

# Debbie M. Yee

## *Curriculum Vitae*

December 2021

### Contact

Cognitive, Linguistic, & Psychological Sciences  
Brown University  
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### Education

- 2019- Postdoctoral Research Fellow, Brown University  
Advisors: Amitai Shenhav (Primary), Laura Stroud (Secondary)
- 2013-2019 Ph.D. in Psychological & Brain Sciences, Washington University in St. Louis  
Advisor: Todd Braver  
*Dissertation: Neural Mechanisms of Motivational Incentive Integration and Cognitive Control*
- 2013-2015 M.A. in Psychological & Brain Sciences, Washington University in St. Louis
- 2007-2011 B.S. in Brain & Cognitive Sciences, Massachusetts Institute of Technology

### Honors and Awards

- 2021- NIH Computational Psychiatry Training Fellowship (T32)
- 2019 Teaching Citation, Washington University
- 2019 Mentorship/Collaboration Award, Scientific Research Network on Decision Neuroscience and Aging
- 2017 Outstanding Teaching Assistant Award, Psychological & Brain Sciences, WashU
- 2017 Summer School in Social Neuroscience and Neuroeconomics Fellow
- 2017-2019 NIH National Research Service Award Pre-Doctoral Fellowship (F31)
- 2016 NIH Aging and Development Training Fellowship (T32)
- 2016 Kavli Summer Institute for Cognitive Neuroscience Fellow
- 2015, 2017 Reinforcement Learning & Decision-Making Student Travel Fellowship
- 2014, 2015 National Science Foundation Graduate Research Fellowship, *Honorable Mention*
- 2014-2016 NIH Cognitive, Computational & Systems Neuroscience Training Fellowship (T32)
- 2010 MIT Undergraduate Research Opportunities Program Direct Funding

## Research Grants

Brown Office of the Vice President Research Seed Award    Shenhav (PI) 6/1/2020–6/30/2022  
Dissociating Neurocomputational Mechanisms Underlying Positive and Negative Motivations for Cognitive Effort Persistence

Pilot project examining neural and computational mechanisms by which positive and negative incentives influence cognitive effort in humans.

Role: Co-PI

Direct Costs: \$49,000

NIA/NIH    Yee (PI) 6/1/2017–8/31/2018

Interactions of Motivational Incentives and Cognitive Control in Older Adult Decision-Making

Pilot project examining the role of motivation and cognitive control in mediating changes in the psychological and neural mechanisms of older adult decision-making.

Role: Subaward PI (on Samanez-Larkin R24-AG054355)

Direct Costs: \$30,000

Mallinckrodt Institute Radiology/Washington University    Braver (PI) 12/2017

Dopaminergic and Neural Mechanisms of Incentive Integration and Motivated Cognitive Control

Role: Co-wrote grant, planning/coordinating PET-MR pilot study and data collection.

Direct costs: \$22,749

## Recent Preprints / Forthcoming

\*denotes shared authorship

\*Vilgis, V., \*Yee, D.M., Silk, T., Vance, A. (2021). Multivariate Pattern Analysis (MVPA) Reveals Distinct Neural Profiles of Verbal vs. Spatial Working Memory in Boys with Attention-Deficit/Hyperactivity Disorder and Boys with Persistent Depressive Disorder. *bioRxiv*. (Invited Revision at Cognitive, Affective, Behavioral Neuroscience)

doi: <https://www.biorxiv.org/content/10.1101/2021.03.09.434662v2>

OSF directory: <https://osf.io/a5349/>

Yee, D.M., Crawford, J.L., Braver, T.S. Juicy Research: An fMRI Protocol for Scanning with Liquid Incentives in Humans. *Invited contribution for STAR Protocols*.

## Publications

1. Leng, X., Yee, D., Ritz, H., Shenhav, A. (in press). Dissociable influences of reward and punishment on adaptive cognitive control. *PLOS Computational Biology*.
2. Yee, D.M., Leng, X., Shenhav, A., Braver, T.S. (2022). Aversive Motivation and Cognitive Control. *Neuroscience and Biobehavioral Reviews*. 133 (104493).
3. Yee, D.M., Crawford, J.L., Lamichhane, B., Braver, T.S. (2021). Dorsal Anterior Cingulate Cortex Encodes the Integrated Incentive Motivational Value of Cognitive Task Performance. *Journal of Neuroscience*

