

# **Jonathan D. Cohen**

## ***Curriculum Vitae***

*(hyperlinks are in gray)*

### **TABLE OF CONTENTS**

SUMMARY

BIOGRAPHICAL

APPOINTMENTS and POSITIONS

HONORS and AWARDS

PUBLICATIONS

1. Peer-Reviewed Articles
2. Invited Reviews, Commentary, Chapters, Edited Volumes & Technical Reports
3. Books
4. Published Abstracts
5. Manuscripts Under Review / In Preparation

TEACHING:

1. Courses
2. Tutorials and Workshops
3. Trainees

RESEARCH AND PROFESSIONAL ACTIVITIES

1. Grants
2. Invited Lectureships
3. Other research-related activities
  - Advisory Boards and Councils
  - Editorial Boards
  - Grant Review
  - Conference Organization
  - Membership in Professional Organizations
  - Software Development

## SUMMARY

I am a cognitive neuroscientist, with over three decades of research experience in computational and mathematical modeling as well as empirical studies of human brain function and behavior, focusing on the neural mechanisms responsible for cognitive control and human intelligence, and how our growing understanding of these can be brought to bear in the design of computational architectures with more human-like cognitive capabilities. My work lies at the points of contact between neuroscience, psychology, computer science and mathematics, as well as behavioral economics and psychiatry, and involves collaborations with investigators in each of these fields. I also have considerable experience in the coordination and administration of scientific research, as one of the two founding Co-Directors of the Princeton Neuroscience Institute, leading multi-institutional projects (NIHM Conte Center; Templeton Center Grant; NSF Convergence Accelerator grant; PNI-Intel Labs collaboration), and a number open source software development projects.

**Theoretical contributions.** Some of the contributions that have emerged from the theoretical work of my colleagues and I are: the first computationally-explicit models of how cognitive control may be implemented in the brain [4] and the role of prefrontal cortex in control [76]; the role of dopaminergic function in the gating and updating of information in prefrontal cortex [5,56], noradrenergic regulation of the explore/exploit tradeoff [55,103,127], and the interaction of these modulatory systems in adaptive regulation of exploration in reinforcement learning [111]; how these mechanisms may be disturbed in psychiatric disorders [8,53,110]; the role of anterior cingulate cortex in performance monitoring [61,102,182] and the optimal allocation of control [175,212]; mathematical analysis of optimal control of simple decision making processes [118,152]; normative approaches to understanding capacity constraints associated with working memory [68,143] and cognitive control [181,249,X,211]; and how the brain regulates the balance between flexible control-dependent and efficient automatic processing [218,X]. Increasingly, our work has come to focus on how these mechanisms contribute to higher cognitive functions and human intelligence, such as the control of memory, planning, and abstract reasoning [221,238,239,253], including ways in which the human brain achieves the flexibility of symbolic forms of computation [115,173,252,258] while preserving the efficiency of computation in neural networks, and how this can be used to inform research in machine learning and artificial intelligence [256,265,X, Y].

**Empirical and methodological contributions.** The theoretical work summarized above has served as the foundation for a number of empirical and methodological contributions. Empirical contributions include: the first demonstrations in humans of sustained activity in PFC associated with working memory performance [15,34]; the distinction between the roles of dorsolateral PFC (in the regulatory functions of control) and anterior cingulate cortex (monitoring and evaluative functions of control [40,51,58,92]; and the role of the locus coeruleus / norepinephrine system in regulating the explore-exploit tradeoff [156,206]. We have also made influential contributions to advances in quantitative methods in cognitive neuroscience, including: the introduction of cluster size correction into the analysis of fMRI data [42]; the use of fMRI to directly study midbrain neuromodulatory nuclei [132]; the design of systems for realtime fMRI analysis [22,260] and closed-loop feedback designs [185,247]; and whole brain, full correlation analysis of fMRI data and its use in realtime analysis [X,178]. Finally, I have lead or co-lead several large software development projects, including: PsyScope [10], the first graphical environment for the design and execution of cognitive behavioral experiments; BrainIAK [244,260] (in collaboration with Intel Labs), an open-source, python-based toolbox for the implementation and optimization of advanced methods of brain image analysis; PsyNeuLink, an open-source, python-based environment for the design and exchange of computational models of brain and cognitive function; SweetPea [254], a framework for specifying empirical experimental designs and machine learning training environments using factorial structure, and generating maximally unbiased sampling of trials; and a model description format [263] for expressing models of brain and cognitive function as computational graphs in machine readable form for exchange across modeling environments.

**BIOGRAPHICAL**

**Business Address:** Princeton Neuroscience Institute  
 Princeton University  
 Princeton, New Jersey 08544

**Birth Date:** 10/5/55  
**Birth Place:** New York City  
**Citizenship:** U.S.A.

**Business Phone:** (609) 258-2696 (voice)

**E-mail:** [jdc@princeton.edu](mailto:jdc@princeton.edu)  
**Home page:** <https://jdc.princeton.edu>

**EDUCATION and TRAINING****UNDERGRADUATE:**

1973-77 Yale University B.A., 1977 Biology and Philosophy

**GRADUATE:**

1979-83 University of Pennsylvania M.D., 1983 Medicine  
 1987-90 Carnegie Mellon University Ph.D., 1990 Cognitive Psychology

**POST-GRADUATE:**

1983-89 Internship in General Medicine, Neurology and Psychiatry  
 Residency in Psychiatry  
 Stanford University School of Medicine

1985-87 NIMH Research Training Fellowship,  
 Department of Psychiatry and Behavioral Sciences  
 Stanford University School of Medicine

**APPOINTMENTS and POSITIONS****ACADEMIC:**

1989- 2005	Assistant to Full Professor of Psychiatry Western Psychiatric Institute and Clinic University of Pittsburgh
1990-98	Assistant to Associate Professor of Psychology Carnegie Mellon University
1992- present	Director, Clinical Cognitive Neuroscience Laboratory University of Pittsburgh
1998- 2005	Professor of Psychology, Princeton University
1999- 2007	Founding Director, Center for the Study of Brain, Mind and Behavior Princeton University
2000- 2008	Director, Program in Neuroscience Princeton University
2005- 2012	Eugene Higgins Professor of Psychology, Princeton University
2005- 2022	Founding Co-Director, Princeton Neuroscience Institute
2007- present	Director, Scully Center for the Neuroscience of Mind and Behavior
2012- present	Robert Bendheim and Lynn Bendheim Thoman Professor in Neuroscience Princeton University
2023- present	Director, Graduate Certificate Program in Statistics and Machine Learning Princeton University

**HONORS and AWARDS**

B.A. Cum Laude Distinction in the Biology Major Distinction in the Philosophy Major Yale University	1977
Miller Foundation Prize for Research in Psychiatry Department of Psychiatry and Behavioral Sciences Stanford University School of Medicine	1986
Annual Resident Research Award Northern California Psychiatric Society	1986
Joseph Zubin Memorial Fund Award for Research in Psychopathology	1993
Kempf Fund Award for Research Development in Psychobiological Psychiatry, American Psychiatric Association	2000
James McKeen Cattell Fund Sabbatical Fellowship Award	2003
Eugene Higgins Chaired Professorship, Princeton University	2005
Salmon Award Lecturer, New York Academy of Medicine	2006
Fellow, Association for Psychological Science	2007
Edward J. Sachar Award, Columbia University School of Medicine	2007
American Psychological Association Distinguished Scientific Contribution Award	2010
Fellow, American Association for the Advancement of Science	2012
William James Fellow Award, Association for Psychological Science	2018
Fellow, Cognitive Science Society	2019
Vannevar Bush Faculty Fellowship, Office of the Under Secretary of Defense for Research & Engineering	2021
Member, American Academy of the Arts & Sciences	2022
Lifetime Achievement Award, Society for Experimental and Cognitive Science, Division 3 of the American Psychological Association	2022

## PUBLICATIONS

### 1. Peer-Reviewed Articles and Competitively-Reviewed Conference Papers

1. Cohen JD, Van Putten T, Marder S, Berger PA & Stahl SM (1987). Treatment of the symptoms of schizophrenia with piquindone, a new atypical neuroleptic. *Psychopharmacology Bulletin*, 23(3), 514-518.
2. Cohen JD, Van Putten T, Marder S, Berger PA & Stahl SM. (1987). The efficacy of piquindone, a new atypical neuroleptic, in the treatment of the positive and the negative symptoms of schizophrenia. *Journal of Clinical Psychopharmacology*, 7(5), 324-329.
3. Servan-Schreiber D, Printz H & Cohen JD (1989). The effect of catecholamines on performance: From unit to system behavior. In D. S. Touretzky (Ed.), *Advances in Neural Information Processing Systems 2*. San Mateo, CA: Morgan Kaufman. [Collected papers of the IEEE Conference on Neural Information Processing Systems - Natural and Synthetic, Denver, Nov. 27-Nov. 30, 1989.]
4. Cohen JD, Dunbar K & McClelland JL (1990). On the control of automatic processes: A parallel distributed processing model of the Stroop effect. *Psychological Review*, 97(3), 332-361.
5. Servan-Schreiber D, Printz H & Cohen JD (1990). A network model of catecholamine effects: Gain, signal-to-noise ratio, and behavior. *Science*, 249, 892-895.
6. Servan-Schreiber D & Cohen JD (1991). Models of neuromodulation and information processing deficits in schizophrenia. *Revue Internationale de Psychopathologie*, 1, 113-134.
7. Servan-Schreiber D & Cohen JD (1991). Network models of neuromodulation and information processing deficits in schizophrenia. *Proceedings of the 12th Annual Meeting of the Cognitive Science Society*.
8. Cohen JD & Servan-Schreiber D (1992). Context, cortex and dopamine: A connectionist approach to behavior and biology in schizophrenia. *Psychological Review*, 99, 45-77.
9. Cohen JD, Servan-Schreiber D & McClelland JL (1992). A parallel distributed processing approach to automaticity. *American Journal of Psychology*, 105, 239-269.
10. Cohen JD, MacWhinney B, Flatt M & Provost J (1993). PsyScope: A new graphic interactive environment for designing psychology experiments. *Behavioral Research Methods, Instruments & Computers*, 25(2), 257-271.
11. Cohen JD, Noll DC & Schneider W (1993). Functional Magnetic Resonance Imaging: Overview and methods for psychological research. *Behavioral Research Methods, Instruments & Computers*, 25(2), 101-113.
12. Cohen JD & Servan-Schreiber D (1993). A theory of dopamine function and cognitive deficits in schizophrenia. *Schizophrenia Bulletin*, 19(1), 85-104.
13. Forman SD, Cohen JD & Johnson MH (1993). Frontal eye fields: Inhibition through competition. *Behavioral and Brain Sciences*, 6, 578.

14. Schneider W, Noll DC & Cohen JD (1993). Functional topographic mapping of the cortical ribbon in human vision with conventional MRI scanners. *Nature*, 365, 150-153.
15. Cohen JD, Forman SD, Braver TS, Casey BJ, Servan-Schreiber D & Noll DC (1994). Activation of prefrontal cortex in a non-spatial working memory task with functional MRI. *Human Brain Mapping*, 1, 293-304.
16. Cohen JD & Huston TA (1994). Progress in the use of parallel distributed processing models for understanding attention and performance. In Umiltà C. and Moscovitch M. (Eds.), *Attention and Performance XV: Conscious and Nonconscious Information Processing*. Cambridge, MA: MIT Press, pp. 453-476.
17. Cohen JD, Romero RD, Servan-Schreiber, D & Farah MJ (1994). Mechanisms of spatial attention: The relation of macrostructure to microstructure in parietal neglect. *Journal of Cognitive Neuroscience*, 6(4), 377-387.
18. Armony JL, Servan-Schreiber D, Cohen JD & LeDoux JE (1995). An anatomically-constrained neural network model of fear conditioning. *Behavioral Neuroscience*, 109(2), 246-256.
19. Braver TS, Cohen JD & Servan-Schreiber D (1995). A computational model of prefrontal cortex function. *Advances in Neural Information Processing Systems*, 7.
20. Carter CS, Mintun M & Cohen JD (1995). Interference and facilitation effects during selective attention: An [15O]-H<sub>2</sub>O PET study of Stroop task performance. *NeuroImage*, 2, 264-272.
21. Casey BJ, Cohen JD, Jezzard P, Turner R, Noll DC, Trainor R, Giedd J, Pannier L, Kaysen D & Rapoport JL (1995). Activation of prefrontal cortex in children during a non-spatial working memory task with functional MRI. *NeuroImage*, 2, 221-229.
22. Forman SD, Cohen JD, Fitzgerald M, Eddy WF, Mintun MA & Noll DC (1995). Improved assessment of significant activation in functional magnetic resonance imaging (fMRI): Use of a cluster-size threshold. *Magnetic Resonance in Medicine*, 33, 636-647.
23. Noll DC, Cohen JD, Meyer CH & Schneider W (1995). Spiral k-space MR imaging of cortical activation. *Journal of Magnetic Resonance Imaging*, 45, 49-56.
24. Barch D, Cohen JD, Servan-Schreiber D, Steingard S, Steinhauer S & van Kammen D (1996). Semantic priming in schizophrenia: An examination of spreading activation using word pronunciation and multiple SOAs. *Journal of Abnormal Psychology*, 105, 592-601.
25. Cohen JD, Braver TS & O'Reilly RC (1996). A computational approach to prefrontal cortex, cognitive control, and schizophrenia: Recent developments and current challenges. *Philosophical Transactions of the Royal Society of London Series B (Biological Sciences)*, 351(1346), 1515-1527.
26. Servan-Schreiber D, Cohen JD & Steingard S (1996). Schizophrenic deficits in the processing of context: A test of a theoretical model. *Archives of General Psychiatry*, 53, 1105-1112.
27. Armony JL, Servan-Schreiber D, Cohen JD & LeDoux JE (1997). Computational modeling of emotion: Explorations through the anatomy and physiology of fear conditioning. *Trends in Cognitive Sciences*, 1, 28-34.

28. Armony JL, Servan-Schreiber D, Romanski LM, Cohen JD & LeDoux JE (1997). Stimulus generalization of fear responses: Effects of auditory cortex lesions in a computational model and in rats. *Cerebral Cortex*, 7, 157-165.
29. Barch DM, Braver TS, Nystrom LE, Forman SD, Noll DC & Cohen JD (1997). Dissociating working memory from task difficulty in human prefrontal cortex. *Neuropsychologia*, 35, 1373-1380.
30. Berns GS, Cohen JD & Mintun MA (1997). Brain regions responsive to novelty in the absence of awareness. *Science*, 276, 1272-1275.
31. Braver, TS, Cohen JD, Jonides J, Smith EE & Noll DC (1997). A parametric study of prefrontal cortex involvement in human working memory. *NeuroImage*, 5(1), 49-62.
32. Carter CS, Mintun M, Nichols T & Cohen JD (1997). Anterior cingulate gyrus dysfunction and selective attention dysfunction in schizophrenia: An 15OH20 PET study during Stroop task performance. *American Journal of Psychiatry*, 154, 1670-1675.
33. Casey BJ, Trainor RJ, Orendi JL, Schubert AB, Nystrom, LE, Giedd J, Castellanos X, Haxby J, Noll DC, Cohen JD, Forman SD, Dahl RE & Rapoport JL (1997). A developmental functional MRI study of prefrontal activation during performance of a Go-No-Go task. *Journal of Cognitive Neuroscience*, 9, 835-847.
34. Cohen JD, Perlstein WM, Braver TS, Nystrom LE, Noll DC, Jonides J & Smith EE (1997). Temporal dynamics of brain activation during a working memory task. *Nature*, 386, 604-608.
35. Genovese CR, Noll DC, Cohen JD & Eddy WF (1997). Estimating test-retest reliability in functional MR imaging I: Statistical methodology. *Magnetic Resonance in Medicine*, 38, 497-507.
36. Goddard N, Hood G, Cohen JD, Eddy WF, Genovese CR & Noll DC (1997). Parallel online analysis of functional MRI datasets. *Journal of Supercomputing*, 11, 295-318.
37. MacWhinney B, Cohen J & Provost J (1997). The PsyScope experiment-building system. *Spatial Vision*, 11, 99-101.
38. Noll DC, Genovese CR, Nystrom L, Vazquez A, Forman SD, Eddy WF & Cohen JD (1997). Estimating test-retest reliability in functional MR imaging II: Application to motor and cognitive activation studies. *Magnetic Resonance in Medicine*, 38, 508-517.
39. Botvinick MM & Cohen JD (1998). Rubber hands 'feel' touch that eyes see. *Nature*, 391, 756.
40. Carter CS, Braver TS, Barch DM, Botvinick MM, Noll DC & Cohen JD (1998). Anterior cingulate cortex, error detection and the on-line monitoring of performance. *Science*, 280, 747-749.
41. Carter CS, Perlstein P, Ganguli R, Brar J, Mintun M & Cohen JD (1998). Functional hypofrontality and working memory dysfunction in schizophrenia. *American Journal of Psychiatry*, 155(9), 1285-1287.



42. Casey, BJ, Cohen JD, O'Craven K, Davidson RJ, Irwin W, Nelson CA, Noll DC, Hu X, Lowe MJ, Rosen BR, Truwitt CL & Turski PA (1998). Reproducibility of fMRI results across four institutions using a spatial working memory task. *Neuroimage* 8(3), 249-61.
43. Cohen JD, Usher M & McClelland JL (1998). A PDP approach to set size effects within the Stroop task: Reply to Kanne, Balota, Spieler, and Faust (1998). *Psychological Review*, 105.
44. Servan-Schreiber D, Bruno R, Carter C & Cohen JD (1998). Dopamine and the mechanisms of cognition. Part I: A neural network model predicting dopamine effects on selective attention. *Biological Psychiatry*, 43, 713-722.
45. Servan-Schreiber D, Carter C, Bruno R & Cohen JD (1998). Dopamine and the mechanisms of cognition. Part II: D-Amphetamine effects in human subjects performing a selective attention task. *Biological Psychiatry*, 43, 723-729.
46. Servan-Schreiber D, Perlstein WM, Cohen JD & Mintun M (1998). Selective pharmacological activation of limbic structures in human volunteers: A positron emission tomography study. *The Journal of Neuropsychiatry and Clinical Psychiatry*, 10, 148-159
47. Aston-Jones G, Rajkowski J & Cohen J (1999). Role of locus coeruleus in attention and behavioral flexibility. *Biological Psychiatry*, 46, 1309-1320.
48. Barch DM, Carter CS, Braver TS, Sabb FW, Noll DC & Cohen JD. (1999). Overt verbal responding during fMRI scanning: Empirical investigations of problems and potential solutions. *Neuroimage*, 10(6), 642-657.
49. Barch DM, Carter CS, Hachten PC and Cohen JD (1999). The "benefits" of distractibility: The mechanisms underlying increased Stroop effects in schizophrenia. *Schizophrenia Bulletin*, 24(4), 749-762.
50. Barch DM, Carter CS, Perlstein WM, Baird J, Cohen JD & Schooler N (1999). Increased Stroop facilitation effects in schizophrenia are not due to increased automatic spreading activation. *Schizophrenia Research*, 39(1), 51-64.
51. Botvinick MM, Nystrom L, Fissell K, Carter CS & Cohen JD (1999). Conflict monitoring vs. selection-for-action in anterior cingulate cortex. *Nature*, 402(6758), 179-181.
52. Braver TS, Barch DM & Cohen JD (1999). Cognition and control in schizophrenia: A computational model of dopamine and prefrontal function. *Biological Psychiatry*, 46(3), 312-328.
53. Cohen JD, Barch DM, Carter CS & Servan-Schreiber D (1999). Context-processing deficits in schizophrenia: converging evidence from three theoretically motivated cognitive tasks *Journal of Abnormal Psychology*, 108, 120-133.
54. Condray R, Steinhauer SR, Cohen JD, van Kammen DP & Kasperek A (1999). Modulation of language processing in schizophrenia: Effects of context and haloperidol on the event-related potential. *Biological Psychiatry*, 45(10), 1336-55.
55. Usher M, Cohen JD, Rajkowski J, Kubiak P & Aston-Jones G (1999). The role of locus coeruleus in the regulation of cognitive performance. *Science*, 283, 549-554.

56. Braver TS & Cohen JD (2000). On the control of control: The role of dopamine in regulating prefrontal function and working memory. In Monsell S & Driver J (Eds.), *Attention and Performance XVIII; Control of Cognitive Processes*, pp. 713-737.
57. Carter CS, Macdonald AM, Botvinick M, Ross LL, Stenger VA, Noll D & Cohen JD (2000). Parsing executive processes: strategic vs. evaluative functions of the anterior cingulate cortex. *Proceedings of the National Academy of Sciences, USA*, 97(4), 1944-1948.
58. MacDonald AW, Cohen JD, Stenger VA & Carter CS (2000). Dissociating the role of dorsolateral prefrontal cortex and anterior cingulate cortex in cognitive control. *Science*, 288, 1835-1837.
59. Nystrom LE, Braver TS, Sabb FW, Delgado MR, Noll DC & Cohen JD (2000). Working memory for letters, shapes and locations: fMRI evidence against stimulus-based regional organization of human prefrontal cortex. *Neuroimage*, 11, 424-446.
60. Barch DM, Carter CS, Braver TS, Sabb FW, MacDonald A, Noll DC & Cohen JD (2001). Selective deficits in prefrontal cortex function in medication naïve patients with schizophrenia. *Archives of General Psychiatry*, 58, 280-8.
61. Botvinick, MM, Braver TS, Carter CS, Barch DM & Cohen JD (2001). Conflict monitoring and cognitive control. *Psychological Review*, 108(3) 624-652.
62. Braver TS, Barch DM, Keys BA, Carter CS, Cohen JD, Kaye JA, Janowsky JS, Taylor SF, Yesavage JA, Mummenthaler MS, Jagust WJ & Reed B (2001). Context processing in older adults: Evidence for a theory relating cognitive control to neurobiology in healthy aging. *Journal of Experimental Psychology: General*, 130, 746-763.
63. Braver TS & Cohen JD (2001). Working memory, cognitive control, and the prefrontal cortex: Computational and empirical studies. *Cognitive Processing*, 2, 25-55.
64. Greene JD, Sommerville RB, Nystrom LE, Darley JM & Cohen JD (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293, 2105-2108.
65. Perlstein WM, Carter CS, Noll DC & Cohen JD (2001). fMRI evidence of prefrontal cortex dysfunction in schizophrenia during parametric manipulation of working memory load. *American Journal of Psychiatry*, 158, 1105-1113.
66. Organization of Human Brain Mapping, Governing Council (2001). Neuroimaging databases. *Science*, 292, 1673-1676.
67. van Veen V, Cohen JD, Botvinick MM, Stenger VA & Carter CS (2001). Anterior cingulate cortex, conflict monitoring, and levels of processing. *Neuroimage*, 14, 1302-1308 (2001)
68. Usher M, Haarmann H, Cohen JD & Horn D (2001). Neural mechanism for the magical number 4: competitive interactions and non-linear oscillations. *Behavioral and Brain Sciences*, 24, p. 151.
69. Cho RY, Nystrom LE, Brown E, Jones AD, Braver TS, Holmes P, & Cohen JD (2002). Mechanisms underlying performance dependencies on stimulus history in a two-alternative forced choice task. *Cognitive, Affective and Behavioral Neuroscience*, 2(4), 283-299.

