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Sebastián Bobadilla Suárez

PERSONAL STATEMENT

I am a cognitive neuroscientist who uses scientific theory together with machine learning techniques to find meaning in unstructured datasets. My work is in collaboration with statisticians and machine learning researchers and focuses on the statistical modeling of human decision-making and categorization data. Through these collaborations, I gained valuable experience in interdisciplinary work. Further to this, I also have professional work and volunteer experience with government institutions and rural/indigenous communities.

EDUCATION

2018 – 2021 University College London (UCL)

Research Associate in Computational Modelling of Brain Imaging Data
with Professor Brad Love

2013 – 2018 University College London (UCL)

PhD in Cognitive Neuroscience.

Thesis: *The Interaction between Task Goals and the Representation of Choice Options in Decision-making.*

Includes studies on decision heuristics and computational methods in neuroimaging.

CONACYT scholarship.

2016 – 2017 The Alan Turing Institute

Internship and Enrichment Year Student.

Working on neural similarity measures and machine classifiers in a statistics and computer science dominated environment.

2012 – 2013 University College London (UCL)

MSc in Social Cognition: Research and Applications.

Distinction. CONACYT scholarship.

Thesis: *Uncertainty, Confidence, and Suboptimality in Choice.*

An eye tracking study of confidence in value-based choices.

2007 – 2011 National School of Anthropology and History

Escuela Nacional de Antropología e Historia (ENAH), Mexico City.

Bachelor's Degree in Social Anthropology, 9.7 out of 10 GPA.

Thesis: *Moral Hierarchies of Madness in the Popolucas of Sotepan, Veracruz.*

Ethnography of three case studies of psychopathology in an indigenous community.

PUBLICATIONS

Articles

Zhang, X. Y., **Bobadilla-Suarez, S.**, Luo, X., Lemonari, M., Brincat, S. L., Siegel, M., ... & Love, B. C. (2023, under review at *Nature Communications*). Adaptive stretching of representations across brain regions and deep learning model layers. *BioRxiv*, 2023-12. <https://doi.org/10.1101/2023.12.01.569615>

Bobadilla-Suarez, S., Jones, M. & Love, B. C. (2022). Robust priors for regularized regression. *Cognitive Psychology*, 132, 101444. <https://doi.org/10.1016/j.cogpsych.2021.101444>

Bobadilla-Suarez, S., Guest, O. & Love, B. C. (2020). Subjective value and decision entropy are jointly encoded by aligned gradients across the human brain. *Communications Biology*, 3(1), 597. <https://doi.org/10.1038/s42003-020-01315-3>

Botvinik-Nezer, R., Holzmeister, F., Camerer, C., Dreber, A., Huber, J., Johannesson, M., ... & Schonberg, T. (2019). Variability in the analysis of a single neuroimaging dataset by many teams. *Nature*, 582(7810), 84–88. <https://doi.org/10.1038/s41586-020-2314-9>

Bobadilla-Suarez, S. Ahlheim, C., Mehrotra, A., Panos, A. & Love, B. C. (2020). Measures of neural similarity. *Computational Brain & Behavior*, 3(4), 369–383. <http://dx.doi.org/10.1007/s42113-019-00068-5>

Bobadilla-Suarez, S., & Love, B. C. (2018). Fast or Frugal, but Not Both: Decision Heuristics Under Time Pressure. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 44(1), 24-33. <http://dx.doi.org/10.1037/xlm0000419>

Bobadilla-Suarez, S., Sunstein, C. R. & Sharot, T. (2017). The intrinsic value of control: The propensity to under-delegate in the face of potential gains and losses. *Journal of Risk and Uncertainty*, 54(3), 187-202. <https://doi.org/10.1007/s11166-017-9259-x>

De Martino, B., **Bobadilla-Suarez, S.**, Nouguchi, T., Sharot, T., & Love, B. C. (2017). Social Information Is Integrated into Value and Confidence Judgments According to Its Reliability. *Journal of Neuroscience*, 37(25), 6066-6074. <https://doi.org/10.1523/JNEUROSCI.3880-16.2017>

Sunstein, C.R., **Bobadilla-Suarez, S.**, Lazzaro, S., & Sharot, T. (2017). How people update beliefs about climate change: Good news and bad news. *Cornell Law Review*, 102(6). <https://heinonline.org/HOL/P?h=hein.journals/clqv102&i=1479>

Bobadilla-Suarez, S. & Lopez-Avila, A. (2014). [Perceived and imagined body image distortion: a possible factor for obesity and overweight in Mexicans]. *Revista Médica del Instituto Mexicano del Seguro Social*, 52(4), 408-414.

Conference Proceedings

Alba Krasovsky, R., **Bobadilla Suarez, S.**, & Schwarz, D. (2018). Social Preference of Building Materials: Decision-Making towards Low Carbon Housing Constructions. In

PLEA 2018: Smart and Healthy Within the Two-Degree Limit: Proceedings of the 34th International Conference on Passive and Low Energy Architecture., Volume 2 (pp. 778-783).

Bobadilla-Suarez, S. & Love, B. C. Measures of neural similarity. Cognitive Computational Neuroscience 2017. Archived at https://ccneuro.org/2017/abstracts/abstract_3000076.pdf

Code contributions

Modified Python and Matlab codebases for new features and release of a package estimating functional dimensionality of fMRI data (<https://github.com/lovelabUCL/dimensionality>).

TALKS

London Judgment and Decision Making Seminar (University College London, 2019). "Rethinking heuristics and optimal decision making."

