

**Samuel David McDougle** ■ samuel.mcdougle@yale.edu ■ Phone: (646) 369-0651  
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## **Academic Appointments**

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Assistant Professor Department of Psychology, <b>Yale University</b>	2020-
Program Faculty: Interdepartmental Neuroscience Program, <b>Yale University</b>	2020-
Cognitive Science Program, <b>Yale University</b>	2020-
Postdoctoral Fellow Advisers: Anne G.E. Collins, Richard B. Ivry Helen Wills Neuroscience Institute, <b>University of California, Berkeley</b>	2018-2020

## **Education**

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Ph.D., Psychology & Neuroscience. <b>Princeton University</b> Adviser: Jordan A. Taylor	2013-2018
B.A., Neuroscience & Behavior. <b>Vassar College</b>	2005-2009

## **Research Interests**

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The computational principles and neural substrates of learning; cognitive contributions to reinforcement and motor skill learning; the interaction between controlled and automatic processes in decision-making and learning; the representation and neural correlates of motor memories

## **Grants, Awards, & Honors**

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Ruth L. Kirschstein National Research Service Award, Individual Postdoctoral Fellowship (NRSA F32), <b>National Institute of Mental Health</b>	2019-2020
Young Investigator Scholarship Award, <b>Neural Control of Movement</b>	2019
Graduate Research Fellowship (GRFP), <b>National Science Foundation</b>	2015-2018
Centennial Scholar Fellowship, <b>Princeton University</b>	2013-2017
Appointed Chair, <b>Gordon Research Seminar: Cerebellum</b>	2017
Young Researcher Award, <b>Karniel Computational Motor Control Workshop</b>	2017

General Honors, **Vassar College** 2009  
Inducted Member, **Psi Chi International Honor Society in Psychology** 2008

## **Research Positions**

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Visiting Scholar 2016  
Adviser: Richard B. Ivry, **University of California, Berkeley**

Research Technician 2009-2011  
Adviser: Javier F. Medina, **University of Pennsylvania**

## **Preprints**

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Guy Avraham, Jordan A. Taylor, Richard B. Ivry, & **Samuel D. McDougle** (2020)  
An associative learning account of sensorimotor adaptation  
*bioRxiv*, DOI: 10.1101/297143

Milena Rmus, **Samuel D. McDougle**, & Anne G.E. Collins  
The role of executive function in shaping reinforcement learning  
*PsyArXiv*, DOI: 10.31234/osf.io/9cvw3

**Samuel D. McDougle**, Jonathan Tsay, Jordan A. Taylor, & Richard B. Ivry  
Cerebellar Degeneration Selectively Disrupts Continuous Mental Operations in Visual Cognition  
*bioRxiv*, DOI: 10.1101/032409

James W. Antony, Thomas H. Hartshorne, Ken Pomeroy, Todd M. Gureckis, Uri Hasson, **Samuel D. McDougle**, & Kenneth A. Norman  
Behavioral, physiological, and neural signatures of surprise during naturalistic sports viewing  
*bioRxiv*, DOI: 10.1101/008714

Lisa Langsdorf, Jana Maresch, Mathias Hegele, **Samuel D. McDougle\***, & Raphael Schween\*  
Prolonged Reaction Times Eliminate Residual Errors in Visuomotor Adaptation  
*bioRxiv*, DOI: 10.1101/888941 \*equal contribution

Faisal Mushtaq, **Samuel D. McDougle**, Matt P. Craddock, Darius E. Parvin, Jack Brookes, Alexandre Schaefer, Mark Mon-Williams, Jordan A. Taylor, & Richard B. Ivry  
Distinct Processing of Selection and Execution Errors in Neural Signatures of Outcome Monitoring  
*bioRxiv*, DOI: 10.1101/853317

## **Publications**

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**Samuel D. McDougle** & Anne G.E. Collins  
Modeling the Influence of Working Memory, Reinforcement, and Action Uncertainty on Reaction Time and Choice during Instrumental Learning  
*Psychonomic Bulletin & Review*, [In Press]