70. Cohen JD, Braver TS & Brown JW (2002). Computational perspectives on dopamine function in prefrontal cortex. *Current Opinion in Neurobiology*, 12, 223–229.
71. Davidson RJ, Lewis DA, Alloy L, Amaral D, Bush G, Cohen JD, Drevets W, Farah M, Kagan J, McClelland JL, Nolen-Hoeksema S & Peterson B (2002). Neural and behavioral substrates of mood and mood regulation. *Biological Psychiatry*, 52(6), 478-502.
72. Fissell K, Tseytlin E, Cunningham D, Karthickeyan I, Carter CS, Schneider W & Cohen JD (2002). Fiswidgets: A graphical computing environment for neuroimaging analysis. *Neuroinformatics*, 1, 111-125.
73. Gilzenrat MS, Holmes BD, Holmes PJ, Rajkowski J, Aston-Jones G & Cohen JD (2002). A modified Fitzhugh-Nagumo system simulates locus coeruleus-mediated regulation of cognitive performance. *Neural Networks*, 15, 647-663.
74. Graziano M, Cohen JD & Botvinick MM (2002). How the brain represents the body. In Prinz W and Hommel B (Eds.), *Attention and Performance XIX: Common Mechanisms in Perception and Action*. Oxford, UK: Oxford University Press, pp. 136-157.
75. Jones AD, Cho R, Nystrom LE, Cohen JD & Braver TS (2002). A computational model of anterior cingulate function in speeded response tasks: Effects of frequency, sequence and conflict. *Cognitive, Affective and Behavioral Neuroscience*, 2(4), 300-317.
76. Miller EK & Cohen JD (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, 24, 167-202.
77. Montague PR, Berns GS, Cohen JD, McClure SM, Pagnoni G, Dhamala M, Wiest MC, Karpov I, King RD, Apple N & Fisher RE (2002) Hyperscanning: Simultaneous fMRI during linked social interactions. *NeuroImage*, 16(4), 1159-64.
78. O'Reilly RC, Noelle DC, Braver TS & Cohen JD (2002). Prefrontal cortex in dynamic categorization tasks: Representational organization and neuromodulatory control. *Cerebral Cortex*, 12, 246-257.
79. Barch, DM, Carter CS, MacDonald A, Braver TS & Cohen JD (2003). Context processing deficits in schizophrenia: Diagnostic specificity, longitudinal course, and relationships to clinical symptoms. *Journal of Abnormal Psychology*, 112, 132-143.
80. Condray R, Siegle GJ, Cohen JD, van Kammen DP & Steinhauer SR (2003). Automatic activation of the semantic network in schizophrenia: N400 elicited by a brief inter-stimulus interval. *Biological Psychiatry*, 54(11): 1134-48.
81. Holroyd CB, Nieuwenhuis S, Yeung N & Cohen JD (2003). Errors in reward prediction are reflected in the event-related brain potential. *NeuroReport*, 14(18), 2481-2484.
82. Perlstein WM, Dixit NK, Carter CS, Noll DC & Cohen JD (2003). Prefrontal cortex dysfunction mediates deficits in working memory and prepotent responding in schizophrenia. *Biological Psychiatry*, 53(1), 25-38.
83. Sanfey AG, Rilling JK, Aronson JA, Nystrom LE & Cohen JD (2003). The neural basis of economic decision-making in the ultimatum game. *Science*, 300, 1755-1757.

84. Bogacz R & Cohen JD (2004). Parameterization of connectionist models. *Behavioral Research Methods, Instruments & Computers*, 36(4), 732-741.
85. Botvinick MM, Cohen JD & Carter CS (2004). Conflict monitoring and anterior cingulate cortex: An update. *Trends in Cognitive Sciences*, 8(12), 539-546.
86. Clayton EC, Rajkowski J, Cohen JD & Aston-Jones G (2004). Phasic activation of monkey locus coeruleus neurons by simple decisions in a forced choice task. *Journal of Neuroscience*, 24(45).
87. Green MF, Nuechterlein KH, Gold JM, Barch DM, Cohen JD, Essock S, Fenton WS, Frese F, Goldberg TE, Heaton RK, Keefe RSE, Kern RS, Kraemer H, Stover E, Weinberger DR, Zalcman S, Marder SR (2004). Approaching a consensus cognitive battery for clinical trials in schizophrenia: The NIMH-MATRICES conference to select cognitive domains and test criteria. *Biological Psychiatry*, 56(5), 301-7.
88. Greene JDC & Cohen JD (2004). For the law, neuroscience changes nothing and everything. *Philosophical Transactions of the Royal Society of London Series B*, 359(1451), 1775-85. Reprinted in *Neuroethics: An Introduction with Readings (Basic Bioethics)*, Farah M (Ed.), Cambridge, MA: MIT Press, 2010; and in *Oxford Handbook of Neuroethics*, Illes J & Sahakian BJ (Eds.), Oxford: Oxford University Press, 2011.
89. Greene JDC, Nystrom LE, Engell AD, Darley JM & Cohen JD (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, 44(2), 389-400.
90. Holroyd CB, Larsen JT & Cohen JD (2004). Context dependence of the event-related brain potential associated with reward and punishment. *Psychophysiology* 41(2), 245-53.
91. Holroyd CB, Yeung N, Nieuwenhuis S, Nystrom LE, Coles MGH & Cohen JD (2004). Dorsal anterior cingulate cortex shows fMRI response to internal and external error signals. *Nature Neuroscience*, 7(5), 497-498.
92. Kerns JG, Cohen JD, MacDonald III AW, Cho RY, Stenger VA & Carter CS (2004). Anterior cingulate conflict monitoring and adjustments in control. *Science*, 303(5660), 1023-1026.
93. Kerns JG, Cohen JD, Stenger VA & Carter CS (2004). Prefrontal cortex guides context-appropriate responding during language production. *Neuron*, 43(2), 283-91.
94. McClure SM, Laibson DI, Loewenstein G & Cohen JD (2004). Separate neural systems value immediate and delayed monetary rewards. *Science*, 306, 503-507. Reprinted in *Recent Developments in Economic Psychology*, Maital S (Ed.), Cheltenham, UK: Edward Elgar Publishing Ltd., 2006; and in *New Developments in Experimental Economics*, Carbone E and Starmer C (eds.), Cheltenham, UK: Edward Elgar Publishing Ltd., 2007.
95. Montague PR, Hyman SE & Cohen JD (2004). Computational roles for dopamine in behavioural control. *Nature*, 431(7010), 760-767.
96. Nieuwenhuis S, Yeung N & Cohen JD (2004). Stimulus modality, perceptual overlap, and the Go/NoGo N2. *Psychophysiology*, 41, 157-160.

97. Nieuwenhuis S, Yeung N, Holroyd CB, Schurger A & Cohen JD (2004). Sensitivity of electrophysiological activity from medial frontal cortex to utilitarian and performance feedback. *Cerebral Cortex*, *14*, 741-747.
98. Rilling JK, Sanfey AG, Aronson JA, Nystrom LE & Cohen JD (2004). The neural correlates of theory of mind within interpersonal interactions. *Neuroimage* *22*(4), 1694-703.
99. Rilling JK, Sanfey AG, Aronson JA, Nystrom LE & Cohen JD (2004). Opposing BOLD responses to reciprocated and unreciprocated altruism in putative reward pathways. *Neuroreport*, *15*(16), 2539-2243.
100. Wager TD, Rilling JK, Smith EE, Sokolik A, Casey KL, Davidson RJ, Kosslyn SK, Rose RM & Cohen JD (2004). Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science*, *303*(5661), 1162-1167. Reprinted in *Pursuing the Placebo: Landmark Studies*, Miller FG, Kaptchuk TJ, Colloca L & Crouch RA (Eds.), Johns Hopkins University Press, 2012.
101. Yeung N, Bogacz R, Holroyd C & Cohen JD (2004). Detection of synchronized oscillations in the electroencephalogram: An evaluation of methods. *Psychophysiology*, *41*, 822-832.
102. Yeung N, Botvinick MM & Cohen JD (2004). The neural basis of error detection: conflict monitoring and the error-related negativity. *Psychological Review*, *111*(4), 931-959.
103. Aston-Jones G & Cohen JD (2005). An integrative theory of locus coeruleus-norepinephrine function: Adaptive gain and optimal performance. *Annual Review of Neuroscience*, *28*, 403-450.
104. Aston-Jones G & Cohen JD (2005). Adaptive gain and the role of the locus coeruleus-norepinephrine system in optimal performance. *Journal of Comparative Neurology*. *493*: 999-110.
105. Brown ET, Gao J, Holmes P, Bogacz R, Gilzenrat M & Cohen JD (2005). Simple neural networks that optimize decisions. *International Journal of Bifurcation & Chaos*, *15*(3): 803-826.
106. Cohen, JD (2005). The vulcanization of the human brain: A neural perspective on interactions between cognition and emotion. *Journal of Economic Perspectives*, *19*, 3-24.
107. Holmes P, Brown E, Moehlis J, Bogacz R, Gao J, Aston-Jones G, Clayton E, Rajkowski J & Cohen JD (2005). Optimal decisions: From neural spikes, through stochastic differential equations, to behavior. *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Science*, *88*(10), 2496-2503.
108. Holroyd CB, Yeung N, Coles MGH & Cohen JD (2005). A mechanism for error detection in speeded response time tasks. *Journal of Experimental Psychology: General*, *134*(2): 163–191.
109. Kerns JG, Cohen JD, MacDonald AW, 3rd, Johnson MK, Stenger VA, Aizenstein H & Carter CS (2005). Decreased conflict- and error-related activity in the anterior cingulate cortex in subjects with schizophrenia. *American Journal of Psychiatry*, *162*(10), 1833-9.
110. MacDonald III A, Carter CS, Kerns J, Ursu S, Barch DM, Holmes A, Stenger VA & Cohen JD (2005). Specificity of prefrontal dysfunction and context processing deficits to schizophrenia in

- a never medicated first-episode psychotic sample. *American Journal of Psychiatry*, 162, 475–484.
111. McClure S, Gilzenrat M and Cohen J (2005). An exploration-exploitation model based on norepinephrine and dopamine activity. *Advances in Neural Information Processing Systems*, 18.
  112. Nieuwenhuis S, Aston-Jones G & Cohen JD (2005). Decision making, the P3, and the locus coeruleus-norepinephrine system. *Psychological Bulletin*, 131(4), 510–532.
  113. Nieuwenhuis S, Gilzenrat MS, Holmes BD, Cohen JD (2005). The role of the locus coeruleus in mediating the attentional blink: A neurocomputational theory. *Journal of Experimental Psychology: General*, 134, 291–307.
  114. Polyn SM, Natu VS, Cohen JD and Norman KA (2005). Category-specific cortical activity precedes retrieval during memory search. *Science*, 310(5756), 1963–6.
  115. Rougier NP, Noelle DC, Braver TS, Cohen JD & O'Reilly RC (2005). Prefrontal cortex and the flexibility of cognitive control: Rules without symbols. *Proceedings of the National Academy of Sciences, USA*, 102(20), 7338–7343.
  116. Yeung N, Holroyd CB & Cohen JD (2005). ERP correlates of feedback and reward processing in the presence and absence of response choice. *Cerebral Cortex*, 15, 535–544.
  117. Bishop SJ, Cohen JD, Fossella J, Casey BJ & Farah MJ (2006). COMT genotype influences prefrontal response to emotional distraction. *Cognitive, Affective and Behavioral Neuroscience*, 6(1), 62–70.
  118. Bogacz R, Brown ET, Moehlis J, Hu P, Holmes P & Cohen JD (2006). The physics of optimal decision making: A formal analysis of models of performance in two-alternative forced choice tasks. *Psychological Review*, 113(4), 700–765.
  119. Montague PR, King-Casas B & Cohen JD (2006). Imaging valuation models in human choice. *Annual Review of Neuroscience*, 29, 417–48.
  120. Nitschke JB, Dixon GE, Sarinopoulos I, Short SJ, Cohen JD, Smith EE, Kosslyn SM, Rose RM & Davidson RJ (2006). Altering expectancy dampens neural response to aversive taste in primary taste cortex. *Nature Neuroscience*, 9(3), 435–42.
  121. Pizzagalli DA, Peccoralo LA, Davidson RJ & Cohen D (2006). Resting anterior cingulate activity and abnormal responses to errors in subjects with elevated depressive symptoms: A 128-channel EEG study. *Human Brain Mapping*, 27, 185–201.
  122. Sanfey AG, Loewenstein G, McClure SM & Cohen JD (2006). Neuroeconomics: cross-currents in research on decision-making. *Trends in Cognitive Sciences*, 10(3), 108–16.
  123. Simen P, Cohen JD & Holmes P (2006). Rapid decision threshold modulation by reward rate in a neural network. *Neural Networks*, 19, 1013–26.
  124. Yeung N & Cohen JD (2006). The impact of cognitive deficits on conflict monitoring: Predictable dissociations between the ERN and N2. *Psychological Science*, 17(2), 164–171.

125. Yeung N, Nystrom LE, Aronson JA & Cohen JD (2006). Between-task competition and cognitive control in task switching. *Journal of Neuroscience*, 26(5), 1429-1438.
126. Bogacz R, McClure SM, Li J, Cohen JD & Montague PR (2007). Short-term memory traces for action bias in human reinforcement learning. *Brain Research*, 1153, 111-21.
127. Cohen JD, McClure SM & Yu AJ (2007). Should I stay or should I go? How the human brain manages the tradeoff between exploitation and exploration. *Philosophical Transactions of the Royal Society of London Series B (Biological Sciences)*, 362(1481): 933-42.
128. Harris LT, McClure SM, van den Bos W, Cohen JD & Fiske ST (2007). Regions of MPFC differentially tuned to social and non-social affective evaluation. *Cognitive, Affective and Behavioral Neuroscience*, 7(4), 309-16.
129. McClure SM, Ericson KM, Laibson DI, Loewenstein G, & Cohen JD (2007). Time discounting for primary rewards. *Journal of Neuroscience*, 27(21), 5796-5804.
130. van den Bos W, McClure SM, Harris LT, Fiske ST & Cohen JD (2007). Dissociating affective evaluation and social cognitive processes in the ventral medial prefrontal cortex. *Cognitive, Affective and Behavioral Neuroscience*, 7(4), 337-46.
131. Yeung N, Bogacz R, Holroyd CB, Nieuwenhuis S & Cohen JD (2007). Theta phase resetting and the error-related negativity. *Psychophysiology*, 44, 39-49.
132. D'Ardenne K, McClure SM, Nystrom LE & Cohen JD (2008). BOLD responses in the dopaminergic ventral tegmental area during a classical conditioning task. *Science*, 319(5867), 1264-7.
133. Fales CL, Barch DM, Rundle MM, Mintun MA, Snyder AX, Cohen JD, Mathews J & Sheline YI (2008). Altered emotional interference processing in affective and cognitive-control brain circuitry in major depression. *Biological Psychiatry*, 63(4), 377-384.
134. Greene JD, Cushman FA, Stewart LE, Lowenberg K, Nystrom LE & Cohen JD. (2008). Pushing moral buttons: The interaction between personal force and intention in moral judgment. *Cognition*, 111, 364-371.
135. Greene JD, Morelli SA, Lowenberg K, Nystrom LE & Cohen JD (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, 107, 1144-54.
136. Kroger JK, Nystrom LE, Cohen JD, & Johnson-Laird PN (2008). Distinct neural substrates for deductive and mathematical processing. *Brain Research*, 1243, 83-103.
137. Liu Y, Holmes P & Cohen JD (2008). A neural network model of the Eriksen task: Reduction, analysis, and data fitting. *Neural Computation*, 20(2), 345-73.
138. Loewenstein G, Rick S and Cohen JD (2008). Neuroeconomics. *Annual Review of Psychology*, 59, 18.1-18.26.
139. Nuechterlein KH, Green MF, Kern RS, Baade LE, Barch D, Cohen JD, Essock S, Fenton WS, Frese FJ, Gold JM, Goldberg T, Heaton R, Keefe RSE, Kraemer H, Mesholam-Gately R, Seidman LJ, Stover E, Weinberger D, Young AS, Zalcman S & Marder SR (2008). The

- MATRICES Consensus Cognitive Battery: Part 1. Test selection, reliability, and validity. *American Journal of Psychiatry*, 165(2), 203-13.
140. Pochon J-P, Riis J, Sanfey A, Nystrom L, Cohen JD (2008). Functional imaging of decision conflict. *Journal of Neuroscience*, 28(13), 3468-73.
  141. Schurger A, Cowey A, Cohen JD, Treisman A & Tallon-Baudry C (2008). Distinct and independent correlates of attention and awareness in a hemianopic patient. *Neuropsychologia*, 46(8), 2189-2197
  142. Shea-Brown ET, Gilzenrat MS, & Cohen JD (2008). Optimization of decision making in multilayer networks: The role of Locus Coeruleus. *Neural Computation*, 20, 2863-2894.
  143. Todd M, Niv Y & Cohen JD (2008). Learning to use working memory in partially observable environments through dopaminergic reinforcement. *Advances in Neural Information Processing Systems*, 20.
  144. Yu A & Cohen JD (2008). Sequential effects: Superstition or rational behavior? *Advances in Neural Information Processing Systems*, 20.
  145. van den Bos W, Li J, Lau T, Maskin E, Cohen JD, Montague PR & McClure SM (2008). The value of victory: social origins of the winner's curse in common value auctions. *Judgment and Decision Making*, 3(7), 483-492.
  146. Barch DM, Carter CS, Arnsten A, Buchanan RW, Cohen JD, Geyer M, Green MF, Krystal JH, Nuechterlein K, Robbins T, Silverstein S, Smith EE, Strauss M, Wykes T, & Heinssen R. (2009). Selecting paradigms from cognitive neuroscience for translation into use in clinical trials: Proceedings of the third CNTRICS meeting. *Schizophrenia Bulletin*, 35, 109-14.
  147. Carter CS, Barch DM, Buchanan RW, Bullmore E, Krystal JH, Cohen JD, Geyer M, Green MF, Nuechterlein KH, Robbins T, Silverstein S, Smith EE, Strauss M & Wykes T & Heinssen R (2008). Identifying cognitive mechanisms targeted for treatment development in schizophrenia: An overview of the first meeting of the Cognitive Neuroscience Treatment Research to Improve Cognition in Schizophrenia (CNTRICS) initiative. *Biological Psychiatry*, 64(1): 4-10.
  148. Cho RY, Orr JM, Cohen JD & Carter CS (2009). Generalized signaling for control: Evidence from post-conflict and post-error performance adjustments. *Journal of Experimental Psychology: Human Perception and Performance*, 35, 1161-1177.
  149. Daubechies I, Roussos E, Takerkart S, Benharrosh M, Golden C, D'Ardenne K, Richter W, Cohen JD & Haxby J (2009). ICA for brain fMRI does NOT select for independence. *Proceedings of the National Academy of Sciences, USA*, 106, 10415-10422.
  150. Gao J, Wong-Lin KF, Holmes P, Simen P & Cohen JD (2009). Sequential effects in two-choice reaction time tasks: Decomposition and synthesis of mechanisms. *Neural Computation*, 21, 2407-2436.
  151. Simen P & Cohen JD (2009). Explicit melioration by a neural diffusion model. *Brain Research*, 1299, 95-117.



152. Simen P, Contreras-Ros D, Buck C, Hu P, Holmes P & Cohen JD (2009). Reward rate optimization in two-alternative decision making: Empirical tests of theoretical predictions. *Journal of Experimental Psychology: Human Perception and Performance*, 35, 1865-1897.
153. Yu AJ, Dayan P & Cohen JD (2009). Attentional control: Toward a rational Bayesian account. *Journal of Experimental Psychology: Human Perception and Performance*, 35(3), 700-17.
154. Bogacz R, Hu PT, Holmes P & Cohen JD (2010). Do humans produce the speed-accuracy tradeoff that maximizes reward rate? *Quarterly Journal of Experimental Psychology*, 63(5), 863-891.
155. Gershman SJ, Cohen JD & Niv Y (2010). Learning to selectively attend. In *Proceedings of the Annual Meeting of the Cognitive Science Society*, 32(32). <https://www.frontiersin.org/articles/10.3389/fpsyg.2013.00623/full>.
156. Gilzenrat MS, Nieuwenhuis S & Cohen JD (2010). Pupil Diameter Tracks Changes in Control State Predicted by the Adaptive Gain Theory of Locus Coeruleus Function. *Cognitive, Affective and Behavioral Neuroscience*, 10(2), 252-269.
157. Lenartowicz A, Escobedo-Quiroz R & Cohen JD (2010). Updating of context in working memory: An event related potential study. *Cognitive, Affective and Behavioral Neuroscience*, 10(2), 298-315.
158. Schurger A, Pereira F, Treisman A & Cohen JD (2010). Reproducibility of activity characterizes conscious from non-conscious neural representations. *Science*, 327(5961), 97-9.
159. Wong-Lin KF, Eckhoff P, Holmes P & Cohen JD (2010). Optimal performance in a countermanding saccade task. *Brain Research*, 1318, 178-187.
160. Balci F, Freestone D, Simen P, deSouza L, Cohen JD & Holmes P (2011). Optimal temporal risk assessment. *Frontiers in Integrative Neuroscience*, 5(56), 1-15.
161. Balci F, Simen P, Niyogi R, Saxe A, Hughes JA, Holmes P & Cohen JD (2011). Acquisition of decision making criteria: Reward rate ultimately beats accuracy. *Attention, Perception, & Psychophysics*, 73, 640-657.
162. Carter CS, Barch DM, Bullmore E, Breiling J, Buchanan RW, Butler P, Cohen JD, Geyer M, Gollub R, Green MF, Jaeger J, Krystal JH, Moore H, Nuechterlein K, Robbins T, Silverstein S, Smith EE, Strauss M & Wykes T (2011). Cognitive Neuroscience Treatment Research to Improve Cognition in Schizophrenia II: Developing imaging biomarkers to enhance treatment development for schizophrenia and related disorders. *Biological Psychiatry*, 70(1): 7-12.
163. Forster, S.E., Carter, C. S., Cohen, J.D., Cho, R.Y. (2011). Parametric manipulation of the conflict signal and control-state adaptation. *Journal of Cognitive Neuroscience*, 23(4), 923-935.
164. Lenartowicz A, Yeung N & Cohen JD (2011). No-go trials can modulate switch cost by interfering with effects of task preparation. *Psychological Research*, 75, 66-76.
165. Simen P, Balci F, DeSouza L, Cohen JD & Holmes P (2011). A model of interval timing by neural integration. *Journal of Neuroscience*, 31, 9238-9253.

