Dominic Le

Contact

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GitHub, Webpage

Research Interests

Causal cognition, cognitive development, counterfactuals, computational cognitive modelling, Bayesian learning, philosophy of language, philosophy of cognitive science.

Education

Faculty of Arts and Science, University of Toronto, 2022 - 2026
Planned H.B.Sc. in Cognitive Science (Computational Cognition) and Psychology.

Research Projects

Backwards Counterfactual Reasoning in Children and Adults   Sep 2024 –
Advisor: Ioana Grosu & Patricia Ganea, University of Toronto.
Department of Applied Psychology and Human Development.

- Developed experimental designs, crafted materials, and put them together for participant experience using Qualtrics.
- Recruited kids through Children Helping Science and adults through Amazon Mechanical Turk.
- Performed statistical analysis using Generalized Linear Mixed Models (GLMM) and Generalized Estimating Equations (GEE) in R.

Hierarchical Models of Associative Learning   Aug 2024 –
Advisor: Sara Aronowitz, University of Toronto.
Department of Philosophy

- Conducted a comprehensive literature review across philosophy and cognitive science to identify limitations in existing Bayesian models of counterfactual thought.
- Developed a novel cognitive framework integrating structural causal models with recurrent counterfactual reasoning, addressing gaps in current cognitive theories.

Modelling Causal Reasoning in a Cognitive Architecture   Sep 2024 –
Advisor: Can Mekik, University of Toronto.
Department of Psychology

- Developed a computational model of human chained causal reasoning using the CLARION cognitive architecture.
- Implemented an agent that learned causal relationships (e.g. forks, diamonds, chains) through activation-based propagation between fuzzy-logic rules.
- Generated and analyzed data across 1000+ simulations per causal structure.

Publications

Ioana Grosu, **Dominic Le**, Patricia Ganea (2025). *Backwards Counterfactuals and the Closest Possible World.* Proceedings of the Annual Meeting of the Cognitive Science Society. Vol. 47. 2025. https://escholarship.org/uc/item/0q93p7sc

Software

Quentin Dercon, Rina Harsch, **Dominic Le**, Shannon Yasuda, Cherrie Chang, Melissa Struhl (2025). *snap-sort (Version 1.0.0)* [Software]. In review for jsPsych-contrib. https://github.com/DomDaSquishyBomb/plugin-drag-and-drop

Developed an open-source drag-and-drop plugin for jsPsych that enables researchers to collect categorization and ranking data through customizable visual interfaces with snap targets, response validation, and timing controls.

Conferences & **Presentations**	**Dominic Le** (2025). *Causal Stacks: A Structural Framework for Recurrent and Hierarchical Counterfactual Reasoning.* Poster accepted for presentation at the 5th European Experimental Philosophy Conference, Norwich, UK; the Society for Philosophy and Psychology (SPP) Annual Meeting; and the Annual Meeting of the Cognitive Science Society (CogSci).

Ioana Grosu, **Dominic Le**, & Patricia Ganea (2025, July). *Backwards Counterfactuals and the Closest Possible World.* Paper accepted for oral presentation to CogSci 2025, San Francisco, CA.

Ioana Grosu, **Dominic Le**, & Patricia Ganea (2025, June). *Changes to Models of Reality in Backwards Counterfactual Reasoning.* Poster accepted for presentation The 51st Annual Meeting of the Society for Philosophy and Psychology (SPP 2025), Ithaca, NY.

Dominic Le, Ioana Grosu, & Patricia Ganea (2025, February). *Time's Asymmetry in Counterfactuals.* Paper presented at the Cognitive Science and Artificial Intelligence Student Association (CASA) Undergraduate Conference, Toronto, ON.

Dominic Le (2024, September). *Modeling Children's Development of Modal Thought.* Talk presented at the Collective Undergraduate Research (CURE) Flash Talks, Toronto, ON.

Dominic Le, Oksana Tkachman (2024, March). *Spatial Frames of Reference in Signed Languages.* Paper presented at the Western Interdisciplinary Student Symposium on Language Research (WISSLR), London, ON.

Labwork	**Research Assistant, Cognitive Development** Jan 2024 –

Supervisor: Ioana Grosu & Patricia Ganea, University of Toronto
Language & Learning Lab

- Recruited and tested children from ages 5-7 in-person for behavioural experiments.
- Recorded and edited audio/video using Canva and Adobe Premiere materials for experimental stimuli.
- Coded recordings from testing trials.