- Raphael Schween, **Samuel D. McDougle**, Mathias Hegele, & Jordan Taylor (2019)  
Assessing Explicit Strategies in Force Field Adaptation  
*Journal of Neurophysiology*, 123: 1552-1565
- Samuel D. McDougle**, Peter A. Butcher, Darius Parvin, Faisal Mushtaq, Yael Niv, Richard B. Ivry, & Jordan A. Taylor (2019)  
Neural Signatures of Prediction Errors in a Decision-Making Task are Modulated by Action Execution Failures  
*Current Biology*, 29: 1606-1613
- Samuel D. McDougle** & Jordan A. Taylor (2019)  
Dissociable Cognitive Strategies for Sensorimotor Learning  
*Nature Communications*, 10(1), 40
- Jordan A. Taylor & **Samuel D. McDougle** (2019)  
Visuomotor Adaptation Tasks as a Window into the Interplay Between Explicit and Implicit Cognitive Processes  
*The Cognitive Neurosciences*, 6th edition (ed. Michael S. Gazzaniga) [In Press]
- Darius E. Parvin, **Samuel D. McDougle**, Jordan A. Taylor, & Richard B. Ivry (2018)  
Credit Assignment in a Motor Decision Making Task is Influenced by Agency and not Sensorimotor Prediction Errors  
*Journal of Neuroscience*, 38(19): 4521-4530
- Samuel D. McDougle**, Krista M. Bond, & Jordan A. Taylor (2017)  
Implications of Plan-based Generalization in Sensorimotor Adaptation  
*The Journal of Neurophysiology*, 118(1): 383-393
- Samuel D. McDougle**, Matthew J. Boggess, Matthew J. Crossley, Darius Parvin, Richard B. Ivry, & Jordan A. Taylor (2016)  
Credit Assignment in Movement-Dependent Reinforcement Learning  
*Proceedings of the National Academy of Sciences*, 113(24): 6797-6802
- Samuel D. McDougle**, Richard B. Ivry, & Jordan A. Taylor (2016)  
Taking Aim at the Cognitive Side of Learning in Sensorimotor Adaptation Tasks  
*Trends in Cognitive Sciences*, 20(7): 535-544
- Samuel D. McDougle** & Jordan A. Taylor (2016)  
Mental Rotation as a Behavioral and Neural Model of Explicit Aiming During Visuomotor Learning  
*Motor Learning & Motor Control* 2016
- Samuel D. McDougle**, Krista M. Bond, & Jordan A. Taylor (2015)  
Explicit and Implicit Processes Constitute the Fast and Slow Processes of Sensorimotor Learning  
*Journal of Neuroscience*, 35(26): 9568-9579
- Selmaan N. Chettih, **Samuel D. McDougle**, Luis I. Ruffolo, & Javier F. Medina (2011)  
Adaptive Timing of Motor Output in the Mouse: The Role of Movement Oscillations in Eyelid Conditioning  
*Frontiers in Integrative Neuroscience*, 5(72)

## **Invited Talks** (*selected*)

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**Samuel D. McDougle** (2019)  
Cerebellar Contributions to Visuomotor Cognition  
*Neural Control of Movement 2019, Toyama, Japan*

**Samuel D. McDougle** (2018)  
The Steep Part of the Curve: Cognitive Representations in Human Learning  
*Yale Psychology, New Haven, CT*

**Samuel D. McDougle** (2018)  
Dynamics of Working Memory Reinforcement Learning Interactions  
*Stanford Psychology Cognition and Neuroscience Seminar Series 2018, Palo Alto, CA*

**Samuel D. McDougle** (2018)  
Parametric and Discrete Representations in Motor Learning  
*Berkeley Neuroscience Retreat 2018, Richmond, CA*

**Samuel D. McDougle** (2018)  
Dissociable Roles for Working Memory in Sensorimotor Learning  
*Berkeley Cognition and Computation Colloquium 2018, Berkeley, CA*

