# Eran Eldar

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## Affiliations

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| Since 2024 | **Associate Professor**<br>Department of Psychology<br>Department of Cognitive and Brain Sciences<br>Hebrew University of Jerusalem |
| 2018 – 2024 | **Senior Lecturer**<br>Department of Psychology<br>Department of Cognitive and Brain Sciences<br>Hebrew University of Jerusalem |
| 2014 – 2018 | **Postdoctoral Research Associate**<br>Max Planck UCL Centre for Computational Psychiatry and Ageing Research<br>Wellcome Centre for Human Neuroimaging<br>University College London |

## Education

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|---|---|---|
| 2009 – 2014 | **PhD in Neuroscience** | Princeton Neuroscience Institute, Princeton University |
| 2007 – 2012 | **BSc in Creative Computing** | International Programmes, University of London |
| 1999 – 2004 | **MD** | Sackler Faculty of Medicine, Tel Aviv University |
| 1996 – 1999 | **BSc in Medical Sciences** | Sackler Faculty of Medicine, Tel Aviv University |

## Grants and Fellowships

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|---|---|
| 2020 – 2025 | R01 Research Project Grant, **National Institutes of Health** (co-PI) |
| 2020 – 2025 | Individual Research Grant, **Israel Science Foundation** |
| 2020 – 2025 | Collaborative Research in Computational Neuroscience, **National Institutes of Health** and **US-Israel Binational Science Foundation** (co-PI) |
| 2020 – 2021 | Sara van Dam project, **The Royal Netherlands Academy of Arts and Sciences** (co-PI) |
| 2019 – 2022 | Alon Fellowship for Outstanding Junior Faculty, **Israeli Council for Higher Education** |
| 2011 – 2014 | International student research fellowship, **Howard Hughes Medical Institute** |

## Publications

2024

Sharp PB, **Eldar E**. Humans adaptively deploy forward and backward prediction. *Nature Human Behaviour* 8, 1726-1737.

Gregorova K , **Eldar E**, Deserno L, Reiter AMF. A cognitive-computational account of mood swings in adolescence. *Trends in Cognitive Sciences* 28, 290-303.

Nahari T, **Eldar E**, Pertzov Y. Fixations durations on familiar items are longer due to attenuation of exploration. *Cognitive Research: Principles and Implications*.

Ben-Dor Cohen M, Nahum M, Traub Bar-Ilan R, **Eldar E**, Maeir A. Coping with emotional dysregulation among young adults with ADHD: A mixed-method study of self-awareness and strategies in daily life. *Neuropsychological Rehabilitation* 34, 1161-1185.

2023

Emanuel A, **Eldar E**. Emotions as computations. *Neuroscience and Biobehavioral Reviews* 144, 104977.

Sharp PB, Fradkin I, **Eldar E**. Hierarchical inference as a source of human biases. *Cognitive, Affective, & Behavioral Neuroscience* 23, 476-490.

Erdman A, **Eldar E**. The computational psychopathology of emotion. *Psychopharmacology* 240, 2231-2238.

Goldway N, **Eldar E**, Shoval G, Hartley CA. Computational mechanisms of addiction and anxiety: a developmental perspective. *Biological Psychiatry* 93, 739-750.

Ben-Dor Cohen M, Maeir A, **Eldar E**, Nahum M. Everyday Cognitive Control and Emotion Dysregulation in Young Adults with and without ADHD: An Ecological Momentary Assessment Study. *Journal of Attention Disorders* 27, 539-553.

Abramson L, Markowitz N, **Eldar E**, Knafo-Noam A. The empathic personality profile: Using a statistical learning algorithm to disentangle phenotypic, genetic, and developmental patterns in personality - empathy relations during adolescence. *Journal of Personality* 91, 753-772.

2022 Fradkin I, **Eldar E**. Accumulating evidence for myriad alternatives: modelling the generation of free association. *Psychological Review* 130, 1492–1520.

