

Contact	<i>Email:</i> taylor.w.webb@gmail.com <i>Website:</i> taylorwwebb.github.io	
Appointments	University of California, Los Angeles	Los Angeles, CA
	Postdoctoral Research Fellow	2019 – 2023
	Advisers: Keith Holyoak, Hongjing Lu, Hakwan Lau	
	Princeton University	Princeton, NJ
Education	Postdoctoral Research Fellow	2018 – 2019
	Adviser: Jonathan Cohen	
	Princeton University	Princeton, NJ
	PhD, MA, Cognitive Psychology and Neuroscience	2012 – 2018
Awards	Adviser: Michael Graziano	
	University of Southern California	Los Angeles, CA
	BA, Neuroscience	2005 – 2010
	BM, Music Composition	
Awards	F32 Postdoctoral National Research Service Award (NIH)	2019 – 2021
	T32 Training Fellowship in Computational Neuroscience (NIH)	2018 – 2019
	Charlotte Elizabeth Procter Fellowship (Princeton University)	2017
	Graduate Student Teaching Award (Princeton University)	2017
	Graduate Student Fellowship (Princeton University)	2017
	Graduate Student Research Funding (Princeton University)	2016 – 2017
	Discovery Scholar Award (University of Southern California)	2010
	Undergraduate Research Fellowship (Rose Hills Foundation)	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	
<i>h-index</i> = 14	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
- 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/abs/2305.18271).
- 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/abs/2305.18271).
- 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.com/2010.00000).
- 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 *The Bloomsbury Companion to the Philosophy of Consciousness*, 187. [pdf](#)
- Graziano, M. S. A., & **Webb, T. W.** (2016). From sponge to human: The evolution of consciousness. In *Evolution of Nervous Systems: Second Edition* (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
	Fundamentals of Neuroscience.	2013 – 2014
Mentorship	<ul style="list-style-type: none"> • Hope Kean, PhD student at MIT. • Alexandra Reblando, research assistant at Columbia University. • Ishan Sinha, product manager at LinkedIn. • Sivananda Rajananda, masters student at Harvard University. • Zach Dulberg, PhD student at Princeton University. • Shanka Subhra Mondal, PhD student at Princeton University. • Yichen Wang, undergraduate student at UCLA. • Jiayi Sun, undergraduate student at UCLA. • Miles Garofola-Lam, undergraduate student at UCLA. 	
Outreach	<i>Volunteer Instructor</i> , Princeton Prison Teaching Initiative.	2014 – 2018