OSF directory: <https://osf.io/upka4/>

4. Crawford, J., Yee, D.M., Hallenback, H.W., Naumann, A., Shapiro, K., Thompson, R.J., Braver, T.S. (2020). Dissociable effects of monetary, liquid, and social incentives and cognitive control. *Frontiers in Psychology*.  
OSF directory: <https://osf.io/pu9gs/>
5. Yee, D.M., Adams, S., Beck, A., Braver, T.S. (2019). Age-Related Differences in Motivational Integration and Cognitive Control. *Cognitive, Affective, Behavioral Neuroscience*. 19(3):692-714.  
OSF directory: <https://osf.io/4urc6/>
6. Yee, D.M., Braver, T.S. (2018). Interactions of Motivation and Cognitive Control. *Current Opinion in Behavioral Sciences*. 19:83-90.
7. Yee, D.M., Krug, M.K., Allen, A.Z., Braver, T.S. (2016). Monetary and Liquid Incentives Combine to Motivate Cognitive Task Performance. *Frontiers in Psychology*. 6:2037.  
OSF directory: <https://osf.io/ajgp3/>
8. Solway, A., Diuk, C., Cordova, N., Yee, D., Barto, A., Niv, Y., Botvinick, M.M. (2014). Optimal Behavioral Hierarchy. *PLoS Computational Biology*. 10(8)
9. Blackburne, L.K., Eddy, M., Kalra, P., Yee, D., Sinha, P., Gabrieli, J.D.E. (2014). Neural Correlates of Letter Reversal in Children and Adults. *PLoS ONE*. 9(5)

### Book Chapters

1. Yee, D.M., Braver T.S. (in press). Neurocomputational Models of Cognitive Control. To appear in R. Sun (Ed.), *The Cambridge Handbook of Computational Cognitive Sciences*. Cambridge University Press.
2. Yee, D.M., Braver, T.S. (2020). Computational Models of Cognitive Control: Past and Current Approaches. To appear in P. Series (Ed.), *Computational Psychiatry: A Primer* (pp. 83-104). MIT Press.

### Manuscripts in Prep

Yee, D.M., Shapiro, K., Braver, T.S. Motivational Incentive Integration and Cognitive Control in Adolescent Development.

Hallenbeck, HW, Yee, DM., Thompson, RJ., Decision-Making Difficulty in Major Depressive Disorder: An Integrative Review and Model Informed by Affect.

## Conference Talks/Presentations

**Yee, D.M.**, Leng, X., Prater Fahey, M., Tarlow, M., Shenhav, A. Psychiatric Symptom Dimensions are Associated with Positive and Negative Influences on Mental Effort. *Society for Affective Science*. (Online, April 15-17, 2021)

**Yee, D.M.**, Braver, T.S. Interactions Between Motivation and Cognitive Control in Older Adult Decision-Making. *Scientific Research Network on Decision Neuroscience and Aging Conference*. (Honolulu, HI, March 8-9, 2020).

**Yee, D.M.**, Braver, T.S. Neural Mechanisms of Motivational Incentive Integration and Cognitive Control. *Cognitive Neuroscience Society Data Blitz*. (San Francisco, CA, Mar 22-26, 2019).

**Yee, D.M.**, Braver, T.S. Neural mechanisms of motivational integration and cognitive control: Implications for healthy aging. *48<sup>th</sup> Annual Meeting for the Society for Neuroscience*. (San Diego, CA, November 3-7, 2018)

## Conference Papers

Leng, X., Ritz, H., **Yee, D.M.**, Shenhav, A. Dissociable influences of reward and punishment on adaptive cognitive control. *Cognitive Science Society*. (Toronto, Canada, July 2020)

## Conference Posters

**Yee, D.M.**, Tarlow, M., Leng, X., Prater Fahey, M., Shenhav, A. Investigating Dissociable Neural Mechanisms of Reward and Penalty Motivation in Mental Effort Allocation. *Symposium for Biology of Decision-Making*. (Online, May 9-12, 2021).

Leng, X., Ritz, H., **Yee, D.M.**, Shenhav, A. Dissociable influences of reward and punishment on adaptive cognitive control. *Cognitive Science Society*. (Toronto, Canada, July 2020)

Crawford, J.L., **Yee, D.M.**, Lamichhane, B., Di Rosa, E., Braver, T.S. Neural Mechanisms of Motivated Cognitive Control in Older Adults. *Organization for Human Brain Mapping*. (Montreal, Canada, June 26-30, 2020).

