WOUTER KOOL

Washington University in St. Louis
Department of Psychological & Brain Sciences
One Brookings Drive, CB 1125
St. Louis, MO 63130
wkool@wustl.edu cdmlab.wustl.edu

EMPLOYMENT

2019-present Assistant Professor, Department of Psychological & Brain Sciences, Washington University in St. Louis

2015-2019 Postdoctoral fellow, Department of Psychology, Harvard University
Advisors: Samuel J. Gershman, Ph.D. & Fiery A. Cushman, Ph.D.

EDUCATION

2015 Ph.D. in Psychology and Neuroscience, Princeton University
Advisor: M. M. Botvinick, M.D., Ph.D.
Secondary advisor: N. B. Turk-Browne, Ph.D.

2011 M.A. in Psychology, Princeton University
Advisor: M. M. Botvinick, M.D., Ph.D.
Secondary advisor: N. B. Turk-Browne, Ph.D.

2009 M.Sc. in Cognitive Neuroscience, Universiteit Leiden
Supervisors: M. M. Botvinick, M.D., Ph.D., and Prof. Dr. B. Hommel

2007 B.S. in Psychology, Universiteit Leiden
Supervisors: Dr. L. S. Colzato, and Prof. Dr. B. Hommel

2004 Propaedeutic diploma in Mathematics, Universiteit Leiden

AWARDS

2019 Rising Star award, Association for Psychological Science

2017 Best talk award, Meeting of the Society for Neuroeconomics

2013-2014 *Harold W. Dodds* Honorific Fellowship, Princeton University

2012 Travel award MoMCAI Meeting 2013, Scientific Research Network on Decision Neuroscience & Aging

2009 *Van de Geer award* for best Master's thesis in Psychology, Universiteit Leiden

2008 Best research poster, CSCA Conference, Amsterdam, the Netherlands

2008 Fellowship *Dr. Hendrik Muller Vaderlandsch Fonds*, The Hague, the Netherlands

2008 Fellowship *LUF Internationaal Studie Fonds*, Universiteit Leiden

2008 Fellowship *Schuurman Schimmel-van Outeren Stichting,* Haarlem, the Netherlands

2008 Fellowship *Curatorenfonds*, Universiteit Leiden

2008 Fellowship *LUSTRA Fonds,* Leiden, the Netherlands

FUNDING

Current

2023-2028 *Office of Naval Research*
Title: A computational cognitive neuroscience framework for attentional control traits and states
Role: Co-PI (PI: Dr. Todd Braver) Total: $2,498,832

Previous

2022-2024 *Transdisciplinary Institute in Applied Data Sciences*
Title: Accounting for human bias to improve AI-assisted decision making
Role: PI (with Dr. CJ Ho) Total: $39,906

2021-2022 *McDonnell Center for Systems Neuroscience*
Title: The construction and use of cognitive maps in goal-directed decision making
Role: PI (with Dr. Zachariah Reagh) Total: $80,000

PUBLICATIONS

See `cdmlab.wustl.edu/publications` for reprints.

Ahn, C., & Kool, W. (submitted). Environmental regularities shape visual search strategy selection.

Gheza, D., Freund, M. C., Zalabak, T. R., & Kool, W. (submitted). Selective distractor representations resolve multidimensional interference.

Treiman, L. S., & Kool, W. (submitted). Choice-induced value updating reveals two paths to a decoy effect.

Treiman, L. S., Ho, C. J., & Kool, W. (submitted). Partisan by proxy: Ingroup favoritism biases how humans train and interact with AI.

Kool, W., & Cushman, F. A., & Gershman, S. J. (submitted). Metacontrol in reinforcement learning.

