Juliana E. Trach juliana.trach@yale.edu

junana.tracn@yale.edu				
EDUCATION				
PhD (in progress)	Yale University Psychology (Cognitive) Advisor: Dr. Sam McDougle Secondary Advisor: Dr. Nick Turk-Browne	2020-present		
M.Phil.	Yale University Psychology (Cognitive)	2023		
M.S.	Yale University Psychology (Cognitive)	2022		
Sc.B. magna cum laude	Brown University Cognitive neuroscience (with departmental honors) Advisors: Dr. Theresa Desrochers & Dr. William Heindel	2014-2018		
AWARDS		2025		
·	ebellum Gordon Research Conference	2025		
Neural Control of Movement Student Travel Award		2024		
Wu Tsai Institute Travel Award		2023		
Conference travel fellowship (Yale University)		2021, 2022, 2023,		
National Science Founda Resource scarcity as cognitive load on lea	2024, 2025 2020-2023			
Magna Cum Laude	2018			
Departmental honors		2018		
Richard E. Whalen Awa Neuroscience and Bo	2018			
Sigma Xi Honors Societ	2017-2018			
Undergraduate Teaching and Research Award at Brown University		2017		
U.S. Department of State	2013-2014			
RESEARCH EXPERIE Lab Manager, Princeton Princeton University, Ac		2018-July 2020		
Honors Student, Desro	2017-2018			
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Brown University, Advisor: Dr. Theresa Desrochers

Research assistant, Badre Lab for Memory and Cognitive Control

2015-2016

Brown University, Advisor: Dr. David Badre

Research Assistant, Center for Brain and Cognition

Fall 2016

Universitat Pompeu Fabra

Research Assistant, Rahnev Lab for Perception, Neuroimaging and Modeling

Summer 2016

Georgia Institute of Technology, Advisor: Dr. Dobromir Rahnev

Research Assistant, Spanish Immersion Day Camp/Afterschool Program

2012-2015

University of Illinois, Urbana-Champaign, Advisor: Dr. Silvina Montrul

MANUSCRIPTS IN PREPARATION

- 1. **Trach, J.E.,** Ou, Y., & McDougle, S.D. (in prep). Cerebellar prediction error coding in unsupervised learning.
- 2. **Trach, J.E.,** Yates, T.S., Behm, L., Choi, D., Ellis, C.T., McDougle, S.D., & Turk-Browne, N.B. (in prep). Neural correlates of reinforcement learning in the human infant brain.
- 3. **Trach, J.E.,** Adanri, T.A., & McDougle, S.D. (in prep). Dynamics of action selection in expert and novice pianists.
- 4. **Trach, J.E.,** Carcamo, D., McDougle, S.D., & Lynn, C.W. (in prep). Human learning of non-Markov structures.
- 5. Choi, D., Yates, T.S., **Trach, J.E.,** Behm, L., Ellis, C.T., & Turk-Browne, N.B. (in prep). Case study of neural evidence for infant memories in early but not later childhood.

PREPRINTS

- 1. **Trach, J.E.,** Ou, Y., & McDougle, S.D. (submitted). The human cerebellum encodes temporally sensitive reinforcement learning signals. [preprint]
- 2. Behm, L., Yates, T.S., **Trach, J.E.,** Choi, D., Du, H., Osumah, C., Deen, B., Kosakawski, H.L., Chen, E.M., Kamps, F.S., Olson, H.A., Ellis, C.T., Saxe, R., & Turk-Browne, N.B. (in revision). Adventures in awake infant fMRI: Insights from more than 750 scanning sessions. [preprint]

