

Naomi Baes

Computational Social Science · Natural Language Processing · Semantic Change · Social Psychology

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Professional Profile

- Computational social scientist bridging Natural Language Processing and Social Psychology, developing theory-driven frameworks to evaluate historical semantic change and quantifying how shifts in meaning reflect cultural dynamics.
- Designed, developed, and prototyped SIBling, a multidimensional framework modeling lexical semantic change (LSC) across three dimensions (challenging current approaches), and co-developed LSC-Eval, an evaluation framework that builds benchmarking suites, using LLM-generated historical text to evaluate and compare methods for LSC detection.
- Published (14; 300+ citations) and presented at leading venues in NLP and Computational Social Science, including **ACL**, **EMNLP**, and **IC2S2**; invited talks at 3 international labs: Utrecht Uni., Change is Key!, National Research Council Canada.
- Active member of the international NLP community: contributor and co-organizer of SemEval shared tasks ([BRIGHTER](#), [BLEnD](#)), workshops ([LChange'26](#)), and serves on program committees ([NLP4Democracy](#), [*SEM 2025](#)).

Education

PhD	Doctor of Philosophy in Social Psychology/ Natural Language Processing Melbourne School of Psychological Sciences <i>Supervisors: Professor Nick Haslam and Dr Ekaterina Vylomova</i> <i>Advisors: Professor Yoshihisa Kashima and Professor Charles Kemp</i> <i>Thesis title: A Multidimensional Framework for Evaluating Lexical Semantic Change with Social Science Applications</i>	University of Melbourne Submission: 2026
GDPA	Graduate Diploma in Psychology (Advanced), First Class Honours Melbourne School of Psychological Sciences <i>Supervisors: Professor Nick Haslam and Dr Ekaterina Vylomova</i> <i>Thesis title: The semantic inflation of “trauma” in psychology</i>	University of Melbourne December 2021
GDP	Graduate Diploma in Psychology, First Class Honours Melbourne School of Psychological Sciences <i>Capstone Supervisor: Professor Charles Kemp</i> <i>Thesis title: Does Rainfall Amount Predict Rain-related Vocabulary Size in Local Languages: Testing the Communicative Need Hypothesis</i>	University of Melbourne December 2020
BIDS	Bachelor of International Development Studies, Early Achievers’ Status Faculty of Education and Arts	Australian Catholic University December 2014

Technical Skills

Programming	Python, R, Bash
NLP & LSC	Sentence embeddings (SentenceTransformers, XL-LEXEME), PRT/APD/Breadth; preprocessing (spaCy, NLTK)
LLMs	Few-shot prompting, synthetic diachronic corpora, benchmarking (LSC-Eval), prototype generation
Statistics	Regression (OLS/GLS/GLM, logistic, mixed-effects), ANOVA, <i>t</i> -tests, bootstrapping; MDS, PCA; theory-driven analysis
Tooling	Spartan (SLURM, GPU), Git/GitHub, VS Code, \LaTeX , NVivo, LIWC

Research Experience (Selected)

Research Internship (On-Site: Sweden) - [Change is Key!](#)

University of Gothenburg

Department of Philosophy, Linguistics, and Theory of Science; Supervisor: Nina Tahmasebi

August – September 2025

- Advanced and completed a [benchmark paper](#) on relations between word senses with an eight-person international team (computational, historical, and theoretical linguists, psychologist) across six departments (Sweden, Belgium, Luxembourg, Australia), contributing two original connotational meaning datasets grounded in my PhD framework on semantic change (SIBling), which informed the study's design and evaluation.
- Co-conceptualized the study; co-designed experiments; annotated WordNet glosses to create gold-standard data for dimensions of connotational meaning; computed inter-annotator reliability; optimized LLM prompts to improve annotation accuracy and consistency in automated labeling; and drafted the initial paper.
- Presented my PhD research at the *Change is Key!* conference, participated in a three-day consortium meeting, and delivered invited international talks at NLP labs (University of Utrecht; National Research Council Canada).