166. D'Ardenne K, Eshel N, Luka J, Lenartowicz A, Nystrom LE & Cohen JD (2012). The role of prefrontal cortex and the midbrain dopamine system in working memory updating. *Proceedings of the National Academy of Sciences, USA*, 109(49).
167. Nedic A, Tomlin D, Holmes P, Prentice DA & Cohen JD (2012). A decision task in a social context: Human experiments, models, and analyses of behavioral data. *Proceedings of the IEEE*, 100(3), 713-733.
168. Reynolds JR, O'Reilly RC, Cohen JD & Braver TS (2012). The function and organization of lateral prefrontal cortex: A test of competing hypotheses. *PLOS ONE*, 7(2), e30284.
169. van Vugt MK, Simen P, Nystrom LE, Holmes P & Cohen JD (2012). EEG oscillations reveal neural correlates of evidence accumulation. *Frontiers in Decision Neuroscience*, 6, 106.
170. Eldar E, Cohen JD & Niv Y (2013). The effects of neural gain on attention and learning. *Nature Neuroscience*, 16, 1146-1153.
171. Eppinger B, Nystrom LE & Cohen JD (2013). Reduced sensitivity to immediate reward during decision-making in older than younger adults. *PLOS ONE*, 7(5): e36953.
172. Eppinger B, Schuck NW, Nystrom LE, & Cohen JD (2013). Reduced striatal responses to reward prediction errors in older compared to younger adults. *Journal of Neuroscience*, 33(24), 9905-9912.
173. Kriete T, Noelle DC, Cohen JD & O'Reilly RC (2013). Indirection and symbol-like processing in the prefrontal cortex and basal ganglia. *Proceedings of the National Academy of Sciences, USA*, 110(41), 16390-16395.
174. Richard AE, Carter CS, Cohen JD & Cho RY (2013). Persistence, diagnostic specificity and genetic liability for context-processing deficits in schizophrenia. *Schizophrenia Research*, 147(1), 75-80.
175. Shenhav A, Botvinick MM & Cohen JD (2013). The expected value of control: An integrative theory of anterior cingulate cortex function. *Neuron*, 79, 217-240.
176. Todd MT, Nystrom LE & Cohen JD (2013). Confounds in multivariate pattern analysis: Theory and rule representation case study. *Neuroimage*, 77, 157-165.
177. Tomlin D, Nedic A, Prentice DA, Holmes P & Cohen JD (2013). The neural substrates of social influence on decision making. *PLOS ONE*, 8(1): e52630.
178. Wang, Y., Li, K., Charikar, M., Cohen, J. D., & Turk-Browne, N. B. (2013). What you find depends on how you look: Category selectivity in frontal cortex revealed by whole-brain correlation analysis. *Journal of Vision*, 13(9), 493-493.
179. Botvinick MM & Cohen JD (2014). The computational and neural basis of cognitive control: Charted territory and new frontiers. *Cognitive Science*, 38, 1249-1285.
180. Cohen JD & Holmes P (2014). Optimality and some of its discontents. *Topics in Cognitive Science*, 6, 258-278.

181. Feng SF, Schwemmer M, Gershman SJ & Cohen JD (2014). Multitasking vs. multiplexing: Toward a normative account of limitations in the simultaneous execution of control-demanding behaviors. *Cognitive, Affective and Behavioral Neuroscience*, 14(1), 129-146.
182. Shenhav A, Straccia MA, Cohen JD & Botvinick MM (2014). Anterior cingulate engagement in a foraging context reflects choice difficulty rather than foraging value. *Nature Neuroscience*, 17, 1249-1254.
183. van Vugt MK, Simen P, Nystrom LE, Holmes PJ & Cohen JD (2014). Lateralized readiness potentials reveal properties of a neural mechanism for implementing a decision threshold. *PLOS ONE*, 9(3): e90943.
184. Wilson RC, Geana A, White JM, Ludvig EA & Cohen JD (2014). Humans use directed and random exploration to solve the explore-exploit dilemma. *Journal of Experimental Psychology: General*, 143(6), 2074.
185. deBettencourt MT, Cohen JD, Lee RF, Norman KA & Turk-Browne NB (2015). Closed-loop training of attention with real-time brain imaging. *Nature Neuroscience*, 18(3), 470-474.
186. Ericson KM, White JM, Laibson D & Cohen JD (2015). Money earlier or later? Simple heuristics explain intertemporal choices about money better than delay discounting. *Psychological Science*, 26(6), 826-833.
187. Field BA, Buck CL, McClure SM, Nystrom LE, Kahneman D & Cohen JD (2015). Attentional modulation of brain responses to primary appetitive and aversive stimuli. *PLOS ONE*, 10(7), e0130880.
188. Schnyer DM, Beevers CG, deBettencourt MT, Sherman SM, Cohen JD, Norman KA & Turk-Browne NB (2015). Neurocognitive therapeutics: From concept to application in the treatment of negative attention bias. *The Biology of Mood & Anxiety*, 5, 1-4.
189. Shvartsman M, Srivastava V & Cohen JD (2015). A theory of decision making under dynamically changing context. *Advances in Neural Information Processing Systems*, 28.
190. Tomlin D, Rand DG, Ludvig EA & Cohen JD (2015). The evolution and devolution of cognitive control: The costs of deliberation in a competitive world. *Scientific Reports* 5(11002). doi:10.1038/srep11002.
191. Toupou DF, Strogatz SH, Cohen JD & Rand DG (2015). Evolutionary game dynamics of controlled and automatic decision-making. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 25(7), 073120.
192. Wang Y, Li K, Cohen JD & Turk-Browne NB (2015). Full correlation matrix analysis (FCMA): An unbiased method for task-related functional connectivity. *Journal of Neuroscience Methods*, 251, 108-119.
193. Eldar, Eran, Yael Niv, and Jonathan D. Cohen (2016). Do you see the forest or the tree? Neural gain and breadth versus focus in perceptual processing. *Psychological Science*, 27(12), 1632-1643.

194. Geana A, Wilson RC, Daw N & Cohen JD (2016). Boredom, Information-Seeking and Exploration. *CogSci 2016: Proceedings of the Annual Meeting of the Cognitive Science Society*.
195. Geana A, Wilson RC, Daw N & Cohen JD (2016). Information-Seeking, Learning and the Marginal Value Theorem: A Normative Approach to Adaptive Exploration. *CogSci 2016: Proceedings of the Annual Meeting of the Cognitive Science Society*.
196. Lewis-Peacock JA, Cohen JD & Norman KA (2016). Neural evidence of the strategic choice between working memory and episodic memory in prospective remembering. *Neuropsychologia*, 93, 280-288.
197. Musslick S, Dey B, Ozcimder K, Patwary MMA, Willke TL & Cohen JD (2016). Controlled vs. automatic processing: A graph-theoretic approach to the analysis of serial vs. parallel processing in Neural Network Architectures. *CogSci 2016: Proceedings of the Annual Meeting of the Cognitive Science Society*.
198. Shenhav A, Cohen JD & Botvinick MM (2016). Dorsal Anterior Cingulate Cortex and the Expected Value of Control. *Nature Neuroscience*, 19, 1286–1291.
199. Shenhav S, Straccia MA, Botvinick MM & Cohen JD (2016). Dorsal anterior cingulate and ventromedial prefrontal cortex have inverse roles in both foraging and economic choice. *Cognitive, Affective and Behavioral Neuroscience*, 16(6), 1127-1139.
200. Warren C, Eldar E, Van den Brink R, Tona K-D, van der Wee N, Giltay E, van Noorden M, Bosch J, Wilson R, Cohen JD & Nieuwenhuis S (2016). Catecholamine-mediated increases in gain enhance the precision of cortical representations. *Journal of Neuroscience*, 36(21), 5699 – 5708.
201. Alon N, Reichman D, Shinkar I, Wagner T, Musslick S, Cohen JD, Griffiths T, Dey B & Ozcimder K (2017). A graph-theoretic approach to multitasking. *Advances in Neural Information Processing Systems*, 30, 2097-2106.
202. Ballard IC, Kim B, Liatsis A, Aydogan G, Cohen JD, & McClure SM (2017). More is meaningful: the magnitude effect in intertemporal choice depends on self-control. *Psychological Science* (28)10.
203. Bejjanki VR, daSilveira RA, Cohen JD & Turk-Browne NB (2017). Noise correlations in the human brain and their impact on pattern classification. *PLoS Computational Biology*, 13(8), e1005674.
204. Cohen JD, Daw N, Engelhardt B, Hasson U, Li K, Niv Y, Norman KA, Pillow J, Ramadge P, Turk-Browne NB, & Willke TL (2017). *Computational Approaches to fMRI Analysis*. *Nature Neuroscience*, 20(3), 304-313.
205. Kane G, Bornstein A, Daw ND, Cohen JD, Wilson RC & Shenhav A (2017). Mechanisms of overharvesting in patch foraging. *CogSci 2017: Proceedings of the Annual Meeting of the Cognitive Science Society*.

206. Kane GA, Vazey EM, Wilson RC, Shenhav A, Daw ND, Aston-Jones G & Cohen JD (2017). Increased locus coeruleus tonic activity causes disengagement from a patch foraging task. *Cognitive, Affective and Behavior Neuroscience*, 17(6), 1073-83.
207. Krueger PM, Wilson RC & Cohen JD (2017). Strategies for exploration in the domain of losses. *Judgment and Decision Making*, 12(2), 104–117.
208. Krueger PM, van Vugt MK, Simen P, Nystrom L, Holmes P & Cohen JD (2017). Evidence accumulation detected in BOLD signal using slow perceptual decision making. *Journal of Neuroscience Methods*, 281, 1–12.
209. Musslick S, Saxe AM, Ozcimder K, Dey B, Henselman G & Cohen JD (2017). Multitasking capability versus learning efficiency in neural network architectures. *CogSci 2017: Proceedings of the Annual Meeting of the Cognitive Science Society*.
210. Ozcimder K, Dey B, Musslick S, Petri G, Ahmed N, Willke TL & Cohen JD (2017). A formal approach to modeling the cost of cognitive control. *CogSci 2017: Proceedings of the Annual Meeting of the Cognitive Science Society*.
211. Rand DG, Tomlin D, Bear A, Ludvig E & Cohen JD (2017). Cyclical population dynamics of automatic versus controlled processing: An evolutionary pendulum. *Psychological Review*, 124(5), 626.
212. Shenhav A, Musslick S, Lieder F, Kool W, Griffiths TL, Cohen JD & Botvinick MM (2017). Toward a rational and mechanistic account of mental effort. *Annual Review of Neuroscience*, 40, 99-124.
213. Srivastava V, Feng SF, Cohen JD, Leonard AE & Shenhav A (2017). A Martingale Analysis of First Passage Times of Time-Independent Wiener Diffusion Models. *Journal of Mathematical Psychology*, 77, 94-110.
214. Tomlin D, Nedic A, Prentice DA, Holmes P & Cohen JD (2017). The integration of social influence and reward: Computational approaches and neural evidence. *Cognitive, Affective and Behavioral Neuroscience*, 17(4), 784–808.
215. Iordan MC, Ellis CT, Lesnick M, Osherson DN & Cohen JD (2018). Feature ratings and empirical dimension-specific similarity explain distinct aspects of semantic similarity judgments. *CogSci 2018: Proceedings of the Annual Meeting of the Cognitive Science Society*.
216. Musslick S, Cohen JD & Shenhav A (2018). Estimating the costs of cognitive control from task performance: Theoretical validation and potential pitfalls. *CogSci 2018: Proceedings of the Annual Meeting of the Cognitive Science Society*.
217. Musslick S, Jang SJ, Shvartsman M, Shenhav A & Cohen JD (2018). Constraints associated with cognitive control and the stability-flexibility dilemma. *CogSci 2018: Proceedings of the Annual Meeting of the Cognitive Science Society*.
218. Sagiv Y, Musslick S, Niv Y & Cohen JD (2018). Efficiency of learning vs. processing: Towards a normative theory of multitasking. *CogSci 2018: Proceedings of the Annual Meeting of the Cognitive Science Society*, <http://arxiv.org/abs/2007.03124>.

219. Shenhav, A., Straccia, M. A., Musslick, S., Cohen, J. D., & Botvinick, M. M. (2018). Dissociable neural mechanisms track evidence accumulation for selection of attention versus action. *Nature Communications*, 9(1), 2485.
220. Ellis CT, Lesnick M, Henselman-Petrusek G, Keller B & Cohen JD (2019). Feasibility of topological data analysis for event-based fMRI. *Network Neuroscience*, 3(3), 695-706.
221. Frankland SM, Webb TW, Petrov AA, O'Reilly RC and Cohen JD (2019). Extracting and utilizing abstract, structured representations for analogy. *CogSci 2019: Proceedings of the Annual Meeting of the Cognitive Science Society*.
222. Hoskin AN, Bornstein AM, Norman KA & Cohen JD (2019). Refresh my memory: Episodic memory reinstatements intrude on working memory maintenance. *Cognitive, Affective, & Behavioral Neuroscience*, 19, 338–354. <https://doi.org/10.3758/s13415-018-00674-z>.
223. Kane GA, Bornstein AM, Shenhav A, Wilson RC, Daw ND & Cohen JD (2019). Rats exhibit similar biases in foraging and intertemporal choice tasks. *eLife*, 8:e48429. <https://www.biorxiv.org/content/10.1101/497321v1>.
224. Musslick S, Bizyaeva A, Aragon S, Leonard N & Cohen JD (2019). Stability-flexibility dilemma in cognitive control: A dynamical system perspective. *CogSci 2019: Proceedings of the Annual Meeting of the Cognitive Science Society*.
225. Musslick S & Cohen JD (2019). A mechanistic account of constraints on control-dependent processing: Shared representation, conflict and persistence. *CogSci 2019: Proceedings of the Annual Meeting of the Cognitive Science Society*.
226. Musslick S, Cohen JD & Shenhav A (2019). Decomposing individual differences in cognitive control: A model-based approach. *CogSci 2019: Proceedings of the Annual Meeting of the Cognitive Science Society*.
227. Poldrack R, Feingold F, Frank M, Gleeson P, de Hollander G, Huys QJM, Love B, Markiewicz C, Moran, R, Ritter P, Turner B, Yarkoni T, Zhan M and Cohen JD (2019). The importance of standards for sharing computational models and data. *Computational Brain & Behavior*, 2, 229–232.
228. Rosendahl M, Bizyaeva A & Cohen, JD (2020). A novel quantum approach to the dynamics of decision making. *CogSci 2020: Proceedings of the Annual Meeting of the Cognitive Science Society*.
229. Spitzer M, Musslick S, Shvartsman M, Shenhav A & Cohen JD (2019). Asymmetric switch costs as a function of task strength. *CogSci 2019: Proceedings of the Annual Meeting of the Cognitive Science Society*.
230. Wilson RC, Shenhav A, Straccia M & Cohen JD (2019). The eighty-five percent rule for optimal learning. *Nature Communications*, 10(1), 4646. <https://www.biorxiv.org/content/10.1101/255182v1>
231. Cohen JD, Ericson KM, Laibson D & White JM (2020). Measuring Time Preferences. *Journal of Economic Literature*, 58(2).

232. Ellis CT, Baldassano C, Schapiro A, Cai MB, & Cohen JD (2020). Facilitating open-science with realistic fMRI simulation: Validation and application. *PeerJ*, 8.
233. Frankland SM & Cohen JD (2020). Determinantal point processes for memory and structured inference. *CogSci 2020: Proceedings of the Annual Meeting of the Cognitive Science Society*.
234. Ho MK, Abel D, Cohen JD, Littman ML & Griffiths TL (2020). The Efficiency of human cognition reflects planned information processing. *Proceedings of the 34th AAAI Conference on Artificial Intelligence*. <https://arxiv.org/abs/2002.05769>.
235. Mosleh M, Kyker K, Cohen JD & Rand DG (2020). Globalization and the Rise and Fall of Cognitive Control. *Nature Communications*, 11(1), 3099. <https://psyarxiv.com/c6q2j/>.
236. Segert S, Tepper M, Turek J & Cohen JD (2020). Relaxed graph matching for analogical reasoning. *ICLR 2020: Proceedings of the International Conference on Learning Representations, Workshop on Bridging AI and Cognitive Science*. [https://baicsworkshop.github.io/pdf/BAICS\\_4.pdf](https://baicsworkshop.github.io/pdf/BAICS_4.pdf).
237. Webb TW, Dulberg Z, Frankland SM, Petrov AA, O'Reilly RC, & Cohen JD (2020). Learning representations that support extrapolation. *ICML 2020: Proceedings of the 37th International Conference on Machine Learning, PMLR 119*. <https://arxiv.org/abs/2007.05059>.
238. Agrawal M, Mattar M, Daw ND & Cohen JD (2021). The temporal dynamics of opportunity costs: A normative account of cognitive fatigue and boredom. *Psychological Review*, 129(3), 564. <https://doi.org/10.1037/rev0000309>.
239. Beukers AO, Buschman TJ, Cohen JD & Norman KA (2021). Is activity silent working memory simply episodic memory? *Trends in Cognitive Sciences*, 25(4), 284-293. <https://doi.org/10.1016/j.tics.2021.01.003>.
240. Bustamante L, Lieder F, Musslick S, Shenhav A & Cohen JD (2021). Learning to overexert cognitive control in a Stroop task. *Cognitive, Affective and Behavioral Neuroscience*. 21(3), 453-471. <https://link.springer.com/article/10.3758/s13415-020-00845-x>.
241. Dulberg Z, Webb T & Cohen JD (2021). Modeling the development of counting with memory-augmented neural networks. *CogSci 2020: Proceedings of the Annual Meeting of the Cognitive Science Society*. <https://arxiv.org/abs/2105.10577>.
242. Eldar E, Felso V, Cohen JD & Niv Y (2021). A pupillary index of susceptibility to decision biases. *Nature Human Behaviour*, 5, 653-662. <https://doi.org/10.6084/m9.figshare.c.4368452.v1>.
243. Jordan C, Giallanza T, Ellis CT, Beckage NM & Cohen JD (2021). Context matters: Recovering human semantic structure from machine learning analysis of large-scale text corpora. *Cognitive Science*, 46(2), e13085.
244. Kumar M, Anderson M, Antony J, Baldassano C, Brooks PB, Cai MB, Po-Hsuan, Chen C, Ellis CT, Henselman-Petrusek G, Huberdeau D, Hutchinson B, Li YP, Lu Q, Manning JR, Mennen AC, Nastase SA, Richard H, Schapiro AC, Schuck NW, Shvartsman M, Sundaram N, Suo D, Turek JS, Turner D, Vo V, Wallace G, Wang Y, Williams JA, Zhang H, Zhu X, Capota M, Cohen

- JD, Hasson U, Li K, Ramadge PJ, Turk-Browne N, Willke TL & Norman KA (2021). BrainIAK: The Brain Imaging Analysis Kit. *Aperture Neuro* 1(4). <https://apertureneuropub.cloud68.co/articles/42/index.html>
245. Kumar S, Dasgupta, I, Cohen JD, Daw ND & Griffiths TL (2021). Meta-learning of structured task distributions in humans and machines. *ICLR 2021: Proceedings of the International Conference on Learning Representations*. <https://arxiv.org/abs/2010.02317>.
  246. Masis J, Musslick S & Cohen JD (2021). The value of learning and cognitive control allocation. *CogSci 2021: Proceedings of the Annual Meeting of the Cognitive Science Society*. <https://escholarship.org/uc/item/7w0223v0>.
  247. Mennen AC, Turk-Browne NB, Wallace G, Seok D, Jaganjac A, Stock J, deBettencourt MT, Cohen JD, Norman KA & Sheline YI (2021). Cloud-based fMRI neurofeedback to reduce the negative attentional bias in depression: a proof-of-concept study. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 6(4), 490-497. <https://doi.org/10.1016/j.bpsc.2020.10.006>.
  248. Momennejad I, Lewis-Peacock J, Norman KA, Cohen, JD, Singh S & Lewis, RL (2021). Rational use of episodic and working memory: A normative account of prospective memory. *Neuropsychologia*, 158, 107657. <https://doi.org/10.1016/j.neuropsychologia.2020.107657>.
  249. Musslick S & Cohen JD (2021). Rationalizing constraints on the capacity for cognitive control. *Trends in Cognitive Sciences*, 25(9), 757-775. <https://doi.org/10.1016/j.tics.2021.06.001>.
  250. Petri G, Musslick S, Dey B, Özcimder K, Ahmed NK, Willke TL & Cohen JD (2021). Topological limits to parallel processing capability of network architectures. *Nature Physics*, 17(5), 646-651. <https://doi.org/10.1038/s41567-021-01170-x>.
  251. Prat-Carrabin A, Wilson RC, Cohen JD & da Silveira RA (2021). Human inference in changing environments with temporal structure. *Psychological Review*, 128(5), 879–912. [arXiv:2101.11143](https://arxiv.org/abs/2101.11143).
  252. Webb TW, Sinha I & Cohen JD (2021). Emergent symbols through binding in external memory. *ICLR 2021: Proceedings of the International Conference on Learning Representations*. <https://arxiv.org/abs/2012.14601>.
  253. Ho M, Abel, D, Correa CG, Littman ML, Cohen JD & Griffiths TL (2022). People construct simple representations to plan. *Nature* 606(7912), 129-136. <https://rdcu.be/cNVkp>.
  254. Musslick S, Cherkaev A, Draut B, Butt A, Srikumar V, Flatt M & Cohen JD (2022). SweetPea: A standard language for factorial experimental design. *Behavioral Methods in Research*, 1-25. <https://doi.org/10.3758/s13428-021-01598-2>.
  255. Kane GA, James MH, Shenhav A, Daw ND, Cohen JD & Aston-Jones G. (2022). Rat anterior cingulate cortex continuously signals decision variables in a patch foraging task. *Journal of Neuroscience*, 42(29), 5730-5744. <https://www.biorxiv.org/content/10.1101/2021.06.07.447464v1>.



