Sean Devine

COGNITIVE & BEHAVIOURAL SCIENTIST

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# Summary

Cognitive Scientist (PhD McGill University) and Behavioural Scientist at Impact Canada.

Research interests: Cognitive effort, decision‑making, statistical modelling

# Education

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| McGill University  Ph.D. In Experimental Psychology (Cognitive Science) | Montreal, Canada  2020‑2024 |
| **Concordia University**  Master Of Experimental Psychology | Montreal, Canada  2020 |
| **Concordia University**  Bachelor Of Psychology | Montreal, Canada  2018 |

# Awards and Grants

Total value: $299 050

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| **Postdoctoral Fellowship**  In recognition of: outstanding research proposed by an upcoming postdoctoral student ($90 000) | NSERC  2024 |
| **Graduate Research Scholarship**  In recognition of: outstanding research proposed by a graduate student in psychology ($2000) | APF  2022 |
| **Student Ambassador Award**  In recognition of: funding for community outreach project to promote science among underrepresented groups ($1000) | NSERC  2021 |
| **Postgraduate Scholarship‑Doctoral**  In recognition of: doctoral students’ academic success and research potential ($63 000) | NSERC  2021 |
| **Graduate Excellence Award**  In recognition of: academic excellence at the graduate level ($ 2550)­ | McGill University  2020 |
| **Bourses de Doctorat en Recherche**  In recognition of: doctoral students’ academic success and research potential. ($84 000) | FRQNT  2020 |
| **Canada Graduate Scholarship‑Master’s Program**  In recognition of: new master’s students’ academic success and research potential ($17 500) | SSHRC  2019 |
| **Bourses de Maîtrise en Recherche**  In recognition of: new masters’ students’ academic success and research potential ($17 500) | FRQNT  2019 |
| **Graduate Special Entrance Award**  In recognition of: incoming masters’ students entering the program with federal or provincial funding ($6000) | Concordia University  2019 |
| **Undergraduate Research Award**  In recognition of: students’ academic success and research potential ($7125 + $2000 FRQNT supplement) | NSERC  2018 |
| **Undergraduate Research Award**  In recognition of: students’ academic success and research potential ($5625) | Concordia University  2017 |
| **Arts and Science Scholar**  In recognition of: students with a GPA in the top 1% of their department | Concordia University  2016-2018 |
| **Dr. Alex Vincent Scholarship in Psychology**  In recognition of: psychology students’ academic excellence and commitment to the field ($750) | Concordia University  2018 |

# Employment

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| **Behavioural Science Fellow**   * Developed behavioural science-supported solutions to public health issues facing Canadian citizens * Worked closely with the Public Health Agency of Canada to design, test, and implement an intervention aimed at promoting healthy behaviours among Canadians. * Consulted on statistics and research-method based training across departments. | Impact Canada  Impact and Innovation Unit & Public Health Agency of Canada  2024-Present |
| **Behavioural Scientist**   * Developed behavioural interventions to solve both client-facing and employee business problems * Leveraged AI (PyTorch, XGBOOST) models for topic modeling, risk prediction, and sentiment analysis * Analyzed large data sources to simulate business path success likelihood * Designed scientific experiments to test new products and ideas * Introduced new statistical techniques (e.g., Bayesian analysis) into industry * Developed new analysis pipelines and integrated with existing dashboards (PowerBI) | IntactLab  (Intact Insurance)  2023-2024 |

# Research Experience

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| **Otto Lab**  Ph.D. Student (supervisor: Dr. Ross Otto)   * Designed numerous experiments, using Python, JavaScript, and MATLAB (including backend with SQL and Postgres) * Analyzed experimental and large-scale consumer data * Fit computational and deep learning models to empirical data * Published results in high-impact, peer-reviewed, journals * Presented results at multiples international conferences * Led multiple workshops, teaching colleagues and students advanced statistical techniques | McGill University  2020-2024 |
| **Lifespan Decision-Making Lab**  Masters Student and Research Coordinator (supervisor: Dr. Ross Otto)   * Designed numerous experiments, using Python, JavaScript, and MATLAB * Analyzed experimental data, resulting in the completion of a master’s thesis and defence * Fit computational models to empirical data * Published results in high-impact, peer-reviewed, journals * Presented results at multiples international conferences * Digitized pre-existing paper-and-pencil experiments, implementing open science best practices | Concordia University  2018-2020 |

# Articles

## Under Review

Bogdanov, M., Bustamante, L.M., **Devine, S.,** Sheldon, S., Otto, A.R. (under review) Non-invasive brain stimulation over the Frontopolar Cortex promotes willingness to exert cognitive effort in a foraging-like sequential choice task. *The Journal of Neuroscience*.

