

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 <ul style="list-style-type: none">- 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 |
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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

Otto Lab

Ph.D. Student (supervisor: Dr. Ross Otto)

McGill University
2020-2024

- 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

Lifespan Decision-Making Lab

Masters Student and Research Coordinator (supervisor: Dr. Ross Otto)

Concordia University
2018-2020

- 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

Articles

Under Review

Devine, S., Dong, D., Sellier, M., Roy, M., & Otto, A.R. (under review). Increased Attention Towards Progress Information Near a Goal State. *Psychonomic, Bulletin, & 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>

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>
- 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. *Throwing 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.

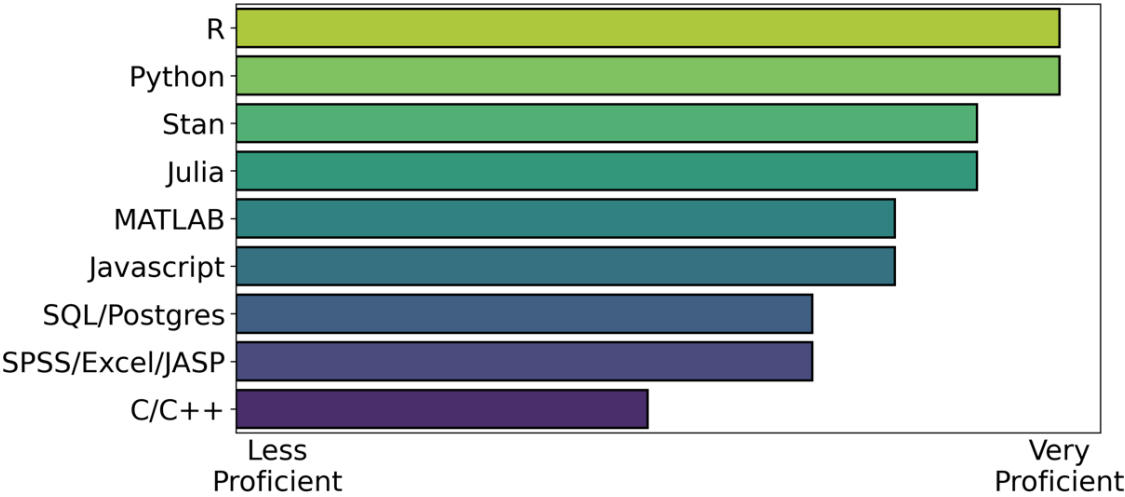
Sean Devine, A. Ross Otto, Aaron M. Bornstein, & Kenway Louie. Context-dependent choice and evaluation in real-world consumer behavior. Talk given at *Math Psych 2021*, online. July 2021.

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

Journal of Trial and Error

2019-2024

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

2018

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

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

Deep Learning Summer School

2021

Neuromatch Academy