Merrick Giles

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Computational Cognitive Science Lab ◇ Complex Human Data Hub ◇ Desk 93
University of Melbourne

EDUCATION

University of Melbourne

Bachelor of Arts (Honours) in Psychology *Graduated 2024*
—— First Class Honours
Focus Areas: Psycholinguistic Research Thesis, Advanced Research Design and Statistical Methods, Computational Modelling in Cognition, Neuroscience

Bachelor of Arts (Second Major) in Philosophy *Graduated 2024*
—— First Class Honours
Focus Areas: Mathematical Logic & Computation, Epistemology, Philosophy of Language

Doctorate of Philosophy (PhD) in Psychological Science *2025 — 2028*
Supervisors: Dr. Francis Mollica & Prof. Andrew Perfors
The acquisition, adaptation, & transmission of strategy in human cognition

RESEARCH INTERESTS

I am interested in building formalised mathematical and computational models of cognition to advance our understanding of intelligence, learning, and communication. To this end, I use Bayesian cognitive modelling, information theory, and behavioural data to investigate human cognition as adapted to cognitive, environmental, and transmissional constraints. This has led to a diverse set of first large-scale projects, covering topics such as: the centrality of colour in human language; communicative strategies in physical reference; the development of addition strategies; language evolution adapted to the goals of speakers.

MAJOR RESEARCH PROJECTS

Colour and Perceptual Efficiency in Reference Production
Collaborators: Dr. Francis Mollica[†]*, Dr. Paula Rubio-Fernández*[‡]
[†]The University of Melbourne, Australia. [‡]Max Plank Institute for Psycholinguistics, Netherlands.

Across three experiments, I investigated the ways in which referring speakers exploit the perceptual dynamics of the environment (colour, perceptual discriminability, salience) to facilitate their listeners' comprehension. Over the course of the project, I narrowed and conceptualised the research question, substantially contributed to the experimental design, implemented a complex experiment from scratch in the Javascript programming language, implemented data pre-processing, visualisation, and Bayesian modelling. I reported Experiment One in a 10,000 word honours thesis, and in oral presentation and written publication at the Cognitive Science Society (CogSci). A paper including Experiments One, Two, and Three are in the process of publication.

Acquisition of Arithmetic Strategy

Collaborators: Dr. Francis Mollica, Dr. Jacob Paul, Prof. Andrew Perfors

The University of Melbourne, Australia.

We are developing a formal model of strategy acquisition, grounded in empirical findings across strategy domains. Currently, we are investigating the acquisition of addition strategies using the theoretical frameworks of Bayesian Program Induction and Rational Metareasoning. We will ground our investigation using decades of data collected in the Maths At the Human Scale Lab. Once the addition project is concluded, we plan to extend our model across more strategy domains.

PUBLICATIONS

Merrick Giles, Paula Rubio-Fernandez, *&* Francis Mollica. (2025). Reference Production Facilitates Listener Search Across Modalities, and Colour is Special. *Under Review.*

Merrick Giles, Paula Rubio-Fernandez, *&* Francis Mollica. (2025). Perceptual Discriminability Drives Overinformative Reference, But Colour Information is Special. *Proceedings of the 47th Annual Conference of the Cognitive Science Society.*

CONFERENCE TALKS *&* PRESENTATIONS

Merrick Giles, Paula Rubio-Fernández, *&* Francis Mollica. Perceptual Discriminability Drives Overinformative Reference, But Colour Information is Special. **Talk** presented at the 47th Annual Meeting of the Cognitive Science Society (CogSci 2025), San-Francisco, U.S.A.

Merrick Giles, Paula Rubio-Fernández, *&* Francis Mollica. Overinformative Speakers Make Reference Reliable By Exploiting Discriminability and Colour. **Poster** presented at Rational Approaches in Language Science (RAILS 2025), Saarbrucken, Germany.

TEACHING

University of Melbourne Casual Academic teaching *Cognitive Psychology* *2025*

HONOURS *&* AWARDS

The University of Melbourne Deans Honours List — top performing third year students *2023*

Complex Human Data Hub Summer Scholarship *2024—2025*

Australian Commonwealth Government and the University of Melbourne PhD Research Training Program Scholarship (complete fee remission, living stipend, research *&* travel funding) *2025—2028*

SKILLS

Programming Languages	Python, R, Javascript/HTML/CSS, LaTeX, BASH
Statistical Modelling	Skilled in both Frequentest *&* Bayesian Approaches
Experimental Design	Skilled in designing innovative and engaging human experiments involving complex data collection.

REFERENCES

Dr. Francis Mollica † Prof. Andrew Perfors † Dr. Paula Rubio-Fernandez † Dr. Simon De Deyne

Follow the links for websites and contact information.