

Ryan E. Harvey

PHD CANDIDATE

Department of Psychology, University of New Mexico

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Education

University of New Mexico

PH.D., PSYCHOLOGY

Albuquerque, NM

2016 - 2021

- Thesis title: Hippocampal functional activity following prenatal alcohol exposure

University of New Mexico

M.Sc., PSYCHOLOGY

Albuquerque, NM

2015 - 2016

- Thesis title: Influence of anterior thalamic inactivation on the retrieval of spatial reference memory and working memory in the radial arm maze

Purdue University

B.A, PSYCHOLOGY

Fort Wayne, IN

2010 - 2014

- Thesis title: Previous training improves egocentric navigation performance in otoconia-deficient mice: evidence for performance improvements in microgravity

Experience

Graduate Student

UNIVERSITY OF NEW MEXICO; DR. BENJAMIN CLARK, MENTOR

2015 - 2021

- Contribution of the anterior thalamus to hippocampal dynamics and spatial memory
- The impact of prenatal alcohol exposure on spatial processing

Research Technician

PURDUE UNIVERSITY; DR. RYAN YODER, SUPERVISOR

2014 - 2015

- Hippocampal representations of otoconia-deficient mice

Research Assistant

PURDUE UNIVERSITY; DR. PUNYA NACHAPPA, MENTOR

2014 - 2015

- The effect of microgravity on soybean growth

Research Assistant

PURDUE UNIVERSITY; DR. CAROL LAWTON, MENTOR

2013 - 2015

- Human spatial navigation and memory in virtual environments
- Motion sickness in response to visual optic flow

Research Assistant

PURDUE UNIVERSITY; DR. RYAN YODER, MENTOR

2012 - 2015

- Spatial navigation and memory in otoconia-deficient mice

Publications

PEER REVIEWED ARTICLES

- **Harvey, R.E.**, Berkowitz, L.E., Savage, D.D., Hamilton, D.A., Clark, B.J. (2020). Altered hippocampal place cell representation and theta rhythmicity following moderate prenatal alcohol exposure. *Current Biology*.
- **Harvey, R.E.**, Berkowitz, L. E., Hamilton, D. A., & Clark, B. J. (2019). The Effects of Developmental Alcohol Exposure on the Neurobiology of Spatial Processing. *Neuroscience & Biobehavioral Reviews*.
- Xu, Z., Wu, W., Winter, S. S., Mehlman, M. L., Butler, W. N., Simmons, C. M., **Harvey, R.E.**, Berkowitz, L.E., Chen, Y., Taube, J.S., Wilber, A. A., & Clark, B.J. (2019). A Comparison of Neural Decoding Methods and Population Coding Across Thalamo-Cortical Head Direction Cells. *Frontiers in Neural Circuits*.
- Berkowitz, L. E., **Harvey, R.E.**, Drake, E., Thompson, S. M., & Clark, B. J. (2018). Progressive impairment of directional and spatially precise trajectories by TgF344-Alzheimer's disease rats in the Morris Water Task. *Scientific reports*.
- **Harvey, R.E.**, Rutan, S. A., Willey, G. R., Siegel, J. J., Clark, B. J., & Yoder, R. M. (2018). Linear self-motion cues support the spatial distribution and stability of hippocampal place cells. *Current Biology*.
- **Harvey, R.E.**, Thompson, S. M., Sanchez, L. M., Yoder, R. M., & Clark, B. J. (2017). Post-training inactivation of the anterior thalamic nuclei impairs spatial performance on the radial arm maze. *Frontiers in neuroscience*.
- Clark, B. J., & **Harvey, R.E.** (2016). Do the anterior and lateral thalamic nuclei make distinct contributions to spatial representation and memory? *Neurobiology of learning and memory*.

- Berkowitz, L.E., **Harvey, R.E.**, Clark B.J. (2020). Spatial Navigation and Alzheimer's disease. In: C. Martin & V.R. Preedy (Eds.), The Neuroscience of Dementia: Genetics, Neurology, Behavior, and Diet in Dementia (1st ed., Vol. 2, pp. in press). Academic Press.

