

# 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

<b>McGill University</b> Ph.D. In Experimental Psychology (Cognitive Science)	Montreal, Canada 2020-2024
<b>Concordia University</b> Master Of Experimental Psychology	Montreal, Canada 2020
<b>Concordia University</b> Bachelor Of Psychology	Montreal, Canada 2018

## Awards and Grants

Total value: \$299 050

<b>Postdoctoral Fellowship</b> In recognition of: outstanding research proposed by an upcoming postdoctoral student (\$90 000)	NSERC 2024
<b>Graduate Research Scholarship</b> In recognition of: outstanding research proposed by a graduate student in psychology (\$2000)	APF 2022
<b>Student Ambassador Award</b> In recognition of: funding for community outreach project to promote science among underrepresented groups (\$1000)	NSERC 2021
<b>Postgraduate Scholarship-Doctoral</b> In recognition of: doctoral students' academic success and research potential (\$63 000)	NSERC 2021
<b>Graduate Excellence Award</b> In recognition of: academic excellence at the graduate level (\$ 2550)	McGill University 2020
<b>Bourses de Doctorat en Recherche</b> In recognition of: doctoral students' academic success and research potential. (\$84 000)	FRQNT 2020
<b>Canada Graduate Scholarship-Master's Program</b> In recognition of: new master's students' academic success and research potential (\$17 500)	SSHRC 2019
<b>Bourses de Maîtrise en Recherche</b> In recognition of: new masters' students' academic success and research potential (\$17 500)	FRQNT 2019
<b>Graduate Special Entrance Award</b> In recognition of: incoming masters' students entering the program with federal or provincial funding (\$6000)	Concordia University 2019
<b>Undergraduate Research Award</b> In recognition of: students' academic success and research potential (\$7125 + \$2000 FRQNT supplement)	NSERC 2018
<b>Undergraduate Research Award</b> In recognition of: students' academic success and research potential (\$5625)	Concordia University 2017
<b>Arts and Science Scholar</b> In recognition of: students with a GPA in the top 1% of their department	Concordia University 2016-2018
<b>Dr. Alex Vincent Scholarship in Psychology</b> 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 understanding and promoting access to vaccine resources among Canadians.
- Provided expertise on statistics and research-method across departments, including tutorials on machine learning techniques (XGBoost) and data simulation techniques.

Impact Canada  
Impact and Innovation  
Unit, Government 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)

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

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All authors listed with "†" contributed equally to a paper in a first-author or supervisory capacity.

## Accepted

**Devine, S.**, James Goulding, John Harvey, Anya Skatova<sup>†</sup> & A. Ross Otto<sup>†</sup>. (in press). Decoy Effects in the Wild: Evidence for (and Constraints on) Attraction Effects in Real-World Consumer Choices. *npj Science of Learning*

## In Revision

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

Bogdanov, M.<sup>†</sup>, **Devine, S.**<sup>†</sup>, Fu, Z., Wang, E., & Otto, A.R. (under review). Throwing good effort after bad: Evidence for a sunk-cost effect in cognitive effort-based decision-making. *Psychological Science*

## Under Review

**Devine, S.**<sup>†</sup>, Bogdanov, M.<sup>†</sup>, Bustamante, L.A., Fu, Z., Sharp, M., & Otto, A.R. (under review). No Evidence for a Generalized Construct of Cognitive Effort Avoidance. *Nature Human Behaviour*.

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*.

## 2025

- Bogdanov, M., Bustamante, L.M., **Devine, S.**, Sheldon, S., Otto, A.R. (2025). 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*. <https://doi.org/10.1523/JNEUROSCI.0647-24.2024>
- Devine, S.**, Dong, D., Sellier, M., Roy, M., & Otto, A.R. (2025). Increased Attention Towards Progress Information Near a Goal State. *Psychonomic, Bulletin, & Review*. <https://doi.org/10.3758/s13423-024-02636-82024>