Sharp PB, Russek EM, Huys QJM, Dolan RJ, **Eldar E**. Humans perseverate on punishment avoidance goals in multigoal reinforcement learning. *eLife* 11, e74402.

Solomyak L, Sharp PB, **Eldar E**. Training diversity promotes absolute-value-guided choice. *PLOS Computational Biology* 18, e1010664.

Fradkin I, **Eldar E**. If you don't let it in, you don't have to get it out: thought preemption as a method to control unwanted thoughts. *PLOS Computational Biology* 18, e1010285.

Shany O, Gurevitch G, Gilam G, Dunsky N, Balter S, Greental A, Nutkevitch N, **Eldar E**, Hendler T. A corticostriatal pathway mediating self-efficacy enhancement. *npj Mental Health Research* 1, 1-15.

Michely J, **Eldar E**, Erdman A, Martin IM, Dolan RJ. Serotonin modulates asymmetric learning from reward and punishment. *Communications Biology* 5, 1-9.

Antonov G, Gagne C, **Eldar E**, Dayan P. Optimism and Pessimism in Optimised Replay. *PLOS Computational Biology* 18, e1009634.

2021 Sharp PB, Dolan RJ, **Eldar E**. Disrupted state transition learning as a computational marker of compulsivity. *Psychological Medicine*, 1-11.

**Eldar E**, Pessiglione M, van Dillen L. Positive affect as a computational mechanism. *Current Opinion in Behavioral Sciences* 39, 52-57.

**Eldar E**, Felso V, Cohen JD, Niv Y. A pupillary index of susceptibility to decision biases. *Nature Human Behaviour*.

Ben-Dor Cohen M, **Eldar E**, Maeir A, Nahum M. Emotional dysregulation and health related quality of life in young adults with ADHD: a cross sectional study. *Health and Quality of Life Outcomes* 19, 1-11.

2020 **Eldar E**, Lièvre G, Dayan P, Dolan RJ. The roles of online and offline replay in planning. *eLife* 9, e56911.

Sharp PB, Miller GA, Dolan RJ, **Eldar E**. Towards formal models of psychopathological traits that explain symptom trajectories. *BMC Medicine* 18, 264.

Michely J, **Eldar E**, Martin I, Dolan RJ. A mechanistic account of serotonin's impact on mood. *Nature Communications* 11, 2335.

Fradkin I, Ludwig C, **Eldar E**, Huppert JD**.** Doubting what you already know: uncertainty regarding state transitions is associated with obsessive compulsive symptoms. *PLOS Computational Biology* 16, e1007634.

2019 Sharp PB, **Eldar E.** Computational models of anxiety: Nascent efforts and future directions. *Current Directions in Psychological Science* 28, 170-176.

Hauser TU, **Eldar E**, Purg N, Moutoussis M, Dolan RJ. Distinct roles of dopamine and noradrenaline in incidental memory. *Journal of Neuroscience* 2, 670-681.

2018 **Eldar E**, Bae GJ, Kurth-Nelson Z, Dayan P, Dolan RJ. Magnetoencephalography decoding reveals structural differences within integrative decision processes. *Nature Human Behaviour* 2, 670–681.

**Eldar E**, Roth C, Dayan P, Dolan RJ. Decodability of reward learning signals predicts mood fluctuations. *Current Biology* 9, 1433–1439.

2017 Hauser TU, **Eldar E**, Dolan RJ. Separate mesocortical and mesolimbic pathways encode effort and reward learning signals. *Proceedings of the National Academy of Sciences* 114, E7395–E7404.

Mason L, **Eldar E**, Rutledge RB. Mood instability and reward dysregulation: a neuro-computational model of bipolar disorder. *JAMA Psychiatry* 74, 1275–1276.

Moutoussis M, **Eldar E**, Dolan RJ. Building a new field of computational psychiatry. *Biological Psychiatry* 82, 388–390.

2016 **Eldar E**, Hauser TU, Dayan P, Dolan RJ. Striatal structure and function predict individual biases in learning to avoid pain. *Proceedings of the National Academy of Sciences* 113, 4812–4817.