Extracurricular Activity

Neuromatch Academy

INTERACTIVE TRACK

2020

- Gained experience with traditional and emerging tools of computational neuroscience
- Group project title: Spatiotemporal distribution of motor processing in V1

Awards & Fellowships

2017-2020 **Fellowship**, National Institute on Alcohol Abuse and Alcoholism T32 Predoctoral Fellowship

- 2017 **Presentation Award**, Psychology research day, University of New Mexico
- 2017 **Travel award**, Student conference award program travel award, University of New Mexico
- 2016 **Travel award**, Student conference award program travel award, University of New Mexico
- 2016 **Poster Award**, Psychology research day, University of New Mexico
- 2015 **Poster award**, student research & creative endeavor symposium, Purdue University
- 2014 **Research grant**, Research, engagement, & sponsored program research scholarship, Purdue University

Presentation

POSTER PRESENTATIONS & TALKS

2020

- **Harvey, R.E.**, Berkowitz, L.E., Clark, B.J. (2020, October). Hippocampal replay alterations following moderate prenatal alcohol. Traditional talk at Neuromatch Conference 3.0.
- Berkowitz, L.E., **Harvey, R.E.**, Gabaldon-Parish, M., Roy, V.J., Clark, B.J. (2020, October). Investigation of postsubicular head direction cells in the TgF344-AD rat model of Alzheimer's disease. Traditional talk at Neuromatch Conference 3.0.
- James, K.E., Berkowitz, L.E., **Harvey, R.E.**, Thompson, S.M., Olguin, C.R., Drake, E.N., Pentkowski, N.S., Clark, B.J. (2020, October). The contribution of anxiety to spatial memory deficits in the TgF344-AD rat model of Alzheimer's disease. Neuromatch Conference 3.0.
- Berkowitz, L.E., **Harvey, R.E.**, Clark, B.J. (2020, July). Head direction cells in the TgF344-AD rat model of Alzheimer's disease. Alzheimer's Association International Conference.

2019

- **Harvey, R.E.**, Berkowitz, L.E., Savage, D.D., Hamilton, D.A., Clark, B.J. (2019, October). Hippocampal CA1, CA3, and dentate gyrus place cell firing characteristics in a rat model of moderate prenatal alcohol exposure. Poster presented at the Society for Neuroscience Conference. Chicago, IL.
- Goncalves-Garcia, M., Berkowitz, L.E., Donaldson, T., **Harvey, R.E.**, Wagner, J., Davies, S., Savage, D.D., Clark, B.J. (2019, October). The effects of moderate prenatal alcohol exposure on the organization of exploratory behavior by adult rats. Poster presented at the Society for Neuroscience Conference. Chicago, IL.
- **Harvey, R.E.**, Berkowitz, L.E., Clark, B.J. (2019, October). Disruption of the anterior thalamic head direction cell network impairs the hippocampal place signal. Poster presented at the Society for Neuroscience Conference. Chicago, IL.
- Berkowitz, L.E., **Harvey, R.E.**, Gabaldon-Parish, M., Roy, V. (2019, October). Characterization of cortical and thalamic head direction cells in the TgF344-AD rat model of Alzheimer's disease. Poster presented at the Society for Neuroscience Conference. Chicago, IL.
- Berkowitz, L.E., Gabaldon-Parish, M., **Harvey, R.E.**, Sneddon, E., Clark, B.J. (2019, October). Distributive home base behavior in the TgF344-AD rat model of Alzheimer's disease. Poster presented at the Society for Neuroscience Conference. Chicago, IL.
- Gabaldon-Parish, M., Berkowitz, L.E., **Harvey, R.E.**, Sneddon, E., Clark, B.J. (2019, March). Distributed home base behavior in TgF344-AD rat model of Alzheimer's disease. Poster presented at UNM Neuroscience day, Albuquerque, NM.
- Goncalves-Garcia, M., Donaldson, T., Berkowitz, L.E., **Harvey, R.E.**, Gabaldon-Parish, M., Sanchez, L., Goss, J.K., Wagner, J., Davies, S., Tofighi, D., Savage, D.D., Clark, B.J. (2019, March). The effects of moderate prenatal alcohol exposure on the organization of exploratory behavior by adult female rats. Poster presented at UNM Neuroscience day, Albuquerque, NM.