1. Welhaf, M. S., Zhang, C., Valdez, M. R., Kool, W., & Bugg, J. M. (in press). Are the correlates of mind wandering consistent across younger and older adults? *Psychological Research*.
2. Treiman, L. S., Ho, C. J.*, & Kool, W.* (in press). Opting in? Information about AI training affects human behavior. *Proceedings of the 2026 ACM Conference on Fairness, Accountability, and Transparency*.
3. Ileri-Tayar, M., Bugg, J. M., & Kool, W. (in press). Switching between cognitive control states? No, thank you. *Journal of Experimental Psychology: General*
4. Zhang, C., & Kool, W. (in press). Inferring mind wandering from perceptual decision making. *Communications Psychology.*
5. Zalabak, T. R., Bustamante, L. A., & Kool, W. (2026). Model-based foraging in structured environments. *Cognition, 267,* 10637.
6. Held, L., Lesage, E., Kool, W, & Braem, S. (2025). When models matter: Environmental demand guides arbitration between model-free and model-based control. *Cognitive, Affective, & Behavioral Neuroscience.*
7. Bustos, B. N., Jiang, J. & Kool, W. (2025). Reward shields the learning of cognitive control demand. *Cognitive Neurodynamics, 19,* 114.
8. Treiman, L. S., Ho, C. J.*, & Kool, W.* (2025). Do people think fast or slow when training AI? *Proceedings of the 2025 ACM Conference on Fairness, Accountability, and Transparency*, 2728-2750.
9. Karagoz A. B., Kool, W.*, & Reagh, Z. M.* (2025). Free recall is scaffolded by event structure and shaped by inference. *Communications Psychology, 3,* 71.
10. Karagoz A. B., Moran, E. K., Barch, D. M., Kool, W.*, & Reagh, Z. M.* (2025). Evidence for shallow cognitive maps in schizophrenia. *Cognitive, Affective, & Behavioral Neuroscience.*
11. Gheza, D., & Kool, W. (2025). Distractor-specific control adaptation in multidimensional environments. *Nature Human Behaviour, 9,* 534-553.
12. Ramakrishnan, S. A., Shaik, R. B., Kanagamani, T., Neppala, G., Chen, J., Fiore, V., Hammond, C. J., Srinivasan, S., Ivanov, I., Chakravarthy, S., Kool, W., & Parvaz, M. A. (2025). Impaired arbitration between reward-related decision-making strategies in Alcohol Users compared to Alcohol Non-Users: a computational modeling study. *NPP - Digital Psychiatry and Neuroscience, 3,* 1.
13. Treiman, L. S., & Kool, W. (2024). Choosing the right frame: How context preferences facilitate subsequent decision making. *Scientific Reports, 14,* 31607.
14. Gheza, D., Zalabak, T. R., & Kool, W. (2024). Control adaptation through the selective suppression of multidimensional distractors. *Computational Cognitive Neuroscience Conference.*
15. Treiman, L. S., Ho*, C. J., & Kool*, W. (2024). The consequences of AI training on human decision making. *Proceedings of the National Academy of Sciences, 121,* e e2408731121.

16. Bustos, B. N.*, Colvett, J. S.*, Bugg, J. M., & Kool, W. (2024). People do not avoid reactively implementing cognitive control. *Journal of Experimental Psychology: Human Perception and Performance, 50,* 587-604.
17. Karagoz, A. B., Reagh, Z.*, & Kool, W.* (2024). The construction and use of cognitive maps in goal-directed decision making. *Journal of Experimental Psychology: General, 153,* 372-385.
18. Gheza, D., Kool, W., & Pourtois, G. (2023). Need for cognition moderates cognitive effort aversion. *PLOS ONE, 18,* e0287954.
19. Treiman, L. S., Ho, C. J., & Kool., W. (2023). Humans forgo reward to instill fairness into AI. (2023). *Proceedings of the AAAI Conference on Human Computation and Crowdsourcing, 11,* 152-162.
20. Smid, C. R., Ganesan, K., Thompson, A., Cañigueral, R., Veselic, S., Royer, J., Kool, W., Hauser, T. U., Bernhardt, B., & Steinbeis, N. (2023). Neurocognitive bases of model-based decision making and its metacontrol in childhood. *Developmental Cognitive Neuroscience, 62,* 101269.
21. Smid, C. R., Kool, W., Hauser, T. U., & Steinbeis, N. (2022). Computational and behavioral markers of model-based decision making in childhood. *Developmental Science,* e13295.
22. Patil*, I., Zucchelli*, M. M., Kool, W., Fornasier, F., Calò, M., Silani, G., Cikara, M., & Cushman, F. A. (2021). Reasoning supports utilitarian resolutions to moral dilemas across diverse measures. *Journal of Personality and Social Psychology.*
23. Bolenz, F., Kool, W., Reiter, A. M. F., Kiebel, S. J., & Eppinger, B. (2019). Metacontrol of decision-making strategies in human aging. *eLife, 8,* e49154.
24. Liu, S., Cushman, F. A., Gershman, S. J., Kool, W., Spelke E. S. (2019). Hard choices: Children's understanding of the cost of action selection. *Proceedings of the Cognitive Science Society.*
25. Patzelt, E. H., Kool, W., Millner, A. J., & Gershman, S. J. (2019). The transdiagnostic structure of mental effort avoidance. *Scientific Reports, 9,* 1689.
26. Patzelt, E. H., Kool, W., Millner, A. J., & Gershman, S. J. (2019). Incentives boost model-based control across a range of severity on several psychiatric constructs. *Biological Psychiatry,* 85, 425-433.
27. Kool, W., & Botvinick, M. M. (2018). Mental labour. *Nature Human Behaviour, 2,* 899-908.
28. Kool, W., Gershman, S. J.*, & Cushman, F. A.* (2018). Planning complexity registers as a cost in metacontrol. *Journal of Cognitive Neuroscience, 30,* 1391-1404.
29. Kool, W., Cushman, F. A.*, Gershman, S. J.* (2018). Competition and cooperation between multiple reinforcement learning strategies. In R. W. Morris, A. M. Bornstein, & A. Shenhav (Eds.), *Understanding Goal-Directed Decision Making: Computations and Circuits* (pp 153-178). New York: Elsevier.
30. Kool, W., Gershman, S. J.*, & Cushman, F. A.* (2017). Cost-benefit arbitration between multiple reinforcement learning systems. *Psychological Science, 28,* 1321-1333.