**Devine, S.**, James Goulding, John Harvey, Anya Skatova† & A. Ross Otto†. (under review). Decoy Effects in the Wild: Evidence for (and Constraints on) Attraction Effects in Real-World Consumer Choices. *Psychological Science*.

Brown, C.S., **Devine, S.**, A. R. Otto, Bischoff-Grethe, A., & Wierenga, C. E. (under review). Greater reliance on model-free learning in adolescent anorexia nervosa: An examination of dual-system reinforcement learning. *Translational Psychiatry*.

**Devine, S.**, Falk, C. F., & Fujimoto, K. A. (under review). Comparing the Accuracy of Three Predictive Information Criteria for Bayesian Linear Multilevel Model Selection. *Multivariate Behavioral Research*.

## 2024

**Devine, S.**, Germain, N., Kasprzyk, A., Eppinger, B. (2024). Changes in The Prevalence of Muscular, but Not Thin Bodies, Bias Young Men’s Judgments About Body Size. *Journal of Masculinity and Men*. <https://doi.org/10.1037/men0000478>

Lind, M. N., Byrne, M. L., **Devine, S.,** & Allen, N. B. (2024). Smile, You’re on Camera: Investigating the Relationship between Selfie Smiles and Distress. *Journal of Trial and Error*. <https://doi.org/10.36850/8716-5abe>

**Devine, S.**, Roy, M., Beierholm, U., Otto, A.R. (2024). Proximity to Rewards Modulates Parameters of Effortful Control Exertion. *Journal of Experimental Psychology: General*. [https://doi.org/10.1037/xge0001561](https://psycnet.apa.org/doi/10.1037/xge0001561)

**Devine, S.**, Otto, A. R., Uanhoro, J. O., & Flake, J. K (2024). A Tutorial for Quantifying Within and Between‑Participant Variance in Multilevel Logistic Models. *Collabra: Psychology*. <https://doi.org/10.1525/collabra.94263>

**Devine, S.,** da Silva Castanheira, K., Fleming, S. M., & Otto, A. R. (2024). Distinguishing between Intrinsic and Instrumental Sources of the Value of Choice. *Cognition, 245*. <https://doi.org/10.1016/j.cognition.2024.105742>

## 2023

**Devine, S.**, Vassena, E., & Otto, A. R. (2023). More than a Feeling: Physiological Measures of Affect Index the Integration of Effort Costs and Rewards During Effortful Decision‑Making. *Cognitive, Affective, Behavioral Neuroscience*. https://doi.org/10.3758/s13415-023-01095-3

## 2022

Otto A.R., **Devine, S.**, Bornstein, A.M., & Louie, K. (2022). Context‑dependent choice and evaluation in real‑world consumer behavior. *Scientific Reports, 12*, 17744

**Devine, S.** ,Neumann,C., Levari, D., Eppinger,B. (2022).Human Ageing is Associated with More Rigid Concept Spaces. *Psychonomic, Bulletin, & Review*. <https://doi.org/10.3758/s13423-022-02197-8>

**Devine, S.**, Germain, N., Ehrlich, S., & Eppinger, B. (2022). Changes in the Prevalence of Thin Bodies Bias Young Women’s Judgments About Body Size. *Psychological Science, 33*(8), 1212‑1225. [https://doi. org/10.1177/09567976221082941](https://doi.org/10.1177/09567976221082941)

**Devine, S.** & Otto, A.R.(2022). Information about task progress modulates cognitive demand avoidance. *Cognition, 225*, 105107. <https://doi.org/10.1016/j.cognition.2022.105107>

## 2021

**Devine, S.**, Neumann, C., Otto, A. R., Bolenz, F., Reiter, A., & Eppinger, B. (2021). Seizing the opportunity: Lifespan differences in the effects of the opportunity cost of time on cognitive control. *Cognition*, *216*, 104863. https://doi.org/10.1016/j.cognition.2021.104863