## 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

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## Guest Lectures

### Decision-Making and Its Applications

For PSYC 213 (Cognition) at McGill University

Apr 2025

<b>Decision-Making under Uncertainty</b> For PSYC 213 (Cognition) at McGill University	Mar 2024
<b>Topics in Logistic Multilevel Modeling</b> For PSYC 541/746 (Multilevel Modeling) at McGill University	Mar 2022
<i>Teaching Assistantships</i>	
<b>Statistics Help Desk</b> McGill University	2023
<b>Introduction to Statistics</b> McGill University and Concordia University	2021-2022
<b>Statistics for Experimental Design</b> McGill University	2021
<i>Organized Workshops</i>	
<b>Introduction to Hierarchical Drift Diffusion Modeling</b> Rabound University	Feb 2024
<b>Introduction to Reinforcement Learning</b> Rabound University	Feb 2024
<b>Bayesian Statistics for A/B Tests</b> IntactLab	Jan 2024
<b>Introduction to Bayesian Statistics</b> IntactLab	June 2023
<b>Introduction to Data Science [Series]</b> McGill University	Nov-Dec 2022
<b>Introduction to Bayesian Statistics</b> Concordia University	March 2022
<b>Maximum Likelihood Estimation in R</b> Concordia and McGill Universities   <a href="https://github.com/seandamiandevine/MLEWorkshop">https://github.com/seandamiandevine/MLEWorkshop</a>	October 2022
<b>Multilevel Modeling: Basic and Advanced Topics</b> Concordia and McGill Universities   <a href="https://github.com/seandamiandevine/MLMTutorial_2021">https://github.com/seandamiandevine/MLMTutorial_2021</a>	June-July 2021
<b>Python for Psychologists</b> Concordia University	April 2020

## Presentations

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### *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.

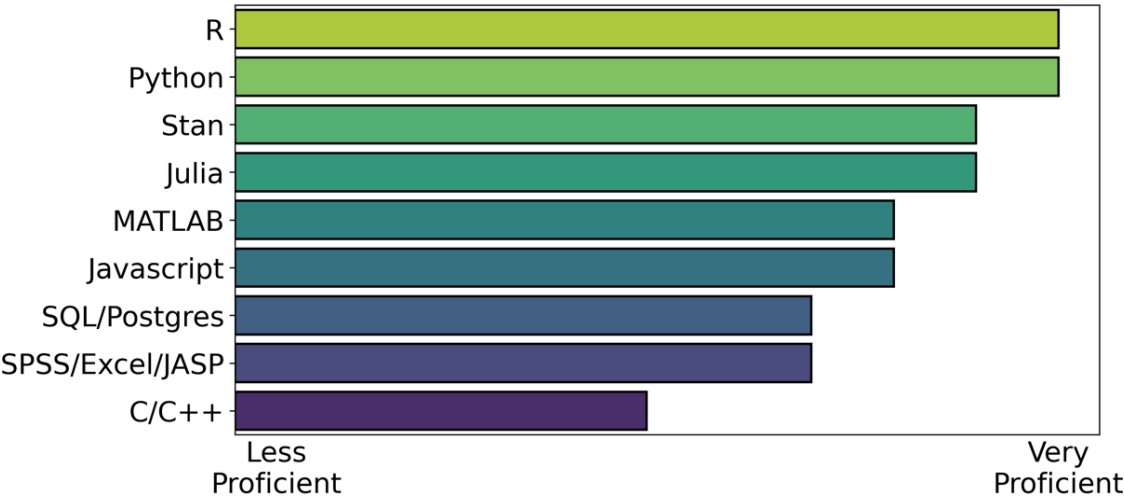
**Sean Devine**, A. Ross Otto, Aaron M. Bornstein, & Kenway Louie. Context-dependent choice and evaluation in real-world consumer behavior. Talk given at *Math Psych 2021*, online. July 2021.

**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

<b>Journal of Trial and Error</b>	2019-2024
Editor of Psychology	
<ul style="list-style-type: none"> <li>- Editor for an international journal that aims to close the gap between what is research and what is published by highlighting important scientific failures</li> <li>- Write and contribute to editorials on the role of failure in psychological science</li> </ul>	

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**

Neuromatch Academy

2021