**Eldar E**, Niv Y, Cohen JD. Do you see the forest or the tree? Neural gain and breadth versus focus in perceptual processing. *Psychological Science* 12, 1632–1643.

**Eldar E**, Rutledge RB, Dolan RJ, Niv Y. Mood as representation of momentum. *Trends in Cognitive Sciences* 20, 15–24.

**Eldar E**, Cohen JD, Niv Y. Amplified selectivity implements the neural gain model of norepinephrine function. *Behavioral and Brain Sciences* 39, e206.

Warren CM, **Eldar E**, van den Brink RL, Tona KD, van der Wee NJ, Giltay EJ, van Noorden MS, Bosch JA, Wilson RC, Cohen JD, Nieuwenhuis S. Norepinephrine-mediated increases in gain enhance the precision of cortical representations. *Journal of Neuroscience* 36, 5699-5708.

Hauser TU, **Eldar E**, Dolan RJ. Neural mechanisms of harm avoidance learning – a model for obsessive-compulsive disorder? *JAMA Psychiatry* 73: 1196–1197.

Gonen T, Soreq E, **Eldar E**, Ben Simon E, Raz G, Hendler T. Human mesostriatal response tracks motivational tendencies under naturalistic goal-conflict. *Social Cognitive and Affective Neuroscience* 11, 961-972.

Whitaker KJ, Vertes PE, Romero-Garcia R, Vasa F, Moutoussis M, Prabhu G, Weiskopf N, Callaghan MF, Wagstyl K, Rittman T, Tait R, Ooi C, Suckling J, Inkster B, Fonagy P, Dolan RJ, Jones PE, Goodyer IM, **NSPN Consortium**, Bullmore ET. Adolescence is associated with genomically patterned consolidation of the hubs of the human brain connectome. *Proceedings of the National Academy of Sciences* 113, 9105–9110.

2015 **Eldar E**, Niv Y. Interaction between emotional state and learning underlies mood instability. *Nature Communications* 6, 6149.

2013 **Eldar E**, Cohen JD, Niv Y. The effects of neural gain on attention and learning. *Nature Neuroscience* 16, 1146–1153.

2011 **Eldar E**, Morris G, Niv Y. The effects of motivation on response rate: a hidden semi-Markov model analysis of behavioral dynamics. *Journal of Neuroscience Methods* 201, 251–261.

2007 **Eldar E**, Ganor O, Admon R, Bleich A, Hendler T. Feeling the real world: limbic response to music depends on related content. *Cerebral Cortex* 17, 2828–2840.

**Supervising**

*Postdoctoral*

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| 2021 – 2023 | Aviv Emanuel | |
| 2019 – 2023 | Paul B. Sharp | |
| 2019 – 2021 | Isaac Fradkin | |

*Doctoral*

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| Since 2021 | Boaz Rosenberg | PhD in Psychology |

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| Since 2020 | Chaviva Moshavi | PhD in Neuroscience |
| Since 2019 | Alon Erdman | PhD in Psychology |
| Since 2019 | Levi Solomyak | PhD in Cognitive and Brain Sciences |
| 2018 – 2023 | Tal Nahari (co-advisor) | PhD in Cognitive and Brain Sciences |
| 2018 – 2023 | Maayan Cohen (co-advisor) | PhD in Occupational Therapy |

*Master*

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|---|---|---|
| Since 2023 | Danielle Babitz | MSc in Neuroscience |
| Since 2021 | Yuval Shalev | MA in Cognitive and Brain Sciences |
| 2022 – 2024 | Yuval Koryto | MA in Psychology |
| 2018 – 2021 | Ran Cohen | MA in Cognitive and Brain Sciences |
| 2016 – 2017 | Charlotte Roth | MSc in Brain and Mind Sciences |
| 2016 – 2017 | Gaëlle Lièvre | MSc in Social Cognition |
| 2015 – 2016 | Gyung Jin Bae | MSc in Cognitive and Decision Neuroscience |