256. Kumar S, Correa CG, Dasgupta I, Marjeh R, Hu MY, Hawkins RD, Daw ND, Cohen JD, Narasimhan K & Griffiths TL (2022). Using natural language and program abstractions to instill human inductive biases in machines. *Advances in Neural Information Processing Systems*. <https://arxiv.org/abs/2205.11558.d>.
257. Segert S & Cohen JD (2022). Maximum entropy function learning. *CogSci 2022: Proceedings of the Annual Meeting of the Cognitive Science Society*. <https://escholarship.org/content/qt2tb2f84r/qt2tb2f84r.pdf>.
258. Segert S & Cohen JD (2022). Function learning and extrapolation via the maximum entropy principle. *Transactions on Machine Learning Research*. <http://arxiv.org/abs/2106.07369>.
259. Vesely J, Pothukuchi Raghav, Gupta S, Ketaki J, Cohen JD & Bhattacharjee A (2022). Distill: Domain-specific compilation for cognitive models. *2022 IEEE/ACM International Symposium on Code Generation and Optimization (CGO)*, IEEE, pp. 301-312.
260. Wallace G, Polcyn S, Brooks PP, Mennen A, Zhao K, Scotti PS, Michelmann S, Li K, Turk-Browne NB, Cohen JD, & Norman KA (2022). RT-Cloud: A cloud-based software framework to simplify and standardize real-time fMRI. *NeuroImage*, 257, 119295. <https://doi.org/10.1016/j.neuroimage.2022.119295>.
261. Agrawal M, Peterson JC, Cohen JD & Griffiths TL (2023). Stress, intertemporal choice, and mitigation behavior during the COVID-19 pandemic. *Journal of Experimental Psychology: General*. <https://dx.doi.org/10.1037/xge0001417>.
262. Bornstein AM, Aly M, Feng SF, Turk-Browne NB, Norman KA & Cohen JD (2023). Associative memory retrieval modulates upcoming perceptual decisions. *Cognitive, Affective and Behavioral Neuroscience*. [http://aaron.bornstein.org/cv/pubs/2022\\_baftnc\\_biorxiv](http://aaron.bornstein.org/cv/pubs/2022_baftnc_biorxiv).
263. Gleeson P, Crook S, Turner D, Mantel K, Raunak M & Cohen JD (2023). Integrating model development across computational neuroscience, cognitive science and machine learning. *Neuron*. <https://www.sciencedirect.com/science/article/pii/S0896627323002611>.
264. Masís, J. A., Melnikoff, D., Barrett, L. F., & Cohen, J. (2023). When to choose: Information seeking in the speed-accuracy tradeoff. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 45, No. 45). <https://escholarship.org/uc/item/46j4g3p4>.
265. Mondal S, Frankland S, Webb T & Cohen JD (2023). Determinantal point process attention over grid codes supports out of distribution generalization. *eLife*, <http://arxiv.org/abs/2305.18417>.
266. Mondal S, Webb TW & Cohen JD (2023). Learning to reason over visual objects. *ICLR 2023: Proceedings of the International Conference on Learning Representations*. <https://arxiv.org/pdf/2303.02260>.
267. Segert S & Cohen JD (2023). Beyond transformers for function learning. *CogSci 2023: Proceedings of the Annual Meeting of the Cognitive Science Society*. <http://arxiv.org/abs/2304.09979>.
268. Webb T, Mondal S & Cohen JD (2024). Systematic visual reasoning through object-centric relational abstraction. *NeurIPS*. <https://arxiv.org/abs/2306.02500>.

269. Beukers AO, Hamin M, Norman KA & Cohen JD (in press). When working memory may be just working, not memory. *Psychological Review*. <https://psyarxiv.com/jtw5p>.
270. Bustamante LA, Oshinowo T, Lee J, Tong E, Burton AR, Shenhav AS, Daw N & Cohen JD (in press). Effort Foraging Task reveals positive correlation between individual differences in the cost of cognitive and physical effort in humans. *Proceedings of the National Academy of Sciences, USA* 10.1073/pnas.2221510120.
271. Dulberg Z, Dubey, R, Berwian IM & Cohen JD (in press). Having “multiple selves” helps learning agents explore and adapt in complex changing worlds. *Proceedings of the National Academy of Sciences, USA*. <https://doi.org/10.1101/2022.12.16.520795>.
272. Ho M, Cohen JD & Griffiths TL (in press). Rational simplification and rigidity in human planning. *Psychological Science*. <https://psyarxiv.com/aqxws>.
273. Kumar S, Dasgupta I, Marjeh R, Daw ND, Cohen JD & Griffiths TL. (in press). Disentangling abstraction from statistical pattern matching in human and machine learning. *PLOS Computational Biology*. <https://arxiv.org/abs/2204.01437>.
274. Petri G, Musslick S & Cohen JD (in press). An information-theoretic approach to reward rate optimization in the tradeoff between controlled and automatic processing in neural network architectures. *eLife*. <https://doi.org/10.1101/2023.09.18.558214>.
275. Rier L, Michelmann S, Ritz R, Shah V, Hill RM, Osborne J, Doyle C, Holmes N, Bowtell R, Brookes MJ, Norman KA, Hasson U, Cohen JD & Boto E (in press). Test-Retest reliability of the human connectome: An OPM- MEG study. [https://direct.mit.edu/imag/article/doi/10.1162/imag\\_a\\_00020/117508/Test-Retest-Reliability-of-the-Human-Connectome-An](https://direct.mit.edu/imag/article/doi/10.1162/imag_a_00020/117508/Test-Retest-Reliability-of-the-Human-Connectome-An)

## 2. Invited Reviews, Commentary, Chapters, Edited Volumes & Technical Reports

- Baars BJ, Cohen JD, Bower GH & Berry JW (1992). Some caveats on testing the Freudian slip hypothesis: Problems in systematic replication. In Baars BJ (Ed.), Experimental slips and human error, Exploring the architecture of volition. New York: Plenum Press.
- Cohen JD & Servan-Schreiber D (1992). Introduction to neural networks in psychiatry. Psychiatric Annals, 22(3), 113-118.
- Servan-Schreiber D & Cohen JD (1992). A neural network model of catecholaminergic modulation of behavior. Psychiatric Annals, 22(3), 125-130.
- Servan-Schreiber D & Cohen JD (1992). Issue Editors, Neural network models in Psychiatry. Psychiatric Annals, 22(3).
- Cohen JD, Servan-Schreiber D, Targ E & Spiegel D (1992). The fabric of thought disorder: A cognitive neuroscience approach to disturbances in the processing of context in schizophrenia. In Stein D & Young J (Eds.), Cognitive Science and Clinical Disorders. NY: Academic Press.

- Cohen JD, Forman SD, Braver TS, Casey BJ, Servan-Schreiber D & Noll DC (1993). Activation of prefrontal cortex in a non-spatial working memory task with functional MRI. Technical Report PDP.CNS.93.3, Pittsburgh PA: Carnegie Mellon University.
- Cohen JD, Romero R, Servan-Schreiber D & Farah MJ (1993). Disengaging from the disengage function: The relation of macrostructure to microstructure in parietal attentional deficits. Technical Report PDP.CNS.93.2, Pittsburgh PA: Carnegie Mellon University.
- Usher M, Cohen JD, Servan-Schreiber D, Rajkowski J, Kubiak P & Aston-Jones G (1995). A computational model of locus coeruleus function and its influence on cognitive performance. Technical Report PDP.CNS.95.1, Pittsburgh PA: Carnegie Mellon University.
- Casey BJ, Cohen JD, Noll D, Schneider W, Giedd J & Rapoport JL (1996). Functional magnetic resonance imaging: Studies of Cognition. In Bigler ED (Ed.) Handbook of Human Brain Function, Neuroimaging II: Clinical Applications. New York: Plenum Press.
- Cohen JD & O'Reilly RC (1996). A preliminary theory of the interactions between prefrontal cortex and hippocampus that contribute to planning and prospective memory. In Brandimonte M, Einstein GO & McDaniel MA (Eds.), Prospective Memory: Theory and Applications. Hillsdale, NJ: Erlbaum. Pages 267-295.
- Keshavan MS & Cohen JD (1996). Magnetic resonance spectroscopy and functional MRI. In Lewis S & Higgins N (Eds.), Brain Imaging in Psychiatry. Oxford, UK: Blackwell Science, Ltd.
- Servan-Schreiber D & Cohen JD (1996). Dopamine, frontal cortex, and schizophrenia: Model and data. In Reggia JA, Ruppini E & Berndt RS (Eds.), Neural Modeling of Brain and Cognitive Disorders. Singapore: World Scientific Publishing Co.
- Cohen JD (1997). Brain Terrain. Nature, 389, 142
- Cohen JD (1997). Dimensions of consciousness: A commentary on Kinsbourne and Hobson. In Cohen JD & Schooler JW (Eds.), Scientific Approaches to Consciousness: 25th Carnegie Symposium on Cognition. New Jersey: Lawrence Erlbaum Associates.
- Cohen JD, Dunbar KO, Barch DM & Braver TS (1997). Reply to Schooler et al: Issues concerning relative speed of processing hypotheses, schizophrenic performance deficits, and prefrontal function in the Stroop task. Journal of Experimental Psychology: General, 126, 37-41.
- Cohen JD & Schooler JW (1997). Science and sentience: Some questions regarding the scientific investigation of consciousness. In Cohen JD & Schooler JW (Eds.), Scientific Approaches to Consciousness: 25th Carnegie Symposium on Cognition. New Jersey: Lawrence Erlbaum Associates.
- Cohen JD & Smith EE (1997). Response to Owen AM, Tuning in to the temporal dynamics of brain activation using functional magnetic resonance imaging (fMRI). Trends in Cognitive Sciences, 1, 125.
- Aston-Jones G, Rajkowski J, Kubiak P, Ivanova S, Usher M & Cohen JD (1998). Neuromodulation and cognitive performance: Recent studies of noradrenergic locus coeruleus neurons in behaving monkeys. In Goldstein D, Eisenhofer G & McCarty R (Eds.), Catecholamines: Bridging Basic

- Science with Clinical Medicine (Advances in Pharmacology, Vol. 42). New York: Academic Press, pp. 755-759.
- Botvinick MM, Braver TS, Carter CS, Barch DM & Cohen JD (1998). Toward a non-homuncular account of control: Cognitive neuroscientific evidence for conflict monitoring. Technical Report PDP.CNS.98.1, Pittsburgh PA: Carnegie Mellon University.
- Braver TS, Barch DM, & Cohen JD (1999). Mechanisms of cognitive control: Active memory, inhibition, and the prefrontal cortex. Technical Report PDP.CNS.99.1, Pittsburgh PA: Carnegie Mellon University.
- Braver TS & Cohen JD (1999). Dopamine, cognitive control, and schizophrenia: The gating model. Progress in Brain Research, 121, 327-349.
- Braver TS & Cohen JD (1999). Dopamine, cognitive control, and schizophrenia: The gating model. In Reggia J, Ruppel E & Glanzman D (Eds.), Disorders of Brain, Behavior and Cognition: The Neurocomputational Perspective. Elsevier.
- O'Reilly RC, Braver TS & Cohen JD (1999). A biologically-based neural network model of working memory. In Shah P & Miyake A (Eds.), Models of Working Memory. Cambridge University Press. Pages 375-411.
- Usher M & Cohen JD (1999). Short term memory and selection processes in a frontal-lobe model. In Heinke D, Humphries GW & Olsen A (Eds.), Connectionist Models in Cognitive Neuroscience. Springer-Verlag.
- Carter CS, Botvinick MM, Cohen JD. (1999) The contribution of the anterior cingulate cortex to executive processes in cognition. Reviews in the Neurosciences, 10, 49-57.
- Aston-Jones G, Rajkowski J & Cohen J (2000). Locus coeruleus and regulation of behavioral flexibility and attention. In Progress in Brain Research.
- Cohen JD (2000), Special Issue: Functional topography of prefrontal cortex. NeuroImage, 11, 378-379.
- Cohen JD, Botvinick MM & Carter CS (2000). Anterior cingulate and prefrontal cortex: who's in control? Nature Neuroscience. 3(5): 421-423.
- Cohen JD & Tong F (2001). The face of controversy: Modular vs. distributed representations in the brain. Science, 293, 2405-2407.
- Aston-Jones G, Rajkowski J & Cohen JD (2002). Role of the locus coeruleus-norepinephrine system in attention and behavioral flexibility. In: Catecholamine Research: From Molecular Insights to Clinical Medicine, Nagatsu T, Nabeshima T, McCarty R & Goldstein D (Eds.). Kluwer Academic/Plenum Publishing: New York, pp. 357-361.
- Bogacz R & Cohen JD (2002). Parameterization of connectionist models. CSBMB.Conte.02.1, Princeton NJ: Princeton University.

- Cohen JD (2002). Neural network models of prefrontal cortex and cognitive control. In Grafman J (Ed.), Handbook of Neuropsychology, 2nd Edition, Vol. 7: The Frontal Lobes. Elsevier: New York, pp.195-213.
- Cohen, J. D. (2002). Inhibition and control. In The Dana Guide To Brain Health, Bloom FE, Beal MF, & Kupfer DJ (Eds). New York: Free Press. Pp.185-189.
- Cohen JD & Blum KI (2002). Overview: Reward and decision. Introduction to special issue. Neuron, 36(2), 193-198.
- Cohen JD & Servan-Schreiber D (2002). Context, cortex and schizophrenia: A connectionist approach to behavior and biology in schizophrenia. In: Cognitive Modeling, Polk TA & Seifert CM (Eds.). MIT Press: Cambridge.
- Nieuwenhuis S, Yeung N & Cohen JD (2003). A computational simulation of electrophysiological markers of anterior cingulate function in a go/nogo task. CSBMB. 03.1, Princeton NJ: Princeton University.
- Paus T, Haxby JV & Cohen JD (2003). Special Issue. Neuroimage.
- Botvinick M, Braver TS, Yeung N, Carter CS & Cohen JD (2004). Conflict monitoring: Computational and empirical studies. In Posner MI (Ed.), Cognitive Neuroscience of Attention. New York: Guilford Press.
- Carter CS, Kerns JG & Cohen JD (2004). Cognitive neuroscience: Bridging thinking and feeling to the brain, and its implications for psychiatry. In: Neurobiology of Mental Illness, Charney DS & Nestler EJ (Eds.), Oxford University Press: Oxford.
- Cohen JD, Aston-Jones G & Gilzenrat MS (2004). A systems-level perspective on attention and cognitive control: Guided activation, adaptive gating, conflict monitoring, and exploitation vs. exploration. In Posner MI (Ed.), Cognitive Neuroscience of Attention. New York: Guilford Press. Pp. 71-90.
- Holmes P, Brown E, Moehlis J, Bogacz R, Gao J, Hu P, Aston-Jones G, Clayton E, Rajkowski J & Cohen JD (2004). Optimal decisions: From neural spikes, through stochastic differential equations, to behavior. Proceedings of the International Symposium on Nonlinear Theory and its Applications. NOLTA2004.
- Sanfey AG & Cohen JD (2004). Is knowing always feeling? Proc Natl Acad Sci U S A, 101(48), 16709-10.
- Cohen JD & Aston-Jones G (2005). Cognitive neuroscience: Decision amid uncertainty. Nature, 436(7050), 471-2.
- Holmes PJ, Bogacz R, Cohen JD & Gold JJ (2005). Letter to the Editor, in response to Hunter PW (2004), Connections, context, and community: Abraham Wald and the sequential probability ratio test. Mathematical Intelligencer, 27(1), 4-5.
- Holroyd CB, Yeung N, Coles MGH & Cohen JD (2006). Internalizing representations of correct behavior from feedback. Princeton Technical Report #06-02.

- Aston-Jones GS, Iba M, Clayton E, Rajkowski J & Cohen J (2007). The locus coeruleus and regulation of behavioral flexibility and attention: Clinical implications. In Ordway GA, Schwartz MA and Frazer A (Eds.), Brain Norepinephrine: Neurobiology and Therapeutics. Cambridge University Press: Cambridge, UK. Pp. 196-235.
- McClure SM, Botvinick MM, Yeung N, Greene JD & Cohen JD (2007). Conflict monitoring in cognition-emotion competition. In Gross JJ (Ed.), Handbook of Emotion Regulation. New York: Guilford Press.
- Cohen JD & Insel TR (2008). Cognitive neuroscience and schizophrenia: Translational research in need of a translator. Biological Psychiatry, 64(1): 2-3.
- Keysers C, Boyd R, Cohen J, Donald M, Güth W, Johnson E, Kurzban R, Schooler L, Schooler J, Spelke E & Trommershäuser J (2008). Explicit and implicit strategies in decision making. In Engel C and Singer W (Eds.), Strüngmann Forum Report: Better than Conscious? Decision Making, the Human Mind, and Implications. Cambridge, MA: MIT Press. Pp. 225-258.
- Simen P, Holmes P, & Cohen JD. (2008). On the neural implementation of optimal decisions. In Morsella E, Bargh JA & Gollwitzer PM (eds.), Oxford Handbook of Human Action, (pp. 534-549). Oxford University Press: Oxford, UK.
- Holmes, P., Eckhoff P, Wong-Lin K, Bogacz R, Zacksenhouse M & Cohen JD (2010). The physics of decision making: stochastic differential equations as models for neural dynamics and evidence accumulation in cortical circuits. In *XVIth International Congress on Mathematical Physics* (pp. 123-142).
- Yeung N, Cohen JD & Botvinick MM (2011). Errors of interpretation and modeling: A reply to Grinband et al.. NeuroImage, 57(2): 316-319.
- Hyman SE & Cohen JD (2012). Disorders of thought and volition: Schizophrenia. In Kandel ER, Schwartz JH & Jessell TM (Eds.), Principles of Neural Science V. New York: McGraw-Hill.
- Hyman SE & Cohen JD (2012). Disorders of mood and anxiety. In Kandel ER, Schwartz JH & Jessell TM (Eds.), Principles of Neural Science V. New York: McGraw-Hill.
- McGuire JT, Cohen JD & Botvinick MM (2013). Mental Effort. In Pashler H. Encyclopedia of the Mind. Thousand Oaks, CA: Sage Publications.
- O'Reilly RC, Petrov AA, Cohen JD, Lebiere CJ, Herd SA, Kriete T & Symons J (2013). How limited systematicity emerges: A computational cognitive neuroscience approach. In The architecture of cognition: Rethinking fodor and Pylyshyn's systematicity challenge.
- Keung W, Osherson D & Cohen JD (2015). Influence of cognitive control on semantic representation. <https://www.biorxiv.org/content/10.1101/067553v1>.
- Wang Y, Anderson M, Cohen JD, Heinecke A, Li K, Satish N, Sundaram N, Turk-Browne NB & Willke T (2015). Optimizing full correlation matrix analysis of fMRI data on Intel Xeon Phi coprocessors. SC '15, November 15-20, 2015. Austin, TX. <https://dl.acm.org/doi/10.1145/2807591.2807631>.

- Cohen JD (2016). Functional MRI (fMRI): A window into the working brain. In Kagel J & Roth A (Eds.), Handbook of Experimental Economics.
- Cohen JD, Dey B, Griffiths T, Musslick S, Ozcimder K, Reichman D, Shinkar I and Wagner T (2016). A graph-theoretic approach to multitasking. arXiv:1611.02400.
- Cohen JD (2017). Cognitive Control: Core Constructs and Current Considerations. In Egner T (Ed.), The Wiley Handbook of Cognitive Control. John Wiley & Sons, Chichester, West Sussex, UK.
- Baru C, Pozmantier M, Altintas I, Baek S, Cohen J, Condon L, Fanti G, Foster I, Jackson E, Lall U, Landman B, Li H, Marin C, Lopez BM, Metaxas D, Olsen B, Page G, Shang J, Turkan Y, and Zhang P (2021). Enabling AI Innovation via Data and Model Sharing: An Overview of the NSF Convergence Accelerator Track D. AI Magazine.

### 3. Books

- Cohen JD & Schooler JW (1997). Editors, Scientific Approaches to Consciousness: 25th Carnegie Symposium on Cognition. New Jersey: Lawrence Erlbaum Associates.