"Neural similarity in BOLD response and multi-unit recordings" given at Neuromatch 3.0, WCHN Brain meeting (University College London, 2020), Applied Machine Learning Group (Forschungszentrum Jülich, 2020), the CityAI Seminar (City University, 2020) and the Psychology Department Seminar (City University, 2021) .

POSTERS

Society for Neuroscience (SfN) Meeting (Chicago, 2019). "The neural link between subjective value and decision entropy."

Interpreting BOLD: Furthering the dialogue between cellular and cognitive neuroscience (Oxford, 2018). "Measures of neural similarity."

Cognitive Computational Neuroscience (CCN, New York, 2017). "Measures of neural similarity."

Society for Neuroscience (SfN) Meeting (Washington, D.C., 2017). "Measures of neural similarity."

The Conference of the European Society for Cognitive Psychology (ESCOP, Paphos, 2015). "Cognitive capacity constraints on heuristics."

Workshop on Memory Processes in Judgment and Decision Making (Hölstein, 2015). "Cognitive capacity constraints on heuristic selection."

SUPERVISION

Marilena Lemonari (MSc)
Nopparada Mingchinda (MRes)
Hui Tang (MSc)
Jianwen (Sharon) Shen (MSc)

Jay See Tow (BSc)

GRANTS/AWARDS

Candidate to National Researcher (Sistema Nacional de Investigadores, SNI)

Guarantors of Brain Conference fee waiver (~250 GBP)

Stipend for the enrichment year at The Alan Turing Institute (~6000 GBP)

SLMS Student Conference Fund (~500 GBP)

CONACYT Scholarship (over 100K GBP)

SKILLS

- Programming and software proficiency: MATLAB, R and Python for statistical modelling. HTML and JavaScript for web design (I maintained affectivebrain.com for 1 year). Bash/UNIX skills for automatization of various computer tasks. Familiarity with MySQL, PHP, and Linux servers.
- Model-based analysis, multivariate pattern analysis (MVPA), and representational similarity analysis (RSA) for functional magnetic resonance imaging (fMRI); brain images of BOLD signal during decision-making/categorization tasks. Analyses with SPM and FSL.
- Experienced with implementation of frequentist and Bayesian statistics and machine learning algorithms. Specifically, I am comfortable with SVM, KNN, GNB, and neural networks for classification problems and with mixed effects models for regression problems.
- Experience with high performance computing and cloud computing.
- Familiar with game theoretical modeling, deep learning, and reinforcement learning.
- Languages: English and Spanish fluency. Basic familiarity with Italian, French, and Portuguese.
- Excellent organizational skills as demonstrated with organizing and moderating The Alan Turing Institute Topical Discussions for PhD students (January 2017 – September 2017) and the Affective Brain Lab Seminar Series at UCL (March 2014 to November 2015)
- Very good familiarity with business culture through participation in the Entrepreneurship for Emerging Markets course at London Business School (Spring term 2015), the UCL Enterprise Bootcamp (8-10 June 2015) and the four-day Engineering YES workshop for start-ups (May 2014)
- Comfortable with using and analyzing eye tracking data.

OTHER EXPERIENCE

- Various masterclasses on Machine Learning and Statistics at The Alan Turing Institute (October 2016 – September 2017)
- Attended the Microsoft Research Summer School in Artificial Intelligence (July 2017)
- Moderator for The Alan Turing Institute Fellow Short Talk (7 February 2017)
- Open Data Science Conference UK (8-9 October 2016).
- Introduction to Machine Learning (23-27 May 2016)
- MR Physics for SPM Users (7 October 2015).
- Magstim Neuroscience Conference (9-10 May 2015)

- Introduction to Statistics with R (27 February, 2-3 March 2015)
- Sample size estimation and power calculations (16 February 2015)
- Data Analysis and Image Processing with Python (4-5 November 2014)
- SPM for fMRI (for experienced users) (15-16 May 2014).
- Diverse online courses and textbooks on programming, neuroscience, and machine learning (2014 - present).
- Introduction to Bayesian Analysis (24 April 2013)
- Organized and participated in several events and talks during my undergraduate degree in social anthropology.

WORK AND VOLUNTEER EXPERIENCE

Senior Director of Machine Learning at OnCorps. Built an LLM RAG system from the ground up (ChatGPT, Databricks, Qdrant). Deploying an anomaly detection system to production for income forecasting at a multi-trillion dollar asset manager (April 2024 – present).

Director of Machine Learning at OnCorps. Oversaw ETL's and dashboards in production. Migrated over 10,000 lines of code from R Shiny to Python Dash (April 2022 – April 2024).

Research Associate in Computational Modelling of Brain Imaging Data at University College London doing advanced machine learning with fMRI and electrophysiological data (2018 – 2021).

Internship and Enrichment Year Student at The Alan Turing Institute (UK National Institute for Data Science) working on the project "Neural similarity measures and machine classifiers" (June 2016 – September 2017).

Social Service Provider at the National Institute of Psychiatry Ramón de la Fuente (Mexico) on the project "Autoperceptive Distortion of Body Image in Men" (December 2010 – June 2011).

Scholarship Grantee with National Institute of Public Health (Mexico). Fieldwork on transnational health practices in the Low Mixteca, Oaxaca (September 2010 – March 2011).

Mental Health Promoter and Assistant at the Psychiatric Hospital Fray Bernardino Álvarez (Mexico). Group psychoanalysis and psychodrama seminars with vulnerable groups in Mexico City (January 2009 – December 2009)