Doctoral Researcher

University of Melbourne

Melbourne School of Psychological Sciences; Supervisors: Nick Haslam & Ekaterina Vylomova

June 2023 – June 2026

- Developed two theory-driven computational linguistic frameworks to model how the meanings of concepts evolve, grounded in the distributional semantics approach and integrating insights from linguistics, NLP, and psychology.
- 1) SIBling reconceptualizes and challenges how semantic change is studied by modeling it across three dimensions—Sentiment, Intensity, and Breadth—using contextualized transformer-based embeddings and lexicon-informed measures applied to each concept's local contextual usage.
- 2) LSC-Eval introduces a novel synthetic benchmarking paradigm that uses natural historical corpora, large language models, and WordNet to generate synthetic historical sentences that systematically induce and evaluate different types of semantic change, challenging existing practices in validation and evaluation.
- Applied SIBling to study conceptual change in historical text corpora reflecting professional psychology, everyday vernacular, and media - tracing semantic shifts in mental health-related concepts and their cultural dynamics.
- Disseminated findings through leading NLP and social science venues ([ACL](#), [EMNLP](#), [IC2S2](#)) and invited talks internationally ([University of Gothenburg](#), [Utrecht University](#), and the [National Research Council Canada](#), and the [Mental Health PhD Program Conference](#)).

Predoctoral / Research Assistant in Concept Creep

University of Melbourne

Melbourne School of Psychological Sciences; Supervisor: Professor Nick Haslam

Jan 2023 –

- Engineered and optimized a reproducible NLP workflow for evaluating conceptual change, leveraging parallel processing across 8 CPU cores and coordinating GPU-backed deployments on Amazon SageMaker for large-scale transformer inference on ProQuest corpora with daily provider updates, enabling lab-wide reuse in TDM Studio.
- Sourced domain experts and trained research assistants to identify, curate, and document [new data sources](#) (New York Times, PubMed), expanding the lab's repository of psychological and media corpora (purchasing where possible).
- Standardized and implemented NLP workflows for preprocessing (cleaning, lemmatization, dependency parsing) and large-scale corpus analysis, including feature extraction (normalized term frequencies, collocates, adjective modifiers).
- Analyzed large-scale data using exploratory algorithms (MDS, PCA) and hypothesis-testing methods (e.g., OLS/GLS regression, logistic regression, ANOVA, *t*-tests).
- Contributed to 13 projects on the semantic expansion of harm-related concepts ("concept creep") → publications.
- Developed productive inter-disciplinary collaborations with researchers across different faculties (FEIT/CIS).

Research Assistant

Swinburne University of Technology

Australian Leadership Index; Supervisors: A/Prof Samuel Wilson, Dr Vlad Demersar, Dr Melissa Wheeler

Aug 2022 – Mar 2023

- Advanced nationally relevant research project on public perceptions of leadership, as part of the Australian Leadership Index team, applying NLP methods to social psychology.
- Extracted meaning from a noisy national longitudinal survey dataset: implemented LIWC for exploratory analysis and information extraction (document-term matrix) and R for dimension reduction (PCA) and further statistical analysis to extract thematic patterns from open-text responses (people's definitions of a concept: "greater/common good").
- Conducted literature review, drafted methods and results, addressed relevant reviewer feedback during review process, leading to [Tier 1 journal publication](#).

Research Assistant/ Research Project Student under Professor Charles Kemp

University of Melbourne

Computational Cognitive Sciences Lab, Melbourne School of Psychological Sciences

Jul 2020 – Jan 2023

- Constructed a multilingual dataset (38 languages) by extracting/annotating grammatical number systems and word-form mappings; collaborated across time zones (CET, GMT, AEDT) for [PNAS](#) publication.
- Contributed to cultural astronomy database on cross-cultural semantic variation in references to celestial objects.
- Co-led a student project on whether the environment (rainfall) shapes language (rain-related vocabulary), by linking term counts from bi-lingual dictionaries, ISO language codes (248 languages), climatic datasets, testing hypothesis using mixed-effects logistic regression modelling.