31. Shenhav, A., Musslick, S., Lieder, F., Kool, W., Griffiths, T. L., Cohen, J. D., & Botvinick, M. M. (2017). Towards a rational and mechanistic account of mental effort. *Annual Reviews of Neuroscience, 40,* 99-124.
32. Kool, W.*, Shenhav, A. S.*, & Botvinick, M. M. (2017). Cognitive control as cost-benefit decision making. In T. Egner (Ed.), *The Wiley Handbook of Cognitive Control* (pp. 167-189). Chichester, West Sussex, UK: John Wiley & Sons.
33. Kool, W., Cushman, F. A.*, & Gershman, S. J.* (2016). When does model-based control pay off? *PLOS Computational Biology*, 12, e1005090.
34. Gold, J. M., Kool., W., Botvinick, M., Hubzin, L., August, S., & Waltz, J. (2015). Cognitive effort avoidance and detection in people with schizophrenia. *Cognitive, Affective, & Behavioral Neuroscience, 15,* 145-154.
35. Kool, W., Conway, A. R. A., & Turk-Browne, N. B. (2014). The sequential dynamics of visual short-term memory. *Attention, Perception, & Psychophysics, 76,* 1885-1901.
36. Braver, T. S., Krug, M. K., Chiew, K. S., Kool, W., Westbrook, J. A., Clement, N. J., … Somerville, L. H. (2014). Mechanisms of motivation-cognition interactions: challenges and opportunities. *Cognitive, Affective, & Behavioral Neuroscience, 14,* 443-472.
37. Kool, W., & Botvinick, M. M. (2014). A labor/leisure trade-off in cognitive control. *Journal of Experimental Psychology: General, 143,* 131-141.
38. Kool, W., & Botvinick, M. M. (2013). The intrinsic cost of cognitive control. *Behavioral and Brain Sciences, 36,* 697-698. Comment on Kurzban, R., Duckworth, A., Kable, J. W., & Myers, J. (2013). An opportunity cost model of subjective effort and task performance.
39. Kool, W., McGuire, J. T., Wang, G. J., & Botvinick, M. M. (2013). A role for effort costs in self-control and intertemporal choice. *PLOS ONE, 8,* e72626.
40. Kool, W., Getz., S., & Botvinick, M. M. (2013). Neural representations of reward probability: Evidence from the Illusion of Control. *Journal of Cognitive Neuroscience, 25,* 852-861.
41. Kool, W.*, McGuire, J. T.*, Rosen, Z., & Botvinick, M. M. (2010). Decision making and the avoidance of cognitive demand. *Journal of Experimental Psychology: General, 139,* 665-682.
42. Colzato, L. S., Kool, W., & Hommel, B. (2008). Stress modulation of visuomotor binding. *Neuropsychologia, 46,* 1542-1548.

CONFERENCE PRESENTATIONS

1. Treiman, L. S., & Kool, W. (2025). *Pairwise comparisons explain the decoy effect.* Poster presented at the Meeting of the Society for Judgment & Decision Making, Denver, CO, 2025. (2nd place in Best Student Poster Award.)
2. Yücel, D., & Kool, W. (2025). *How do humans learn multidimensional reward structures?* Poster presented at the Meeting of the Psychonomic Society, Denver, CO, November 2025.

