

Contact	<i>Email:</i> taylor.w.webb@gmail.com	<i>Website:</i> taylorwwebb.github.io
Appointments	University of California, Los Angeles Postdoctoral Research Fellow Advisers: Keith Holyoak, Hongjing Lu, Hakwan Lau	Los Angeles, CA 2019 – 2023
	Princeton University Postdoctoral Research Fellow Adviser: Jonathan Cohen	Princeton, NJ 2018 – 2019
Education	Princeton University PhD, MA, Cognitive Psychology and Neuroscience Adviser: Michael Graziano	Princeton, NJ 2012 – 2018
	University of Southern California BA, Neuroscience BM, Music Composition	Los Angeles, CA 2005 – 2010
Awards	F32 Postdoctoral National Research Service Award (NIH) T32 Training Fellowship in Computational Neuroscience (NIH) Charlotte Elizabeth Procter Fellowship (Princeton University) Graduate Student Teaching Award (Princeton University) Graduate Student Fellowship (Princeton University) Graduate Student Research Funding (Princeton University) Discovery Scholar Award (University of Southern California) Undergraduate Research Fellowship (Rose Hills Foundation)	2019 – 2021 2018 – 2019 2017 2017 2017 2016 – 2017 2010 2008 – 2010
Research interests	Analogy and relational reasoning; metacognition; decision-making; visual attention; computational modeling; artificial intelligence; neuroimaging	
Publications	Webb, T. W. , Holyoak, K. J., & Lu, H. (2023). Emergent analogical reasoning in large language models. <i>Nature Human Behaviour</i> , 7, 1526-1541. doi.org/10.1038/s41562-023-01659-w Webb, T. W.* , Fu, S.*, Bihl, T., Holyoak, K. J., & Lu, H. (2023). Zero-shot visual reasoning through probabilistic analogical mapping. <i>Nature Communications</i> , 15, 5144. doi.org/10.1038/s41467-023-40804-x . * <i>Equal contribution</i> Webb, T. W. , Miyoshi, K., Yan So, T., Rajananda, S., & Lau, H. (2023). Natural statistics support a rational account of confidence biases. <i>Nature Communications</i> , 14, 3992. doi.org/10.1038/s41467-023-39737-2	

Webb, T. W.*, Mondal, S. S.*, & Cohen, J. D. (2023). Systematic visual reasoning through object-centric relational abstraction. To appear in *37th Conference on Neural Information Processing Systems (NeurIPS)*. Preprint available on [arXiv](#).

* Equal contribution

Mondal, S. S., **Webb, T. W.***, & Cohen, J. D. (2023). Learning to reason over visual objects. In *11th International Conference on Learning Representations (ICLR)*. doi.org/10.48550/arXiv.2303.02260

* Equal contribution

Mondal, S. S., Frankland, S. M., **Webb, T. W.**, & Cohen, J. D. (2023). Determinantal Point Process Attention Over Grid Codes Supports Out-of-Distribution Generalization. *eLife*, 12, RP89911. doi.org/10.7554/eLife.89911.1

Webb, T. W., Sinha, I., & Cohen, J. D. (2021). Emergent symbols through binding in external memory. In *9th International Conference on Learning Representations (ICLR)*. doi.org/10.48550/arXiv.2012.14601

Webb, T. W., Dulberg, Z., Frankland, S. M., Petrov, A. A., O'Reilly, R. C., & Cohen, J. D. (2020). Learning representations that support extrapolation. In *37th International Conference on Machine Learning (ICML)*. (pp. 10136-10146). doi.org/10.48550/arXiv.2007.05059

Wilterson, A. I., Kemper, C. M., Kim, N., **Webb, T. W.**, Reblando, A. M., & Graziano, M. S. A. (2020). Attention control and the attention schema theory of consciousness. *Progress in Neurobiology*, 195, 101844. doi.org/10.1016/j.pneurobio.2020.101844

Guterstam, A., Kean, H. H., **Webb, T. W.**, Kean, F. S., & Graziano, M. S. A. (2019). Implicit model of other people's visual attention as an invisible, force-carrying beam projecting from the eyes. *Proceedings of the National Academy of Sciences*, 116(1), 328-333. doi.org/10.1073/pnas.1816581115

Bio, B. J., **Webb, T. W.**, & Graziano, M. S. A. (2018). Projecting one's own spatial bias onto others during a theory-of-mind task. *Proceedings of the National Academy of Sciences*, 115(7), E1684-E1689. doi.org/10.1073/pnas.1718493115

Webb, T. W., Igelstrom, K. M., Schurger, A., & Graziano, M. S. A. (2016). Cortical networks involved in visual awareness independent of visual attention. *Proceedings of the National Academy of Sciences*, 113(48), 13923-13928. doi.org/10.1073/pnas.1611505113

Igelstrom, K. M., **Webb, T. W.**, & Graziano, M. S. A. (2016). Functional connectivity between the temporoparietal cortex and cerebellum in autism spectrum disorder. *Cerebral Cortex*, 27(4), 2617-2627. doi.org/10.1093/cercor/bhw079

Igelstrom, K. M., **Webb, T. W.**, Kelly, Y. T., & Graziano, M. S. A. (2016). Topographical organization of attentional, social and memory processes in the human temporoparietal cortex. *Eneuro*, 3(2). doi.org/10.1523/ENEURO.0060-16.2016

