Nora Harhen

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EDUCATION

University of California, Irvine   2019-2024
Ph.D., Cognitive Sciences
Concentration: Cognitive Neuroscience
Advisor: Dr. Aaron Bornstein

University of California, Berkeley   2014-2018
B.A., Cognitive Science (with High Honors)
Concentration: Cognitive Neuroscience
Advisor: Dr. Anne Collins

EXPERIENCE

Hartley Lab, PI: Dr. Catherine Hartley   2024-present
New York University
Postdoctoral Researcher

Neuroplasticity & Development Lab, PI: Dr. Marina Bedny   2018-2019
Johns Hopkins University
Lab Manager

AWARDS

F31 Ruth L. Kirschstein National Research Service Award, NIMH	2023-2024
Memory, Space, & Time Workshop Travel Award	2022
Sloan-Nomis Cognitive Foundations of Economic Behavior Summer School	2022
Reinforcement Learning & Decision-making Conference Travel Award	2022
National Defense Science & Engineering Graduate Fellowship	2020-2023
Robert J. Glushko Prize for Outstanding Undergraduate Research	2018
Summer Undergraduate Research Fellowship	2017

PUBLICATIONS
(*Equal contribution)

In Preparation

Harhen, N.C., Hartley, C.A.*, Bornstein A.M.* Developmental differences in exploration reveal differences in structure inference.

Harhen, N.C., Bornstein A.M.*, Hartley, C.A.* Reinstated episodes and context differentially guide decision making across development.

Journal Articles

Harhen, N.C., Bornstein A.M. Interval timing as a computational pathway from early life adversity to affective disorders. *Topics in Cognitive Science* (2024).

Harhen, N.C., Bornstein A.M. Overharvesting in human patch foraging reflects rational structure learning and adaptive planning. *Proceedings of the National Academy of Sciences* (2023).

Arcos, K.*, **Harhen, N.***, Loiotile, R., Bedny, M. Superior verbal but not nonverbal memory in congenital blindness. *Exp Brain Res* (2022). https://doi.org/10.1007/s00221-021-06304-4

Loiotile, R., Kanjlia, S., **Harhen, N.**, Bedny, M. "Visual" cortices of congenitally blind adults are sensitive to response selection demands in a go/no-go task. *Neuroimage* (2021). https://doi.org/10.1016/j.neuroimage.2021.118023.

Refereed Conference Proceedings

Harhen, N.C., Hartley C.A., Bornstein A.M. Development of structure inference contributes to age-related differences in exploration. *Cognitive Computational Neuroscience* (2024).

Chen, Y., **Harhen, N.C.**, Stout D.A., Bornstein A.M. Early life unpredictability modulates planning horizon in a structured foraging task. *Cognitive Computational Neuroscience* (2024).

Harhen, N.C., Bornstein A.M. Learning to expect change: Volatility during early experience alters reward expectations in a model of interval timing. *Proceedings of the 20th International Conference on Cognitive Modeling* (2022). Selected as one of the best papers of *ICCM*.

Harhen, N.C., Bornstein A.M. Humans adapt their foraging strategies and computations to environment complexity. *Proceedings of the 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making* (2022).

Harhen, N.C., Bornstein A.M. Structure learning as a mechanism of overharvesting. *Proceedings of the 19th International Conference on Cognitive Modeling* (2021).

Harhen, N.C., Hartley, C.A, Bornstein, A.M. Model-based foraging using latent-cause inference. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society* (2021).

CONFERENCE POSTERS & TALKS

Harhen, N.C., Bornstein A.M.*, Hartley, C.A.* Reinstated episodes and context differentially guide decision making across development. Society for Neuroscience Meeting, Chicago, IL (October 2024).

Harhen, N.C., Hartley C.A.*, Bornstein A.M.* Development of structure inference contributes to age-related differences in exploration. Cognitive Computational Neuroscience Conference, Boston, MA (August 2024).

Chen, Y., **Harhen, N.C.**, Stout D.A., Bornstein A.M. Early life unpredictability modulates planning horizon in a structured foraging task. Cognitive Computational Neuroscience Conference, Boston, MA (August 2024).

Harhen, N.C., Goldway, N., Martinez-Ortiz, M.A., Ma, Y., Hartley C.A. Do early-life environments shape clinically relevant learning computations? Computational Psychiatry Conference, Minneapolis, MN (July 2024).