3. Welhaf, M. S., Zhang, C., Valdez, M. R., Kool, W., & Bugg, J. M. (2025). A comprehensive investigation of potential mediators of age-related differences in mind wandering. Poster presented at the Meeting of the Psychonomic Society, Denver, CO, November 2025.
4. Hawkins, G., Gheza, D., Kool, W., Braver, T., Heathcote, A., & Forstmann, B. (2025). *Converging evidence for mind wandering from EEG, behavior, and self-report.* Talk presented at the Meeting of the Psychonomic Society, Denver, CO, November 2025.
5. Dey, A., Braver, T., & Kool, W. (2025). *Hybrid computational modeling of attentional control.* Talk presented at the Meeting of the Psychonomic Society, Denver, CO, November 2025.
6. Kool, W. (2025). *Task structure guides metacontrol.* Talk presented at the Meeting of the Psychonomic Society, Denver, CO, November 2025.
7. Ileri-Tayar, M., Bugg, J. M., & Kool, W, (2025). *Target enhancement or distractor suppression? Modeling the source of reward-induced control enhancements.* Talk presented at the Future of Cognitive Control, Denver, CO, November, 2025.
8. Kool, W. (2025). *Multidimensional influences on decision making and control.* Talk presented at the Satellite Meeting of the Society for Mathematical Psychology, Denver, CO, November 2025.
9. Gheza, D., Freund, M., Zalabak, T.R. & Kool, W. (2025). *The neural basis of multidimensional attention control.* Talk presented at the Meeting of the Society for Neuroscience, San Diego, CA, November 2025.
10. Hoy, C., Starr, P., Kool., W., & Little, S. (2025). *Dopamine, deep brain stimulation, and fronto-basal ganglia intracranial recordings during goal-directed decision making in Parkinson's disease.* Talk presented at the International Conference on Cognitive Neuroscience , Porto, Portugal, September 2025.
11. Ileri-Tayar, M., Bugg, J. M., & Kool, W. (2025). *Switching between cognitive control states? No, thank you.* Talk presented at the 24th Conference of the European Society for Cognitive Psychology, Sheffield, UK, September 2025.
12. Treiman, L., Ho, C. J., & Kool, W. (2025). *Do people think fast or slow when training AI?* Talk presented at the ACM Conference on Fairness, Accountability, and Transparency, Athens, Greece, June 2025.
13. Kool, W. (2025). *Metacontrol is guided by task structure.* Talk presented at the 2025 Annual Meeting of the Society for the Science of Motivation, Washington, DC, May 2025.
14. Dey, A., Gheza., D., Fengler, A., Frank, M. J., Braver, T. S., & Kool, W. (2025). *Advances in computational methods enable precise linkage of attentional control mechanisms and individual behavioral patterns.* Talk presented at the 1st Annual Meeting of the Society for Philosophy & Neuroscience, St. Louis, MO, May 2025.
15. Hoy, C., Kool., W., Starr, P., & Little, S. (2025). *Reward processing and prediction errors in frontal and basal ganglia signals during decision making.* Talk presented at the International Brain Stimulation Conference, Kobe, Japan, February 2025.

16. Zalabak, T. R., Bustamante, L. A., & Kool, W. (2024). *Model-based foraging in structured environments.* Poster presented at the Meeting of the Society for Judgment and Decision Making, New York, NY, November 2024.
17. Treiman, L. S., Ho, C-. J., & Kool, W. (2024). *Human training of artificial intelligence.* Poster presented at the Meeting of the Society for Judgment and Decision Making, New York, NY, November 2024.
18. Ahn, C., & Kool, W. (2024). *Environmental regularities shape visual search strategies.* Poster presented at the Meeting of the Psychonomic Society, New York, NY, November 2024.
19. Gheza, D., Zalabak, T. R., & Kool, W. (2024). *Distractor-specific control adaptation in multidimensional environments.* Talk presented at the Meeting of the Psychonomic Society, New York, NY, November 2024.
20. Ileri-Tayar, M., Kool, W., & Bugg, J. M. (2024). *Reward induces shifts in learning-guided reactive control*. Talk presented at the Meeting of the Psychonomic Society, New York, NY, November 2024.
21. Ileri-Tayar, M., Bugg, J. M., & Kool, W. (2024). *Switching between cognitive control states? No, thank you*. Poster presented at the Meeting of the Psychonomic Society, New York, NY, November 2024.
22. Treiman, L., Ho, C. J., & Kool, W. (2024). *The consequences of AI training on human decision making.* Talk presented at the 8th annual Psychology of Technology Institute's "New Directions in Research on the Psychology of Technology" conference, Boston, MA, October 2024.
23. Karagoz, A. B., Kool, W., & Reagh, Z.M. (2024). *Event boundaries and inference shape the content and organization of memory.* Talk presented at the Meeting of the Society for Neuroscience, Chicago, IL, October 2024.
24. Gheza, D., Zalabak, T. R., & Kool, W. (2024). *Control adaptation through selective suppression of multidimensional distractors.* Talk and poster presented at the Computational Cognitive Neuroscience Conference, Cambridge, MA, August 2024.
25. Hoy, C. W., Kool, W., & Little, S. J. (2024). Assessing goal-directed decision making in Parkinson's disease using dopamine and intracranial recordings from human fronto-basal ganglia circuits. Poster presented at the Computational Psychiatry Conference, Minneapolis, MN, July 2024.
26. Hoy, C. W., Kool, W., & Little, S. J. (2024). Goal-directed decision making in Parkinson's disease: Dopamine, DBS, and intracrantial recordings from human fronto-basal ganglia circuits. Poster presented at the 10th Annual BRAIN Initiative Conference, Rockville, MD, June 2024.
27. Karagoz, A. B., Kool, W., & Reagh, Z. M. (2024). *Representations of cognitive maps underlying model-based planning.* Talk presented at the Meeting of the Cognitive Neuroscience Society, Toronto, Canada, April 2024.
28. Karagoz, A. B., Kool, W., & Reagh, Z. M. (2024). *Representations of cognitive maps underlying model-based planning.* Talk presented at the Meeting of the Cognitive Neuroscience Society, Toronto, Canada, April 2024.