Research Assistant, Psycholinguistics Mar 2023 –Sep 2024
Supervisor: Oksana Tkachman, University of British Columbia
Language & Learning Lab

- Coded signed language signs from a database for their reference frames and spatial relations.

Research Assistant, Morality and Abnormal Psychology Nov 2023 –Jun 2024
Supervisor: Mark Miller, University of Toronto
Consciousness & Wisdom Studies Lab

- Categorized and annotated bibliography for a literature review for SSHRC Insight Grant proposal.

Previous **Employment**	**Child's Program Assistant,** UofT Family Housing Jun 2024–Aug 2024

- Designed and coordinated community-based children's programs and services for the UofT Family Housing community, i.e. French Cultural Enrichment Program, STEAM day, and Music day.
- Compiled a material list for the supervisor when creating new programs.

- Consistently and effectively communicated with parents/caregivers and teams.

Supported Child Care Worker, BGC Canada   Jun 2023–Sep 2023
- Actively attended to social/recreational needs of 5-12 year-olds and their families.
- Responsibly fostered one-on-one support with children who have special needs.
- Keep track of statistics and ensure that documentation is accurate and complete (e.g., incident reports, daily log sheets, member systems, etc.).

Day Camp Coordinator, Cadets Canada   Jun 2022–Aug 2023
- Plan camp's daily schedule to fulfill federal requirements for citizenship, physical activity, and career exploration.
- Mentor program assistants to execute schedule and lead cadets with warmth and kindness.

Relevant Coursework	Programming & Computer Science:	Seminar on Cognitive Architectures: Python
	Data, Computation, and the Mind: Python	Intro to A.I.: Python
	Software Design: Java	Intro to Computer Programming: Python
	Psychology & Cognitive Science:	Minds and Machines
	Behavioural Neuroscience	Intro to Semantics
	Sensation and Perception	Intro to Cognitive Science
	Intro to Philosophy: Knowledge and Reality	Intro to Psychology
	Intro to Developmental Psychology	Intro to Cognitive Psychology
	Statistics & Mathematics:	Treatment of Psychological Data: R
	Experimental Design and Theory: R	Math Expres. and Reas. in Computer Science
	Psychology Statistics II: JASP	Probability and Statistics II: R
	Probability and Statistics I: R	Multivariable Calculus with Proofs
	Linear Algebra I	Calculus with Proofs

Student Affiliations	**Mentor,** CURE - Undergraduate Research Student Group	Sep 2024 –
	Staff Writer, Demo Magazine - Hart House Music Publication	Sep 2023 –
	Editor, Mentis - UofT Cognitive Science Undergraduate Journal	Sep 2024 –
	Executive Secretary, CASA - CogSci and A.I. Student Association	2024 –2025
	CogSci Course Union Representative, University College Council	2024 –2025

Recognitions	($7500) University of Toronto Excellence Award (UTEA-SSH).	2025
	($1500) Victoria College Regents Participation Award.	2025
	(Priceless) MAT237 Meme Contest Nominee. 2x	2024
	($2000) Gyro Club of Nanaimo Jack Ryan Scholarship.	2022
	($1250) British Columbia District/Authority Scholarship.	2022
	($1250) British Columbia Excellence Scholarship.	2022
	($2000) Vancouver Island University Dual Enrollment Scholarship.	2021

Skills and Characteristics		
	<u>Natural Languages:</u>	Fluent: English (native), French.
		Rudimentary: Vietnamese (heritage).
	<u>Computer Languages:</u>	Proficient: R, Python, Java, HTML/CSS
		Rudimentary: JavaScript, C#, C++.
	<u>Certifications:</u>	Standard First Aid - with CPR-C-AED (St. John Ambulance till 2026), Responsible Adult (YMCA, 2023)
	<u>Software Tools:</u>	Document-preparation: MS Office, LaTeX (Overleaf/VSCode), Google Workspace.
		Data-collection: Qualtrics, MTurk, CHS, REDCap.
		Data-processing: RStudio, Pandas+NumPy, JASP.
		Image-manipulation: Photoshop, Canva
		Audio-editing: Ableton Live, Logic, Audacity.
		Video-editing: Premiere, Final Cut, Animate.
	<u>Outside Interests:</u>	Guitar pedals/audio effects, comedy writing, songwriting, role-playing games.