Research Intern / Honours Student / Affiliated Researcher

University of Melbourne

Social/Personality Laboratory; Supervisors: Professor Nick Haslam & Dr Ekaterina Vylomova

Jul 2020 - 2022

- Led a team project analysing sentiment in psychology corpus data; co-drafted manuscript resulting in a [publication](#).
- Designed and implemented a novel algorithm for evaluating the semantic severity of concepts, leading to [paper](#).
- Supported Prof Nick Haslam in supervising Yu Xiao's 2022 Honours thesis ([PSYC40010](#)), providing reproducible R scripts (index computation, plotting), result interpretation, manuscript preparation, leading to [PLOS ONE](#) publication.

Selected Publications

Summary (as of 20/12/2025): *h*-index: 7 [[Google Scholar](#)], 4 [[Scopus](#)].

Total publications (2022-25): 14 (10 journal articles; 3 conference proceedings (A* ACL); 1 workshop proceedings paper).
Press: 3.

Journal Publications/Conference Proceedings:

First Author

Naomi Baes, Raphael Merx, Nick Haslam, Ekaterina Vylomova, and Haim Dubossarsky. (2025). LSC-Eval: A General Framework to Evaluate Methods for Assessing Dimensions of Lexical Semantic Change Using LLM-Generated Synthetic Data. In *Findings of the Association for Computational Linguistics: ACL 2025*, pages 10905–10939, Vienna, Austria. Association for Computational Linguistics. [[link](#)]

Role: Lead author — co-designed the conceptual framework, synthetic dataset pipeline, and experimental setup. Jointly implemented the end-to-end LLM-generation pipeline/ evaluation framework and maintained the shared [GitHub repository](#).

Baes, N., Haslam, N., Vylomova, E. (2024). A Multidimensional Framework for Evaluating Lexical Semantic Change with Social Science Applications. In *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, pages 1390–1415, Bangkok, Thailand. Association for Computational Linguistics. [[link](#)]

Role: Lead author - Led study design, method development (contextualised embeddings, affect rated lexica), [source code](#).

Baes, N., Haslam, N., & Vylomova, E. (2023, December). Semantic Shifts in Mental Health-Related Concepts. In *Proceedings of the 4th Workshop on Computational Approaches to Historical Language Change*, pages 119–128, Singapore. Association for Computational Linguistics. [[link](#)]

Role: Led study design, data processing, developed novel method for evaluating cultural trend (pathologisation), writing.

Last Author

Haslam, N., **Baes, N.** (2024). What should we call mental ill health? Historical shifts in the popularity of generic terms. *PLOS Mental Health*, 1(1):e0000032. [[link](#)]

Role: Corpus acquisition and preprocessing, Extract normalised term frequencies, run multidimensional scaling analysis.

Haslam, N., & **Baes, N.** (2023). Scientific eminence and scientific hierarchy: bibliometric prediction of fellowship in the Australian Academy of Science. *Scientometrics*, 128(12), pages 6659–6674. [[link](#)]

Role: Conceptualise study design with PI, compile dataset, exploratory analyses and logistic regression analysis, writing.

Middle Author

Shamsuddeen Hassan Muhammad, Nedjma Ousidhoum, Idris Abdulmumin, Jan Philip Wahle, Terry Ruas, Meriem Beloucif, Christine de Kock, Nirmal Surange, Daniela Teodorescu, , [...], Nikolay Babakov, **Naomi Baes**, Ana-Maria Bucur, [...], Yi Zhou, and Saif M. Mohammad. 2025. BRIGHTER: BRIDging the Gap in Human-Annotated Textual Emotion Recognition Datasets for 28 Languages. In *Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, pages 8895–8916, Vienna, Austria. Association for Computational Linguistics. [[link](#)]

Role: Worked in team to construct Romanian dataset (gold standard annotation) - one of 28 low-resource languages.

Best Resource Paper Award at ACL Main Conference 2025

Wheeler, M. A., Wilson, S. G., **Baes, N.**, & Demsar, V. (2024). A search for commonalities in defining the common good: Using folk theories to unlock shared conceptions. *British Journal of Social Psychology*, 63(2), pages 956–974. [\[link\]](#)
 Role: Conceptualisation (research gap, method design), data processing (LIWC), thematic analysis (PCA), writing (sections).

