# Lenard Dome

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https://lenarddome.github.io/
lenarddome
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## RESEARCH AREAS

**Computational Modelling of the Complexity of Cognition and Behaviour**
**Categorization, Learning, Social Categorization**
**Open Science and Open Software**

## ACADEMIC POSITIONS

2020 - 2023 Ph.D. Psychology. Plymouth University. (Supervisor: Andy Wills).
2021 - 2023 Visiting Lecturer, Tutor and Specialist. University of Plymouth.
2019 - 2020 M.Sc. Advanced Psychology. Plymouth University. (Supervisor: Patric Bach).
2019 - 2023 Teaching Assistant. University of Plymouth.
2017 - 2019 Research Assistant. (Line Manager: Andy Wills).
2017 - 2018 Research Assistant. (Line Manager: Marina Wimmer).

## QUALIFICATIONS

2020 - 2023 Ph.D. Psychology. *Straight Pass*.
2019 - 2020 M.Sc. Advanced Psychology. Plymouth University. *Distinction*.
2017 - 2019 B.Sc. Psychology. Plymouth University. *First*.

## GRANTS AND AWARDS

2020 **Awarded** Undergraduate Project Prize. Experimental Psychological Society / British Science Association.
2019 **Awarded** Doctoral Training Studentship (1+3). ESRC & SWDTP. £87,510.62.

## PUBLICATIONS

preprint. **Dome, L.** & Wills, A.J. "Better generalization through distractions." https://psyarxiv.com/eskr9/
preprint. **Dome, L.** & Wills, A.J. "g-distance: On the comparison of model and human heterogeneity." https://psyarxiv.com/ygmcj/.

2023 **Dome, L.** & Wills, A. J. "Errorless irrationality: removing error-driven components from the inverse base-rate effect paradigm." *Proceedings of the 45th Annual Conference of the Cognitive Science Society.* Austin, TX: Cognitive Science Society. https://escholarship.org/uc/item/0kw671vv

2021 **Dome, L.**, Edmunds, C. E. R., Wills, A. J. "SUSTAIN captures category learning, recognition, and hippocampal activation in a unidimensional vs information-integration task." *Proceedings of the 43rd Annual Conference of the Cognitive Science Society.* Austin, TX: Cognitive Science Society. https://escholarship.org/uc/item/5r98q3dr

Spicer, S. G., Wills, A. J., Jones, P. M., Mitchell, C., & **Dome, L.** "Representing uncertainty in the Rescorla-Wagner model: blocking, the redundancy effect, and outcome base rate." *Open Journal of Experimental Psychology and Neuroscience.* doi.org/10.46221/ojepn.2021.6623

2019 Wimmer, M. C., **Dome, L.**, Wennekers, T. & Hancock, P. J. B. "Is the letter cancellation task a suitable index of ego-depletion? Empirical and conceptual issues." *Social Psychology.* doi.org/10.1027/1864-9335/a000393

## RESEARCH SOFTWARE

**psp** *maintainer, developer* Implements an $n$-dimensional parameter space partitioning algorithm for evaluating the global behaviour of formal computational models as described by Pitt, Kim, Navarro and Myung (2006). 5.7K downloads. [source code] [cran]

**catlearn** *senior developer* Catlearn is an archive of formal models of categorization and learning, plus benchmark datasets to test them against. It currently houses 14 formal mathematical models of learning and categorization. I have contributed 8 models to the package. 38K downloads. [source code] [cran]

## INVITED TALKS

2021 Clearing confounds from the inverse base-rate effect: Irrationality and concurrent load."2020 British Science Association / Experimental Psychological Society Undergraduate Project Prize Talk." 2021. [video].

The role of base rates in categorizing ambiguity and forming stereotypes. "Liverpool John Moores University: Cognitive and Affective Neuroscience Group Seminar." 2021.

## CONFERENCE PRESENTATIONS

2023 Experimental Psychology Society Meeting. Plymouth.

2022 22nd Associative Learning Symposium: Gregynog Hall, Wales, UK.

2021 Cognitive Science Conference: Online.

2019 The British Psychological Society: South West Undergraduate Conference. Plymouth, UK.

## TECHNICAL SKILLS

**Linear and Non-linear Optimisation:** *grid-search global optimisation, differential evolutionary algorithms for global optimisation, gradient descent on error.*

**Global Model Behaviour, Data Discretization:** *n-dimensional Parameter Space Partitioning.*

**Computational Modelling, A.I.:** *Embedding, Sequence Modelling, Feed-forward and Convolutional Neural Networks, Adaptive and Static Clustering Models.*

**Data Science:** *Bayesian Parameter Estimation and Model Comparison, Bayesian Linear Modelling, Supervised clustering, String Metrics (e.g. Levenshtein distance), Bayes Factor, Markov Chain Monte Carlo Sampling Methods, Parametric and Non-parametric Frequentist Methods, Big Data.*

**Experimental Design and Data collection:** *Desiging, implementing, testing and deploying large-scale behavioural experiments through Sona, Prolific, Jatos, PsychoPy.*

## PROGRAMMING AND COMPUTING

**R**: *computational modelling, data analysis, programming, algorithms, statistical analysis*.

**Python**: *experimental design, programming, computational modelling, statistical analysis*.

**C++**: *computational modelling, statistical analysis, Rcpp and RcppArmadillo*

**Javascript**: *jsPsych for experimental design*.

**CSS**: *webdesign*.

**UNIX**: *Bash, CLI, Ubuntu Server, ssh*.

**High Perfromance Computing**: *Slurm, Microsoft Azure, Google Cloud Computing*.

## TEACHING AND PEER-TRAINING EXPERIENCE

**How to write clean R code** This session was delivered as part of a monthly training session in R that is organised and maintained by the local R community.

**Estimating Sample Size with Bayes Factors** This workshop is a user-friendly and hands-on introduction to estimating sample sizes with a combination of Bayes Factor and Monte Carlo methods.

**Better Tables and Better Graphs** A how-to on correlation matrices, custom table of descriptive statistics, and publication-quality graphs showing both central tendency and variability (or uncertainty) of your data.

**Introduction to Quantitative Analysis with R** This is a half-day session (4 - 5 hours) aimed at first-year Doctoral Clinical Psychology students.

**Intermediate Guide to Research Methods in R** This is an intermediate half-day session (4 - 5 hours) aimed at second-year Doctoral Clinical Psychology students.

## SUPERVISORY EXPERIENCE

**Undergraduate Dissertations** I supervised multiple final-year undergraduate research projects to date.

**Peer-to-peer training and support** Assist, train and support junior lab members, as well as PhD students, in experimental design, theory, and coding both in R and python.