Ruel, A., **Devine, S**., & Eppinger, B. (2021). Resource‐rational approach to meta‐control problems across the lifespan. *Wiley Interdisciplinary Reviews: Cognitive Science, 12*(5), e1556. https://doi.org/10.1002/wcs.1556

# Teaching

## Guest Lectures

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| **Decision-Making under Uncertainty**  For PSYC 213 (Cognition) at McGill University | Mar 2024 |
| **Topics in Logistic Multilevel Modeling**  For PSYC 541/746 (Multilevel Modeling) at McGill University | Mar 2022 |

## Teaching Assistantships

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| **Statistics Help Desk**  McGill University | 2023 |
| **Introduction to Statistics**  McGill University and Concordia University | 2021-2022 |
| Statistics for Experimental Design  McGill University | 2021 |

## Organized Workshops

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| **Introduction to Hierarchical Drift Diffusion Modeling**  Rabound University | Feb 2024 |
| **Introduction to Reinforcement Learning**  Rabound University | Feb 2024 |
| **Bayesian Statistics for A/B Tests**  IntactLab | Jan 2024 |
| **Introduction to Bayesian Statistics**  IntactLab | June 2023 |
| Introduction to Data Science [Series]  McGill University | Nov-Dec 2022 |
| **Introduction to Bayesian Statistics**  Concordia University | March 2022 |
| **Maximum Likelihood Estimation in R**  Concordia and McGill Universities | https://github.com/seandamiandevine/MLEWorkshop | October 2022 |
| **Multilevel Modeling: Basic and Advanced Topics**  Concordia and McGill Universities | https://github.com/seandamiandevine/MLMTutorial\_2021 | June-July 2021 |
| **Python for Psychologists**  Concordia University | April 2020 |

# Presentations

## Colloquia and Invited Talks

*Context-Dependency in Cognitive Effort Valuation and Decision-Making*. Shenhav Lab, Brown University. April 2024. Invited Talk.

*Context-Dependency in Cognitive Effort Valuation and Decision-Making*. Behavioural Control Seminar, Radboud University. February 2024. Colloquium.

*No Evidence for a Generalized Construct of Cognitive Effort Aversion.* Poldrak Lab, Stanford University. February 2024. Invited Talk.

*Distinguishing between Intrinsic and Instrumental Sources of the Value of Choice*. UNSW Cognition Group, University of South Wales. May 2023. Invited Talk.

*Making Progress on the Effort Paradox: Information about Task Progress Modulates Cognitive Demand Avoidance*. Control and Decision-Making Lab, University of Washington in St. Louis. March 2021. Invited Talk.

*Making Progress on the Effort Paradox: Information about Task Progress Modulates Cognitive Demand Avoidance*. Motivational & Cognitive Control Lab, Radboud University. March 2021. Invited Talk.

## Conference Proceedings and Published Abstracts

**Sean Devine** & A. Ross Otto. Making Progress on the Effort Paradox: Information about task progress modulates cognitive demand avoidance. (2021). In *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*.

**Sean Devine**, Cassandra Neumann, David E. Levari, Robert Wilson, & Ben Eppinger. (2020). Prevalence-induced concept change in older adults. In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*. Montreal, CA. [Contributed Talk].

**Sean Devine**, Cassandra Neumann, David E. Levari, Robert Wilson, & Ben Eppinger. (2020). Prevalence-induced concept change in older adults. Accepted at *Cognitive Ageing 2020*, Atlanta, Georgia, USA.

**Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑related changes in the effects of opportunity costs on cognitive effort(2019). In *The Multidisciplinary Conference on Reinforcement Learning and Decision Making 2019*. Montreal, QC, Canada.

Ben Eppinger, **Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑related changes in the effects of opportunity costs on cognitive effort. Accepted at *FENS2018*, Berlin, Germany, July 2018.

## Poster Presentations

**Sean Devine**, Mario Bogdanov, Ziqi Fu, Madeleine Sharp, A. Ross Otto. *No Evidence for a Generalized Construct of Cognitive Effort Aversion*. Cognitive Neuroscience Society Annual Meeting. Toronto, ON, Canada, 2024.