### 4. Published Abstracts

- Cohen JD (1989). A network model of schizophrenic language deficits. Book of Abstracts, 142nd Annual Meeting of the American Psychiatric Association.
- Cohen JD & Servan-Schreiber D (1991). Computer simulation models of the relationship between disturbances of dopamine, prefrontal cortex and cognitive function in schizophrenia. Abstracts of Panels and Posters, 30th Annual Meeting of the American College of Neuropsychopharmacology.
- Halliday R, Callaway E, Naylor H, Herzig K, Yano L, Cohen JD & Servan-Schreiber D (1991). Two empirical findings linked to neural network modeling: Amphetamine speeds reaction time (RT) but not P3. Yohimbine speeds P3 but not RT. Abstracts of Panels and Posters, 30th Annual Meeting of the American College of Neuropsychopharmacology.
- Noll DC, Meyer CH, Cohen JD & Schneider W (1991). Spiral-scan imaging of cortical activation. 11th Annual Meeting of the Society of Magnetic Resonance Imaging.
- Casey BJ, Cohen JD, Noll DC, Forman SD & Rapoport JL (1993). Activation of the anterior cingulate during the Stroop conflict paradigm using functional MRI. Society for Neuroscience Abstracts, 19, 1285, 1993.
- Cohen JD, Forman SD, Casey BJ & Noll DC (1993). Spiral-scan imaging of dorsolateral prefrontal cortex during a working memory task. Twelfth Annual Meeting of the Society of Magnetic Resonance in Medicine.
- Noll DC, Cohen JD, Forman SD, Schneider W & Meyers CH (1993). Spiral k-space MRI of brain function. Twelfth Annual Meeting of the Society of Magnetic Resonance in Medicine.
- Noll DC, Schneider W & Cohen JD (1993). Artifacts in functional MRI using conventional scanning (1993). Twelfth Annual Meeting of the Society of Magnetic Resonance in Medicine.

- Carter CS, Cohen JD & Mintun M (1994). Interference, facilitation and strategy development in Stroop task performance: An  $^{15}\text{O}$ H $_2$ O PET study. Abstracts of Panels and Posters, 33rd Annual Meeting of the American College of Neuropsychopharmacology.
- Forman SD, Cohen JD, Mintun MA & Noll DC (1994). Improved assessment of significant change in functional magnetic resonance imaging (fMRI): Use of the contiguity threshold. Annual Meeting of the Society for Magnetic Resonance.
- Forman SD, Cohen JD, Noll DC, Mintun MA & Casey BJ (1994). Within subject comparison of PET & fMRI to visualize activation of prefrontal cortex (PFC). Society for Neuroscience Abstracts, 20.
- Huston T & Cohen JD (1994). Stimulus-induced shifts of task attention. Abstracts of the Psychonomic Society, 35th Annual Meeting.
- Servan-Schreiber D, Noll D, Cohen JD, Beuger M, Olga T, Swanson D & Mann JJ (1994). fMRI studies of limbic activation. Abstracts of Panels and Posters, 33th Annual Meeting of the American College of Neuropsychopharmacology.
- Barch DB, Cohen JD, Servan-Schreiber D & Ganguli R (1995). The stability and interrelationships of CPT-AX and Stroop performance in schizophrenia. Schizophrenia Research, 15(1-2), 108.
- Braver TS, Cohen JD & Servan-Schreiber D (1995). Neural network simulations of schizophrenic performance in a variant of the CPT-AX: A predicted double dissociation. Schizophrenia Research, 15(1-2), 110.
- Braver TS, Cohen JD, Jonides J, Smith EE, Awh E, Schumacher E, Lauber E & Noll DC (1995). A parametric study of prefrontal cortex involvement in human working memory using functional MRI. Society for Neuroscience Abstracts, 21, 274.
- Carter CS, Barch D, Perlstein W., Baird J, Baker R, Cohen JD & Schooler N (1995). A cognitive neuropsychological study of schizophrenia symptoms: Correlates of Stroop and semantic priming performance. Schizophrenia Research, 15(1-2), 111.
- Cohen JD & O'Reilly RC (1995). A computational model of prefrontal cortical and hippocampal function, and their interaction in behavioral tasks. Schizophrenia Research, 15(1-2), 112.
- Cohen JD, Ganguli R, Carter C, Brar J, Nichols T, DeLeo M & Mintun M (1995). Hypofrontality and working memory dysfunction in schizophrenia. Biological Psychiatry, 37, 633.
- Cohen JD, Usher M, Servan-Schreiber D & Aston-Jones G (1995). A computational model of the effects of locus coeruleus neuromodulation on attention. Biological Psychiatry, 37, 618.
- Forman SD & Cohen JD (1995). Modeling saccadic eye movements in schizophrenia: Insights into memory mechanisms. Schizophrenia Research, 15(1-2), 175.
- Forman SD, Cohen JD, Braver TS & Orr RJ (1995). Validation of functional magnetic resonance imaging: Application to schizophrenia research. Schizophrenia Research, 15(1-2), 82.
- Aston-Jones G, Kubiak P, Rajkowski J, Ivanova S & Cohen J (1996). Enhancement of locus coeruleus (LC) neuronal responses to visual targets by preceding auditory distractors. Society for Neuroscience Abstracts, 22.



- Cohen JD & Usher M (1996). A neural network model of Stroop interference and facilitation effects in schizophrenia. Biological Psychiatry, 39, 568.
- Barch DM, Braver TS, Nystrom L, Noll DC & Cohen JD (1997). Activation of prefrontal cortex by the representation and maintenance of context information. Schizophrenia Research, 24(1,2), 163.
- Barch DM, Carter CS, Braver TS & Cohen JD (1997). The effects of d-amphetamine on working memory and language deficits in schizophrenia. Schizophrenia Research, 24(1,2), 129.
- Barch DM, Carter CS, Cohen JD & Sabb F (1997). The effects of D-amphetamine on language function in schizophrenia. Society for Neuroscience Abstracts, 23, 1952.
- Braver TS & Cohen JD (1997). Driving subjects to distraction: Cognitive control, prefrontal cortex, and schizophrenia. Abstracts of the Psychonomic Society, 2, 23.
- Braver TS, Cohen JD & McClelland JL (1997). An integrated computational model of dopamine function in reinforcement learning and working memory. Society for Neuroscience Abstracts, 23, 775.
- Carter CS, Barch DM & Cohen JD (1997). Disturbed language processing: disorganization, and attentional impairment in schizophrenia. Schizophrenia Research, 24(1,2), 130.
- Carter CS, Mintun M & Cohen JD (1997). Abnormal cortical physiology associated with selective attention dysfunction in schizophrenia. Schizophrenia Research, 24(1,2), 164.
- Carter CS, Barch DM, Cohen JD & Braver TS (1997). CNS catecholamines and cognitive dysfunction in schizophrenia. Schizophrenia Research, 24(1,2), 211.
- Cohen JD, Nystrom LE, Sabb F & Noll DC (1997). Tracking the dynamics of fMRI activation under manipulations of duration and intensity of working memory processes. Society for Neuroscience Abstracts, 23, 1678.
- Casey BJ, Cohen JD, King SW, Franzen PL, Nystrom LE, Badgaiyan RD, Schubert AB & Noll DC (1997). A developmental functional MRI study of cortical activation during a spatial working memory task. NeuroImage, 5(4), S69.
- Casey BJ, Forman SD, Franzen PL, Badgaiyan RD, King SW, Braver TS, Cohen JD & Noll DC (1997). Ventral and dorsolateral prefrontal activation as a function of target probability. NeuroImage, 5(4), S92.
- Condray R, Steinhauer SR, Cohen JD, van Kammen DP, Kasperek A & Kelley ME (1997). Effects of haloperidol on the event-related potential in schizophrenics. Schizophrenia Research, 24(1,2), 232.
- Silakov V, Rajkowski J, Ivanova S, Watanabe T, Cohen JD, Usher M & Aston-Jones G (1997). Correlated impulse activities of locus coeruleus (LC) neurons in monkey: Dependency on level of task performance. Society for Neuroscience Abstracts, 23, 1587.
- Usher M & Cohen JD (1997). Interference-based capacity limitations in active memory. Abstracts of the Psychonomic Society, 2, 11.
- Berns GS & Cohen JD (1998). Dissociating brain regions for novel learning from response competition using implicit sequence learning. Society for Neuroscience Abstracts.

- Chein JM, Noll DC, Cohen JD, Fissell K, Nystrom LE, Saab F, Fiez JA (1998). An fMRI study of verbal working memory: Effects of length, lexicality, and phonological similarity. Society for Neuroscience Abstracts.
- McClelland JL, Pollock JA, Cohen JD, Fisher RN & Abdulaziz T (1998). Tracking the human brain: An interactive multimedia presentation. Society for Neuroscience Abstracts.
- Barch DM, Carter CS, Sabb FW, MacDonald III A, Noll DC, Braver TS & Cohen JD (1999). Prefrontal cortex and context processing in medication naïve first episode patients with schizophrenia. Society for Neuroscience Abstracts, 25, 1289.
- Carter CS, MacDonald III A, Botvinick MM, Stenger VA & Cohen JD (1999). Anterior cingulate cortex and executive control: what is it really doing? Society for Neuroscience Abstracts, 25, 2168.
- Wheeler ME, Sabb FW, Graziano MSA & Cohen JD (1999). Imagined movement of real objects in space near the body differentially activates frontal and parietal cortex. Society for Neuroscience Abstracts, 25, 98.
- Kroger JK, Nystrom LE, Li T-Q, Holmes BD & Cohen JD (2000). Differential cortical responses to memory load and representational structure. Journal of Cognitive Neuroscience, S145.
- van Veen V, Cohen JD, Botvinick M, Stenger VA & Carter CS (2000). Conflict related activity and the anterior cingulate: An event-related fMRI analysis of stimulus vs. response based conflict. Journal of Cognitive Neuroscience, S114.
- Aston-Jones G & Cohen JD (2000). Neuromodulation and Cognitive Function: Recent Studies of Noradrenergic Neurons in Behaving Monkeys. Abstracts of Panels and Posters, 39th Annual Meeting of the American College of Neuropsychopharmacology.
- Cho RY, Nystrom LE, Holmes P, Brown E, Casey BJ & Cohen JD (2000). A connectionist model of conflict and control in a forced-choice task. Society for Neuroscience Abstracts, 26, 1317.
- Greene JD, Sommerville RB, Nystrom LE, Darley JM & Cohen JD (2000). An fMRI investigation of emotion in moral judgment. Society for Neuroscience Abstracts, 26, 2022.
- Rajkowski J, Lu W, Zhu Y, Cohen JD & Aston-Jones G (2000). Prominent projections from the anterior cingulate cortex to the locus coeruleus in rhesus monkey. Society for Neuroscience Abstracts, 26, 2230.
- Li T-Q, Skare S & Cohen JD (2001). White matter fiber tracking using the eigenvalue weighted average eigenvector. Proceedings of the International Society for Magnetic Resonance in Medicine, 9.
- Li TQ, Nystrom L & Cohen JD (2001). Ultra-fast trial-based fMRI using amplitude modulated stimuli. NeuroImage.
- Gilzenrat MS, Holmes BD, Holmes PJ, Rajkowski J & Cohen JD (2001). A modified Fitzhugh-Nagumo system simulates locus coeruleus-mediated regulation of cognitive performance. Society for Neuroscience Abstracts, 26, Program No. 851.14.

- Li T, Kroger JK, Kastner S & Cohen JD (2001). The neural substrate of haptic working memory. Society for Neuroscience Abstracts, 26, Program No. 782.1.
- Perlstein WM, Lageman SK, Cole MA, Jones VM, Demery J, Carter CS & Cohen JD (2001). Working memory and inhibition: prefrontal mediation and dysfunction in schizophrenia. Society for Neuroscience Abstracts, 26, Program No. 886.3.
- Yeung N & Cohen JD (2001). The role of anterior cingulate in performance monitoring: response conflict and the error-related negativity. Society for Neuroscience Abstracts, 26, Program No. 849.6.
- Carter CS, van Veen V, Holroyd C, Stenger VA & Cohen JD (2002). Errors and conflict but not error feedback engage the anterior cingulate cortex during event-related fMRI: implications for performance monitoring in the human brain. Neuroimage 16(2), 1002.
- Yeung N, Nystrom L, Kitazono M & Cohen J (2002). An fMRI study of switching attention between tasks. Neuroimage 16(2), 692.
- Aston-Jones G, Rajkowski J, Lu W, Zhu Y, Cohen J & Morecraft R (2002). Prominent projections from the orbital prefrontal cortex to the locus coeruleus (LC) in monkey. Society for Neuroscience Abstracts, Program No. 86.9.
- Clayton E, Rajkowski J, Cohen J & Aston-Jones G (2002). The primate locus coeruleus and discrimination/decision-making in the eriksen flanker task. Society for Neuroscience Abstracts, Program No. 86.8.
- Nystrom LE, Yeung NP, Kitazono MT & Cohen JD (2002). Anterior cingulate activity: From conflict or motor planning? Society for Neuroscience Abstracts, Program No. 180.3.
- Polyn SM, Norman KA & Cohen JD (2002). Connectionist modeling of source memory phenomena. Society for Neuroscience Abstracts, Program No. 582.5.
- Rajkowski J, Majczynski H, Clayton E, Cohen J & Aston-Jones G (2002). Phasic activation of monkey locus coeruleus (LC) neurons with recognition of behaviorally significant stimuli. Society for Neuroscience Abstracts, Program No. 86.1.
- Rilling JK, Sanfey AG, Aronson JA, Nystrom LE & Cohen JD (2002). Mapping the brain's response to reciprocated and unreciprocated social cooperation. Society for Neuroscience Abstracts, Program No. 78.10.
- Sanfey AG, Rilling JK, Aronson JA, Nystrom LE & Cohen JD (2002). An investigation of the neural dynamics of fairness and unfairness? Society for Neuroscience Abstracts, Program No. 78.11.
- Benharrosh M, Takerkart S, Cohen J, Daubechies I & Richter W (2003). Using ICA on fMRI data: does independence matter? Neuroimage, 19(2), 778.
- Bishop SJ, Farah M, Fossella JA, Casey BJ & Cohen JD (2003). The MAOA-LPR polymorphism and prefrontal cortical activation to emotional distractors. Neuroimage, 19(2), 6.
- Bogacz R, Moehlis, Brown E, Holmes P & Cohen JD (2003). Neural mechanisms for decision optimization. Society for Neuroscience Abstracts, Program No. 197.6.

- Carter CS, Kerns J, Sohn M-H & Cohen JD (2003). A conflict over conflict monitoring and the anterior cingulate cortex. Society for Neuroscience Abstracts, Program No. 343.12.
- Gilzenrat MS, Cohen JD, Rajkowski J & Aston-Jones G (2003). Pupil dynamics predict changes in task engagement mediated by locus coeruleus. Society for Neuroscience Abstracts, Program No. 515.19.
- Greene JD, Nystrom LE, Darley JM & Cohen JD (2003). Neural activity correlated with outcome of moral decision. Cognitive Neuroscience Society Annual Meeting Program, E81, p. 166.
- Greene JD, Nystrom LE, Engell AD, Darley JM & Cohen JD (2003). Patterns of neural activity correlated with individual differences in moral judgment. Society for Neuroscience Abstracts, Program No. 443.3.
- Nieuwenhuis S, Holroyd CB, Yeung N, Nystrom LE, Cohen JD, Mars RB & Coles MGH (2003). Neural correlates of reinforcement learning and error processing: A functional magnetic resonance imaging study. Society for Neuroscience Abstracts, Program No. 197.11.
- Rilling JK, Wager TS, Davidson RJ, Kosslyn SM, Rose R, Smith EE & Cohen JD (2003). An fMRI investigation of the neural mechanisms of placebo analgesia. Neuroimage, 19(2), 504.
- Takerkart S, Benharrosh M, Cohen J & Daubechies I (2003). Estimating spatially distributed patterns of brain activity in fMRI datasets by using ICA. Neuroimage, 19(2), 946.
- Wager TD, Smith EE, Sokolik A, Cohen JD, Rilling JK, Davidson RJ, Kosslyn S, Rose RM & Casey KL (2003). Placebo reduces the BOLD fMRI response in the anticipation and experience of thermal pain. Neuroimage, 19(2), 84.
- D'Ardenne McClure K, McClure SM, Richter MC, Cohen JD, and Richter W (2004). Rest Matters: Kinetics of the BOLD response depend on inter-stimulus time. Society for Neuroscience Abstracts, Program No. 694.17.
- Dixon GE, Nitschke JB, Short SJ, Lakshmanan A, Carew ME, Anderle MJ, Schaefer HS, Johnstone T, Cohen JD, Kosslyn SM, Smith EE, Davidson RJ (2004). The neural correlates of anticipation: The functional neurobiology of gustatory expectancy in the human brain. Society for Neuroscience Abstracts, Program No. 179.10.
- Gilzenrat MS, Brown ET, Aston-Jones G & Cohen JD (2004). Locus Coeruleus, adaptive gain, and the optimization of decision tasks. Society for Neuroscience Abstracts, Program No. 899.6.
- McClure SM, Laibson DI, Loewenstein G & Cohen JD (2004). Separate neural systems represent immediate and delayed rewards. Society for Neuroscience Abstracts, Program No. 548.1.
- Polyn SM, Cohen JD & Norman KA (2004). Detecting distributed patterns in an fMRI study of free recall. Society for Neuroscience Abstracts, Program No. 79.14.
- Rilling JK, Sanfey AG, Aronson JA, Nystrom LE & Cohen JD (2004). Neural correlates of theory of mind within interpersonal interactions. NeuroImage, 22S(1), TH129.
- Cohen JD, McClure SM, Gilzenrat MS & Aston-Jones G (2005). Dopamine-norepinephrine interactions: Exploitation vs. Exploration. Neuropsychopharmacology, 30, S1, S28.

- Greene JD, Lowenberg K, Nystrom LE, Darley JM & Cohen JD (2005). Saving lives versus keeping promises: An fMRI investigation of consequentialist and deontological moral judgment. Society for Neuroscience Abstracts, Program No. 12.7.
- McClure, S.M., Laibson, D.I., Loewenstein, G., Ericson, K., McClure, K.D., Cohen, J.D. (2005) Neural mechanisms of time discounting for primary reward. Society for Neuroeconomics, online abstracts.
- Polyn SM, Detre G, Takerkart S, Natu V, Benharrosh M, Singer B, Cohen JD, Haxby JV & Norman KA (2005). A Matlab-based toolbox to facilitate multi-voxel pattern classification of fMRI data. Neuroimage, 26, S1, 728.
- Simen PA, Holmes P & Cohen J (2005). Threshold adaptation in decision making. Society for Neuroscience Abstracts, Program No. 768.15.
- Snitz BE, Cho RY, Archer G, Cohen JD & Carter CS (2005). Lateral and medial hypofrontality in first-episode psychosis: Diagnostic specificity to schizophrenia. Neuroimage, 26, S1, 1274.
- Detre GJ, Polyn SM, Moore CD, Natu VS, Singer BD, Cohen JD, Haxby JV & Norman KA (2006). The Multi-Voxel Pattern Analysis (MVPA) toolbox. Neuroimage, 31, S1, 128.
- McClure SM, Ericson KM, Laibson DI, Loewenstein G & Cohen JD (2006) Time discounting for primary reward. Neuroimage, 31, S1, 2749.
- McClure KD, McClure SM, Nystrom LE & Cohen JD (2006) Functional MRI of midbrain dopamine nuclei. Neuroimage, 31, S1, 2796.
- D'Ardenne K, McClure SM, Nystrom LE, & Cohen JD (2007). BOLD responses in the dopaminergic ventral tegmental area. Society for Neuroscience Abstracts, Program No. 704.21.
- Greene JD, Paxton JM, Nystrom LE & Cohen JD (2007). Dissociation between affective and cognitive moral disapproval. Society for Neuroscience Abstracts, Program No. 126.4.
- Simen PA & Cohen JD (2007). A diffusion-based neural network model of interval timing and temporal discounting. Society for Neuroscience Abstracts, Program No. 637.13.
- Todd MT, Wong KF, & Cohen JD (2007). Competition, gating, and learning: A new computational model of task switching. Society for Neuroscience Abstracts, Program No. 634.10.
- van den Bos W, Li J, Lau T, McClure SM, Cohen JD & Montague PR (2007). Social influences on bidding in common value auctions and the Winner's Curse. Abstract at meeting of the Society for Neuroeconomics, Nantucket Beach, MA.
- Nedic A, Tomlin D, Holmes P, Prentice DA and Cohen JD (2008) A simple decision task in a social context: Preliminary experiments and a model. Proceedings of the 47th IEEE Conference on Decision and Control.
- Yu AJ & Cohen JD (2008). Sequential Effects: Annoying Quirk or Adaptive Behavior? Computational and Systems Neuroscience, Abstract #III-58. [http://cosyne.org/cosyne08/posters/COSYNE2008\\_0065\\_poster.pdf](http://cosyne.org/cosyne08/posters/COSYNE2008_0065_poster.pdf).

- Becker, T. M., Cho, R. Y., Cohen, J. D., Kerns, J. G., Carter, C. S. (2009). The association between impaired language production and prefrontal cortex goal maintenance deficits in medication-naïve people with schizophrenia. NeuroImage, 47, S1, 189.
- Cho R, Cohen JD, Sacks A, Yen Y-T & Carter CS (2009). Disturbances in Frontal Cortical Gamma Oscillations in Association with Genetic Liability for Schizophrenia. Abstracts of Panels and Posters, 48th Annual Meeting of the American College of Neuropsychopharmacology.
- Cho RY, Forster SE, Cohen JD & Carter CS (2009). Impairments in prefrontal cortical gamma-band synchrony and cognitive control in first-episode schizophrenia. NeuroImage.
- Forster SE, Cho RY, Cohen JD & Carter CS (2009). Effects of parametric manipulations of conflict on N2 amplitude and cognitive control adjustments. NeuroImage.
- Simen PA, Nystrom LE, van Vugt M, Krueger P & Cohen JD (2009). Event-related fMRI during slow decision making can reveal temporal structure in neural activity. Society for Neuroscience Abstracts, 576.9/FF111.
- Tomlin D, Nedic A, Holmes P & Cohen JD (2009). Neural and behavioral responses to social feedback during group decision-making. Society for Neuroscience Abstracts, 475.4/FF27.
- Eppinger B, Nystrom L & Cohen JD. (2010). Age-related changes in reward sensitivity during decision-making and learning. Society for Neuroscience Abstracts, 911.2/LLL48.
- Gershman SJ, Cohen JD & Niv Y (2010). Learning to selectively attend. CogSci 2010: Proceedings of the 32th Annual Meeting of the Cognitive Science Society.
- Getz SJ, Tomlin D, Nystrom LE, Cohen JD & Conway ARA (2010). Executive control of intertemporal choice: Effects of cognitive load on impulsive decision-making. Abstracts of the Psychonomic Society, 3067.
- Todd MT, Niv Y & Cohen JD (2010). Mental set representations in fMRI. Society for Neuroscience Abstracts, 603.8/KKK52
- Tomlin D, Nedic A, Prentice DA, Holmes P & Cohen JD (2010). Group foraging task reveals neural substrates of social influence. Society for Neuroscience Abstracts, 403.9/LLL65.
- Wilson RC, Cohen JD & Niv Y (2010). Inferring relevance in a changing world. Society for Neuroscience Abstracts, 907.12/KKK45.
- Feng S, Schwemmer M & Cohen JD (2011). Computational Constraints on Cognitive Control. Society for Neuroscience Abstracts.
- Geana A, Wilson RC, White JM, Ludvig E & Cohen JD. (2011). The Separate Roles of Reward Magnitude and Uncertainty in the Explore/Exploit Dilemma. Society for Neuroscience Abstracts, 830.10/XX40.
- Lewis-Peacock JA, Salesi MR, Cohen JD & Norman KA (2011). Decoding the use of working memory and episodic memory in prospective remembering. Society for Neuroscience Abstracts, 829.04.

