

Robert D. Hawkins

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| CONTACT INFORMATION | Princeton University Peretsman Scully Hall Princeton, NJ 08544 | <i>Phone:</i> (217)-549-6923 <i>Email:</i> rdhawkins@princeton.edu <i>Website:</i> http://rxdhawkins.com |
| APPOINTMENTS | Assistant Professor, University of Wisconsin–Madison (starting 2023) Postdoctoral Research Fellow, Princeton University, 2019 – Present | |
| EDUCATION | PhD, Psychology, Stanford University, 2019 BS, Cognitive Science and Mathematics, Indiana University, 2014 | |
| FELLOWSHIPS | C. V. Starr Postdoctoral Research Fellowship, 2021-present NSF SBE Postdoctoral Research Fellowship, 2019-2021 E. K. Potter Stanford Graduate Fellowship, 2017-2019 NSF Graduate Research Fellowship, 2014-2017 Arthur R. Metz Scholarship, 2010-2014 Science, Technology, and Research (STARS) Scholarship, 2010-2014 Edward A. Knapp Undergraduate Fellowship, Santa Fe Institute, 2012 | |
| GRANTS | Princeton-UTokyo Strategic Partnership Seed Grant, 2022-2023 | |
| AWARDS | Best Long Paper Award, EMNLP, 2022 Outstanding Paper Award, NeurIPS, 2022 Best Paper Award, NeurIPS Workshop on Language and Reinforcement Learning, 2022 Cognitive Science Society Prize for Computational Modeling in Language, 2020 Cognitive Science Society Glushko Student Travel Award, 2019 Best Paper Award, ICML Workshop on Adaptive and Multi-Task Learning, 2019 Cognitive Science Society Glushko Student Travel Award, 2016 Cognitive Science Society Prize for Computational Modeling in Applied Cognition, 2015 Phi Beta Kappa, 2013 Sigma Xi Outstanding Undergraduate Research Award, 2013 IU Mathematics Cora B. Hennel Memorial Award, 2013 IU Cognitive Science Program Award for Outstanding Achievement, 2013 IU Cognitive Science Program Award for Outstanding Contribution, 2012 Best Paper Award, Midwest Undergraduate Cognitive Science Conference, 2012 | |
| JOURNAL PAPERS | Chen, A.M., Palacci, A., Vélez, N. Hawkins, R.D.* , Gershman, S.J.* (<i>submitted</i>). Learning to teach, teaching to learn. Pre-print available on PsyArXiv [link]. | |
| * : EQUAL CONTRIBUTION | Hawkins, R.D. , Berdahl, A., Pentland, A.S., Goodman, N.D., Tenenbaum, J.B., Krafft, P.M. (<i>under review</i>). Flexible social inference facilitates targeted social learning when rewards are not observable. Pre-print available on ArXiv [link]. | |
| | Sumers, T., Hawkins, R.D. , Ho, M., Griffiths, T.L. (<i>under review</i>). Reconciling truthfulness and relevance via decision-theoretic utility. Pre-print available on PsyArXiv [link]. | |
| | Kumar, S.*, Sumers, T.R.*, Yamakoshi, T. Norman, K.A., Hasson, U., Griffiths, T.L., Hawkins, R.D. , Nastase, S.A. (<i>under review</i>). Reconstructing the cascade of language processing in the brain using the internal structure of transformer-based language models. Pre-print available on <i>BioRxiv</i> [link]. | |