**Samuel D. McDougle** (2017)  
Analog Computations Drive Strategic Re-aiming of an Intended Movement  
*Karniel Computational Motor Control Workshop 2017, Beer-Sheva, Israel*

**Samuel D. McDougle** (2016)  
Mental Rotation as a Behavioral and Neural Model of Explicit Aiming during Visuomotor Learning  
*Motor Learning and Motor Control 2016, San Diego, CA*

**Samuel D. McDougle** (2015)  
Examining the Various Processes Driving Sensorimotor Learning  
*Gordon Research Conference, Cerebellum: Circuit Physiology, Computation and Disease 2015, Lewiston, ME*

## **Conference Presentations** (*selected*)

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Guy Avraham, Jordan A. Taylor, Richard B. Ivry, & **Samuel D. McDougle** (2019)  
Is Visuomotor Adaptation Classical Conditioning?  
*Neural Control of Movement 2019, Toyama, Japan*

**Samuel D. McDougle**, Sonia Bishop, & Anne G.E. Collins (2019)  
Behavioral and Neural Signatures of Reinforcement Learning with Arbitrary Pseudo-rewards  
*Society for Neuroscience 2019, Chicago, IL*

William Ryan, **Samuel D. McDougle**, & Anne G.E. Collins (2019)  
Working Memory Contributions to Probabilistic Reinforcement Learning  
*RLDM, Montreal, Canada*

James W. Antony, **Samuel D. McDougale**, Tom Harthshorne, Todd Gureckis, Uri Hasson, & Kenneth A. Norman (2019)

March Madness: Behavioral, Physiological, and Neural Effects of Continuously Updated Surprise and Suspense

*Society for Neuroscience 2019, Chicago, IL*

**Samuel D. McDougale** & Anne G.E. Collins (2019)

Uncertainty in Choice Policy Explains Reaction Time: Toward a Unified Account of Set Size, Repetition, Delay, and Learning Effects on Choice Reaction Time

*Cognitive Neuroscience Society 2019, San Francisco, CA*

**Samuel D. McDougale**, Peter A. Butcher, Darius Parvin, Faisal Mushtaq, Yael Niv, Richard B. Ivry, & Jordan A. Taylor (2018)

Neural Signatures of Reward Prediction Errors in a Decision-Making Task are Modulated by Action Execution Failures

*Society for Neuroscience 2018, San Diego, CA*

**Samuel D. McDougale** & Jordan A. Taylor (2018)

Parametric Versus Discrete Working Memory Representations in Sensorimotor Learning

*Neural Control of Movement 2018, Santa Fe, NM*

**Samuel D. McDougale**, Richard B. Ivry, & Jordan A. Taylor (2017)

Dissociable Effects of Cerebellar Degeneration on Continuous versus Discrete Working Memory Transformations

*Gordon Research Conference: Cerebellum 2017, Lewiston, ME*

**Samuel D. McDougale** & Jordan A. Taylor (2017)

Leveraging the Motor System to Reveal Intermediate Cognitive States

*Society for Neuroscience 2017, Washington D.C.*

**Samuel D. McDougale** & Jordan A. Taylor (2017)

Between Zero and One: Evidence for an Analog Computation in the Re-planning of Movements

*Neural Control of Movement 2017, Dublin, Ireland*

**Samuel D. McDougale**, Nicholas B. Turk-Browne, & Jordan A. Taylor (2016)

Recalibration, Heuristics, and Learning *de novo*: On the Multiple Processes of Sensorimotor Learning and the Role of the Medial Temporal Lobe

*Society for Neuroscience 2016, San Diego, CA*

**Samuel D. McDougale**, Krista M. Bond, & Jordan A. Taylor (2016)

The Consequences of Aim-Based Generalization on Visuomotor Adaptation

*Neural Control of Movement 2016, Montego Bay, Jamaica*

**Samuel D. McDougale**, Matthew J. Crossley, Matthew B. Boggess, Richard B. Ivry, & Jordan A. Taylor (2015)

Credit Assignment in Movement-Dependent Reinforcement Learning

*Learning & Memory 2015, Austin, TX*

**Samuel D. McDougle**, Krista M. Bond, & Jordan A. Taylor (2015)  
The Role of Reward, Punishment, and Movement Direction on Implicit Sensorimotor Learning\*