- Sanchez, L.M., **Harvey, R.E.**, Benthem, D., Goss, J., Johnson, S.A., Turner, S.M., Savage, D.D., Burke, S.N., & Clark, B.J., (2018, November). The effect of moderate prenatal alcohol exposure on object discrimination by adult rats. Poster presented at the Society for Neuroscience Conference. San Diego, CA.
- Yoder, R.M., **Harvey, R.E.**, Rutan, S.A., Carstensen, L.C., Willey, G.R., Terry, C.A., Siegel, J.J., & Clark, B.J., (2018, November). Linear self-motion cues contribute to hippocampal place cells: Functional implications. *Current Biology*, 28(11), 1803-1810. Poster presented at the Society for Neuroscience Conference. San Diego, CA.
- **Harvey, R.E.**, Berkowitz, L. E., Savage, D. D., Hamilton, D. A., & Clark, B. J. (2018, November). Spatial and temporal stability in CA1 hippocampal place cells following moderate prenatal alcohol exposure. Poster presented at the Society for Neuroscience Conference. San Diego, CA.
- **Harvey, R.E.**, Berkowitz, L. E., Savage, D. D., Hamilton, D. A., & Clark, B. J. (2018, September). Spatial and temporal deficits in hippocampal place cells following moderate prenatal alcohol exposure. Poster presented at FASD Awareness Day. Albuquerque, NM.
- **Harvey, R.E.**, Berkowitz, L. E., Savage, D. D., Hamilton, D. A., & Clark, B. J. (2018, October). Altered spatial coding of hippocampal place cells following moderate prenatal alcohol exposure. Poster presented at the New Mexico EEG and Behavior conference. Albuquerque, NM.
- **Harvey, R.E.**, Berkowitz, L. E., Savage, D. D., Hamilton, D. A., & Clark, B. J. (2018, April). Altered spatial coding of hippocampal place cells following moderate prenatal alcohol exposure. Poster presented at the International Conference on Learning and Memory. Huntington Beach, CA.
- Berkowitz, L. E., **Harvey, R.E.**, & Clark, B. J. (2018, April). Characterization of Head Direction Cells in the TgF344-AD Rat Model of Alzheimer's Disease. Poster presented at the International Conference on Learning and Memory. Huntington Beach, CA.
- **Harvey, R.E.**, Berkowitz, L. E., Savage, D. D., Hamilton, D. A., & Clark, B. J. (2018, March). Reduced Spatial Coding of Hippocampal Place Cells Following Moderate Prenatal Alcohol Exposure. Poster presented at the Gordon Research Conference. Galveston, TX

- Berkowitz, L. E. Thompson, S. M., Drake, E. N., Madden, J. T., Sneddon, E. A., **Harvey, R.E.**, Clark B. J. (2017, November). Sex specific spatial navigation and spatial memory impairment in the TgF344-ad rat model of Alzheimer's disease. Poster presented at the Society for Neuroscience Conference. Washington DC.
- **Harvey, R.E.**, Goss, J., Rigg, T., Berkowitz, L. E., Wagner, J. L., Savage, D. D., Hamilton, D. A., & Clark, B.J. (2017, November). Reduced spatial coding of hippocampal place cells following moderate prenatal alcohol exposure. Poster presented at the Society for Neuroscience Conference. Washington DC.
- **Harvey, R.E.**, Rigg, T., Goss, J., Wagner, J.L., Savage, D.D., Hamilton, D.A., Clark, B.J. (2017). Reduced spatial and directional coding by hippocampal place cells following moderate prenatal alcohol exposure in the rat. Poster presented at the 40th Annual Research Society on Alcoholism Meeting, Denver, CO.
- **Harvey, R.E.** (2017). First Characterization of Hippocampal Place Cell firing in a Moderate Prenatal Alcohol Rat Model. Talk delivered at UNM Psychology Research Day, Data Blitz. Albuquerque, NM.
- **Harvey, R.E.**, Rigg, T., Goss, J., Rysanek, J.S., Wagner, J.L., Savage, D.D., Hamilton, D.A., Clark, B.J., (2017). Reduced directional coding and phase locking by hippocampal place cells following moderate prenatal alcohol exposure in the rat. Poster presented at UNM Neuroscience day, Albuquerque, NM.
- **Harvey, R.E.**, Rigg, T., Goss, J., Rysanek, J.S., Wagner, J.L., Savage, D.D., Hamilton, D.A., Clark, B.J., (2017). Reduced directional coding and phase locking by hippocampal place cells following moderate prenatal alcohol exposure in the rat. Poster presented at UNM Alcohol Research Poster Session, Albuquerque, NM.

- Thompson, S.M., **Harvey, R.E.**, Sanchez, L.M., Winter, S.S., Clark, B.J. (2016). Directional Discrimination in an Object-Place Paired Associate Memory is Impaired after Muscimol Inactivation of the Anterior Thalamus. Poster presented at The Annual Society for Neuroscience conference. San Diego, CA.
- **Harvey, R.E.**, Thompson, S., Sanchez, L.M., Sneddon, E.A., Yoder, R.M., Clark, B. (2016). Influence of Anterior Thalamic Inactivation on the Retrieval of Spatial Inactivation of the Anterodorsal Thalamic Nuclei Leads to Reference Memory and Working Memory in the Radial Arm Maze. Poster presented at The Annual Society for Neuroscience conference. San Diego, CA.
- **Harvey, R.E.**, Thompson, S., Sanchez, L.M., Yoder, R.M., Clark, B. (2016). Inactivation of the anterodorsal thalamus leads to navigational deficits in the radial arm maze. Poster presented at UNM psychology department's Psychology Research Day. Albuquerque, NM.
- **Harvey, R.E.**, Thompson, S., Sanchez, L.M., Yoder, R.M., Clark, B. (2016). Inactivation of the anterodorsal thalamic nuclei leads to navigational deficits in the radial arm maze. Poster presented at the Brain & Behavioral Health Institute's Neuroscience day. Albuquerque, NM.

