April). *Evaluating the social and emotional well-being of gifted students receiving different levels of gifted services* [Poster Session]. Annual Meeting of the American Educational Research Association, Toronto, Ontario.

Honors and Awards

2025: Bobby Klatzky Graduate Student Best Publication Award, Department of Psychology, Carnegie Mellon University

2022: Graduate Assessment Fellowship, Carnegie Mellon University

2022: Award for Excellence in Research, Mensa Education & Research Foundation

2021: Presidential Fellowship, Dietrich College, Carnegie Mellon University

2019: Undergraduate Research Fellowship, American Educational Research Association

Teaching Experience

Instructor of Record (University of Waterloo)
Summer 2026: Artificial Intelligence (AI) Methods for Psychological Science (New Course)

Graduate Teaching Assistant (Carnegie Mellon University)
Spring 2025: Behavioral Decision Making

Autumn 2024: Human Intelligence and Human Stupidity

Spring 2023: Research Methods in Social Psychology

Spring 2022: Programming and Data Analysis for Social Scientists

Autumn 2021: Human Intelligence and Human Stupidity

Spring 2021: Behavioral Economics in the Wild

Autumn 2020: Reason, Passion, and Cognition

Mentorship

University of Waterloo
Graduate Student Collaborator (Co-Authorship): Lucas R. Betts

Undergraduate Summer Intern (8-Week Intensive Program): Lucy Hu

Undergraduate Collaborators (Co-Authorship): Jordan Bauman; Logan Smith; Lucy Hu; Matthew Pinchak; Sofia Sierra

Carnegie Mellon University
Undergraduate Collaborators (Co-Authorship): Mira Devgan; Sara Christie

Undergraduate Thesis Co-Advisees: Brett Nyman; QX Teo; Sara Christie; TL Nguyen

Undergraduate Research Assistants: Aleksaundra Handrinos; Anthony Montoya; Claire Liu; Claire Phonepresert; Hannah Park; Jackie Liu; Jannie Du; Jess Zheng; Joanna Tan; Menghan Liu; Nancy Zuo; Piper Ligotti; Roslyn Randall; Shirley Yu

Institutional Service

2026: Mentor, LIFT Psychology Undergraduate Mentorship Program
Responsibilities*:* Meeting monthly with a designated undergraduate mentee to provide guidance on academic decision-making and graduate school applications.

2025: Facilitator, Workshop on Safe and Effective AI Use for Academic Staff
Responsibilities*:* Leading a workshop for departmental staff on how to use generative AI to approach novel challenges while adhering to university AI policies.

2023-2025: Director, Graduate Psychology Outreach Program
Responsibilities: Creating and organizing opportunities for members of the outreach program to engage with underrepresented students in the Pittsburgh community through Psychology-themed volunteering.

2022–2024: Chair, SDS Graduate Student Events Committee
Responsibilities: Planning and coordinating group activities to foster healthy and positive working relationships among graduate students in my department.

Professional Affiliations and Service

Affiliations: Society for Judgment and Decision Making; Psychonomic Society; Canadian Society for Brain, Behavior, and Cognitive Science; Cognitive Science Society; International Association for Metacognition; Metareasoning Society.

Ad Hoc Reviewer: Nature; Nature Communications; Behavior Research Methods; Journal of Experimental Psychology: Learning, Memory, and Cognition; Cognition; Judgment and Decision Making; Decision; EURO Journal of Decision Processes; BMC Psychology; Psychological Reports; American Educational Research Journal; Gifted Child Quarterly; Journal for the Education of the Gifted; Exceptional Children; Frontiers in Artificial Intelligence

Select Media Coverage

Is AI Making Us Stupid?

CBC Radio: AI's impact on learning (Read)

Le Devoir: Is AI making us stupid? A study responds (Read in French)

Phys.org: AI may not make us stupid, but relying on it could weaken the skills built through practice (Read)

PsyPost: Is AI making us stupid through cognitive offloading? New review explores the evidence (Read)

Science News: Is AI making us dumber? Maybe not. But our skills are at risk (Read)

Quantifying uncert-AI-nty: Testing the accuracy of LLMs' confidence judgments

AI Insider: Chatbots Overconfident, Even When Wrong (Read)

All Things Cognition Podcast: The overconfidence of LLMs (Listen)

Axios: AI is overconfident even when wrong, says report (Read)

Daily Star: Cocky AI chatbots are 'overconfident' even when they're wrong, say boffins (Read)

Der Spiegel: Chatbots tend to overestimate their own abilities (Read in German)

KDKA Radio: AI chatbots are overconfident (Listen)

Neuroscience News: AI chatbots overestimate themselves, and don't realize it (Read)

Pittsburgh Post-Gazette: CMU study says chatbots aren't good at knowing when they're wrong (Read)

Pittsburgh Tribune-Review: Carnegie Mellon study exposes gaps in AI's self-awareness (Read)

Scientias: AI knows a lot, but not when it is wrong – and that is a problem (Read in Dutch)

TechXplore: AI chatbots remain overconfident—even when they're wrong, study finds (Read)

The University Network: AI chatbots overestimate abilities and lack self-awareness, study reveals (Read)