Academic Awards and Grants

Current Ongoing Research Support:

- **AUD \$135k** – Australian Government Research Training Program Scholarship (Stipend) **Australian Government**
 Research Training Program Scholarship (Fee Offset) **Australian Government**
Details: Awarded a highly competitive national scholarship covering tuition and stipend July 2023–Dec 2026
- **AUD \$15k** – Seed Funding, [Hallmark Research Initiative: Fighting Harmful Online Communication](#) 2025–2026
Project: Automatic Evaluation of Stigma in Online Communication
Research Team: Yulia Otmakhova, **Naomi Baes***, Jemima Kang*, Mike Conway, Chris Groot, Jacinthe Flore, Nick Haslam (*Equal contribution)
Contribution: Co-led project conceptualization and proposal development; co-authored and defended the funding proposal. Led corpus sourcing and preprocessing (News on the Web), coordinated domain and ML experts to ensure theoretical validity and interpretability, and drafted early manuscript sections (Introduction, Methods).

Other:

- **AUD ~\$20,000** - In-Kind Research Support, [Concept Creep Grant \(Nick Haslam, University of Melbourne\)](#) 2023–2025
Details: Funded international flights, accommodation, and conference fees for EMNLP 2023; SASP Conference and Summer School; ESSLLI Summer School; IC2S2 2025, ACL 2024 & 2025 conferences; 2025 Google Sydney Research Day Visit (education and research dissemination).
- **AUD ~\$6,500** - In-Kind Research Support, [Change is Key! \(University of Gothenburg\)](#) 2025
Details: International flight and airport pickup, guest housing, and resort stay funded during a two-month research internship and consortium event in Sweden (Uddevalla CIK Meeting; University of Gothenburg Conference).
- **AUD \$4,000** - RHD Career Development Support scheme **Melbourne School of Psychological Sciences**
Details: Trip: (1) IC2S2 (Sweden, Norrköping); (2) ACL (Austria, Vienna); (3) 2-month Internship at Change is Key! (CIK) @ University of Gothenburg (Sweden); (4) CIK Consortium Meeting (Uddevalla) & Conference (UoG) 2025
- **AUD ~\$4,000** - In-Kind Research Support, [\(Ekaterina Vylomova, University of Melbourne\)](#) 2023–2024
Details: Funded international flights and registration for EMNLP 2023; 2025 Google Sydney Research Day Visit.
- **USD \$200** - EMNLP Sponsorship, [iguanodon.ai](#), Partial conference registration and ACL membership fee 2023
- **AUD \$130k** - Australian Government Research Training Program Scholarship, Australian Gov. (2022–2025) *Declined*
- **AUD \$100** - Advanced Psychological Theory & Practice Prize, Melbourne School of Psychological Sciences, Top 2020
- Best Capstone Presentation Award, Melbourne School of Psychological Sciences, GDPA 2021
- First Class Honours, Melbourne School of Psychological Sciences, Awarded for academic excellence in GDPA 2021
- Commonwealth Supported Place, Australian Commonwealth Government, Graduate Diploma in Psychology (Adv) 2020
- First Class Honours, Melbourne School of Psychological Sciences, Awarded for academic excellence in GDP 2020

Invited Talks

- **Semantic Shifts in Mental Health-Related Concepts.** *Mental Health PhD Program Conference (October 2025).* [\[Slides\]](#)
- **Dimensions of Semantic Change: Applying the SIBling Framework to Mental Health Concepts.** [\[Natural Language and Text Processing Lab\]](#) *University of Utrecht (September 2025).* [\[Slides\]](#)
- **Dimensions of Semantic Change: Validation and Application of the SIBling Framework.**
 - **September 2025:** Change is Key! – Using LLMs in the Humanities and Social Sciences (full-day conference), University of Gothenburg, Department of Philosophy, Linguistics and Theory of Science [\[Event\]](#) [\[Slides\]](#)
 - **September 2025:** Invited talk, National Research Council Canada [\[Slides\]](#)
- **A General Framework to Evaluate Methods for Assessing Dimensions of Lexical Semantic Change Using LLM-Generated Synthetic Data.** *Natural Language Processing Reading Group, University of Melbourne (April 2025)*
- **A Multidimensional Framework for Evaluating Lexical Semantic Change with Social Science Applications.** *Association for Computational Linguistics, Main Conference, Bangkok, Thailand (August 2024).* [\[Video/ Slides/ Poster\]](#)