- Todd MT, Botvinick MM, Schwemmer MA, Cohen JD & Dayan P (2011). Normative analysis of task switching. Society for Neuroscience Abstracts.
- Tomlin D, Nedic A, Todd MT, Wilson RC, Prentice DA, Holmes P & Cohen JD (2011). Group foraging task reveals separable influences of individual experience and social information. Society for Neuroscience Abstracts.
- Wilson RC, Geana A, Myles-White J, Ludwig E & Cohen JD (2011). Why the grass is greener on the other side: Behavioral evidence for an ambiguity bonus in human exploratory decision making. Society for Neuroscience Abstracts, 830.13.
- Goldfarb S, Simen P, Caicedo C, Holmes P, Leonard NE & Cohen JD (2011). Optimal performance and the LBA model. Abstracts of the Psychonomic Society.
- Cohen JD, Lewis-Peacock JA & Norman KA (2012). Neural evidence for the flexible use of working memory and episodic memory in prospective remembering. Society for Neuroscience Abstracts.
- deBettencourt MT, Lee RF, Cohen JD, Norman KA & Turk-Browne NB (2012). Real-time decoding and training of sustained attention. Society for Neuroscience Abstracts.
- Eldar E, Radulescu A, Niv Y & Cohen JD (2012). Norepinephrine, neural gain, and "first one wins" network dynamics. Computational and Systems Neuroscience (CoSyNe).
- Tomlin D, Nedic A, Wilson RC, Holmes P & Cohen JD (2012). Group foraging task reveals separable influences of individual experience and social information. Society for Neuroscience Abstracts.
- deBettencourt MT, Lee RF, Cohen JD, Norman KA & Turk-Browne NB (2013). Externalizing internal states with real-time neurofeedback to train visual attention. Journal of Vision Sciences.
- Wang Y, Li K, Charikar M, Cohen JD & Turk-Browne NB (2013). What you find depends on how you look: Category selectivity in frontal cortex revealed by whole-brain correlation analysis. Journal of Vision Sciences.
- Shenhav A, Botvinick MM & Cohen JD (2013). Decision costs may explain dACC activity in a "foraging" context. Society for Neuroscience Abstracts.
- Wilson RC, White JM & Cohen JD (2013). The role of adaptive decision noise in exploration. Society for Neuroscience Abstracts.
- Geana A, Wilson RC & Cohen JD (2014). Risk, ambiguity and decision horizon in human exploration: A Wheel of Fortune task. Society for Neuroscience Abstracts.
- Momennejad I, Cohen JD & Norman KA (2014). Imagine the future! How does episodic simulation enhance prospective memory? Society for Neuroscience Abstracts.
- Wilson RC & Cohen JD (2014). Humans tradeoff information seeking and randomness in explore-exploit decisions. Society for Neuroscience Abstracts.
- Kane GA, Vazey EM, Wilson RC, Shenhav A, Daw N, Aston-Jones G & Cohen JD (2015). Examining the Role of the Locus Coeruleus in Foraging and Exploration. Society for Neuroscience Abstracts.

- Keung W, Osherson D & Cohen JD (2015). Influence of cognitive control on semantic representation: seeing things under a different light. Computational and Systems Neuroscience (CoSyNe).
- Keung W, Osherson D & Cohen JD (2015). Influence of cognitive control on semantic representation. <https://www.biorxiv.org/content/10.1101/067553v1>.
- Krueger P, Wilson RC & Cohen JD (2015). Strategies for exploration in the domain of losses. Computational and Systems Neuroscience (CoSyNe).
- Lositsky O, Wilson RC, Shvartsman M & Cohen JD (2015). A drift diffusion model of proactive and reactive control in a context-dependent two-alternative forced choice task. RLDM 2015: Proceedings of the Multi-disciplinary Conference on Reinforcement Learning and Decision Making.
- Novick AS, Bornstein AM, Norman KA & Cohen JD (2015). Refresh my memory: Context information from episodic memory affects working memory maintenance. Society for Neuroscience Abstracts.
- Wang Y, Anderson M, Cohen JD, Heinecke A, Li K, Satish N, Sundaram N, Turk-Browne NB & Willke T (2015). Full correlation matrix analysis of fMRI data on Intel® Xeon Phi™ coprocessors. In Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (p. 23). ACM.
- Cohen JD, Dey B, Griffiths T, Musslick S, Özcimder K, Reichman D, Shinkar I and Wagner T (2016). A graph-theoretic approach to multitasking. [arXiv:1611.02400](https://arxiv.org/abs/1611.02400).
- Lositsky O, Wilson RC, Shvartsman M & Cohen JD (2016). Adaptive task representations in context-based decision making. Society for Neuroscience Abstracts.
- Momennejad I, Tomov, M, Norman KA & Cohen JD (2016). The strategic allocation of working memory and episodic memory in prospective remembering: A neural network model. Society for Neuroscience Abstracts.
- Musslick S, Dey B, Özcimder K, Patwary M, Krieger P, Willke TL & Cohen JD (2016). Multitasking capacity versus efficiency of representation in neural network architectures. Nanosymposium. Society for Neuroscience Abstracts.
- Novick AS, Bornstein AM, Norman KA & Cohen JD (2016). Blast from the past: Episodic memory supports working memory maintenance. Society for Neuroscience Abstracts.
- Wang S, Cohen JD & Wilson RC (2016). Blink different! Blink rate reflects individual differences in directed exploration. Computational and Systems Neuroscience (CoSyNe).
- Wilson RC & Cohen JD (2016). A unifying theory of explore-exploit decisions. Computational and Systems Neuroscience (CoSyNe).
- Wang Y, Keller B, Capota M, Anderson MJ, Sundaram N, Cohen JD & Li K, Turk-Browne NB & Willke TL (2016). Real-time full correlation matrix analysis of fMRI data. BigD237: 2016 IEEE International Conference on Big Data.
- Capota M, Willke TL, Norman KA, Cohen JD & Turk-Browne NB (2017). Brain imaging analysis kit: advanced fMRI analysis at scale. Society for Neuroscience Abstracts.



- Cherkaev A, Musslick S, Cohen JD, Srikumar V & Flatt M (2017). SweetPea: A Language for Designing Experiments. The 45th Symposium on Principles of Programming Languages (POPL).
- Cohen JD, Lesnick M, Keller B, Baldassano C, Schapiro A & Ellis C (2017). Using realistic, synthetic fMRI data to validate Topological Data Analysis as a tool for fMRI. Society for Neuroscience Abstracts.
- Ebitz RB, Cohen JD & Buschman (2017). Mechanisms for generating flexibility in a changing world. Society for Neuroscience Abstracts.
- Iordan MC, Ritvo VJH, Norman KA, Turk-Browne NB & Cohen JD (2017). Inducing neural plasticity and perceptual similarity via real-time fMRI neurofeedback. Society for Neuroscience Abstracts.
- Musslick S, Jang SG, Panichello M, Bustamante L, Shenhav A & Cohen JD (2017). Constraints associated with cognitive control and the stability-flexibility dilemma. Society for Neuroscience Abstracts.
- Novick AS, Bornstein AM, Norman KA & Cohen JD (2017). Drift diffusion modeling of interactions between episodic and working memory. Society for Neuroscience Abstracts.
- Suo DC, Hutchinson JB, deBettencourt M, Mennen A, Wang Y, Willke T, Turk-Browne NB, Norman KA, Cohen JD & Li K (2017). Real-time fMRI analysis in the cloud. Society for Neuroscience Abstracts.
- Bustamante LA, Burton AR, Baker AL, Shenhav AL, Daw ND & Cohen JD (2018). The cost of cognitive control and the balance of random versus directed exploration. Society for Neuroscience Abstracts.
- Bustamante LA, Lieder F, Musslick S, Shenhav A & Cohen JD (2018). Learning to overexert cognitive control in the Stroop task. CCN 2018: Proceedings of the Annual Conference on Cognitive Computational Neuroscience.
- Iordan MC, Ritvo VJH, Norman KA, Turk-Browne NB & Cohen JD (2018). Using closed loop real-time fMRI neurofeedback to induce neural plasticity and influence perceptual similarity. Society for Neuroscience Abstracts.
- Kane G, James M, Shenhav A, Wilson RC, Daw N, Aston-Jones G & Cohen JD (2018). Does the anterior cingulate contribute to foraging decisions? Computational and Systems Neuroscience (CoSyNe).
- Musslick S, Cohen JD & Shenhav A (2018). Estimating the costs of cognitive control: Theoretical validation and potential pitfalls. Society for Neuroscience Abstracts.
- Novick A, Musslick S, Iordan M & Cohen JD (2018). Why we struggle to multitask: Converging evidence from computational modeling, human behavior, and neuroimaging. Society for Neuroscience Abstracts.
- Shvartsman M, Charles A, Cohen JD, Aoi M, Sundaram N & Wilke T (2018). Matrix-normal models for fMRI analysis. Computational and Systems Neuroscience (CoSyNe).

- Shvartsman M, Sundaram N, Aoi M, Charles A, Willke T & Cohen JD (2018). Matrix-normal models for fMRI analysis. AISTATS.
- Wilson RC & Cohen JD (2018). Deep exploration explains the tradeoff between directed and random exploration. Society for Neuroscience Abstracts.
- Agrawal M, Mattar MG, Daw ND & Cohen JD (2019). Rational arbitration of hippocampal replay. CCN 2019: Proceedings of the Annual Conference on Cognitive Computational Neuroscience.
- Beukers A, Norman KA & Cohen JD (2019). Working with episodic memory: The n-back task. CCN 2019: Proceedings of the Annual Conference on Cognitive Computational Neuroscience.
- Ebitz B, Cohen J, Buschman T, Moore T & Hayden B (2019). Exploration via disrupted sensorimotor control dynamics Computational and Systems Neuroscience (CoSyNe).
- Henselman-Petrusek G, Segert S, Keller B, Tepper M, Cohen JD (2019). Geometry of Shared Representations. CCN 2019: Proceedings of the Annual Conference on Cognitive Computational Neuroscience. <https://doi.org/10.32470/CCN.2019.1418-0>.
- Willke TL, Yoo SBM, Capotă M, Musslick S, Hayden BY & Cohen JD (2019). A Comparison of non-human primate and deep reinforcement learning agent performance in a virtual pursuit-avoidance task. RLDM 2019: Proceedings of the Multi-disciplinary Conference on Reinforcement Learning and Decision Making. <https://www.biorxiv.org/content/10.1101/567545v2>.
- Dulberg Z and Cohen JD (2020). Learning canonical transformations. BabyMind 2020, NeurIPS Workshop.
- Kumar S, Dasgupta I, Cohen JD, Daw N & Griffiths T (2020). Meta-Learning of compositional task distributions in humans and machines. MetaLearn 2020, NeurIPS Workshop.
- Bustamante L, Bogdanov M, Solis J, Oshinowo T, Sheldon S, Devine S, Lee J, Tong E, Burton A, Grahek I, Fahey MP, Konova A, Otto R, Barch D, Shenhav A, Cohen J, Daw N (2023). Quantifying individual differences in cognitive and physical effort cost with the Effort Foraging Task; applications in large online, clinical depression, and transcranial direct stimulation studies. International conference on Motivational and Cognitive Control.
- Bustamante LA, Fahey MP, Solis J, Oshinowo T, Tong E, Lee JR, Burton AR, Grahek I, Shenhav A, Barch DM, Daw ND, Konova AB & Cohen JD (2023). Anxiety in major depression associated with increased willingness to exert cognitive, but not physical effort. Society for Biological Psychiatry.

## 5. Manuscripts Under Review / In Preparation

- Altabaa A, Webb T, Cohen JD & Lafferty J (under review). Abstractors: Transformer modules for symbolic message passing and relational reasoning. <https://arxiv.org/abs/2304.00195>.
- Campbell D, Kumar S, Giallanza T, Cohen JD, and Griffiths TL (under review). Relational constraints on neural networks reproduce human biases towards abstract geometric regularity. <https://arxiv.org/abs/2309.17363>.

- Giallanza T, Campbell D & Cohen JD (under review). Toward the emergence of intelligent control: Episodic generalization and optimization. <https://osf.io/preprints/psyarxiv/dzvpy/>
- Giallanza T, Campbell D, Cohen JD & Rogers TT (under review). An integrated model of semantics and control. <https://psyarxiv.com/jq7ta>.
- Iordan MC, Ritvo VJH, Norman KA, Turk-Browne NB & Cohen JDC (under review). Sculpting New Visual Concepts into the Human Brain. <https://www.biorxiv.org/content/10.1101/2020.10.14.339853v1>.
- Musslick S, Saxe AM, Hoskin AN, Sagiv Y, Reichman D, Petri G & Cohen, JD (under review). On the rational boundedness of cognitive control: Shared versus separated representations. <https://psyarxiv.com/jkhdf>.
- Pothukuchi RP, Lufkin L, Shen YJ, Simon A, Trevisan BE, Tu M, Yang M, Foxman B, Pothukuchi VS, Kyaw TH, Epping G, Jongkees B, Busemeyer J, Cohen JD & Bhattacharjee A (under review). Quantum cognitive modeling: New applications and systems research directions. <https://arxiv.org/abs/2309.00597>.
- Pyle R, Musslick S, Cohen JD & Patel AB (under review). A quantitative approach to predicting representational learning and performance in neural networks. <https://arxiv.org/abs/2307.07575>
- Ravi S, Musslick S, Hamin M, Willke TL & Cohen JD (under review). Navigating the trade-off between multi-task learning and learning to multitask in deep neural networks. <https://arxiv.org/abs/2007.10527>.
- Shenhav A, Musslick S, Botvinick MM & Cohen JD (under review) Misdirected vigor: Differentiating the control of value from the value of control.
- Webb TW, Frankland SM, Altabaa A, Krishnamurthy K, Campbell D, Russin J, Reilly RO, Lafferty J & Cohen JD (under review). The Relational bottleneck as an inductive bias for efficient abstraction. <https://arxiv.org/abs/2309.06629>.
- Wilson RC, Wang S, Sadhegiyeh H & Cohen JD (under review). Deep exploration as a unifying account of explore-exploit behavior. PsyArXiv: <https://psyarxiv.com/uj85c>.
- Frankland SM, Webb TW & Cohen JD (in preparation). No coincidence, George: Capacity limits as the curse of compositionality. <https://doi.org/10.31234/osf.io/cjuxb>.
- Henselman-Petrusek G, Giallanza T, Musslick S & Cohen JD (in preparation). Multitasking networks use multiaffine representations to direct flow of feature data.
- Jonkes BJ, Todd MT, Lloyd K, Dayan P & Cohen JD (in preparation). When it pays to be quick: dissociating control over task preparation and speed-accuracy trade-off in task switching. <https://psyarxiv.com/quhns>.
- Momennejad I, Tomov M, Norman KA, Cohen JD (in preparation). The strategic allocation of working memory and episodic memory in cognitive control: A neural network model of prospective memory.
- Rosendahl L & Cohen JD (in preparation). A quantum framework for modeling cognitive control and arousal.

Shvartsman M, Sundaram N, Srivasta V, & Cohen JD (in preparation). A normative theory of decision making from multiple stimuli.

## PROFESSIONAL ACTIVITIES

### TEACHING:

#### 1. Courses

- 1989-96 Introduction to Cognitive Psychology (undergraduate survey course)  
Department of Psychology, Carnegie Mellon University
- 1989-96 Cognitive Neuroscience section of Cognitive Core (graduate survey course). Department of Psychology, Carnegie Mellon University
- 1990-93 Co-coordinator, Fellowship Training Program in Schizophrenia Research. Western Psychiatric Institute and Clinic, University of Pittsburgh
- 1992-93 Research Methods in Cognitive Neuroscience (advanced undergraduate seminar).  
Department of Psychology, Carnegie Mellon University
- 1992-93 Functional Neural Circuits (graduate and advanced undergraduate seminar). Department of Psychology, Carnegie Mellon University
- 1994-95 Neural and Psychological Mechanisms of Working Memory (graduate and advanced undergraduate seminar). Department of Psychology, Carnegie Mellon University
- 1996-97 Advanced Topics in Cognitive Neuroscience (graduate and advanced undergraduate seminar). Department of Psychology, Carnegie Mellon University.
- 1996-97 Biological and Psychological Mechanisms of Attention (graduate and advanced undergraduate seminar). Department of Psychology, Carnegie Mellon University; co-taught with Gary Aston-Jones.
- 1999-00 Neural Bases of Cognitive Control (undergraduate course). Department of Psychology, Princeton University.
- 1999-01 Topics in Molecular and Cognitive Neuroscience (graduate seminar). Departments of Psychology and Molecular Biology, Princeton University.
- 1999-01 Introduction to Neural Networks (undergraduate course). Department of Psychology, Princeton University.

- 2001-02    Advanced Topics in Neural Network Models of Psychological Function (advanced undergraduate / graduate seminar). Department of Psychology, Princeton University.
- 2002-03    Statistical Methods in Psychological Research (advanced undergraduate / graduate course). Department of Psychology, Princeton University.
- 2004-07    Graduate Proseminar in Cognitive Psychology.    Department of Psychology, Princeton University.
- 2009-16    Core Course for Ph.D. Program in Neuroscience, Princeton Neuroscience Institute, Princeton University.
- 2017        Introduction to Cognitive Psychology (undergraduate survey course, with laboratory component). Department of Psychology, Princeton University
- 2018-20    Computational Models of Psychological Function (undergraduate course, with laboratory component). Princeton Neuroscience Institute and Department of Psychology, Princeton University
- 2022        The Computational Basis of Natural Intelligence in the Human Brain (undergraduate seminar). Princeton Neuroscience Institute, Princeton University

## 2. Tutorials and Workshops

- May, 1990-93 — Cohen JD, Servan-Schreiber D. Course co-directors, A primer on neural modeling in psychiatry. 144-7th Annual Meetings of the American Psychiatric Society, New York.
- July, 1991 — Invited faculty member.    James S. McDonnell Summer Institute in Cognitive Neuroscience, Dartmouth College, Hanover.
- October, 1993 — Applications of Functional MRI to Studies of Human Memory. Invited tutorial, Memory Disorders Research Society, Boston.
- November, 1993 — Functional neuroimaging. Invited tutorial, Neural Information Processing Society, Boulder.
- August, 1996 — Neuroimaging and Behavior. Invited workshop, XXVI International Congress of Psychology, Montreal.
- January, 1997 — The Role of Neuromodulation in Cognition: Physiological and Computational Approaches. Panel organizer, 30th Winter Conference on Brain Research, Breckenridge, Colorado.
- July, 1997 — Invited faculty member.    James S. McDonnell Summer Institute in Cognitive Neuroscience, Dartmouth College, Hanover.
- September, 2000 — International Workshop on Neural Bases of Executive Functions and Performance Monitoring, Jena, Germany.

July, 2001 — Invited faculty member. James S. McDonnell Summer Institute in Cognitive Neuroscience, Dartmouth College, Hanover.