Leng, X., **Yee, D.M.**, Shenhav, A. Disentangling the influence of positive and negative incentives on cognitive effort. *Cognitive Neuroscience Society*. (Boston, MA, March 14-17, 2020)

Leng, X., **Yee, D.M.**, Shenhav, A. The influence of positive and negative incentives on cognitive effort persistence. *7<sup>th</sup> International Symposium on Motivation and Cognitive Control*. (Berlin, Germany, Sept 16-18, 2019).

**Yee, D.M.**, Dean Wolf, C.K., Shenhav, A., Braver, T.S. A Hierarchical Drift Diffusion Model of Motivation-Cognitive Control Interactions. *Reinforcement Learning and Decision Making* (Montreal, CA, July 2019).

**Yee D.M.**, Braver, T.S. Neural Mechanisms of Motivational Incentive Integration and Cognitive Control. *7<sup>th</sup> International Symposium on Motivation and Cognitive Control*. (Berlin, Germany, Sept 16-18, 2019).

**Yee, D.M.**, Braver, T.S. Neural Mechanisms of Motivational Incentive Integration and Cognitive Control. *Cognitive Neuroscience Society Annual Meeting*. (San Francisco, CA, Mar 22-26, 2019).

Nauman, A.N., **Yee, D.M.**, Hallenback, H.W., Thompson, R.J., Braver, T.S. Motivational Integration and Cognitive Control: Dissociable Effects of Monetary, Liquid, and Social Incentives. *Society for Affective Science*. (Boston, MA, March 21-23, 2019).

Hallenback, H.W., **Yee, D.M.**, Nauman, A.N., Thompson, R.J., Braver, T.S. Depression and Motivation: Parsing Monetary, Social, and Liquid Incentives. *Society for Affective Science*. (Boston, MA, March 21-23, 2019).

Crawford, J.L., **Yee, D.M.**, Braver, T.S. Age-related changes in motivational integration and socio-emotional incentives. Dallas Aging and Cognition Conference. (Dallas, TX, Jan 27-28, 2019)

**Yee, D.M.**, Braver, T.S. Neural Mechanisms of Motivational Incentive Integration and Cognitive Control. *Society for Neuroeconomics Annual Meeting*. (Philadelphia, PA, Oct 5-7, 2018)

**Yee, D.M.**, Braver, T.S. Neural Mechanisms of Motivational Incentive Integration and Cognitive Control. *Eighth International Symposium on Biology of Decision Making*. (Paris, France, May 24-26, 2018)

**Yee, D.M.**, Braver, T.S. Reward and Punishment Effects on the Integration of Monetary and Liquid Incentives on Cognitive Control: Effects of Age. *Cognitive Aging Conference*. (Atlanta, GA, May 3-6, 2018)

**Yee, D.M.**, Dean Wolf, C., Braver, T.S. Reinforcement and Punishment Effects on Incentive Integration and Motivated Cognitive Control. *25<sup>th</sup> Annual Cognitive Neuroscience Society Meeting*. (Boston, MA, March 24-27, 2018)

**Yee, D.M.**, Braver, T.S. Reinforcement and Valence Effects on Incentive Integration and Motivated Cognitive Control. *Multi-Disciplinary Conference on Reinforcement Learning and Decision Making*. (Ann Arbor, MI, June 11-14, 2017)

**Yee, D.M.**, Adams, S., Weiss, J., Braver, T.S. Motivation-Cognition Interactions in Older and Younger Adults. *Association for Psychological Science*. (Boston, MA, May 25-27, 2017)

**Yee, D.M.**, Adams, S., Weiss, J., Braver, T.S. Motivation-Cognition Interactions in Older and Younger Adults. *The Society for Affective Science*. (Boston, MA, April 27, 2017)

**Yee, D.**, Braver, T. Monetary and Liquid Incentives Combine to Modulate Cognitive Task Performance. *56<sup>th</sup> Annual Meeting of The Psychonomic Society*. (Chicago, IL, November 21, 2015)

**Yee, D.**, Braver, T. Monetary and Liquid Incentives Combine to Modulate Cognitive Task Performance. *Society for Neuroeconomics Annual Meeting*. (Miami, FL, September 25, 2015)

Oksanen, K., **Yee, D.**, Koller, J., Black, K., Braver, T. Applying simultaneous PET/MR to Explore Relationships Between Task-Evoked BOLD Signals and Dopamine. *Organization of the Human Brain Mapping Meeting*. (Honolulu, HI, June 15, 2015).