**Sean Devine,** Mario Bogdanov, Ziqi Fu, A. Ross Otto. T*hrowing good effort after bad: Evidence for a sunk-cost effect in cognitive effort-based decision-making.* Society for Neuroeconomics Meeting. Vancouver, BC, Canada, 2023.

**Sean Devine**, Mathieu Roy, Ulrik Beierholm, A. Ross Otto. Proximity to Appetitive and Aversive Goals Jointly Determines Parameters of Effortful Control Exertion. Presented at the *3rd Workshop on Mental Effort*. Providence, RI, USA, 2022.

**Sean Devine**, Anya Skatova, James Goulding, A. Ross Otto. Decoy Effects in a Massive Real‑World Retail Dataset. Presented at *The Society for Judgment and Decision-Making Annual Meeting 2022*. San Diego, CA, USA, 2022. **[Runner‑up for best student poster award]**.

**Sean Devine**, Eliana Vasenna, Emma Kiedyk, A. Ross Otto. Physiological Measures of Affective Valence and Arousal Index Effort Costs During Decision‑Making. Presented at *The Multi‑disciplinary Conference on Reinforcement Learning and Decision Making 2022*. Providence, RI, USA, 2022.

Alexa Nordine, **Sean Devine**, Emma Kiedyk, A. Ross Otto. Physiological Measurements of Emotion in Risky Decision‑Making: Examining EMG and SCR Responses to Choice Outcome. Presented at *CPA’s 83rd Annual National Convention*. Calgary, AB, Canada, 2022.

A. Ross Otto, **Sean Devine**, Aaron M. Bornstein, & Kenway Louie. Context‑dependent choice and evaluation in real‑world consumer behavior. Presented at the *Society for Neuroeconomics Annual Meeting 2021*. Online, 2021.

**Sean Devine** & A. Ross Otto. Making Progress on the Effort Paradox: Information about task progress modulates cognitive demand avoidance. Presented at *CogSci2021*, Montreal, Canada, 2021.

**Sean Devine**, Nathalie Germaine, Stefan Erhlich, & Ben Eppinger. Changes in The Prevalence Of Thin Bodies Biases Young Women’s Judgements about Body Size. Presented at *Canadian Society for Brain, Behaviour and Cognitive Science: Annual Meeting 2021*, Montreal, Canada, 2021.

**Sean Devine** & A. Ross Otto. Making Progress on the Effort Paradox: Information about task progress modulates cognitive demand avoidance. Presented at *Canadian Society for Brain, Behaviour and Cognitive Science: Annual Meeting 2021*, Montreal, Canada, 2021.

**Sean Devine**, Cassandra Neumann, David E. Levari, Robert Wilson, & Ben Eppinger. Prevalence‑induced concept change in older adults. Accepted at *Cognitive Ageing 2020*, Atlanta, Georgia, USA, 2020.

**Sean Devine**, Cassandra Neumann, David E. Levari, Robert Wilson, & Ben Eppinger. Prevalence‑induced Concept Change in Older Adults. Presented at the Annual *CRDH Conference 2020*, Montreal, Canada, January, 2020.

**Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑related changes in the effects of opportunity costs on cognitive effort. Presented at *RLDM2019*, Montreal, Canada, July 2019.

**Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑related changes in the effects of opportunity costs on cognitive effort. Presented at the Annual *CRDH Conference 2020*, Montreal, Canada, February 2019. Winner of the best undergraduate poster presentation award (value: $100).

**Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑ related changes in the effects of opportunity costs on cognitive effort Presented at the *6th FLUX Conference*, Berlin, Germany, August 2018.

Ben Eppinger, **Sean Devine**, Florian Bolenz, Joni Shuchat, Ross Otto, & Andrea Reiter. Ageing‑related changes in the effects of opportunity costs on cognitive effort. Presented at the *11th FENS (Forum of Neuroscience)*, Berlin, Germany, August 2018.

## Conference Talks

**Sean Devine**, Carl F. Falk, Ken A. Fujimoto. *Comparing the Accuracy of Three Predictive Information Criteria for Bayesian Linear Multilevel Model Selection.* Modern Modeling Methods. Storrs, CT, USA, 2024.

**Sean Devine**, Anya Skatova, James Goulding, A. Ross Otto. Decoy Effects in a Massive Real‑World Retail Dataset. Presented at *The Society for Judgment and Decision-Making Annual Doctoral Symposium 2023*. Online, 2023. **[Invited speaker]**.