*Progress in Motor Control 2015, Budapest, Hungary*

\*(Received "Best Poster" award)

**Samuel D. McDougle**, Krista M. Bond, & Jordan A. Taylor (2015)  
Explicit and Implicit Processes Underlie Fast and Slow Processes of Motor Learning  
*Neural Control of Movement 2015, Charleston, SC*

Peter A. Butcher, Richard B. Ivry, **Samuel D. McDougle**, Sheng-Han Kuo, David Rydz, John W. Krakauer, & Jordan A. Taylor (2015)

Cerebellar Degeneration Disrupts Aiming Strategies and Motor Adaptation in a Sensorimotor Learning Task

*Gordon Research Conference, Cerebellum: Circuit Physiology, Computation and Disease 2015, Lewiston, ME*

**Samuel D. McDougle**, Richard B. Ivry, & Jordan A. Taylor (2014)

Sensory Prediction Errors Affect Reinforcement Learning

*Society for Neuroscience 2014, Washington D.C.*

Charlotte Arlt, Farzaneh Najafi, **Samuel D. McDougle**, Samuel S.-H. Wang, Ilker Ozden, & Javier F. Medina (2010)

Eyeblink Conditioning and *In Vivo* Calcium Imaging in Mice Walking on a Floating-Ball Apparatus

*Society for Neuroscience 2010, San Diego, CA*

## **Teaching**

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Primary Instructor: *Human Skill Learning* (Yale University)

Teaching Assistant: *Cognitive Psychology* (Princeton University)

Lead Lecturer: *Introduction to Psychology* (Princeton Prison Teaching Initiative)

Private Tutor: *AP Biology and Math* (Bespoke Education, New York City)

## **Mentoring**

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Hanna Hillman (2020-), graduate student (Yale)

Juliana Trach (2020-), graduate student (Yale)

Alexander Forrence (2020-), research assistant (Yale)

Eddie Yu (2020-), undergraduate (Yale)

Eliana Shaulson (2019), undergraduate (Berkeley)

Ham Huang (2018-2019), undergraduate (Berkeley)

Helen Lu (2018-2019), undergraduate (Berkeley)

Seo Yoon Oh (2018), undergraduate (Berkeley)

Mitashee Das (2017), undergraduate (Princeton)

André Belarmino (2015), undergraduate (Princeton; now medical student at Weill Cornell)

Krista Bond (2014-2017), research assistant (Princeton; now PhD student at Carnegie Mellon)

## **Outreach**

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Member, **Committee for Racial Equity & Justice** (Yale) 2020-  
Instructor & Group Leader, **Princeton Prison Teaching Initiative** (Princeton) 2014-2016

## **Ad Hoc Reviewing**

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*Current Opinion in Behavioral Sciences*  
*eLife*  
*Experimental Brain Research*  
*Journal of Cognitive Neuroscience*  
*Journal of Mathematical Psychology*  
*Journal of Neurophysiology*  
*Journal of Neuroscience*  
*Journal of Experimental Child Psychology*  
*Nature Communications*  
*NeuroImage*  
*PLoS Computational Biology*  
*Psychonomic Bulletin and Review*  
*Quarterly Journal of Experimental Psychology*  
*Scientific Reports*

## **Editing**

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*eLife* (Guest Reviewing Editor)

## **Other Activities**

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*Editorial Consultant:* Worked for Samsung and Razorfish LLC developing a tech and culture mobile app (2012)  
*Science Writer/Contributor:* Wrote pieces for media outlets including *The Atlantic*, *Motherboard*, and *The World Science Festival* (2011-2014)  
*Musician/Music Educator:* Former member (fiddle/guitar) of musical groups "The Powder Kegs" and "Tumbling Bones;" European and US touring at folk festivals and venues, including an appearance on American Public Media's *A Prairie Home Companion* (2007)