Botvinick, M. M., Diuk, C., **Yee, D.**, Cheong, J., Weinstein, A., Niv, Y. & Barto. A. A general form for state-space representations in frontal and temporal cortex. *44<sup>th</sup> Annual Meeting of the Society for Neuroscience*. (Washington D.C., November 18, 2014).

Solway, A., Diuk, C., Cordova, N., **Yee, D.**, Barto, A., Niv, Y., Botvinick, M. Optimal Task Decomposition. *Multi-Disciplinary Conference on Reinforcement Learning and Decision Making Meeting*. (Princeton, NJ, October 25, 2013).

Diuk, C., **Yee, D.**, Ribas-Fernandes, J, Cordova, N., Schapiro A., Niv, Y., Botvinick., M. Divide and Conquer: Task Decomposition in Humans. *42<sup>nd</sup> Annual Meeting of the Society for Neuroscience*. (New Orleans, LA, October 16, 2012).

Blackburne, L.K., Eddy, M., Kalra, P., **Yee, D.**, Del Tufo, S., Sinha, P., Gabrieli, J.D.E. Neural Correlates of Letter Reversal in Children and Adults. *19<sup>th</sup> Annual Cognitive Neuroscience Society Meeting*. (Chicago, IL, April 2, 2012).

Blackburne, L.K., Palti, D., Perea, M., Kim, J., Huang, C., **Yee, D.**, Gabrieli, J.D.E. Attention and Reading Skill Modulate Selectivity of the Left Occipitotemporal Region. *Organization of Human Brain Mapping Meeting*. (Barcelona, Spain, June 6, 2010).

Blackburne, L.K., Palta, D., Perea, M., Kim, J., Huang, C., **Yee, D.**, Gabrieli, J.D.E. Functional Connectivity of Left Fusiform to Phonological Processing Regions Increases with Reading Skill. *39<sup>th</sup> Annual Meeting of the Society for Neuroscience*. (Chicago, IL, October 20, 2009).

## Invited Articles

Weston, S.J., **Yee, D.** Why You Should Become a User: A Brief Introduction to R. *The Observer* (29)3, Association for Psychological Science. (March 2017).

## Open Datasets

Etzel, J., **Yee, D.**, Lamichhane, B., Jeffers, M., Di Rosa, E., Crawford, J., An, H., Braver, T. (2018). Multiband Acquisition Dataset.  
website: <https://openneuro.org/datasets/ds001399/versions/00002>

## Invited Talks

- 2022 Neuroscience Research Group, University of Denver (Denver, CO)
- 2021 Cognitive Colloquium, Purdue University (West Lafayette, IN)
- 2021 Cognitive / Cognitive Neuroscience Seminar, University of Michigan (Ann Arbor, MI)
- 2021 Otto Lab Meeting, McGill University (Toronto, CN)
- 2020 Neural Mechanisms of Motivation and Cognition Workshop (Bern, Switzerland; Postponed/cancelled due to COVID-19)
- 2020 Cognitive and Affective Neuroscience Lab Meeting (PI: Elizabeth Kensinger), Boston College (Boston, MA)
- 2019 Social and Cognitive Seminar, Brown University (Providence, RI)
- 2018 Cognitive, Computational, and Systems Neuroscience Retreat (St. Louis, MO)
- 2017 Shenhav Lab Meeting, Brown University (Providence, RI)
- 2017 Washington University Neuroscience Retreat (St. Louis, MO)

## Teaching Experience and Certifications

- 2019 Completed Teaching Citation at Washington University
- 2014-2017 Co-Instructor, Annual Introductory R & Advanced R workshops  
*Developed programming for and co-taught two-day workshop to introduce basics of R-Statistical programming language to students, postdoctoral fellows, and faculty in the Psychological and Brain Sciences Department. Additionally, presented monthly 1-hour workshops to Psychology department on relevant packages, including R-markdown, psych, ggplot2, dplyr, tidyr, and yaRrr. Workshop materials can be found here: <https://debyeeneuro.com/r-tutorials/>*
- 2016 Fall Teaching Assistant, Psych 5066: Graduate Quantitative Methods I  
Guest Lecturer, Graduate Quantitative Methods I
- 2017 Spring Teaching Assistant, Psych 5067: Graduate Quantitative Methods II  
Guest Lecturer, Graduate Quantitative Methods II  
*NOTE: Quantitative Methods I and II are the requisite graduate level statistics courses for first year Psychological & Brain Sciences PhD students*
- 2018 Fall Guest Lecturer, Cognitive Neuroscience  
*Introductory survey course on cognitive neuroscience for undergraduate students*  
Title: “Executive functions (& its interactions with reward)”
- 2019 Spring Guest Lecturer, Advanced Cognitive Neuroscience  
*Upper-level seminar course on cognitive neuroscience for undergraduate students*  
Title: “Performance Monitoring and the Anterior Cingulate Cortex”

