

Joseph T. McGuire

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Employment

Boston University, 2015–present
Assistant Professor, Department of Psychological & Brain Sciences

University of Pennsylvania, 2010–2015
Postdoctoral Fellow, Department of Psychology
Advisor: Joseph W. Kable

Education

Ph.D., Psychology, January 2011
Princeton University, Princeton, NJ
Advisor: Matthew M. Botvinick

B.A., Cognitive Science, May 2003
Yale University, New Haven, CT
Advisor: Marcia K. Johnson

Grants

NIH R21-MH124095, *Modeling dimensions of individual variation in adaptive foraging decisions*. Role: PI (PIs: Fulford, McGuire). 2021–2023.

NIH R01-MH100095, *Reward learning in late-life suicidal behavior*. Role: Co-I (PI: Dombrovski). 2020–2025.

NIH National Research Service Award, F32-EY029134, *Eye movements and the dynamics of adaptive learning*. Role: Sponsor (PI: Bakst). 2019–2022.

NSF BCS-1755757, *Cortical representations for value-based decision making*. Role: PI. 2018–2021.

NSF SBE Postdoctoral Research Fellowship, SMA-1809071, *Eye movements and the dynamics of adaptive learning*. Role: Sponsor (PI: Bakst). 2018–2019.

NIH National Research Service Award, F32-DA030870, *Temporal dynamics and neural mechanisms of preference reversal*. Role: PI. 2011–2014.

Preprints

Toro-Serey, C., Kane, G.A., & McGuire, J.T. (2021). Apparent preferences for cognitive effort fade when multiple forms of effort and delay are interleaved in a foraging environment. *PsyArXiv*. <https://doi.org/10.31234/osf.io/5ygywh>

Peer-reviewed publications

Morin, T.M., Chang, A.E., Ma, W., McGuire, J.T., & Stern, C.E. (in press). Dynamic network analysis demonstrates the formation of stable functional networks during rule learning. *Cerebral Cortex*.

Bakst, L., & McGuire, J.T. (2021). Eye movements reflect adaptive predictions and predictive precision. *Journal of Experimental Psychology: General*, *150*, 915–929.

Botvinik-Nezer, R., Holzmeister, F., Camerer, C., Dreber, A., Huber, J., Johannesson, M., ... & Schonberg, T. (2020). Variability in the analysis of a single neuroimaging dataset by many teams. *Nature*, *582*, 84–88.

Kao, C.H., Khambhati, A.N., Bassett, D.S., Nassar, M.R., McGuire, J.T., Gold, J.I., & Kable, J.W. (2020). Functional brain network reconfiguration during learning in a dynamic environment. *Nature Communications*, *11*, 1682.

Toro-Serey, C., Tobyne, S.M., & McGuire, J.T. (2020). Spectral partitioning identifies individual heterogeneity in the functional network topography of ventral and anterior medial prefrontal cortex. *NeuroImage*, *205*, 116305.

Babcock, S.W., Howard, M.W., & McGuire, J.T. (2019). Time-conjunctive representations of future events. *Memory & Cognition*, *48*, 672–682.

Nassar, M.R., McGuire, J.T., Ritz, H., & Kable, J.W. (2019). Dissociable forms of uncertainty-driven representational change across the human brain. *Journal of Neuroscience*, *39*, 1688–1698.

Lempert, K.M., McGuire, J.T., Hazeltine, D.B., Phelps, E.A., & Kable, J.W. (2018). The effects of acute stress on the calibration of persistence. *Neurobiology of Stress*, *8*, 1–9.

Krastev, S., McGuire, J.T., McNeney, D., Kable, J.W., Stolle, D., Gidengil, E., Fellows, L.K. (2016). Do political and economic choices rely on common neural substrates? A systematic review of the emerging neuropolitics literature. *Frontiers in Psychology*, *7*, 264.

McGuire, J.T. & Kable, J.W. (2015). Medial prefrontal cortical activity reflects dynamic re-evaluation during voluntary persistence. *Nature Neuroscience*, *18*, 760–766.

McGuire, J.T.*, Nassar, M.R.*, Gold, J.I., & Kable, J.W. (2014). Functionally dissociable influences on learning rate in a dynamic environment. *Neuron*, *84*, 870–881.

Kool, W., McGuire, J.T., Wang, G.J., & Botvinick, M.M. (2013). Neural and behavioral evidence for an intrinsic cost of self-control. *PLoS ONE*, *8*, e72626.

Bartra, O.*, McGuire, J.T.*, & Kable, J.W.* (2013). The valuation system: A coordinate-based meta-analysis of BOLD fMRI experiments examining neural correlates of subjective value. *NeuroImage*, *76*, 412–427.