29. Hoy, C. W., Kool, W., & Little, S. J. (2024). *Assessing goal-directed decision making in Parkinson's disease using dopamine, deep brain stimulation, and intracranial recordings from human fronto-basal ganglia circuits.* Poster presented at the Gordon Research Seminar and Conference on Basal Ganglia, Ventura, CA, March 2024.
30. Held, L., Lesage, E., Kool, W., & Braem, S. (2023). *When models matter: How we learn to arbitrate between model-based and model-free control.* Poster presented at the NVP Winter Conference, Egmond aan Zee, the Netherlands, December 2023.
31. Treiman, L. S., & Kool, W. (2023). *Choosing the right frame: How context preferences facilitate subsequent decisions.* Poster presented at the Meeting of the Psychonomic Society, San Francisco, CA, November 2023.
32. Zalabak, T., Bustamante, L., & Kool, W. (2023). *Model-based foraging in structured environments.* Poster presented at the Meeting of the Psychonomic Society, San Francisco, CA, November 2023.
33. Gheza, D., & Kool, W. (2023). *Multidimensional control adaptation is distractor specific.* Poster presented at the Meeting of the Psychonomic Society, San Francisco, CA, November 2023.
34. Zhang, K., & Kool, W. (2023). *Inferring mind wandering from perceptual decision making.* Poster presented at the Meeting of the Psychonomic Society, San Francisco, CA, November 2023.
35. Karagoz, A. B., Kool, W., & Reagh, Z. M. (2023). *Representations of cognitive maps underlying model-based planning.* Talk presented at the Meeting of the Society for Neuroscience, Washington DC, November 2023.
36. Treiman, L., Ho, C. J., & Kool, W. (2023). *Humans forgo reward to instill fairness into AI.* Talk presented at the AAAI Conference on Human Computation and Crowdsourcing, Delft, the Netherlands, November 2023.
37. Held, L., Lesage, E., Kool, W., & Braem, S. (2023). *Can we learn to be more model-based based on environmental demand and reinforcement?* Poster presented at the meeting of the Society for Neuroeconomics, Vancouver, Canada, October 2023.
38. Hoy, C. W., Kool, W., & Little, S. J. (2023). *Assessing goal-directed decision making in Parkinson's disease using dopamine, deep brain stimulation, and intracranial recordings from human fronto-basal ganglia circuits.* Poster presented at the International Conference on Motivational and Cognitive Control, Lyon, France, October 2023.
39. Held, L., Kool, W., & Braem, S. (2023). *When models matter: How we learn to arbitrate between model-based and model-free control.* Poster presented at the Symposium on the Biology of Decision Making, Paris, France, June 2023.
40. Karagoz, A. B., Kool, W., & Reagh, Z. M. (2023). *The influence of rule-based event boundaries on item memory.* Poster presented at the International Conference on Learning and Memory, Huntington Beach, CA, April 2023.

41. Gheza, D., Zalabak, T. & Kool, W. (2022). *Control mechanisms informed by neural representations of task rules.* Poster presented at the meeting of the Cognitive Neuroscience Society, San Francisco, CA, March 2023.
42. Ramakrishnan, S., Chen, J., Neppala, G. K., Shaik, R. B., Kool, W., Ivanov, I., Parvaz M. A. (2022). *Impaired arbitration between decision-making strategies in alcohol users: A computational modeling study.* Poster presented at the Computational Psychiatry Course, July 2022.
43. Gheza, D., & Kool, W. (2022). *Planning hurts: Model-based reinforcement learning taxes the central executive.* Poster presented at the Multi-Disciplinary Conference on Reinforcement Learning and Decision Making, Providence, RI, June 2022.
44. Karagoz, A. B., Reagh, Z. M., & Kool, W. (2022). *Constructing and using cognitve maps for model-based control.* Poster presented at the Multi-Disciplinary Conference on Reinforcement Learning and Decision Making, Providence, RI, June 2022.
45. Dolgin, J., Bustos, B., Wilson, R. C., & Kool, W. (2021). *Directed exploration involves deciding not just whether, but also when to explore.* Poster presented at the virtual meeting of the Psychonomic Society, November 2021.
46. Gheza, D., & Kool, W. (2021). *Planning hurts: Model-based reinforcement learning taxes the central executive.* Poster presented at the virtual meeting of the Psychonomic Society, November 2021.
47. Karagoz, A. B., Reagh, Z. M., & Kool, W. (2021). *The construction and use of cognitive maps in model-based control.* Poster presented at the virtual meeting of the Psychonomic Society, November 2021.
48. Kool, W., Gruber, E., Gheza., D., & Dolgin, J. (2021). *Implicit planning through statistical learning.* Poster presented at the virtual meeting of the Psychonomic Society, November 2021.
49. Smid, C. R., Thompson, A., Ganesan, K., Cañigueral, R., Royer, J., Kool, W., Hauser, T. U., Bernhardt, B., & Steinbeis, N. (2021). *The structural brain basis of model-based decision making and its metacontrol in childhood.* Poster presented at the Flux Virtual Congress, September 2021.
50. Dolgin, J., Bustos, B., Wilson, R. C., & Kool, W. (2021). *Directed exploration involves deciding not just whether, but also when to explore.* Poster presented at the 2nd Workshop on Mental Effort, September 2021.
51. Gheza, D., & Kool, W. (2021). *Planning hurts: Model-based reinforcement learning taxes the central executive.* Poster presented at the 2nd Workshop on Mental Effort, September 2021.
52. Ramakrishnan, S. A., Chen, J., Neppala, G. K., Wagner, A., Kool, W., Ivanov, I., & Parvaz, M . A. (2021). *Impaired arbitration between decision-making strategies in alcohol and cannabis users: A preliminary computational modeling study.* Poster presented at the Virtual Meeting of the Society of Biological Psychiatry. April 2021.
53. Kool, W. (2020). *Neural and behavioral signatures of cost-benefit decision making.* Talk presented at the Mental Effort workshop at the virtual meeting of the Cognitive Science Society, July 2020.