### 3. Trainees

#### Graduate advisees:

Therese Huston, Ph.D. (1990-1995)

CMU Department of Psychology

Behavioral and computational modeling studies of selective attention

Director, Center for Excellence in Teaching & Learning, University of Seattle

Todd Braver, Ph.D. (1992- 97)

CMU Department of Psychology

Computational and neuroimaging studies of prefrontal cortex and cognitive control

Professor of Psychology, Washington University, St. Louis

Matthew Botvinick, M.D., Ph.D. (1995-2001)

CMU Department of Psychology

Computational modeling and fMRI studies of the role of anterior cingulate cortex in conflict monitoring and control

Professor of Psychology and Neuroscience, Princeton University

Mark Gilzenrat, Ph.D. (1996-2006)

CMU Department of Psychology (1996-1998)

Princeton Department of Psychology (1998-2006)

Computational models and pupillometric studies of neuromodulatory influences on selective attention

Software architect, Navaraga Corporation

Raymond Cho, M.D. (1999-2003)

Department of Psychology, Princeton University

Assistant Professor of Psychiatry, University of Pittsburgh

Eric Shea-Brown, Ph.D. (1999-2004)

Program in Applied and Computational Mathematics, Princeton University

Co-advisor with Philip Holmes

Neural oscillators and integrators in the dynamics of decision tasks

Associate Professor of Applied Mathematics, University of Washington, Seattle

Sean Polyn (2000-2005)

Department of Psychology, Princeton University

Computational modeling of context updating, reinforcement learning and dopamine function

Associate Professor of Psychology and Psychiatry, Vanderbilt University

Aaron Schurger (2001-2008)

Department of Psychology, Princeton University  
Electrophysiological and fMRI studies of perceptual awareness  
Associate Professor, Inserm-CEA

Agatha Lenartowicz (2002-2008)  
Department of Psychology, Princeton University  
Behavioral, electrophysiological and fMRI studies of task switching  
Postdoctoral Fellow, UCLA

Kimberly D'Ardenne McClure (2005-2008)  
Department of Chemistry, Princeton University  
fMRI studies of brainstem neuromodulatory nuclei  
Postdoctoral Fellow, Montague Lab, Virginia Tech

Susan Robison (2005-2009; co-advised with Ken Norman)  
Department of Chemistry, Princeton University  
Behavioral and fMRI studies of cognitive control and episodic memory

Emily Chakwin (2006-2008)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of moral reasoning

Michael Todd (2006-2012)  
Department of Psychology, Princeton University  
Computational modeling studies of cognitive control  
Data Scientist, Netflix

Adam Moore (2006-2011; co-advised with Andy Conway)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of moral reasoning

John White (2008-2013)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of economic decision making  
Data Scientist, Netflix

Sarah Getz (2008-2013; co-advised with Andy Conway)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of economic decision making

Andra Geana (2010-2016)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of exploration and exploitation in decision making  
Postdoctoral Fellow, Brown University

Jane Keung (2011-2016)

Princeton Neuroscience Institute, Princeton University  
Behavioral and fMRI studies of prefrontal cortex and cognitive control  
Postdoctoral Fellow, University of Arizona

Yida Wang (2011-2016)  
Department of Computer Science, Princeton University  
Co-advisor with Kai Li and Nick Turk-Browne  
Full-correlation matrix analysis of fMRI data  
Applied Scientist, Amazon

Olga Lositsky (2012-2017)  
Princeton Neuroscience Institute, Princeton University  
Behavioral and fMRI studies of decision making  
Postdoctoral Fellow, Brown University

Gary Kane (2012-2018)  
Department of Psychology, Princeton University  
Behavioral and neurophysiological studies of foraging behavior and LC function in rodents  
Postdoctoral Fellow, Harvard University

Sachin Ravi (2014-2019)  
Department of Computer Science, Princeton University (Co-advisor with Kai Li)  
Meta-learning and controlled vs. automatic processing  
Machine Learning Research Engineer, Apple

Laura Bustamante (2014-2022)  
Princeton Neuroscience Institute, Princeton University  
Behavioral and fMRI studies of the cost of cognitive control  
Postdoctoral Fellow, Washington University

Sebastian Musslick (2014-2022)  
Princeton Neuroscience Institute, Princeton University  
Behavioral and fMRI studies of cognitive control  
Schmidt Science Fellow, Assistant Professor, Brown University

Abigail Novick (2014-2022)  
Department of Psychology, Princeton University  
Behavioral and fMRI studies of representational sharing and multitasking

Lena Rosendahl (2016-2022)  
Department of Mechanical and Aerospace Engineering  
Co-advisor with Naomi Leonard  
Quantum probabilistic models of cognitive control  
Data Analyst, Mathematica



Mayank Agrawal (2017-present)

Department of Psychology, Princeton University

Computational and Behavioral studies of learning and cognitive control

Zach Dulberg (2019-present)

Princeton Neuroscience Institute, Princeton University

Learning mechanisms for acquiring representations that support generalization

Sreejan Kumar (2019-present)

Princeton Neuroscience Institute, Princeton University

Neural mechanisms underlying learning, representation and reasoning

Simon Segert (2019-present)

Princeton Neuroscience Institute, Princeton University

Neurally-plausible mechanisms of relational reasoning

Tyler Giallanza (2020-present)

Department of Psychology, Princeton University

Neural mechanisms underlying learning, representation and processing of semantics

Samyak Gupta (2020-present)

Department of Computer Science, Princeton University

Co-advisor with Kai Li

Compilation and efficient computational of heterogeneous cognitive models

Shanka Mondal (2020-present)

Electrical and Computer Engineering, Princeton University

Neural mechanisms underlying learning, representation and generalization

Declan Campbell (2022-present)

Princeton Neuroscience Institute, Princeton University

Computational models of human intelligence

Ph.D. Thesis Co-Advisor:

Cliona Golden (2004, Ingrid Daubechies), PACM, Princeton University

Adi Livnat (2005, Simon Levin), Ecology and Evolutionary Biology, Princeton University

Ilya Fischhoff (2006, Daniel Rubenstein), Ecology and Evolutionary Biology, Princeton University

Juan Gao (2007, Phil Holmes), Program in Applied and Computational Mathematics, Princeton University

Yuan (Sophie) Liu (2007, Phil Holmes), Physics, Princeton University

Caitlin Newberry (2007, Wolf Richter), Chemistry, Princeton University

Phil Eckoff (2008, Phil Holmes), Program in Applied and Computational Mathematics, Princeton University

Andrea Nedic (2011, Phil Holmes), Electrical Engineering, Princeton University

Samuel Feng (Phil Holmes), Program in Applied and Computational Mathematic, Princeton University

Stephanie Goldfarb (2013, Naomi Leonard), Program in Applied and Computational Mathematic, Princeton University

Eran Eldar (2014, Yale Niv), Princeton Neuroscience Institute, Princeton University

Paul Reverdy (2014, Naomi Leonard), Mechanical and Aerospace Engineering, Princeton University

Postdoctoral trainees:

Steve Forman, M.D., Ph.D. (1992-1994)

University of Pittsburgh Department of Psychiatry

fMRI studies of prefrontal function

Associate Professor of Psychiatry, University of Pittsburgh

Medical Director of the Center for Treatment of Addictive Disorders, Pittsburgh VA

Marius Usher, Ph.D. (1993-1995)

CMU Department of Psychology

Computational models of catecholaminergic neuromodulation and selective attention

Professor of Psychology and Neuroscience, Tel Aviv University

Deanna Barch, Ph.D. (1993-1995)

University of Pittsburgh Department of Psychiatry

Professor of Psychology and Radiology, Washington University, St. Louis

William Perlstein, Ph.D. (1993-1996)

University of Pittsburgh Department of Psychiatry

Electrophysiological and fMRI studies of working memory in schizophrenia

Associate Professor of Clinical and Health Psychology and Psychiatry, University of Florida, Gainesville

Gregory Berns, M.D., Ph.D. (1995-1998)

University of Pittsburgh Department of Psychiatry

Functional neuroimaging studies of novelty detection

Professor of Economics, Emory University

Randy Gobbel, Ph.D. (1997-1998)

Carnegie Mellon University Department of Psychology

Computational modeling studies of basal ganglia function in control of sequential action  
Computer Scientist, Artificial Intelligence Center, SRI International

James Kroger (1998-2001)  
Princeton University Department of Psychology  
fMRI studies of prefrontal cortex organization  
Professor of Psychology, New Mexico State University

Nicholas Yeung, Ph.D. (1999-2004)  
Princeton University Department of Psychology  
Modeling, ERP and fMRI studies of conflict monitoring and cognitive control  
University Lecturer in Experimental Psychology, University of Oxford

Gesine Dreisbach, Ph.D. (2000-2001)  
Princeton University Department of Psychology  
fMRI studies of tasking switching  
Professor of Psychology, University of Regensburg

Clay Holroyd, Ph.D. (2001-2004)  
Princeton University Department of Psychology  
Neural network modeling, ERP, and fMRI studies of performance monitoring and reinforcement learning  
Professor of Psychology, University of Victoria

James Rilling, Ph.D. (2001-2003)  
Center for the Study of Brain, Mind & Behavior, Princeton University  
Neural mechanisms of economic decision making; neural mechanisms in placebo responding.  
Associate Professor of Anthropology and Psychiatry and Behavioral Sciences, Emory University

Alan Sanfey, Ph.D. (2001-2003)  
Center for the Study of Brain, Mind & Behavior, Princeton University  
Neural mechanisms of economic decision making; neural mechanisms in placebo responding.  
Associate Professor of Psychology, University of Arizona  
Principal Investigator, Donders Institute for Brain, Cognition and Behavior, Radboud University

Rafal Bogacz, Ph.D. (2002-2004)  
Princeton University Department of Psychology  
Neural network modeling and ERP studies of task switching and performance monitoring.  
Associate Professor of Clinical Neuroscience, University of Oxford

Sander Nieuwenhuis, Ph.D. (2002-2003)  
Princeton University Department of Psychology  
ERP studies and neural network modeling of performance monitoring, task switching and the attentional blink.  
Assistant Professor, Cognitive Psychology Unit, Leiden University

Joshua Greene, Ph.D. (2001-2006)

Princeton University Department of Psychology

Neural bases of moral reasoning

Professor of Psychology, Harvard University

Samuel McClure, Ph.D. (2003-2007)

Princeton University Department of Psychology

Neural network modeling and neuroimaging studies of reinforcement learning and decision making

Assistant Professor of Psychology, Stanford University

Jean-Baptiste Pochon, Ph.D. (2003-2005)

Princeton University Department of Psychology

Neuroimaging studies of decision making, conflict monitoring and cognitive control

Postdoctoral Fellow, L'Hôpital de la Salpêtrière in Paris

Patrick Simen, PhD. (2003-2007)

Princeton University Program in Applied & Computational Mathematics

Computational modeling, mathematical analysis, behavioral and neuroimaging studies of decision making and cognitive control

Assistant Professor, Oberlin College

Jason Chein, Ph.D. (2004-2005)

Princeton University Department of Psychology

Neuroimaging studies of prefrontal cortex organization and function

Assistant Professor of Psychology, Temple University

Brent Field, Ph.D. (2004-2015)

Center for Study of Brain, Mind and Behavior, and Center for Health and Well-Being, Woodrow Wilson School of Public Policy

Behavioral and neuroimaging studies of attention and emotional regulation among meditation practitioners

Angela Yu, Ph.D. (2004-2008)

Princeton University Department of Psychology

Computational modeling and mathematical analysis studies of decision making and cognitive control

Associate Professor of Cognitive Science, University of California, San Diego

Damon Tomlin, Ph.D. (2006-2013)

Princeton University Department of Psychology and Princeton Neuroscience Institute

Neuroimaging studies of economic and social decision making and cognitive control

KongFatt Wong-Lin, Ph.D. (2006-2009)

Princeton University Department of Mechanical and Aerospace Engineering

Computational modeling and mathematical analysis studies of decision making and cognitive control

Lecturer, Ulster University

Yael Niv, Ph.D. (2007-2008)

Princeton University Department of Psychology

Neuroimaging and computational modeling studies of decision making and cognitive control

Associate Professor of Psychology and Neuroscience, Princeton University

Benjamin Eppinger, Ph.D. (2007-2010)

Princeton University Department of Psychology and Center for Health and Well Being of the Woodrow Wilson School for Public Policy

Neuroimaging studies of age-related differences in economic decision making and cognitive control

Researcher, MPI for Human Development, Berlin

Marieke van Vugt, Ph.D. (2008-2010)

Princeton University Department of Psychology

Neuroimaging and computational modeling studies of decision making and cognitive control

Assistant Professor, University of Groningen

Fuat Balci, Ph.D. (2008-2010)

Princeton University Department of Psychology

Theoretical and behavioral studies of interval timing and decision making

Assistant Professor, Department of Psychology, Koc University, Istanbul

Robert Wilson, Ph.D. (2009-2014)

Princeton University Department of Psychology and Princeton Neuroscience Institute

Theoretical, behavioral and neuroimaging studies of cognitive control & locus coeruleus function

Assistant Professor, University of Arizona

Michael Schwemmer, Ph.D. (2010-2012)

Princeton Neuroscience Institute

Theoretical analyses of capacity constraints on cognitive control

Postdoctoral Fellow, Mathematical Biosciences Institute, Ohio State University

Jarrold Lewis-Peacock, Ph.D. in Psychology, University of Wisconsin-Madison

Princeton Neuroscience Institute (2011-2013; co-advised with Ken Norman)

Neuroimaging studies of cognitive control and prospective memory

Assistant Professor, University of Texas, Austin

Elliot Ludvig, Ph.D., Psychological and Brain Sciences, Duke University

Princeton Neuroscience Institute (2011-2013)

Theoretical model and behavioral studies of learning, memory and cognitive control

Professor, University of Warwick

Amitai Shenhav, Ph.D. in Psychology, Harvard University

CV Starr Fellow, PNI (2012-2016; co-advised with Matthew Botvinick)

Theoretical and neuroimaging studies of the costs of cognitive control

Associate Professor, Brown University

Aaron Bornstein, Ph.D. in Neuroscience, NYU  
Princeton Neuroscience Institute (2013-2019; co-advised with Ken Norman)  
Neuroimaging studies of episodic memory and decision making  
Assistant Professor, University of California, Irvine

Ida Momennajad, Ph.D.  
Princeton Neuroscience Institute (2013-2018; co-advised with Ken Norman & Nathaniel Daw)  
Neuroimaging and theoretical modeling studies of prospective memory

Michael Shvartsman, Ph.D. in Cognitive Science, University of Michigan  
Princeton Neuroscience Institute (2014-2018)  
Theoretical analysis of decision making; Bayesian hierarchical analysis of neuroimaging data  
Oculus Research

Hasan Kayhan Ozcimder, Ph.D. in Mechanical Engineering, Boston University  
Princeton Neuroscience Institute (2015-2017; co-advised with Naomi Leonard)  
Mathematical modeling of capacity constraints in controlled (interactive parallel) processing  
Mathworks

Michael Lesnick, Ph.D in Applied Mathematics, Stanford University  
Princeton Neuroscience Institute (2016-2018)  
Tools for topological data analysis (TDA) and their application to neuroscientific data analysis  
Department of Mathematics, SUNY Albany

Biswadip Dey, Ph.D. in Mechanical Engineering, University of Maryland, College Park  
Princeton Neuroscience Institute (2015-present; co-advised with Naomi Leonard)  
Mathematical modeling of capacity constraints in controlled (interactive parallel) processing.

Marius Cătălin Iordan, Ph.D. in Computer Science, Stanford University  
Princeton Neuroscience Institute (2016-present; co-advised with Daniel Osherson)  
Theoretical and neuroimaging studies of semantic representations and cognitive control

Simon Cullen, PhD. in Philosophy, Princeton University  
Princeton Neuroscience Institute (2017-2018)  
Theoretical and experimental studies of moral reasoning  
Assistant Professor, Carnegie Mellon University

Greg Henselman, Ph.D. in Applied Mathematics, University of Pennsylvania  
Princeton Neuroscience Institute (2017-present)  
Tools for topological data analysis (TDA) and their application to neuroscientific data analysis

Steven Frankland, Ph.D. in Psychology, Harvard University  
Princeton Neuroscience Institute (2017-2023)  
Neural network modeling of abstract reasoning

Assistant Professor, Dartmouth University

Taylor Webb, Ph.D. in Psychology, Princeton University  
Princeton Neuroscience Institute (2018-2019)  
Neural network modeling of analogical reasoning.

Bryant Jonkes. Ph.D. in Cognitive Psychology, Leiden University, the Netherlands  
Princeton Neuroscience Institute (2019-2020)  
Theoretical modeling and behavioral studies of the dynamics of cognitive control  
Assistant Professor in Cognitive Psychology Unit, Leiden University, the Netherlands.

Javier Masis, Ph.D. in Psychology, Harvard University  
Princeton Neuroscience Institute (2020-present)  
Neural network modeling of learning and control

Harrison Ritz, Ph.D. in Psychology, Brown University  
CV Starr Fellow, PNI (2022-present)  
Theoretical and neuroimaging studies of the dynamics of cognitive control

## RESEARCH and PROFESSIONAL ACTIVITIES:

### 1. Grants

NIMH Physician Scientist Award	Context Disturbance in Schizophrenia: Models and Measures	PI	1987-92	MH00673
NIMH P50	Cortical Circuitry and Cognition in Schizophrenia (Edward Stricker, PI) Project 4 (1990-96), Project 7 (1997-02): The Role of Prefrontal Cortex in the Cognitive Dysfunctions of Schizophrenia; Project ?? (2003-07): Neuroendophenotypes and the expression of illness liability in schizophrenia	PI, Project 4,7	1990-07	MH45156
NIMH FIRST Award; RO1	Mechanisms of Context Processing in Schizophrenia	PI	1991-2012	MH47073
NIMH Program Project	Toward Models of Normal and Disordered Cognition (James L. McClelland, PI) Project 2 (1991-96): Neuromodulation and the Processing of Context in Schizophrenia; Project 4 (1997-02): Mechanisms of Cognitive Control	PI, Project 2,4	1991-2002	MH47566
NIMH P50	Center for Functional Brain Imaging (Robert Moore & Mark Mintun, Co-PIs) Cognitive Studies Core	Co-Direct., Cognitive Core	1992-97	MH49815

McDonnell Foundation	Neural Bases of Rehearsal and Maintenance in Working Memory	PI	1994-96	JSMF 94-32
NSF CRI	Computational and Statistical Methods for the Analysis of Neuroimaging Datasets	PI	1995-96	IBN9418982
NIMH RO1	fMRI Studies of Prefrontal Cortex	PI	1996-2009	MH52864
NIMH Program Project	Toward Models of Normal and Disordered Cognition (James L. McClelland, PI)	PI, Project 4	1997-02	MH47566
NIDA/HBP RO1	Advanced Methods for Neuroimaging Data Analysis	PI	1997-99	DA11469
NSF ESI	Tracking the Human Brain: An Interactive Planetarium Exposition (Bryan Rogers, PI)	Co-Invest.	1997-99	ESI9705491
NARSAD Independent Investigator Award	An fMRI Study of the Role of Anterior Cingulate in Working Memory Dysfunction in Schizophrenia	PI	1997-99	
NIMH RO1	Neurophysiological and Modeling Studies of Locus Coeruleus (Gary Aston-Jones, Co-PI)	Co-PI	1998-2001	MH33194
NSF MRI	Acquisition of Core Equipment for Princeton Cognitive and Behavioral Neuroscience Initiative (Marcia Johnson and Charles Gross, Co-PIs)	Co-PI	1998-2001	MRI/OSTI9871186
NJCST	New Jersey Brain Imaging Consortium: Acquisition of high field MRI scanner	PI	1999	
NIMH/HBP RO1	Usability and Interoperability of Neuroimaging Software	PI	2000-03	MH62006
NIMH RO1	Pathophysiology of Cognitive Disability in Schizophrenia (Cameron Carter, PI)	Co-Invest.	2000-04	MH59883
NIMH P50	Conte Center for Neuroscience Research: Cognitive and Neural Mechanisms of Conflict and Control	PI	2000-10	MH62196
Seaver Institute	Neural Economics: Understanding the brain mechanisms underlying cognitive-emotional interactions in decision making	PI	2001-02	
NIDA R21	Hyperscan: Simultaneous fMRI Across the Internet (Emory University; Greg Berns, PI)	Co-Invest.	2001-03	DA014883
MacArthur Foundation	Neural Bases of Placebo Effect and the Expectation of Pain	PI	2001-03	
NIMH P50	IBSC: Toward a Neurobiologically Constrained Framework for Modeling Human Cognition (James L. McClelland, PI). Project 4: Mechanisms of Cognitive Control	PI Project 4	2002-07	MH64445
NIMH RO1	New Wavelet-Based and Source Separation Methods for fMRI (Ingrid Daubechies, PI)	Co-Invest.	2002-07	MH067204
NIMH T32	Training Program in Quantitative Neuroscience	PI	2002-present	MH65214



NJCST	Center for Molecular and Biomolecular Imaging (Warren Warren, PI)	Co-Invest.	2002-09	
DURIP	Computing Environment for Computational Modeling of Brain Functions	PI	2003	ONR
NSF BCS	Social Cognitive Neuroscience of Category-based Responses (Susan Fiske, PI)	Co-Invest.	2004-05	
NIDA RO1	Neural Mechanisms and Social Influence in Delay Discounting and Impulsive Behavior	PI	2006-11	DA022564
NIDA T90	Training Program in Quantitative and Computational Neuroscience (David Tank, Co-PI)	Co-PI	2006-11	DA022770
MURI	Dynamic Decision Making in Complex Task Environments: Principles and Neural Mechanisms (James L. McClelland, PI)	Co-Invest.	2006-11	AFOSR
MURI	Behavioral Dynamics in the Cooperative Control of Mixed Human/Robotic Teams (John Baillieu, PI)	Co-Invest.	2006-11	AFOSR
DURIP	A Second Generation Flexible Computing Environment for Computational Modeling of Brain Function and Neuroimaging Data Analysis	PI	2008	AFOSR
NCRR	Expansion of a Computing Facility for fMRI and Neuroimaging Analysis	PI	2008	RR023532
NSF MRI	Acquisition of High Performance Compute Cluster for Multivariate Realtime.	PI	2012	BCS1229597
John Templeton Foundation	Toward a Scientific Understanding of the Human Capacity for Cognitive Control	PI	2012-2022	
Intel Corporation	Advanced Methods for Realtime Analysis of Human Brain Imaging Data	PI	2014-2019	
Templeton World Charity	System-Level Modeling of Intelligent Behavior	PI	2018-2020	Beyond Turing
NIH CTSA	New Jersey Alliance for Clinical and Translational Science	Co-Invest.	2019-2024	UL1 TR003017
NIH R21	PsyNeuLink: A Block Modeling Environment for Cognitive Neuroscience	PI	2019-2021	MH117548
NSF Convergence Accelerator — Track D	A Standardized Model Description Format for Accelerating Convergence in Neuroscience, Cognitive Science, Machine Learning and Beyond	PI	2020-2021	Approved
DURIP	A Balanced, shared Computational Resource for Multidisciplinary Neuroscience Research	PI	2020	AWD1006863
Vannevar Bush Faculty Fellowship	Toward a Brain-Inspired Model of the Flexibility and Autonomy of Human Behavior	PI	2021-2026	N00014-22-1-2002