PUBLICATIONS

- **1. Trach, J.E.** & McDougle, S.D. (2025). Mental graphs structure the storage and retrieval of visuomotor associations. *Nature Human Behavior*. 9, 1898-1912. [paper]
- 2. Yates, T.S., Fel, J., Choi, D., **Trach, J.E.,** Behm, L., Ellis, C.T., & Turk-Browne, N.B. (2025). Hippocampal encoding of memories in human infants. *Science*. *387*(6740), 1316-1320. [paper]
- 3. **Trach, J.E.,** deBettencourt, M.T., Radulescu, A. & McDougle, S.D. (2025). Rewards transiently and automatically enhance sustained attention. *Journal of Experimental Psychology: General*. 154(4). [paper]

- 4. Lacal, I., Das, A., Logiaco, L., Molano-Mazon, M., Schwaner, M.J., & **Trach, J.E.** (2024). Emerging perspectives for the study of the neural basis of motor behaviour. *European Journal of Neuroscience*, 60, 6342-6356. [paper]
- 5. Piazza, E., Cohen, A., **Trach, J.E.,** and Lew-Williams, C. (2021). Neural synchrony predicts children's learning of novel words. *Cognition*, 214. [paper]
- 6. **Trach, J.E.,** McKim, T.H., and Desrochers, T.M. (2021). Abstract sequential control is facilitated by practice and embedded motor sequences, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *47*(10), 1638-1659. [paper]

REFEREED CONFERENCE PROCEEDINGS

- 1. **Trach, J.E.**, Carcamo, D., McDougle, S.D., & Lynn, C. (2025). Human learning of non-Markov structures. *Proceedings of the 47th Annual Conference of the Cognitive Science Society*.
- 2. **Trach, J.E.** & McDougle, S.D. (2024). Rapid parallel processing dynamics during hierarchical category decisions. *Proceedings of the 46th Annual Conference of the Cognitive Science Society*.
- 3. **Trach, J.E.** and McDougle, S.D. (2023). Structured dynamics of hierarchical action selection. *Proceedings of the 45th Annual Conference of the Cognitive Science Society*.
- 4. **Trach, J.E.** and McDougle, S.D. (2022). Climbing the tree: Structured hierarchical representations in visuomotor maps. *Proceedings of the 44th Annual Conference of the Cognitive Science Society*.

CONFERENCE PRESENTATIONS TALKS

- 1. **Trach, J.E.** & McDougle, S.D. (July 2025). Exploring non-motor prediction errors in the human cerebellum. *Gordon Research Symposium*, Lausanne, Switzerland.
- 2. **Trach, J.E.,** Yates, T.S. Behm, L. Choi, D., Ellis, C.T, McDougle, S.D., and Turk-Browne, N.B. (June 2025). Neural correlates of reward learning in the human infant brain. *MAMM*, New York, NY.
- 3. **Trach, J.E.,** Yates, T.S., Choi, D., Behm, L., Ellis, C.T., McDougle, S.D., & Turk-Browne, N.B. (April 2023). Striatal and cerebellar involvement in reinforcement learning in the human infant brain. *NCM*. Dubrovnik, Croatia.
- 4. **Trach, J.E.** & McDougle, S.M. (July 2023). Structured dynamics of hierarchical action selection. *CogSci*, Sydney, Australia.
- 5. **Trach, J.E.** & McDougle, S.M. (September 2022). Climbing the tree: Structured hierarchical representations in visuomotor maps. *MAMM*, New York, NY.
- 6. **Trach, J.E.** & McDougle, S.M. (July/August 2022). Climbing the tree: Structured hierarchical representations in visuomotor maps. *CogSci*, Toronto, ON. (Talk)

POSTERS

1. **Trach, J.E.**, Carcamo, D., McDougle, S.D., & Lynn, C. (July 2025). Human learning of non-Markov structures. *CogSci*, San Francisco, CA.