McGuire, J.T. & Kable, J.W. (2013). Rational temporal predictions can underlie apparent failures to delay gratification. *Psychological Review*, *120*, 395–410.

McGuire, J.T. & Kable, J.W. (2012). Decision makers calibrate behavioral persistence on the basis of time-interval experience. *Cognition*, *124*, 216–226.

Ribas-Fernandes, J.J.F., Solway, A., Diuk, C., McGuire, J.T., Barto, A.G., Niv, Y., & Botvinick, M.M. (2011). A neural signature of hierarchical reinforcement learning. *Neuron*, *71*, 370–379.

Kool, W.*, McGuire, J.T.*, Rosen, Z.B., & Botvinick, M.M. (2010). Decision making and the avoidance of cognitive demand. *Journal of Experimental Psychology: General*, *139*, 665–682.

McGuire, J.T. & Botvinick, M.M. (2010). Prefrontal cortex, cognitive control, and the registration of decision costs. *Proceedings of the National Academy of Sciences, USA*, *107*, 7922-7926.

Botvinick, M.M., Huffstetler, S., & McGuire, J.T. (2009). Effort discounting in human nucleus accumbens. *Cognitive, Affective & Behavioral Neuroscience*, *9*, 16-27.

Mitchell, K.J., Raye, C.L., McGuire, J.T., Frankel, H., Greene, E.J., & Johnson, M.K. (2008). Neuroimaging evidence for agenda-dependent monitoring of different features during short-term source memory tests. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, *34*, 780-790.

Johnson, M.K., Mitchell, K.J., Raye, C.L., McGuire, J.T., & Sanislow, C.A. (2006). Mental rubbernecking to negative information depends on task context. *Psychonomic Bulletin & Review*, *13*, 614-618.

* denotes equal contribution

Chapters and commentaries

McGuire, J.T. & Kable, J.W. (2016). Deciding to curtail persistence. In K.D. Vohs and R.F. Baumeister (Eds.) *Handbook of Self-Regulation: Research, Theory, and Applications*. Guilford.

McGuire, J.T. & Kable, J.W. (2014). Go means green. *Nature Neuroscience*, *17*, 489-490. News & Views commentary.

McGuire, J.T., Cohen, J.D., & Botvinick, M.M. (2013). Mental effort. In H. Pashler (Ed.): *Encyclopedia of the Mind* (pp. 502–506). Thousand Oaks, CA: SAGE Publications.

McGuire, J.T. & Botvinick, M.M. (2010). The impact of anticipated cognitive demand on attention and behavioral choice. In B. Bruya (Ed.), *Effortless attention: A new perspective in the cognitive science of attention and action* (pp. 103–120). Cambridge, MA: MIT Press.

Conference presentations

Bakst, L., Schaefer, L., Nassar, M.R., & McGuire, J.T. (2021, September). *Theoretical models of context-appropriate adaptive learning*. Poster to be presented

at the annual meeting of the Society for Neuroeconomics, Sep. 29–Oct. 1 (meeting held virtually).

Liapis, S.S.P., Morin, T.M., McGuire, J.T., & Stern, C.E. (2021, June). *The dimensionality of representational space calibrates to abstract reasoning complexity*. Poster at the annual meeting of the Organization for Human Brain Mapping, June 21–25 (meeting held virtually).

Esfand, S.M., McGuire, J.T., & Kibbe, M.M. (2021, April). *Children calibrate their willingness to wait for rewards on the basis of time-interval experience*. Poster at the annual meeting of the Society for Research in Child Development, April 7–9 (meeting held virtually).

Liapis, S.S.P., Brown, T.I., McGuire, J.T., & Stern, C.E. (2021, January). *Medial temporal lobe subfields balance representational dimensionality during prospective planning*. Poster at the SfN Global Connectome, Jan. 11–13 (meeting held virtually).

Sussman, L., & McGuire, J.T. (2020, October). *Adaptive self-control: Environmental volatility and precommitment decisions*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 7–9 (meeting held virtually).

Toro-Serey, C., Chen, Y., Sussman, L., & McGuire, J.T. (2020, June). *Individual-specific functional architecture and activation patterns in medial prefrontal cortex*. Poster at the annual meeting of the Organization for Human Brain Mapping, June 23–July 3 (meeting held virtually).

Bakst, L., Bloem, I., McGuire, J.T., & Ling, S. (2020, June). *Dynamic spotlight model recovers the position but not the width of covert spatial attention*. Talk at the annual meeting of the Vision Sciences Society, June 19–24 (meeting held virtually).