## Undergraduate Mentoring

- At Washington University in St. Louis*
- 2014-2015 Harold Lee (*Mind Brain Behavior*)
- 2015-2016 Jessica Weiss (*Honors Thesis*)
- 2015-2016 Carolyn Dean Wolf (*Independent Study*)

2015-2016 Rachel Lilenbaum  
2015-2018 Katie Shapiro (*Independent Study; SURA Awardee*)  
2016-2017 Marisa Gong (*Mind Brain Behavior*)  
2016-2017 Aaditya Manirajan (*Honors Thesis; SURA Awardee*)  
2017 Sarah Finlay (*visiting student from Dartmouth*)  
2018 Casey Mason (*SURA Awardee*)  
2018 Sara Hendrix

*At Brown*

2020- Kaitlyn Mundy (*UTRA Awardee*)  
2021- Sam Nevins

### **Professional Memberships**

Association for Psychological Science  
Association for Women in Science, *St. Louis Chapter Co-President (2014-2017)*  
Cognitive Neuroscience Society  
Psychonomics  
Society for Affective Science  
Society for Neuroeconomics  
Society for Neuroscience

### **Ad Hoc Journal Reviewer**

Brain and Behavioral Sciences; Collabra; Cognitive Affective & Behavioral Neuroscience; Developmental Cognitive Neuroscience; International Journal of Developmental Sciences; Frontiers in Human Neuroscience; Journal of Gerontology; NeuroImage; Journal of Experimental Psychology: General; Neuropsychologia; Neuroscience and Biobehavioral Reviews; PLOS One; Psychology and Aging; Psychological Research; Scientific Reports; Social and Personality Compass, Quarterly Journal of Experimental Psychology; Psychonomic Bulletin & Review; Journal of Psychiatry & Neuroscience; Affective Science

### **Additional Training**

2020 Carney Computational Modeling Workshop, *Brown University, Providence, RI*  
2019 Harmonization Workshop, Scientific Research Network on Decision Neuroscience and Aging, *Miami, FL*  
2018 Computational Psychiatry Workshop, *San Diego, CA*  
2017 AFNI Bootcamp  
2016 Computational Psychiatry Course, *Translational Neuromodeling Unit, Zurich, CH*  
2013-2014 Completion of Cognitive, Computational, and Systems Neuroscience Pathway

### **University and Community Service**

CLPS Dept “How to Join a Research Lab”, *Panelist (2021)*  
Carney Brain Science External Postdoc Seminar Series, *Speaker Selection Committee (2021-)*  
CLPS Professional Development Series: The Postdoc, *Panelist (2021)*  
CLPS Diversity & Inclusion Plan Committee – Department Culture, *Subcommittee Chair (2020-)*



Washington University NIH Fellowship Writing Workshop Mentor (2017)  
Cognitive Computational Systems Neuroscience, *Steering Committee* (2015-2018)  
Psychology Grad Student Association, *Diversity Committee* (2014-2016)  
Association for Women in Science – St. Louis Chapter, *President* (2014-2017)  
MIT Educational Counselor (2011-2018), *Regional Chair* (2015-2018)

### **Public Outreach**

Growing Up in Aging Neuroscience Webinar Series, *Organizer* (2020)  
Teen Science Café Network Conference Panel: Understanding the Motivations of Scientist-Presenters, *Panelist* (2018)  
Teen Science Cafe, *St. Louis Science Center, Academy of Science STL, Cahokia HS* (2018)

### **Press Releases**

“Sum of incentives dictate efforts”, Washington University Newsroom (April 2021)

### **Pre-Doctoral Research Experiences**

2011-2013	Research Specialist, Princeton University PI: Matthew Botvinick M.D., Ph.D.
2009-2010	Research Assistant, Massachusetts Institute of Technology PI: John Gabrieli, Ph.D.
2008	Research Assistant, Massachusetts Institute of Technology PI: Ed Boyden, Ph.D.

### **Other Skills**

**Programming:** R (expert), Matlab (expert), bash/tcsh (expert), Python (beginner)  
**Languages:** English (native), French (intermediate, conversational), Chinese (conversational)