- **Semantic Shifts in Mental Health-Related Concepts.** *LChange'23 at EMNLP*, Sentosa, Singapore (Dec 2023). [[Slides](#)]
- **The Concept Creep of Mental Illness.** *SASP-ACPID Conference*, Noosa, QLD (Nov 2023). [[Slides](#)] [[Event](#)]
- **The Semantic Inflation of 'Trauma' in Psychology.** *Computational Cognitive Sciences Lab, Complex Human Data Hub*, University of Melbourne (Apr 2022). [[Slides](#)]

Media and Outreach

Popular Press & Commentary:

- Nick Haslam, **Naomi Baes**, Ekaterina Vylomova, Yu Xiao). “Do we think about anxiety and depression differently now?” *Pursuit*, University of Melbourne, July 2023.
- Nick Haslam & **Naomi Baes**. “Mental illness, psychiatric disorder or psychological problem. What should we call mental distress?” *The Conversation*, June 2024.
- Melissa A. Wheeler, **Naomi Baes**, Samuel Wilson, & Vlad Demsar. “What does the ‘common good’ actually mean? Our research found common ground across the political divide.” *The Conversation*, January 2024.

Academic Service

Leadership Positions:

- **Workshop organizing committee (Program Chair)** for The International Workshop on Computational Approaches to Language Change (LChange'26), co-located with [EACL2026](#) in Morocco, March 24-26 2026.
- **SemEval organizing committee (Language Co-lead: Australian English)** for [BLEnD](#) SemEval-2026 shared task on evaluating cultural awareness in language models across 26 languages and 30 countries and regions.
- **Program Committee:** The 1st workshop on NLP for Democracy ([NLP4Democracy](#)), at COLM 2025 in Montréal, Canada
- **Program Committee:** The 14th Joint Conference on Lexical and Computational Semantics ([*SEM 2025](#)), EMNLP China

Ad-hoc Reviewer:

- **Journals:** 1) *Psychological Trauma: Theory, Research, Practice, and Policy* (x6); 2) *Journal of Biosocial Science* (x2); 3) *Advances in Methods and Practices in Psychological Science* (x1) (*editor invite*); 4) *PLOS Mental Health* (x4); 5) *Journal of Medical Internet Research* (x2)
- **Conference Proceedings:** 1) [Association for Computational Linguistics \(ACL\) Rolling Review](#) (2025: x6 papers)
- **Workshops:** 1) [NLP4Democracy](#) (COLM 2025: x3 papers); 2) [SEM2025](#) (EMNLP 2025: x3 papers); 3) The 23rd Annual Workshop of the Australasian Language Technology Association ([ALTA](#)): 2025 x3 papers

Professional Development

Academic Conferences:

- **Change is Key! Full-Day Conference**, University of Gothenburg (UoG) - Department of Philosophy, Linguistics and Theory of Science, Göteborg, Sweden (September 12, 2025). *Presenter (Invited Talk) & Attendee*. [[Program](#)]
- **Language models And RePresentations (LARP) 2025**, UoG, Göteborg, Sweden (September 2025). [[Program](#)]
- **ACL 2025 (63rd Annual Meeting)**, Vienna, Austria (July-Aug 2025). *Poster Presenter & Conference Attendee*. [[Program](#)]
- **IC2S2 2025 (11th International Conference on Computational Social Science)**, Norrköping, Sweden (July 2025). *Poster Presenter & Conference Attendee*. [[Program](#)]
- **Google Australia Research@Sydney Student Event**, Google Sydney Aus. (Feb 2025). *PhD Student Attendee*. [[Link](#)]
- **ACL 2024 (62nd Annual Meeting)**, Bangkok, Thailand (Aug 2024). *Poster Presenter & Conference Attendee*. [[Program](#)]
- **EMNLP 2023**, Sentosa, Singapore (Dec 2023). *Workshop Presenter (LChange'23), Conference Attendee & Mentee (with Syrielle Montariol)*. [[Program](#)]
- **SASP-ACPID 2023**, Noosa, QLD, Australia (Nov 2023). *Presenter & Conference Attendee*. [[Abstract Book](#)]

