Jason K. Chow

Comptuational Cognitive Scientist

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Data-driven computational researcher focused on building new tools to tackle complex research problems. Possess strong technical skills in machine learning and statistical analysis aimed at psychometrics, experimental psychology, and AI. Apt at learning new skills and applying techniques from different fields to yield insights that would be otherwise impossible. Thrives in fast-paced settings and excels working independently or collaboratively.

Education

PhD. in Psychological Sciences • **2018—2024** Vanderbilt University

Research on high-level perception using deep neural networks, cognitive models, simulation techniques, and psychometrics.

- *Developed scalable framework to reliably measure representational variability across deep neural networks due to differences in model attributes (e.g., model architecture, training dataset, and training regime) across 700+ models and 9 datasets.*
- *Distilled insights from high-dimensional large-scale analysis (e.g., INDSCAL, hierarchical clustering) of deep neural network models to efficiently instantiate parametric model manipulations across a set of 100 new networks to systematically vary representations to model individual differences in object recognition ability.*
- *Implemented psychologically-inspired transfer learning DNN architecture improving a multi-task classification accuracy by 3%.*
- *Designed, optimized, and validated new measures of object recognition ability in vision, haptics, and audition using hand-designed trials and data-driven automated techniques resulting in high reliability with faster tests (25% reduction in test time).*
- *Created internal R package to perform statistical analysis/visualization of multivariate individual differences data using confirmatory factor analysis and Bayesian hypothesis testing, resulting in 7 first-author publications.*

B.S in Psychology • **2014-2018** University of Toronto, St. George

Languages

Python • R • Javascript • Bash • SQL • MatLab

Libraries & Technologies

NumPy • Pandas • Scikit-learn • SciPy • Tensorflow • PyTorch • Flask • Jupyter • D3.js • Observable Framework • jsPsych • Tidyverse • Lavaan • BayesFactor • Git • MySQL • GCP / AWS • GitHub Actions • Docker

Relevant Personal Projects

Raided Lost Ark
github.com/evilandrex/raided-loa

Website to analyze global trends in performance across classes in the game. Developed data scraping Python CLI for use with Github Actions. Displayed data in interactive dashboard built with D3.js and Observable Framework. Visited by 22K+ users.

Raided Guild Wars 2
github.com/Raided-pro/RaidedGW2

Set of tools to collect, analyze, and display historical team data. Created Discord bot for ETL into a MySQL database. Created API with Flask to serve data for an interactive dashboard.

Selected Publications

in prep. **Chow, J. K.** & Palmeri, T. J. Large-scale analysis of pretrained deep neural networks reveals parametric relationship between model similarity and model attributes. Manuscript in prep.

in prep. **Chow, J. K.**, McGugin, R. W. & Gauthier, I. Object recognition ability, but not face recognition ability, predicts performance in identifying AI-generated faces. t related abilities for visual and haptic object recognition. Manuscript in prep.

2024 **Chow, J. K.** & Palmeri, T. J. Manipulating and Measuring Variation in Deep Neural Network (DNN) Representations of Objects. Cognition https://osf.io/preprints/psyarxiv/yw49e

2024 **Chow, J. K.**, Palmeri, T. J. & Gauthier, I. Distinct but related abilities for visual and haptic object recognition. Psychonomic Bulletin & Review https://doi.org/10.3758/s13423-024-02471-x

2024 Smithson, C. J., **Chow, J. K.**, Chang, T. Y. & Gauthier, I. Measuring object recognition ability: Reliability, validity, and the aggregate z-score approach. Behavior Research Methods https://doi.org/10.3758/s13428-024-02372-w

2023 **Chow, J. K.**, Chang, T. Y. & Gauthier, I. Evidence for an amodal domain-general object recognition ability. Cognition https://doi.org/10.1016/j.cognition.2023.105542