54. Patil, I., Kool, W., Campbell, S., Cikara, M., & Cushman, F. A. (2018). *Moral learning privileges model-free update.* Talk presented at the meeting of the European Society for Cognitive and Affective Neuroscience, Leiden, July 2018.
55. Bolenz, F., Kool, W., Reiter, F. A., Kiebel, S. J., & Eppinger, B. (2018). *Meta-control of learning strategies in human aging.* Poster presented at the meeting of the Federation for European Neuroscience Societies, Berlin, July 2018.
56. Kool, W., Cushman, F. A., & Gershman, S. J. (2017). *Neural and behavioral signatures of metacontrol in reinforcement learning.* Talk presented at the meeting of the Society for Neuroscience, Washington, DC, November 2017.
57. Kool, W., Gershman, S. J., & Cushman, F. A. (2017). *Neural and behavioral signatures of metacontrol in reinforcement learning.* Talk presented at the meeting of the Society for Neuroeconomics, Toronto, Canada, October 2017.
58. Kool, W., Cushman, F. A., & Gershman, S. J. (2017). *Metacontrol in reinforcement learning.* Talk presented at the International Conference for Cognitive Neuroscience, Amsterdam, the Netherlands, August 2017.
59. Kool, W., Cushman, F. A., & Gershman, S. J. (2017). *Metacontrol in reinforcement learning.* Poster presented at the Multi-Disciplinary Conference on Reinforcement Learning and Decision Making, Ann Arbor, MI, June 2017.
60. Kool, W., Gershman, S. J., & Cushman, F. A. (2017). *Thinking fast or slow? A reinforcement-learning approach.* Poster presented at the meeting of the Society for Personality and Social Psychology, San Antonio, TX, January 2017.
61. Kool, W. (2017). *Decision making and the intrinsic cost of cognitive control.* Talk presented at the Society for Personality and Social Psychology Self-Regulation Preconference, San Antonio, TX, January 2017.
62. Kool, W., Cushman, F. A., & Gershman, S. J. (2016). *A cost-benefit analysis between multiple reinforcement-learning mechanisms.* Talk presented at the meeting of the Society for Judgment and Decision Making, Boston, MA, November 2016.
63. Kool, W., Cushman, F. A., Gershman, S. J., & Botvinick, M. M. (2016). *Cost-benefit analyses in cognitive control.* Talk presented at the meeting of the Association for Psychological Science, Chicago, IL, May 2016.
64. Kool, W., Cushman, F. A., & Gershman, S. J. (2016). *Cost-benefit analyses in reinforcement learning.* Poster presented at the meeting of the Social & Affective Neuroscience Society, New York, NY, April 2016.
65. Kool, W., & Botvinick, M. M. (2015). *Dopaminergic genes predict the cost of cognitive control and reliance on habit.* Poster presented at the meeting of the Society for Neuroeconomics, Miami, FL, September 2015.