- 2. **Trach, J.E.** & McDougle, S.D. (July 2025). Exploring non-motor prediction errors in the human cerebellum. *Gordon Research Conference*, Lausanne, Switzerland.
- 3. **Trach, J.E.** & McDougle, S.D. (June 2025). Structured action preparation during visuomotor decision making. *RLDM*, Dublin, Ireland.
- 4. **Trach, J.E.** & McDougle, S.D. (April 2025). Nonmotor prediction errors in the human cerebellum during reinforcement learning. *NCM*, Panama City, Panama.
- 5. **Trach, J.E.** & McDougle, S.D. (March 2025). Neural correlates of reinforcement learning in the human cerebellum. *CNS*, Boston, MA.
- 6. **Trach, J.E.** & McDougle, S.D. (October 2024). Exploring nonmotor prediction errors in the human cerebellum. *SfN*, Chicago, IL.
- 7. **Trach, J.E.,** Ingram, M., & McDougle, S.D. (July 2024). Rapid parallel processing dynamics during hierarchical category decisions. *CogSci*, Rotterdam, Netherlands.
- 8. **Trach J.E.,** deBettencourt, M.T., Radulescu, A. & McDougle, S.D. (April 2024). Reward feedback enhances sustained attention on short timescales. *NCM*, Dubrovnik, Croatia.
- 9. Adanri, T.A., **Trach, J.E.,** & McDougle, S.D. (November 2023). Compression of structured cognitive representations with extensive practice. *SfN*, Washington, DC.
- 10. **Trach, J.E.**, Yates, T.S., Choi, D., Behm, L., Ellis, C.T., McDougle, S.D., & Turk-Browne, N.B. (November 2023). Striatal involvement in reward processing in the human infant brain. *SfN*, Washington, DC.
- 11. **Trach, J.E.** & McDougle, S.M. (April 2023). Behavioral dynamics of hierarchical action selection. *NCM*, Victoria, BC.
- 12. **Trach, J.E.**, deBettencourt, M.T., Radulescu, A. & McDougle, S.D. (November 2022). Reward prediction error modulates sustained attention. *SfN*, San Diego, CA.
- 13. Choi, D., **Trach, J.E.**, Yates, T., Ellis, C., and Turk-Browne, N. (2022) Neural retrieval of infant memories during childhood. *SfN*, San Diego, CA.
- 14. **Trach, J.E.**, Burde, J., deBettencourt, M.T., Radulescu, A. & McDougle, S.D. (June 2022) Reward prediction error modulates sustained attention. RLDM, Brown University.
- 15. **Trach, J.E.** & Desrochers, T.M. (2018, January). Practice and motor sequences facilitate the execution of abstract task sequences. Poster presented at the Ivy League Undergraduate Research Symposium at the University of Pennsylvania.
- 16. **Trach, J.E.** & Desrochers, T.M. (2017, November). Testing the effect of practice and motor learning on abstract sequence execution. Poster presented at the Association for Women in Mathematics Poster Symposium at Brown University.
- 17. **Trach, J.E.** & Desrochers, T.M. (2017, November). Testing the effect of practice and motor learning on abstract sequence execution. Poster presented at the Epsilon Alpha Mu Honor Society at Harvard University.
- 18. **Trach, J.E.** & Desrochers, T.M. (2016, August). Preliminary results: Testing the effect of practice and motor learning on abstract sequence execution. Poster presented at the Summer Research Symposium at Brown University.

OTHER TALKS

1. *Learning of non-Markov statistics in adults and preschoolers*, Cognitive Origins Lab at UW-Madison, November 2025.