Summer Schools/Workshops/Consortium Meetings:

- **Change is Key! Consortium Meeting**, Uddevalla, Sweden (September 9-11, 2025). *Attendee (Invite only)*
- **ESSLLI 2024 (35th European Summer School in Logic, Language and Information)**, Jul–Aug 2024. [[Programme](#)]
- **Change is Key! Workshop @ ESSLLI: Computational Models for Semantic Change and their Applications in Multidisciplinary Research**, KU Leuven, Belgium (Jul–Aug, 2024). *Inst.: Haim Dubossarsky, Pierluigi Cassotti*. [[Details](#)]
- **LChange'23 Workshop @ EMNLP: 4th International Workshop on Computational Approaches to Historical Language Change**, Sentosa, Singapore (Dec 2023). [[Event Link](#)]
- **SASP Summer School: How Evolution Shaped the Social Mind**, University of Melbourne (Nov 2023). *Instructors: Khandis Blake, Amanda Rotella, Beatrice Alba*. [[Event](#)]

Technical Skill Development:

- Graduate-level training in **COMP90042: Natural Language Processing**, **COMP90049: Introduction to Machine Learning**, and **High Performance Computing Workshops** (Job Submission Approaches; Parallel and High Performance Python; Parallel Programming and Performance), University of Melbourne [Research Computing Services](#).

Professional Memberships:

- Association for the Advancement of Artificial Intelligence: Washington, DC, US 2025–
- Mental Health PhD Program, Melbourne School of Psychological Sciences, University of Melbourne, AUS 2024–
- Association for Computational Linguistics: Stroudsburg, Pennsylvania, US 2023–
- Society of Australasian Social Psychologists: Sydney, AU 2023–

Teaching and Mentorship

Supervision Roles:

- **Psychology students:** Supported Prof Nick Haslam in supervising Honours theses ([PSYC40010](#)) on the concept creep of [anxiety and depression](#) (2022), and *ADHD* (2025; scaled mark = 90%), guiding students on how to use (and adapt) my semi-automated, scalable NLP workflows for processing and extracting information and annual indices from large text corpora; debugging issues.
- **Computer Science RAs:** Co-supervised research assistants developing NLP pipelines with LLMs for contextualized embedding extraction (fine-tuned BERT) and dehumanization index computation using semantically accurate sentence-level representation.
- Supervised and trained research assistants on corpus coding, compilation for concept creep projects (2023–24).
- Wrote reference letter supporting application for a Master of Computer Science student (and RA I co-supervised on research projects) to MIT Electrical Engineering and Computer Science (EECS) Graduate Admissions 2026 program.

Teaching Appointments:

Teaching Assistant, [BUSA90543: Natural Language Processing](#)

Melbourne Business School; Subject Coordinator: A/Prof Jey Han Lau

University of Melbourne

May–July 2025

- Co-facilitated weekly 2-hour workshops for Master of Business Analytics students, translating advanced NLP and ML concepts into applied, business-focused exercises.
- Alternated between conceptual Q&A sessions and hands-on Python/Jupyter labs covering POS tagging, feed-forward and recurrent neural networks (LSTMs), and pretrained/large language models (PLMs/LLMs).
- Guided discussions on model evaluation, responsible AI, and the interpretation of NLP methods for analytics decision-making.

Academic Tutor (Psychology, Research Methods & Statistics)

Students from six Australian universities

Private Tutoring Service

Mar 2022–July 2025

- Tutored 70+ students (AQF Levels 7–9) in psychology, research methods, and statistics across 30+ subjects.
- Provided tailored guidance on research design, statistical analysis, and academic writing; advised on thesis preparation, time management, and program entry.
- Proofread and reviewed assessments ranging from 1,500-word lab reports to 10,000-word theses in a confidential one-to-one setting.