**2. Invited Lectureships**

American Association for the Advancement of Science (2002)  
 American Association of Directors of Psychiatry Residency Training (AADPRT), Annual Meeting, Schein Lecture (2012)  
 American College of Neuropsychopharmacology, Panels (1994, 1995, 1997, 1998, 1999, 2005)  
 American Economic Association, Symposia (2003, 2005, 2006)  
 American Psychological Association, Distinguished Scientific Contribution Award Lecture (2010)  
 American Psychological Society (1994, 1998)  
 ARVO (2000)  
 Association for Research in Nervous and Mental Disease, Annual Conference Special Lecture (2006)  
 Association for Psychological Science, William James Award Public Address (2018)  
 Attention and Performance XV, XVIII (1992, 1998)  
 Baylor College of Medicine, Neuroscience Colloquium (1999); Keynote speaker, Annual Neuroscience Retreat and Rush and Helen Record Forum (2008)  
 Beckman Institute for Advanced Science and Technology, University of Illinois, Smith, Hinchman & Grills Distinguished Lecture (2003)  
 Behavioral Neurology Society, Keynote Address (1998)  
 Biological Psychiatry Society, Presidential Symposium (2002, 2008)  
 Boston University, Department of Cognitive and Neural Systems Colloquium (2001)  
 Brandeis University, Department of Biology, Colloquium (1997, 2003)  
 Brown University, Shlossberg Colloquium (2017)  
 California Institute of Technology 2nd Annual Chen Center Distinguished Lecture (2018)  
 Cambridge University and the Royal Society, Symposium on Executive and Cognitive Functions of Prefrontal Cortex (1996)  
 Cardiff University, Cardiff Cognitive Neuroscience Seminar Series (2005)  
 Carmel Conference XV (1997)  
 Carnegie Mellon University, Psychology Department Colloquium (1994, 2009)  
 CENTAI, Turin (2023), Navigating the Research Frontier of AI and Complexity  
 Cognitive Neuroscience Society (1995, 1996, 2000, 2002, 2006)  
 Cognitive Neuroscience Treatment Research to Improve Cognition in Schizophrenia Meeting, Invited Talk (2007)  
 Cold Spring Harbor Laboratory, Computational and Systems Neuroscience Workshop (2004)  
 College de France, Colloque de Rentrée, Invited Talk (2007)  
 Columbia Presbyterian Hospital, Joseph Zubin Memorial Fund Award Lecture (1994)  
 Columbia University, College of Physicians and Surgeons, Department of Psychiatry, Grand Rounds (1990)  
 Columbia University, College of Physicians and Surgeons, Department of Economics, Cognition and Decision Seminar Series (2016)  
 Computational Psychiatry 2017 Keynote Address (2017)  
 Computational Psychiatry 2018 Keynote Address (2018)  
 Cornell Medical School, Sackler Institute Colloquium (2002)  
 CUNY, Department of Psychology Colloquium (2000)  
 DARPA ISAT Toward Optimal Learning Workshop, Invited Address (2014)

Defense Basic Research Exchange Forum (2023)  
 Dynamical Systems in Neuroscience, Annual Meeting (1999)  
 Eden Institute Foundation, Lecture Series Fellow (2001)  
 Emory School of Medicine, Department of Psychiatry, Grand Rounds (1999)  
 Ellison Medical Foundation, Workshop of the Biological Assessment of Mental Processes (2006)  
 Eunice Kennedy Shriver Center for Developmental Cognitive Neuroscience, Colloquium (2000)  
 FENS and The Brain Prize, Brain Conference on New Insights into Psychiatric Disorders through Computational, Biological and Developmental Approaches, Keynote Address (2016)  
 Florida State University, Department of Psychology, Colloquium (1998)  
 Frankfurt Institute for Advanced Studies, Ernst Strüngmann Forum (2007)  
 Future Science Prize Ceremony and Future Forum Science Symposium Keynote Address (2018)  
 Harvard University, Department of Psychology, Colloquium (1996, 2002)  
 Harvard University, Department of Economics, Labor Economics Seminar (2003)  
 Human Brain Project, Annual Conference (1998, 1999)  
 Indiana University, William Lowe Bryan Memorial Lecture on Cognitive Science (1992)  
 Institute for Advanced Studies, Department of Mathematics, Symposium (2003)  
 Institute of Psychiatry, King's College, London, Paul Janssen Lecture (2010)  
 Intel Corporation Annual Developers' Conference, Keynote Address (2016)  
 Intel Corporation, 2018 Consumer Electronics Show Spotlight Presentation (2018)  
 Intel Corporation Technology Strategy and Leadership Meeting: Outsider Perspective (2018)  
 Intel Labs Open Innovation Leadership Forum, Invited Address (2105)  
 Intel Labs, Mini-Symposium: The Mind's Eye Project (2106)  
 Interface 95 - The 27th Symposium on the Interface: Computing Science and Statistics (1995)  
 International Conference on Cognitive and Neural Systems, 10th Annual Meeting (2006), Invited Address  
 International Conference on Cognitive Neuroscience, Keynote Address (1996)  
 International Congress on Schizophrenia Research (1997), Invited Address  
 International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine (1997)  
 International Neuropsychological Society (1992), Invited Address  
 James S. McDonnell Summer Institute in Cognitive Neuroscience (1995, 1997, 2001)  
 Japanese Neuropsychological Association, Keynote Address (1997)  
 Jena International Workshop on Executive Functions and the Brain (2000)  
 Kern Medina Seminar on Humanities and Science for State and Federal Judges (2014)  
 Lehigh University, Annual Neuroscience Retreat, Keynote Address (2015)  
 Library of Congress / NIMH Annual Decade of the Brain Public Program (1999)  
 Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Distinguished Guest Lecture Series (2011)  
 McGill University, Department of Psychiatry, Grand Rounds (1991)  
 Memory Disorders Research Society (1994, 1997, 1999)  
 Mind-Life Institute / M.I.T. (2003)  
 National Foundation for Functional Brain Imaging 1<sup>st</sup> Annual Meeting (1999)  
 New York Academy of Medicine, Annual Salmon Lecture (2006)

New York Academy of Sciences, Imaging Discussion Group Meeting (2005)  
 NIDA, Invited Seminar (2011)  
 NINDS, Cognitive Neuroscience Section, Grand Rounds (1993)  
 NIMH, St. Elizabeth's Hospital, Grand Rounds (1997)  
 NIMH Extramural program, Colloquia and Workshops (1999, 2000, 2001)  
 NIMH Intramural program, Neuroscience Colloquium (1999)  
 Nordic Center of Excellence and the Stockholm Brain Institute, Invited Talk (2007)  
 Northern California Psychiatric Society, Award Address (1986)  
 Northwestern University, Department of Psychology, Colloquium (1998)  
 NYU, Departments of Psychology and Neuroscience, Colloquia (1999, 2000)  
 Ohio State University, Mathematical Biosciences Institute Workshop on Systems Level Modeling (2002)  
 President's Council on Bioethics (2004)  
 Princeton Conference on Cerebral Vascular Disease (1994)  
 Princeton Plasma Physics Laboratory, Colloquium (2004)  
 Princeton University, Department of Psychology, Colloquium (1996)  
 Princeton University, Council on Science and Technology Public Lecture Series (2000)  
 Psychonomic Society, Invited Symposium Lectures (1996, 2002)  
 Queens College, CUNY, Annual Neuropsychology Symposium, Keynote Address (2007)  
 Reinforcement Learning and Decision Making, First Annual Meeting, Invited Address (2013)  
 Research Society on Alcoholism, Plenary Address (2002)  
 Rockefeller University, Neuroscience Colloquium (1999)  
 Rotman Research Institute, 10th Annual Conference on the Frontal Lobes (2000)  
 Royal Society, UK, Mental Processes in the Human Brain (2006)  
 Rutgers University, Department of Psychology & Center for Molecular and Behavioral Neuroscience Colloquium (1999, 2000)  
 Rutgers University Brain Health Institute, Invited Colloquium Address (2015)  
 Sierra Ventures 13th Annual CXO Summit Keynote Address (2018)  
 Simons Foundation SFARI Annual Scientific Meeting Keynote Address (2018)  
 SISA, Trieste Encounters in Cognition (1992)  
 Smithsonian Institute Public Lecture Series (1999)  
 Society for Psychophysiological Research, Invited Address (2006)  
 Society for Research on Psychopathology (1993)  
 Stanford University, Neurobiology Department, Frontiers in Neuroscience Lecture Series (2009)  
 Templeton Foundation, Annual Members Meeting Keynote Address (2016)  
 Templeton World Charities Fund Diverse Intelligences Grantee Meeting (2018)  
 TPG Annual Retreat, Featured Speaker (2007)  
 University of California, Berkeley, Helen Wills Neuroscience Institute Inaugural Lecture (2000)  
 University of California, Berkeley, Neuroscience Student Seminar Series (2010, 2016)  
 University of California, Davis, Keynote Address, Opening of Brain Imaging Center (2005)  
 University of California, Davis, Department of Psychiatry Grand Rounds (2005)  
 University of California, San Francisco, Department of Psychiatry Grand Rounds (2001)  
 University College London and Wellcome Functional Imaging Laboratory (1997, 2000)

University of Colorado Boulder, Department of Psychology, Symposium (1997, 2002)  
University of Colorado Boulder, Determinants of Executive Function & Dysfunction Conference (2013)  
University of Illinois, Program in Neuroscience, Colloquium (1998)  
University of Michigan, Departments of Psychology and Psychiatry Colloquia (1994, 2000)  
University of Michigan, Marshall Weinberg Cognitive Science Symposium (2013)  
University of Maryland, Psychiatric Research Center, 25<sup>th</sup> Anniversary Symposium (2002)  
University of Maryland, Cognitive Science Colloquium (2016)  
University of Medicine and Dentistry of New Jersey, Graduate Program in Physiology and Neurobiology, Special Lecture (1999)  
University of Medicine and Dentistry of New Jersey, Dept. of Neurology Grand Rounds (2002)  
University of North Carolina at Greensboro, Kendon Smith Annual Lecture Series (2004)  
University of Oregon, Institute of Cognitive and Decision Sciences, Symposia (1990, 1996)  
University of Pennsylvania, Department of Psychology, Cognitive Science Program, and Institute for Neural Sciences Colloquia (1996, 2001)  
University of Pennsylvania, Institute of Neurological Sciences, James M. Sprague Annual Lecture (2006)  
University of Pennsylvania and Philadelphia Psychoanalytic Center, Evening Program (2006)  
University of Rochester, Department of Brain and Cognitive Sciences, Colloquium (2006)  
University of Texas Austin, Cognitive Neuroscience & Imaging Research Center Seminar, Invited talk (2016)  
University of Texas Southwestern Medical Center, Dept. of Psychiatry, Colloquium (2003)  
University of Vermont, Department of Psychiatry, Grand Rounds (1992)  
University of Waterloo, Centre for Theoretical Neuroscience, 5<sup>th</sup> Annual Brain Day (2011)  
University of Waterloo, Neuroscience Colloquium Series (2021)  
University of Wisconsin, Department of Psychology, Colloquium (1987, 2002)  
University of Wisconsin Medical School, 5<sup>th</sup> Annual Symposium on Emotion (1999)  
Vanderbilt University, Annual Neuroscience Retreat Keynote Address (2001)  
Vanderbilt University, Stroopfest (2002)  
Virginia Tech Carilion Research Institute Maury Strauss Distinguished Public Lecture (2018)  
Washington University, Department of Psychiatry, Grand Rounds (2003)  
Winter Conference on Brain Research (1993, 1996, 1997, 1998)  
Workshop on Neural Modeling of Brain and Cognitive Disorders (1995, 1998)  
Yale University School of Medicine, Department of Neurobiology, Colloquium (2002)  
Yale University School of Medicine, Department of Psychiatry, Abraham Ribicoff Annual Lecture (2004)

### **3. Other research-related activities**

#### Advisory Boards and Councils

Allegheny County Neuropsychiatric Survey, Executive Advisory Board (1996-8)  
University of Michigan, Department of Psychology, External Advisory Board (1997)

National Alliance for Research on Schizophrenia and Depression (NARSAD), Scientific Council (1998-present)

NIMH Board of Scientific Counselors, Advisory Panel on Intramural Research Program (1999)

Yale-New Haven VAMC Schizophrenia Research Center, Scientific Advisory Board (1999)

International Organization of Human Brain Mapping, Governing Council (1998-2002), Treasurer (2000-2001), Chair of Neuroinformatics Committee (1998-2001), Chair, Nominations Committee (2001)

National Foundation for Functional Brain Imaging, Advisory Board (1999-2004)

Center for Magnetic Resonance Research, University of Minnesota, Advisory Board (2000)

Harvard Initiative in Systems Neuroscience, Advisory Board (2000)

American Psychiatric Association / NIMH DSM-V Workgroup on Neuroscience (2000-2002)

NIMH Workgroup on Strategic Plan for Mood Disorders (2000-2002).

International Association for the Study of Attention and Performance, Advisory Council (2001-present)

University of Pennsylvania NIMH Silvio O. Conte Center for Neuroscience Research, “The Neurobiology of Stimulus Encoding in Schizophrenia,” External Advisory Board (2003, 2008)

Harvard University, Department of Psychology, External Review Committee (2003)

NIMH Measurement and Treatment Development Activities on Cognition in Schizophrenia (MATRICS), Neurocognition Committee (2002-2006)

Council of Princeton University, Executive Committee (2004-5)

National Advisory Mental Health Council (NAMHC) (2004-8)

The Society for Neuroeconomics, Board of Directors (2004-2005)

Gatsby Computational Neuroscience Unit, UCL, Quinquennial Review Panel (2005)

National Advisory Mental Health Council Workgroup on MRI Safety (2005-2007)

Brookhaven National Laboratory, Science and Technology Steering Committee (2005-2014)

Institute for Advanced Studies, Princeton, Decadal Visiting Committee for School of Social Sciences (2007)

National Advisory Mental Health Council Workgroup on Neuroscience Training (2007-2008)

University of Colorado, Boulder NIMH Interdisciplinary Behavioral Science Center, “Executive Function and Dysfunction,” External Advisory Board (2009)

Johns Hopkins University, Psychological Brain Sciences Department and Mind Brain Institute External Review Committee (2011)

Princeton University, Research Computing Advisory Council, Member (2011-present)

Harvard University, Mind, Brain and Behavior Initiative, External Review Committee (2013)

Ecole Normale Supérieure, Scientific Advisory Committee of the Département d'Etudes Cognitives (2014-present)

National Academy of Medicine, Forum on Neuroscience (2015-2023)

Yale University, Wu Tsai Institute, External Advisory Board (2022-present)

### Editorial Boards

*American Journal of Psychiatry*, Consulting Editor (2001-2006)

*Biological Psychiatry*, Board of Editors (1999-2009)

*Brain Research*, Senior Editor for Computational Neuroscience (2005-2010)

*Cognitive Neuropsychology*, Advisory editor (1997-2002)  
*Journal of Experimental Psychology: General*, Consulting Editor (1996-2005)  
*Journal of Neurophysiology* (2003-2004)  
*Neuroimage*, Board of Editors (2002-2003)  
*Neuroinformatics*, Board of Editors (2002-present)  
*Neuropsychopharmacology*, Board of Editors (1999-2008)  
*Neuroscience*, Board of Editors (1999-2003)  
*NMR in Biomedicine*, Board of Editors (2003-2006)  
*Proceedings of the Royal Society, Biological Sciences*, Board of Editors (2003-2008)  
*Science*, Board of Reviewing Editors (1998-2014)  
*Trends in Cognitive Science*, Advisory Editorial Board (2004-present)  
*Computational Psychiatry*, Editorial Board (2014-present)

### Grant Review

Integrative Cognitive Functional Neuroscience Study Section, NIH  
 Clinical Psychopathology Study Section, NIMH  
 Human Development and Aging Study Section, NIH  
 Human Frontier Science Program  
 Medical Research Council (MRC), UK  
 National Center for Research Resources, NIH  
 NIMH Intramural Research Program, NIH  
 NSF Review Panel  
 Wellcome Trust

### Conference Organization

New Directions in Health Care and Education Annual Colloquium. University of Pennsylvania Medical School, May, 1980. Founder and Co-organizer.  
 25th Annual Carnegie Symposium on Cognition: Scientific Approaches to the Question of Consciousness. Carnegie Mellon University, May, 1993. Co-organizer.  
 Center for Neuroscience and Mental Disorders bi-annual workshop: Cognitive Neuroscience Approaches to Schizophrenia. University of Pittsburgh, May, 1994. Organizer.  
 International Congress on Schizophrenia Research. Colorado Springs, April, 1997. Program Consultant.  
 Society for Research in Psychopathology. Palm Springs, October, 1997. Program Committee.  
 Neural Processes and Economics Workshop, Woodrow Wilson School, Princeton University. Co-organizer, 2000.  
 Organization for Human Brain Mapping, New York City, 2003, Chair, Local Organizing Committee.  
 Computational Cognitive Neuroscience Conference, Co-Founder (with Randall O'Reilly); 2005-2008, Program Committee.

Membership in Professional Organizations

American Academy of Arts and Sciences  
 American Association for the Advancement of Science  
 American Psychological Society  
 Cognitive Science Society  
 Psychonomic Society  
 Society for Neuroscience

Software Development

*PsyScope* [10]: Designer and Co-Producer with Brian MacWhinney, Psychology, Carnegie Mellon University — this is a graphical, interactive program for the design and implementation of cognitive experimental tasks on Macintosh computers. It provides the ability to present stimuli in text, graphic, and acoustic form, and can be used to record manual or voice responses with millisecond accuracy. It incorporates a fully general scripting language, as well as a graphic interface, and is extensible through the use of plug-and-play add-on modules. PsyScope was originally designed for Mac OS prior to and through System 9. It was independently ported to MacOS X, and continues to be supported by the community, freely available, and widely used (with over 3,000 downloads) for experimental research and as a teaching instrument in research centers throughout the world. The design of PsyScope also provided one of the foundations for E-Prime, a PC/Windows-based commercially supported package that was developed in collaboration with Psychology Software Tools (PST) Inc. and is also in widespread use.

*Brain Image Analysis Kit* [244]: Project Co-Director, with Ted Willke, Brain Inspired Computing Lab, Intel Labs; Ken Norman, Neuroscience and Psychology, Princeton; and Nicholas Turk-Browne, Psychology, Yale University — this is a Python-based, open source software package, developed in collaboration with Intel Labs, that supports the application of advanced methods from machine learning and multivariate statistics to the analysis of neuroimaging data. It is tightly integrated with SciKit-Learn, and includes modules for Full Correlation Matrix Analysis (FCMA; Wang et al. 2015), Multi-voxel Pattern Analysis (MVPA), a suite of methods for Shared Response Modeling (SRM) (including hyper alignment and Inter-Subject Functional Correlation [IFSC]), Topographic Factor Analysis (TFA), and Bayesian-derived methods for Representational Similarity Analysis (RSA). Within the first year and half of its development it has attracted over 9,000 downloads.

*RT-Cloud* [260]: Project Co-Director, with Ken Norman, Princeton Neuroscience Institute. This is an open-source software package, integrated into the BrainIAK environment, that makes it easier to build and deploy real-time fMRI experiments. The framework provides a coordination hub between the experimenter's script, a subject feedback script, the scanner data, and experiment control. It streams scanner data (in real-time) to an experimenter's script and forwards the results for use in subject feedback (optionally using tools like PsychoPy, jsPsych, or PsychToolbox). It provides a web-based user interface that allows for starting and stopping runs, changing settings, and viewing output. It can be configured to run in the cloud, on a cluster, or in the control room. This framework is under active development with funding from NIMH to further extend its capabilities, including support for standards such as BIDS and OpenNeuro.



*PsyNeuLink*, Designer and Lead Developer, with Abhishek Bhattacharjee, Computer Science, Yale University and Amitai Shenhav, Brain and Cognitive Sciences, Brown University; and support from Templeton World Charitable Foundation and NIMH — this is a "block modeling environment" designed for use by neuroscientists, psychologists, computational psychiatrists and others interested in building system-level models of the computational mechanisms underlying brain function and its expression in psychological processes and behavior, and in exploring their relationship to developments in research on machine learning and artificial intelligence. It allows components to be constructed that implement various, possibly disparate functions, at potentially different levels of analysis and/or timescale of operation, and integrate these into a coherent modeling environment that can be used to simulate and study their interaction. *PsyNeuLink* is written in Python, is open source, and meant to be extended. Its goal is to provide an environment for implementing models that are expressed in a concise and easy to read form, and that can be executed, shared, compared, and integrated with one another. *PsyNeuLink* maintains a publicly accessible library of its components and models, to which users can contribute, providing a common repository for model-sharing in a manner paralleling data-sharing efforts in empirical research.

*SweetPea* [254]: Co-Designer, with Matthew Flatt and Vivek Srikumar, Computer Science, University of Utah — this is an experimental design environment that simplifies and standardizes the format in which experimental factors are expressed and combined, and used to generate balanced samples of valid trial sequences. As experimental designs in psychology and neuroscience — as well as the theories they are designed to test — become more complex, the ability to insure appropriately balanced sampling of relevant experimental and control conditions becomes increasingly difficult, and designs that do so increasingly difficult to express and/or interpret, which poses challenges to reliability and/or reproducibility of results. Similar problems arise in computational modeling, where uncontrolled or poorly understood differences in the inputs to a simulation can confound interpretations of its behavior, just as it does empirical data. *SweetPea* addresses this problem by providing a declarative language for expressing a design— in terms of factors (experimental variables), levels (values for those variable to be sampled), crossings among factors, and constraints on trial sequences (e.g., number or types of repeats). The design is then translated into a form (currently, conjunctive normal form) that can be sampled using a SAT solver, to insure that valid trial sequences are sampled in a balanced fashion.

*ModECI (Model Exchange and Convergence Initiative)* [263]: Lead Developer with Padraig Gleason, Neuroscience, Physiology and Pharmacology, University of College London and NeuroML; in collaboration with Abhishek Bhattacharjee, Computer Science, Yale University; Sharon Crook, Arizona State University and NeuroML, Ted Willke, Brain Inspired Computing Lab, Intel Labs; and support from the NSF Convergence Accelerator Program — this project seeks to accelerate the convergence of progress in the brain, cognitive and computer sciences by facilitating the exchange of computational models, through the development of a standardized model description format, that expresses models in the form of a computational graph in which each node is a computational component and edges specify connections between them that determine the flow of computation. The format is implemented in serialized forms (e.g., JSON, YAML) that allows the exchange of models in machine-readable form among a broad range of existing environments — from biologically detailed ones (e.g., NeuroML, Emergent, and Nengo) and system-level level packages (such as *PsyNeuLink*) to abstract symbol processing environments used in cognitive science (such as ACT-R) and neural

network modeling ones served by the ONNX standard used in the machine learning community (e.g., PyTorch and TensorFlow).