Spring 2016

- 2. *Mental graphs structure the storage and retrieval of visuomotor associations*, Super Lab at Western University, October 2025.
- 3. *Interactions between structure cognitive representations and action selection*, Computational Cognitive Neuroscience Lab at UC-Berkeley, October 2025.
- 4. *New frontiers in the cognitive neuroscience of reinforcement learning*, Kennedy Krieger Institute at Johns Hopkins, October 2025.
- 5. *Human learning on non-Markov structures*, Current works in cognitive psychology, Yale University, 2025.
- 6. Rapid parallel processing dynamics during hierarchical category decisions. Desrochers Lab, Brown University, 2024.
- 7. Assessing the dynamics of visuomotor expertise, Current works in cognitive psychology, Yale University, 2024.
- 8. Cognitive-motor interactions during structured action selection, CoCoA Workshop, Princeton University, 2024.
- 9. Striatal and cerebellar involvement during reinforcement learning in the human infant brain, 2024, Scaffolding of Cognition Lab, Stanford University, 2024.
- 10. Behavioral dynamics of hierarchical decision making, Current works in cognitive psychology, Yale University, 2023.
- 11. Structured dynamics of hierarchical action selection, BLAM Lab, Johns Hopkins University, 2023.
- 12. Structured dynamics of hierarchical action selection, Graduate Student Interviews Student Symposium, Yale University, 2023.
- 13. Abstract sequential task control is facilitated by practice and embedded motor sequences, Desrochers Lab Meeting, December 2020.

TEACHING EXPERIENCE

Teaching Assistant, Intensive Beginning German

Brown University, German Department

Teaching Fellow, Introduction to Psychology (PSYC110)	Spring 2023
Yale University, Psychology department	opring 2023
Advisor: Dr. Stephanie Lazarro	
Teaching Fellow, The Human Brain (PSYC160)	Fall 2022
Yale University, Psychology department	
Advisor: Dr. Gregory McCarthy	
Guest Lecturer, Learning and Memory (PSYC376)	Spring 2022
Yale University, Psychology department	
Advisor: Dr. Samuel D. McDougle	
Teaching Fellow, Learning and Memory (PSYC376)	Spring 2022
Yale University, Psychology department	
Advisor: Dr. Samuel D. McDougle	
Teaching Fellow, Statistics (PSYC200)	Fall 2021
Yale University, Psychology department	
Advisor: Dr. Dylan Gee	
Teaching Assistant, Introductory Statistics	Fall 2017
Brown University, CLPS department	
Advisor: Dr. Kathryn Spoehr	

Advisor: Dr. Jan Sokolosky

TEACHING TRAINING

Fundamentals of teaching workshop (4 sessions, 6hrs)

Teacher, mentor, role model: Who are you? (4 sessions, 6hrs)

Grading and values (4 sessions, 6hrs)

Mentorship in research lab settings (2 sessions, 3hrs)

Preparing the teaching portfolio (1 session, 1.5hrs)

Preparing the teaching statement (1 session, 1.5hrs)

Grading and rubrics (1 session, 1.5hrs)

Effective mentorship (1 session, 1hr)

MENTORSHIP

MAPS mentor	2024-present
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Yale University

WTI Summer Scholar mentor 2022

Yale University

Yale Sneak Peek Mentor 2021-present

Yale University

Yale Sneak Application Support 2021-present

Yale University

Graduate-Undergraduate Mentorship Initiative Advisor 2020-present

Yale University

Departmental Peer Advisor, Cognitive Neuroscience 2015-2018

Brown University, CLPS Department

Meiklejohn Peer Advisor 2015-2018

Brown University

Research mentees

Tolu Adanri

(Thesis: Dynamics of action selection in expert and novice pianists)

Tess Levy

(Thesis: *Neural correlates of reward processing in the human cerebellum*)

Liz Pandolpho

(Thesis: The effect of extensive practice on the hierarchical representations of action selection)

Ophelia Pilkinton

(Thesis: Interactions between episodic memory and task sequence processing)

Sophia Ou

Jia Dunsby

Hyder Jafri

Maya Ingram

Steph Hu Jed Burde

INSTITUTIONAL SERVICE	
Colloquium Committee, Cognitive Psychology Area Yale University	2022-2024
Student Coordinator, Current Works in Cognitive and Developmental Psychology Talk Series Yale University	2021-2022
McDougal Center Fellow for Graduate Student Life, Arts and Culture Yale University	2021-2022
Student Coordinator, Graduate Student Interviews	2021, 2023
Yale University	
Diversity and Inclusion Action Plan Committee	Spring 2016
Brown University, CLPS Department	