66. Kool, W., & Botvinick, M. M. (2013). *The intrinsic cost of cognitive control.* Talk presented at the meeting of the Society for Psychophysiological Research, Florence, October 2013.
67. Kool, W., McGuire, J. T., Wang, G. J., & Botvinick, M. M. (2012). *Aversion to cognitive effort predicts poor self-control and reliance on habit.* Poster presented at the MoMCAI conference, Washington DC, May 2013.
68. Kool, W., Wang, G. J., & Botvinick, M. M. (2012). *A role for effort costs in self-control and intertemporal choice.* Poster presented at the meeting of the Society for Neuroscience, New Orleans, LA, October 2012.
69. Kool, W., Getz, S., & Botvinick, M. M. (2011). *Ventral striatum is immune to the Illusion of Control.* Poster presented at the meeting of the Society for Neuroscience, Washington, DC, November 2011.
70. Kool, W., Conway, A. R. A., & Turk-Browne, N. B. (2011). *The sequential dynamics of visual short-term memory.* Poster presented at the meeting of the Society for Psychonomics, Seattle, WA, November 2011.
71. Hommel, B., Colzato, L., van Wouwe, N., & Kool, W. (2008). *Affect, stress, and visuomotor binding: Evidence for a role of dopamine in integrating perception and action.* Poster presented at the meeting of the Cognitive Neuroscience Society, New York, NY, May 2008.

WORKSHOPS

1. Smid, C. R., & Kool, W. (2021). *Computational modeling of goal-directed and habitual reinforcement-learning strategies*. Workshop presented at the FLUX 2021 Virtual Congress.

INVITED PRESENTATIONS

1. *Metacontrol is guided by task structure.* Talk presented at the meeting of the Laboratory for Cognition and Action, Department of Psychology, University of California, Riverside, CA, April 2026.
2. *Metacontrol is guided by task structure.* Talk presented at the UCL Max Planck Computational Psychiatry Seminar Series, University College London, London, England, May 2025.
3. *Cognitive control and task structure.* Talk presented at the Neuro-CoE Seminar Series, Columbia University, New York, NY, October 2024.
4. *Humans forgo reward to install fairness into AI.* Talk presented at the AI & Digital Health Summit, St. Louis, MO, September 2023.
5. *Accounting for the cost of autonomy in human decision making.* Talk presented at the PI Workshop on Autonomy in Humans, Animals, and Machines, St. Louis, MO, September 2023.
6. *Investigating metacontrol using uni- and multivariate neuroimaging.* Talk presented at the Washington University Neuroimaging Community Symposium, St. Louis, MO, March 2023.

7. *Cost-benefit tradeoffs in meta- and cognitive control.* Talk presented at the Volition and Cognitive Control Symposium. Technische Universität Dresden, Germany, July 2022.
8. *Metacontrol as cost-benefit decision making.* Talk presented at the Affective Brain Lab Seminar Series, School of Psychology, University College London, UK, January 2022.
9. *Metacontrol as cost-benefit decision making.* Talk presented at the Leeds Psychology Research Seminar, School of Pscyhology, University of Leeds, UK, December 2021.
10. *Towards efficient metacontrol.* Talk presented at the Philosophy – Neuroscience – Psychology program seminar series, Washington University in St. Louis, MO, October 2021.
11. *Behavioral, neural, and computational signatures of metacontrol.* Talk presented at the Reinforcement Learning and Decision Making seminar series, Max Planck Institute Tübingen, Germany, December 2020.
12. *Neural, and computational signatures of metacontrol.* Talk presented at the Washington University NeuroImaging Community seminar series, Department of Radiology, Washington University in St. Louis, MO, November 2020.
13. *Decision making and the intrinsic cost of cognitive control.* Talk presented at the Department of Psychology at The University of Chicago, Chicago, IL, January 2019.
14. *Decision making and the intrinsic cost of cognitive control.* Talk presented at the Department of Psychological & Brain Science at Washington University in St. Louis, MO, December 2018.
15. *Metacontrol in reinforcement learning.* Talk presented at the 2018 TU Dresden Symposium "Volition and Self-Control: From Metaphors to Mechanisms", Dresden, Germany, August 2018.
16. *Decision making and the intrinsic cost of cognitive control.* Talk presented at the Department of Psychology at Columbia University, New York City, NY, December 2016.
17. *Decision making and the avoidance of cognitive effort.* Talk presented at the Center for Social Brain Science at Dartmouth University, Hanover, NH, March 2016.
18. *The intrinsic cost of cognitive control.* Talk presented at the Donders Institute for Brain, Cognition and Behavior at the Radbout University Nijmegen, the Netherlands, October 2013.
19. *A role for mental effort avoidance in self-control.* Talk presented at the Princeton Research Symposium (PRS), Princeton, October 2013.