**Sean Devine**, Mathieu Roy, Ulrik Beierholm, A. Ross Otto. Proximity to Appetitive and Aversive Goals Jointly Determines Parameters of Effortful Control Exertion. Presented at *Society for Neuroscience Meeting 2022*. San Diego, CA, USA, 2022.

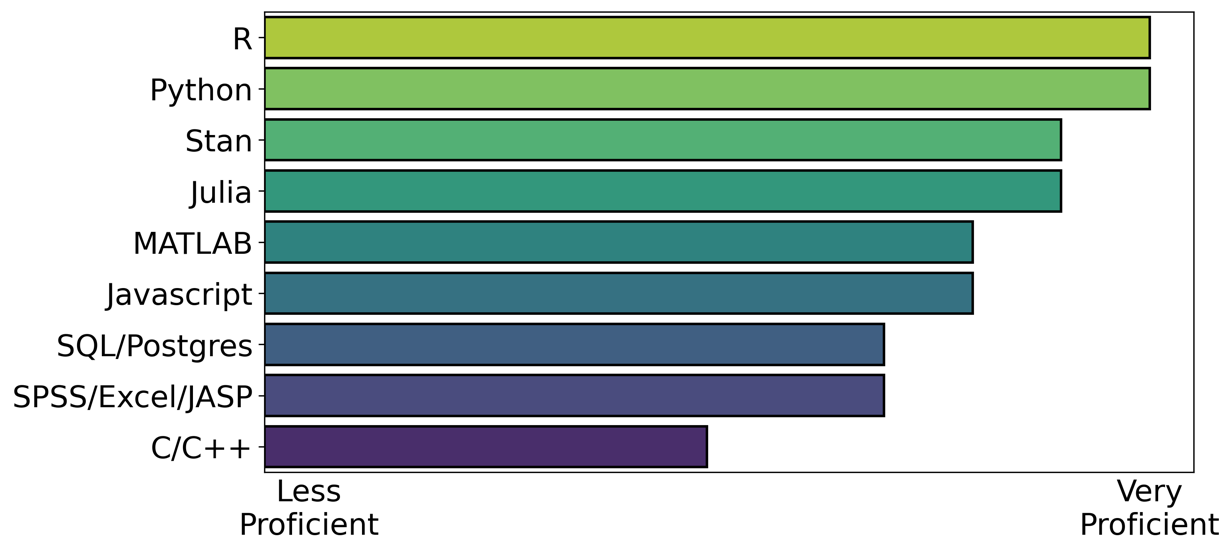
**Sean Devine**, A. Ross Otto, Aaron M. Bornstein, & Kenway Louie. Context‑dependent choice and evaluation in real‑world consumer behavior. Talk given at *Math Psych 2021*, online. July 2021.

**Sean Devine**, Cassandra Neumann, David E. Levari, Robert Wilson, & Ben Eppinger. Prevalence‑induced concept change in older adults. Speech given at *CogSci2020*, Toronto, Canada, July 2020. [Online due to COVID].

**Sean Devine**, Cassandra Neumann, & Alexa Ruel. Life of the mind: Judgment and decision making in human ageing. Speech given at *First Annual CRDH Webinar Series*, Montreal, Canada, April 2020.

# Professional Skills

## Programming Languages



# Other Work and Extracurricular Experience

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| Journal of Trial and Error  Editor of Psychology   * Editor for an international journal that aims to close the gap between what is research and what is published by highlighting important scientific failures * Write and contribute to editorials on the role of failure in psychological science | 2019-2024 |
| *Science of Learning* Symposium, Berlin, Germany  Assistant Organizer   * Assisted in planning and organization of an international symposium on recent neuroscientific, developmental, and social advancements in learning science | 2018 |

## Editorial Activities—Reviewer

I have served as reviewer for the following journals: The Psychological Science Accelerator, Personality and Social Psychology Bulletin, Perspectives in Psychological Science, Cognitive, Affective, & Behavioural Neuroscience, Cognition, Royal Society for Open Science, Advances in Cognitive Science, and the Journal of Trial and Error.

## Additional Training

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| **Deep Learning Summer School**  Neuromatch Academy | 2021 |