- Webb, T. W.**, Kean, H. H., & Graziano, M. S. A. (2016). Effects of awareness on the control of attention. *Journal of Cognitive Neuroscience*, 28(6), 842-851. doi.org/10.1162/jocn.a_00931
- Igelstrom, K. M., **Webb, T. W.**, & Graziano, M. S. A. (2015). Neural processes in the human temporoparietal cortex separated by localized independent component analysis. *Journal of Neuroscience*, 35(25), 9432-9445. doi.org/10.1523/JNEUROSCI.0551-15.2015
- Webb, T. W.**, & Graziano, M. S. A. (2015). The attention schema theory: a mechanistic account of subjective awareness. *Frontiers in psychology*, 6, 500. doi.org/10.3389/fpsyg.2015.00500
- Graziano, M. S. A., & **Webb, T. W.** (2014). A mechanistic theory of consciousness. *International Journal of Machine Consciousness*, 6(02), 163-176. doi.org/10.1142/S1793843014400174
- Kelly, Y. T., **Webb, T. W.**, Meier, J. D., Arcaro, M. J., & Graziano, M. S. A. (2014). Attributing awareness to oneself and to others. *Proceedings of the National Academy of Sciences*, 111(13), 5012-5017. doi.org/10.1073/pnas.1401201111
- Manuscripts under review
- Webb, T. W.**, Frankland, S. M., Altabaa, A., Krishnamurthy, K., Campbell, D., Russin, J., O'Reilly, R., Lafferty, J., & Cohen, J. D. (2023). The relational bottleneck as an inductive bias for efficient abstraction. Preprint available on [arXiv](https://arxiv.org).
- Webb, T. W.***, Mondal, S. S.*, Wang, C., Krabach, B., & Momennejad, I. (2023). A Prefrontal Cortex-inspired Architecture for Planning in Large Language Models. Preprint available on [arXiv](https://arxiv.org).
- * Equal contribution
- Altabaa, A., **Webb, T. W.**, Cohen, J. D., & Lafferty, J. (2023). Abstractors: Transformer Modules for Symbolic Message Passing and Relational Reasoning. Preprint available on [arXiv](https://arxiv.org).
- Frankland, S. M., **Webb, T. W.**, & Cohen, J. D. (2021). No Coincidence, George: Capacity-Limits as the Curse of Compositionality. Preprint available on [PsyArXiv](https://psyarxiv.org).
- Conference proceedings (non-archival)
- Webb, T. W.**, Miyoshi, K., Yan So, T., & Lau, H. (2021). A task-optimized neural network model of decision confidence. In *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. [pdf](#)
- Dulberg, Z., **Webb, T. W.**, & Cohen, J. D. (2021). Modelling the development of counting with memory-augmented neural networks. In *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. doi.org/10.48550/arXiv.2105.10577
- Frankland, S. M., **Webb, T. W.**, Petrov, A. A., O'Reilly, R. C., & Cohen, J. D. (2019). Extracting and Utilizing Abstract, Structured Representations for Analogy. In *Proceedings of the 41st Annual Meeting of the Cognitive Science Society*. [pdf](#)

Book chapters	Graziano, M. S. A., & Webb, T. W. (2018). Understanding consciousness by building it. In <i>The Bloomsbury Companion to the Philosophy of Consciousness</i> , 187. pdf	
	Graziano, M. S. A., & Webb, T. W. (2016). From sponge to human: The evolution of consciousness. In <i>Evolution of Nervous Systems: Second Edition</i> (pp. 547-554). Kaas J. and Krubitzer L., Eds., Elsevier. pdf	
Presentations	2023. Emergent analogical reasoning in large language models. Invited talk at <i>Large language models meet cognitive science</i> workshop, Cognitive Science Society Annual Meeting, Sydney.	
	2023. Emergent analogical reasoning in large language models. Invited talk at the Santa Fe Institute. Santa Fe, NM.	
	2021. Performance-optimized neural networks as an explanatory framework for decision confidence. Invited talk at <i>Metacognition in the Age of AI: Challenges and Opportunities</i> workshop, Neural Information Processing Systems (NeurIPS), Virtual.	
	2021. Emergent symbols through binding in external memory. Talk presented at International Conference on Learning Representations (ICLR), Virtual.	
	2019. Canonical representations for generalization in relational reasoning. Talk presented at the <i>Understanding interactions amongst cognitive control, learning and representation</i> symposium, Cognitive Science Society Annual Meeting, Montreal.	
	2017. A functional role for consciousness in model-based control of attention. Talk presented at the Association for the Scientific Study of Consciousness Annual Meeting, Beijing.	
	2016. Manipulating visual awareness while controlling attention: effects on cortical networks. Talk presented at the Association for the Scientific Study of Consciousness Annual Meeting, Buenos Aires.	
Teaching	<i>Assistant Instructor</i> , Princeton University	
	Life Cycles of Behavior.	2017
	Introduction to Clinical Neuropsychology.	2015 – 2016
	Introduction to Cognitive Neuroscience.	2014 – 2016
Outreach	Fundamentals of Neuroscience.	2013 – 2014
	<i>Volunteer Instructor</i> , Princeton Prison Teaching Initiative.	2014 – 2018