PEER REVIEW

Articles

Affective Science • Attention, Perception, & Psychophysics • Behavioral & Brain Sciences • Behavioral Research Methods • Biological Psychiatry • Biological Psychiatry: Open Science • Cerebral • Child Development • Cognition • Cognitive, Affective, & Behavioral Neuroscience • Cognitive Development • Cognitive Research: Principles & Implications • Cognitive Science •

Collabra: Psychology • Communications Psychology • Computational Psychiatry • Computers in Human Behavior Reports • Current Directions in Psychological Science • eLife • Emotion • European Neuropsychopharmacology • Humans in Computer Behavior • iScience • Journal of Alzheimer's Disease • Journal of Cognitive Neuroscience • Journal of Experimental Psychology: General • Journal of Experimental Psychology: Human Perception and Performance • Journal of Experimental Psychology: Learning, Memory, and Cognition • Journal of Experimental Social Psychology • Journal of Neuroscience • Journal of Personality and Social Psychology: Attitudes and Social Cognition • Methods in Psychology • Motivation Science • Nature Human Behaviour • NeuroImage • Neuropsychologia • PLOS Computational Biology • PLOS ONE • Proceedings for the National Academy of Sciences of the USA • Proceedings of the Royal Society B: Biological Sciences • Psychonomic Bulletin & Review • Psychological Research • Psychological Review • Psychological Science • Psychophysiology • Scientific Reports • Social Cognitive and Affective Neuroscience • Technology in Society • Visual Cognition

Consulting editor

Cognitive Research: Principles and Implications

Guest editor

PLOS ONE • PLOS Computational Biology

Grants

National Science Foundation • Dresden Collaborative Research Center

MENTORING

Postdoctoral fellows

2024-present Abhishek Dey
2020-present Davide Gheza

Graduate students

2024-present Duygu Yücel
2022-present Cathy Zhang
2022-present Christopher Ahn
2021-26 Lauren Treiman (Provost Graduate Student Research Excellence Award)
2020-22 Jack Dolgin

Co-advised postdoctoral fellows

2022-26 Colin Hoy (UCSF, PI: Simon Little)

Lab staff

2021-26 Thea Zalabak

2019-21 Bettina Bustos (now University of Iowa)

Undergraduate students

Xintian Wang (2024-2026)
Andrew Zhang (2024-2025)
Ugo Uzo-Ojinnaka (2024)
Ananya Nath (2023-2024)
Trey Hepp (2023)
Ankit Chhajed (2021-2024)
Emanuel Gerbi (2021-2022)
Melodey Soong (2021-2022)
Eric Gruber (2020-2021)

Dissertation defense committee

2026 Shinhae Ahn
2026 Lauren Treiman (chair)
2026 Gizem Filiz
2025 Ata Karagoz
2023 Xiaojin Ma
2023 Jackson Colvett
2023 Michael Freund
2021 Kendra Smith
2021 Martin Jensen Mækelæ (The Arctic University of Norway)

Dissertation proposal committee

2025 Shinhae Ahn
2025 Gizem Filiz
2025 Merve Ileri-Tayar
2025 Lauren Treiman (chair)
2025 Kris Nilsson
2024 Ata Karagoz
2022 Jackson Colvett
2021 Michael Freund

Subject matter committee

2026 Maddie Valdez
2025 Chris Ahn (chair)
2025 Cathy Zhang (chair)
2025 Thomas Dudey
2024 Merve Ileri Tayar
2024 Gizem Filiz
2023 Tan Nguyen
2023 Jacob Pine
2023 Ata Karagoz
2021 Michael Freund

Qualifying exam committee

2023 Lauren Treiman (chair)

Master's thesis committee

2024 Thomas Dudey
2024 Chris Ahn (chair)
2024 Cathy Zhang (chair)
2023 Merve Ileri-Tayar
2023 Jack Dolgin (chair)
2022 Ata Karagoz
2022 Tan Nguyen
2020 Xiaojin Ma

TEACHING

Primary instructor, Washington University in St. Louis

PSY360 Cognitive Psychology: 2020-present

PSY4631/5631 Introduction to Computational Cognitive Science: 2021-present

Guest lectures

DCDS499 Introduction to Graduate Research in Computational and Data Sciences: Fall 2021, Fall 2023

PSY591 Research in Psychology: Spring 2021

Teaching assistant

2015 Lab materials developer (cognitive control and connectionism), Introduction to Psychology, Princeton University.

2012 Introduction to Cognitive Neuroscience, Professor Matthew M. Botvinick, Princeton University.

SERVICE

2026- Psychological & Brain Sciences undergraduate curriculum committee, Washington University in St. Louis

2024- Psychological & Brain Sciences subject pool committee, Washington University in St. Louis

2024- CCSN fellowship committee, Washington University in St. Louis

2023- Psychological & Brain Sciences IT committee, Washington University in St. Louis

2023- CHCP steering committee, Washington University in St. Louis

2024-2026 CCSN mini-retreat faculty supervisor, Washington University in St. Louis

2020 Internal APA grant review committee, Department of Psychological & Brain Sciences, Washington University in St. Louis

2020 Assistant in Instruction Award committee, Department of Psychological & Brain Sciences, Washington University in St. Louis

2012-14 Princeton Neuroscience Institute, Neuroscience of Social Decision Making colloquium series co-organizer

2012-13 Princeton Department of Psychology, Graduate Student Committee member

2011 Princeton Department of Psychology, Graduate Student Orientation coordinator

2011 Princeton Department of Psychology, Colloquium Host