Bakst, L., & McGuire, J.T. (2019, October). *Implicit meta-learning of noise and volatility*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 4–6, Dublin, Ireland.

Chen, Y., Li, T., Lynch, J., & McGuire, J.T. (2019, October). *Learning and individual differences in adaptive persistence*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 4–6, Dublin, Ireland.

Toro-Serey, C., & McGuire, J.T. (2019, October). *Apparent preferences for cognitive effort fade when multiple forms of effort and delay are interleaved in a foraging environment*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 4–6, Dublin, Ireland.

Toro-Serey, C., Tobyne, S.M., & McGuire, J.T. (2019, June). *Individual heterogeneity in the functional topography of the DMN in medial prefrontal cortex*. Poster at the annual meeting of the Organization for Human Brain Mapping, Jun. 9–13, Rome, Italy.

Toro-Serey, C. & McGuire, J.T. (2018, October). *Parsing medial prefrontal cortex: A joint meta-analytic and graph-theoretic approach*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 5–7, Philadelphia, PA.

- Babcock, S., Howard, M.W., & McGuire, J.T. (2018, October). *Assessing temporal relationships on an internally simulated timeline of the future*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 5–7, Philadelphia, PA.
- Dombrovski, A.Y., Hallquist, M., Szanto, K., & McGuire, J.T. (2018, October). *Voluntary temporal persistence in depression and attempted suicide*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 5–7, Philadelphia, PA.
- Bakst, L., & McGuire, J.T. (2017, October). *Eye movements as a readout of implicit spatial prediction*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 6–8, Toronto, Canada.
- Lynch, J.D. & McGuire, J.T. (2017, October). *Time-driven reassessment of anticipated reward magnitude*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 6–8, Toronto, Canada.
- Toro-Serey, C. & McGuire, J.T. (2017, October). *Effort and delay discounting in a foraging environment*. Poster at the annual meeting of the Society for Neuroeconomics, Oct. 6–8, Toronto, Canada.
- McGuire, J.T. (2017, March). *Contending with temporal uncertainty*. Talk at the annual meeting of the Eastern Psychological Association, Mar. 16–18, Boston, MA.
- McGuire, J.T., Breslow, D., Peterson, T., & Kable, J.W. (2016, November). *Representing the temporal structure of complex decision environments*. Poster at the annual meeting of the Psychonomic Society, Nov. 17–20, Boston, MA.
- Kable, J.W., Nassar, M., & McGuire, J. (2016, November). *Dissociable explanations for uncertainty driven changes in neural representation across the brain*. Poster at the annual meeting of the Society for Neuroscience, Nov. 12–16, San Diego, CA.
- Lempert, K.M., McGuire, J.T., Hazeltine, D.B., Kable, J.W., & Phelps, E.A. (2016, November). *Cortisol response to acute stress predicts more optimal persistence behavior*. Talk at the annual meeting of the Society for Neuroscience, Nov. 12–16, San Diego, CA.
- Ternes, K., Kable, J., McGuire, J., Rascovsky, K., McMillan, C., & Grossman, M. (2016, November). *Reversal learning deficits in behavioral variant frontotemporal degeneration*. Poster at the annual meeting of the Society for Neuroscience, Nov. 12–16, San Diego, CA.
- McGuire, J.T. (2016, November). *Reassessing the value of high-control strategies*. Talk at the Control Processes Meeting, Nov. 10–11, La Jolla, CA.
- McGuire, J.T. (2016, June). *Dynamically re-evaluating future prospects*. Talk at the Foundations of Utility and Risk Conference, June 27–30, Coventry, UK.
- McGuire, J.T. (2014, December). *Cortical and subcortical encoding of prospective reward value*. Talk at the annual meeting of the American College of Neuropsychopharmacology, Dec. 7–11, Phoenix, AZ.
- McGuire, J.T., Mukherjee, D., Kazinka, R., Vaidya, A.R., & Kable, J.W. (2014, September). *Altered willingness to wait for delayed rewards in the context of*

psychopathology or focal brain injury. Talk at the annual meeting of the Society for Neuroeconomics, Sep. 26–28, Miami, FL.

McGuire, J.T. & Kable, J.W. (2013, November). *Delay-of-gratification decisions emerge from rational predictions: Behavioral and neural evidence*. Talk at the annual meeting of the Society for Judgment and Decision Making, Nov. 15–18, Toronto, Canada.

McGuire, J.T. & Kable, J.W. (2013, October). *Calibrating behavioral persistence*. Poster at the Multidisciplinary Symposium on Reinforcement Learning and Decision Making, Oct. 25–27, Princeton, NJ.