Harhen, N.C., Hartley C.A.*, Bornstein A.M.* Developmental differences in exploration reveal differences in structure inference. The Fifth International Convention

on the Mathematics Of Neuroscience and AI, Rome, Italy (May 2024). Selected for a spotlight talk.

Harhen, N.C., Bornstein A.M. Temporal representation optimization as a computational link between early life experience and affective disorders. Computational Psychiatry Conference, Dublin, Ireland (July 2023).

Harhen, N.C., Bornstein A.M. Temporal representation optimization as a computational link between early life experience and affective disorders. International Conference on Learning and Memory, Huntington Beach, CA (April 2023). Selected for a symposium talk.

Harhen, N.C., Bornstein A.M.*, Hartley, C.A.* Changes in memory-guided decision-making underlie increased model-based planning across development. Society for Neuroeconomics Annual Meeting, Crystal City, VA (October 2022).

Harhen, N.C., Bornstein A.M.*, Hartley, C.A.* Memory-guided decision-making develops alongside model-based planning. Flux Society Congress, Paris, France (September 2022).

Harhen, N.C., Bornstein A.M. Learning to expect change: Volatility during early experience alters reward expectations in a model of interval timing. International Conference on Cognitive Modeling, Toronto, Canada (July 2022). Selected for a talk.

Harhen, N.C., Bornstein A.M. Temporal representation adaptation as a computational link between early life unpredictability and anhedonia. Computational Psychiatry Course, New York, NY (July 2022).

Harhen, N.C., Bornstein A.M. Humans adapt their foraging strategies and computations to environment complexity. 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making, Providence, RI (June 2022).

Harhen, N.C., Bornstein, A.M. Representation learning and adaptation in human foraging. Data Blitz, UCI Center for Learning and Memory Spring Conference, Irvine, CA (March 2022). Selected for a talk.

Harhen, N.C., Bornstein, A.M. Unpredictability during the development of interval timing produces asymmetric responses to positive and negative outcomes. Conte Center @ UCI, 9th Annual Symposium, Irvine, CA, (March 2022).

Harhen, N.C., Baram, T.Z., Yassa, M.A., Bornstein, A.M. Formalizing the Relationship Between Early Life Adversity and Addiction Vulnerability: The Role of Memory Sampling. Society for Biological Psychiatry Annual Meeting, Virtual (April 2021).

Harhen, N.C., Baram, T.Z., Yassa, M.A., Bornstein, A.M. Formalizing the Relationship Between Early Life Adversity and Addiction Vulnerability: The Role of Memory Sampling. Data Blitz, Conte Center @ UCI, 8th Annual Symposium, Virtual (March 2021). Selected for a talk.

Harhen, N.C., Hartley, C.A., Bornstein, A.M. Foraging behavior adjusts to multiple scales of context. Society for Neuroeconomics Annual Meeting, Virtual (October 2020). Selected for a talk.

Kanjlia, S., Loiotile, R., **Harhen, N.**, Bedny, M. Sub-specialization of "visual" cortices for multiple higher-cognitive functions in congenital blindness. Cognitive Neuroscience Society Annual Meeting, San Francisco, CA (March 2019).

Harhen, N.C., Collins, A.G.E. Goal-directed behavior leverages reinforcement learning mechanisms. Cognitive Neuroscience Society Annual Meeting, San Francisco, CA (March 2017).

INVITED TALKS	2024: University of Amsterdam, Frankenhuis Lab
	2024: Emory University, Research Seminar Series
	2024: Janelia, Mechanistic Basis of Foraging Conference
	2023: University of Birmingham, Lockwood & Apps Labs
	2023: MIT & UCL, Affective Brain Lab
	2022: NYU, Concepts & Categories (ConCats) Seminar

TEACHING

Psych 111/112 A,B,C: Honors Experimental Psych
Teaching Assistant   September 2019 - June 2020

Letters & Science 22: Sense, Sensibility, & Science
Teaching Assistant   January 2016 - May 2016

MENTORING

Julia Yin, NYU Training Program in Computational Neuro	January 2024 - present
Yvette Ma, Research Assistant	September 2023 - present
Brianna Sarcos, Research Assistant	June 2020 - June 2021
Romeo Ignacio, Research Assistant	March 2021 - June 2021

SERVICE

Application Statement Feedback Program
Editor   2021-

UCI Cognitive Sciences Colloquium Organizing Committee
Student Organizer   2021-2022

Competitive Edge
Peer Mentor   2020

OTHER TRAINING

Model-based cognitive electrophysiology workshop   2020
University of Pennsylvania