- Lawton C. A., **Harvey, R.E.**, Horton, A. H., Terry, C. A., Serna, C. E. (2015). Effects of video game experience on perceived self-motion in a stereoscopic display. Poster presented at the Association for Psychological Science. New York, NY.
- Lawton C. A., **Harvey, R.E.**, Horton, A. H., Terry, C. A., Serna, C. E. (2015). Sex Differences in Perceived Self-Movement in a Stereoscopic Head-Mounted Display. Poster presented at the Midwestern Psychological Association, Chicago, IL.
- **Harvey, R.E.**, Horton, A. H., Serna, C. E., Terry, C. A. (2015). Video game experience: Perception of self motion and motion sickness in the virtual world. 18th Annual Student Research And Creative Endeavor Symposium. Purdue University Fort Wayne, 2015.

- **Harvey, R.E.** & Yoder, R. M. (2014). Previous training improves egocentric navigation performance in otoconia-deficient mice. Poster presented at the Midwestern Psychological Association, Chicago, IL.
- Lawton, C. A., Brockman, S. N., Goebel, E. A., Long, A. M., Phillips, E. L., **Harvey, R.E.**, Kirby, S. L., & Rosbrugh, H. H. (2014). Sex, handedness, and virtual navigation. Poster presented at the Midwestern Psychological Association, Chicago, IL.
- **Harvey, R.E.** (2014). Pretraining improves egocentric navigation performance in otoconia-deficient mice. 17th Annual Student Research And Creative Endeavor Symposium. Purdue University Fort Wayne, 2014.

- Kirby, S. L., **Harvey, R.E.**, Goebel, E. A., Köppen, J. R., Wallace, D. G., & Yoder, R. M. (2013) Head direction signal degradation impairs spatial learning. Poster presented at Society for Neuroscience, San Diego, CA.
- **Harvey, R.E.** & Yoder, R. M. (2013). Finding Their Way in Space: An Alternative Strategy Improves Navigation Performance in Otoconia-Deficient Mice. Poster presented at the 29th American Society for Gravitational and Space Research, Orlando, FL.
- Kirby, S. L., **Harvey, R.E.**, & Yoder, R. M. (2013). Head direction signal degradation contributes to navigation impairments. Poster presented at the Midwestern Psychological Association, Chicago, IL.
- **Harvey, R.E.** & Yoder, R. M. (2013). The head direction signal contributes to accurate navigation in darkness. Program No. 16. 16th Annual Student Research And Creative Endeavor Symposium. Purdue University Fort Wayne, 2013.

Editorial service

CO-REVIEWER

- 2020: Wellcome Open Research
- 2019: Frontiers neural circuits
- 2017: Current biology
- 2017: Behavioral brain research

Mentorship

2020-2021 **Katie James**, Undergraduate Research Assistant

2019 **Mônica Goncalves-Garcia**, Undergraduate Research Assistant

2017-2019 **Jacob Ring**, Honors Student

2017 **Danielle Benthem**, Psych 499 Student

2016-2018 **Joshua Rysanek**, Undergraduate Research Assistant

2016-2019 **Jonathan Goss**, Psych 499 Student

2016-2017 **Tanner Rigg**, Work Study Student

2016 **Kharli Brockmeier**, Undergraduate Research Assistant

2016 **Landri Medina**, Undergraduate Research Assistant

2015-2017 **Elizabeth Sneddon**, Psych 499 Student

2015-2017 **Shannon Thompson**, Post-bacc

2015-2017 **Lilliana Sanchez**, Post-bacc

2015 **Sierra Yazzie**, Undergraduate Research Assistant

Academic service

2016-2019 **New Mexico Brain Bee**, organizing volunteer and judge

2016 **Office for Diversity, Equity & Inclusion STEAM-H**, speaker

2016 **NeuroExpo ABQ at the New Mexico Museum of Natural History**, presenter

Teaching Experience

2020 **Transcranial stimulation laboratory**, Teaching Assistant, University of New Mexico

2017 **Brain and Behavior**, Guest Lecture, University of New Mexico

2016 **Brain and Behavior**, Teaching Assistant, University of New Mexico

2015 **Aging and Dementia**, Guest Lecture, University of New Mexico

2015 **Introductory Psychology**, Teaching Assistant, University of New Mexico

2013 **Psychobiology**, Teaching Assistant, Purdue University

2012 **Introductory Psychology**, Teaching Assistant, Purdue University

Skills

Animal Behavior	Rodent handling & training on spatial tasks, detailed behavioral scoring
In-vivo Electrophysiology	Micro-drive construction & implantation, single unit recordings in awake behaving rodents
In-vivo drug infusion	Construction and use of custom infusion device for drug delivery to multiple brain regions
Programming	Python, Matlab, R, \LaTeX
Tissue preparation	Sectioning & staining tissue