Nassar, M.R., McGuire, J.T., Gold, J.I., & Kable, J.W. (2013, October). *Dissociating components of learning rate in the fMRI BOLD response*. Poster at the Multidisciplinary Symposium on Reinforcement Learning and Decision Making, Oct. 25–27, Princeton, NJ.

McGuire, J.T. & Kable, J.W. (2013, September). *A learning model of time-varying expectations while waiting for delayed rewards*. Poster at the annual meeting of the Society for Neuroeconomics, Sep. 27–29, Lausanne, Switzerland.

McGuire, J.T., Bartra, O., & Kable, J.W. (2013, June). *The valuation system: A coordinate-based meta-analysis examining BOLD correlates of subjective value*. Poster at the annual meeting of the Organization for Human Brain Mapping, Jun. 16–20, Seattle, WA.

McGuire, J.T. & Kable, J.W. (2013, May). *Rational preference reversals in real time*. Talk at the Interdisciplinary Symposium on Decision Neuroscience, Temple University, May 3–5, Philadelphia, PA.

McGuire, J.T., Nassar, M.R., Heasly, B., Gold, J.I., & Kable, J.W. (2012, November). *Dorsal anterior cingulate reflects multiple influences on learning rate in a dynamic environment*. Poster at the annual meeting of the Society for Neuroscience, Nov. 13–17, New Orleans, LA.

McGuire, J.T. & Kable, J.W. (2012, September). *Ventromedial prefrontal cortex and decisions to sustain delay of gratification*. Talk at the annual meeting of the Society for Neuroeconomics, Sep. 28–30, Key Biscayne, FL.

McGuire, J.T. & Kable, J.W. (2011, November). *Evaluative neural mechanisms and delay of gratification*. Poster at the annual meeting of the Society for Neuroscience, Nov. 12–16, Washington, DC.

Senecal, N., McGuire, J.T., & Kable, J.W. (2011, November). *Individual differences in value-responsive cortical topography*. Poster at the annual meeting of the Society for Neuroscience, Nov. 12–16, Washington, DC.

McGuire, J.T. & Kable, J.W. (2011, September). *Temporal expectations and limited willingness to wait for delayed outcomes*. Poster at the annual meeting of the Society for Neuroeconomics, Sept. 30–Oct. 2, Evanston, IL.

McGuire, J.T. & Kable, J.W. (2011, July). *Time-interval statistics adaptively modulate decision makers' willingness to wait for delayed outcomes*. Talk at the annual meeting of Cognitive Science Society, July 20–23, Boston, MA.

McGuire, J.T. & Botvinick, M.M. (2010, April). *Perceptual ambiguity drives subjective decision costs: A test of neural mediation*. Poster at the annual meeting of the Cognitive Neuroscience Society, April 17–20, 2010, Montreal, Canada.

McGuire, J.T. & Botvinick, M.M. (2009, October). *Cortical responses during interference from competing task sets*. Talk at the annual meeting of the Society for Neuroscience, October 17–21, 2009, Chicago, IL.

Fernandes, J., McGuire, J.T., Niv, Y., & Botvinick, M.M. (2009, October). *Neural correlates of hierarchical reinforcement learning: An fMRI study*. Poster at the annual meeting of the Society for Neuroscience, October 17–21, 2009, Chicago, IL.

McGuire, J.T. & Botvinick, M.M. (2009, June). *Intrinsically aversive characteristics of controlled cognition correlate with BOLD signal in left inferior frontal gyrus*. Poster at the annual meeting of the Society for Human Brain Mapping, June 18–23, 2009, San Francisco, CA.

Rosen, Z.B., McGuire, J.T., & Botvinick, M.M. (2007, May). *Is mental effort aversive? Some behavioral and psychophysiological evidence*. Poster at the annual meeting of the Cognitive Neuroscience Society, May 5–8, 2007, New York, NY.

Sanislow, C.A., Mitchell, K.J., Raye, C.L., Greene, E.J., Cunningham, W.A., McGuire, J.T., & Johnson, M.K. (2004, April). *Orbitofrontal cortex is active when a salient stimulus must be ignored during refreshing*. Poster at the annual meeting of the Cognitive Neuroscience Society, April 18–20, 2004, San Francisco, CA.

Teaching

Undergraduate and graduate courses at Boston University

CAS PS/NE528, *Human Brain Mapping*, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Spring 2020, Fall 2020, Fall 2021.

CAS PS336, *Introduction to Cognitive Psychology*, Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2019, Spring 2021.

Guest lectures at Boston University

GRS PS 704, *Contemporary Trends in Psychology*, 2016–2020.

GRS PS 831, *Neuropsychology*, 2016.

GRS NE 501, *Frontiers of Neuroscience*, 2016, 2019.

GRS NE 742, *Neural Systems: Cognition & Behavior*, 2016–2018.

University of Pennsylvania, 2011–2014

Mentor, undergraduate independent research: *Department of Psychology, Biological Basis of Behavior Program, Cognitive Science Program*.

University of Pennsylvania and Princeton University, 2006–2010

Teaching assistant or laboratory instructor: *Cognitive Neuroscience, Decision Making and Judgment, Psychology of Music, Human Memory, Introduction to Cognitive Science.*

Service

Department of Psychological & Brain Sciences

Clara Mayo award committee, 2016–present.

Merit committee, 2020.

Faculty search committee, 2018–2019.

Brain, Behavior, & Cognition graduate admissions committee, 2016–2018.

Website committee, 2017–2018.

College of Arts & Sciences

Natural Sciences Curriculum Committee, 2017–2020.

Graduate Program for Neuroscience

Tools of the Trade workshop leader, 2016–2018.

RISE Program

Mentor, 2016–2019.

Professional activities

Interdisciplinary center & program affiliations at Boston University

Graduate Program for Neuroscience

Center for Systems Neuroscience

Cognitive Neuroimaging Center

Hariri Institute for Computing

Professional affiliations

Cognitive Science Society

Organization for Human Brain Mapping

Psychonomic Society

Society for Judgment and Decision Making

Society for Neuroeconomics

Society for Neuroscience

Ad hoc manuscript reviewing

Behavioural Brain Research, Brain Research, Cell Press Community, Cerebral Cortex, Cognition, Cognitive Affective & Behavioral Neuroscience, Cognitive Science, Current Directions in Psychological Science, eLife, eNeuro, Journal of Cognitive Neuroscience, JEP General, JEP Learning Memory & Cognition, Journal of Neuroscience, Journal of Sleep Research, Management Science, Nature, Nature Communications, Neuron, NeuroImage, Neuropsychologia, Neuropsychopharmacology, PLoS Computational Biology, PLoS ONE, PNAS, Psychological Bulletin, Psychological Review, Psychological Science,

Psychonomic Bulletin & Review, Social Cognitive and Affective Neuroscience,
Trends in Cognitive Sciences

Conference abstract reviewing

Cognitive Science Society, Cosyne, Organization for Human Brain Mapping,
Reinforcement Learning and Decision Making, Society for Judgment and Decision
Making

Grant reviewing

NSF panelist (2018, 2020) and ad hoc reviewer (2018–2021)

Invited presentations

Neuropsychology and Neuroimaging Lecture Series, VA Boston, Jan. 17, 2019.
Current Work in Behavior, Genetics and Neuroscience, Yale University, Feb. 9, 2018.
Imaging Center Speaker Series, McLean Hospital, Oct. 18, 2017.
University of Chicago Booth School of Business, Jun. 1, 2017.
Psychology and Economics Working Group, Harvard University, Mar. 8, 2017.
BU Undergraduate Economics Association, Boston University, Oct. 25, 2016.
Behavioral Science Summer School, University of Warwick, June 30, 2016.
Cognition, Brain, & Behavior Seminar, Harvard University, Mar. 3, 2016.
Affective Brain Lab, Massachusetts Institute of Technology, Oct. 29, 2015.
Laboratory of Neural Computation and Cognition, Brown University, Oct. 15, 2015.
Sackler Institute, Weill Cornell Medical College, Mar. 5, 2015.
Department of Cognitive Science, UC San Diego, Feb. 23, 2015.
Department of Psychology, UC Berkeley, Feb. 2, 2015.
Department of Psychological & Brain Sciences, Boston University, Jan. 29, 2015.
Center for Neuromodulation in Depression and Stress, Department of Psychiatry,
University of Pennsylvania, Dec. 17, 2014.
Department of Psychology, University at Albany, SUNY, Dec. 3, 2014.
Brain & Cognitive Sciences Seminar, Temple University, Nov. 10, 2014.
Department of Psychiatry, University of Pittsburgh, May 14, 2014.
Department of Psychology, University of Nevada, Reno, Jan. 30, 2014.
Marketing Workshop, University of Chicago Booth School of Business, Oct. 29, 2013.
Department of Psychology, University of Texas at Austin, Jan. 7, 2013.
Cognitive & Behavioral Neuroscience Retreat, Univ. of Pennsylvania, Dec. 14, 2012.

Popular media

Michael S. Goldberg. "How decisions work." *BU Today*. Feb. 6, 2018.

Maria Konnikova. "You're so self-controlling." *The New York Times*. Nov. 16, 2013.