- Hawkins, R.D.**, Sano, M., Goodman, N.D., Fan, J.E. (*under review*). Visual resemblance and communicative context jointly constrain the emergence of graphical conventions. Pre-print available on *arXiv:2104.05857*.
- Goldstone, R.L., Andrade-Lotero, E., **Hawkins, R.D.**, Roberts, M.E. (*in press*). The emergence of specialized roles within groups. *Topics in Cognitive Science*.
- Sumers, T., Ho, M., **Hawkins, R.D.**, Griffiths, T.L. (*in press*) Show or tell? Exploring when (and why) teaching with language outperforms demonstration. *Cognition*.
- Hawkins, R.D.**, Franke, M., Frank, M.C., Goldberg, A.E., Smith, K., Griffiths, T.L., Goodman, N.D. (*in press*). From partners to populations: A hierarchical Bayesian account of coordination and convention. *Psychological Review*.
- Barnett, S., Griffiths, T.L., **Hawkins, R.D.** (2022). A pragmatic account of the weak evidence effect. *Open Mind*, 6, 169–182.
- Murthy, S., Griffiths, T.L., **Hawkins, R.D.** (2022). Shades of confusion: Lexical uncertainty modulates ad hoc coordination in an interactive communication task based on variable word-color associations. *Cognition*, 225, 105152.
- Antony, J. Romero, A. Vierra, A. Luenser, R. **Hawkins, R.D.**, Bennion, K. (2022). Semantic relatedness retroactively boosts memory and promotes memory interdependence across episodes. *eLife*, 11, e72519.
- Hawkins, R.D.**, Gweon, H. Goodman, N.D. (2021). The division of labor in communication: Speakers help listeners account for asymmetries in visual perspective. *Cognitive Science*, 45 (3), e12926.
- Degen, J., **Hawkins, R.D.**, Kreiss, E., Graf, C., Goodman, N.D. (2020). When redundancy is useful: A Bayesian approach to ‘overinformative’ referring expressions. *Psychological Review*, 127(4), 591–621.
- Fan, J.E., **Hawkins, R.D.**, Wu, M., Goodman, N.D. (2020). Pragmatic inference and visual abstraction enable contextual flexibility during visual communication. *Computational Brain and Behavior*, 3(1), 86–101.
- Hawkins, R.D.**, Frank, M.C., Goodman, N.D. (2020). Characterizing the dynamics of learning in repeated reference games. *Cognitive Science*, 44(6), e12845.
- Hawkins, R.D.**, Goodman, N.D., Goldstone, R. (2019). The emergence of social norms and conventions. *Trends in Cognitive Sciences*, 23(2), 158–169.
- Hawkins, R.D.***, Smith, E.*, Au, C., Arias, J., Catapano, R., Hermann, E., Keil, M., Lampinen, A., Raposo, S., Reynolds, J., Salehi, S., Salloum, J., Tan, J., Frank, M.C. (2018). Improving the replicability of psychological science through pedagogy. *Advances in Methods and Practices in Psychological Science*, 1(1), 7–18.
- Monroe, W., **Hawkins, R.D.**, Goodman, N.D., Potts, C. (2017). Colors in context: A pragmatic neural model for grounded language understanding. *Transactions of the Association for Computational Linguistics*, 5, 325–338.
- Avena-Koenigsberger, A, Misic, B., **Hawkins, R.D.**, Griffa, A., Hagmann, P., Goñi, J., and Sporns, O. (2017). Path ensembles and a tradeoff between communication efficiency and resilience in the human connectome. *Brain Structure and Function*, 222(1), 603-618.
- Hawkins, R.D.**, Goldstone, R.L. (2016). The formation of social conventions in real-time environments. *PLOS ONE*, 11(3), e0151670.

PROCEEDINGS
PAPERS

- Hawkins, R.D.**, Houpt, J., Eidels, A., Townsend, J. (2016). Can two dots form a Gestalt? Measuring emergent features with the capacity coefficient. *Vision Research*, 126, 19–33.
- Silbert, N., **Hawkins, R.D.** (2016). A tutorial on general recognition theory. *Journal of Mathematical Psychology*, 73, 94-109.
- Hawkins, R.D.** (2015). Conducting real-time multiplayer experiments on the web. *Behavior Research Methods*, 47(4), 966-976
- DeDeo, S., **Hawkins, R.D.**, Klingenstein, S., Hitchcock, T. (2013). Bootstrap methods for the empirical study of decision-making and information flows in social systems. *Entropy*, 15(6), 2246-2276.
- Hernandez Cano, L., Pu, Y., **Hawkins, R.D.**, Tenenbaum, J.T., Solar-Lezama, A. (*under review*). Grounding natural language as collaborative search.
- Ji, A., Kojima, N., Rush, N., Suhr, A., Vong, W.K., **Hawkins, R.D.**, Artzi, Y. (2022). Abstract visual reasoning with tangram shapes. *Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. [oral]
- White, J., Goodman, N.D., **Hawkins, R.D.** (2022). Mixed-effects transformers for hierarchical adaptation. *Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. [poster]
- Sumers, T., **Hawkins, R.D.**, Ho, M., Griffiths, T.L., Hadfield-Menell, D. (2022). How to talk so your robot will learn: Instructions, descriptions, and pragmatics. *Proceedings of the 36th Annual Conference on Neural Information Processing Systems (NeurIPS)*. [poster]
- Kumar, S., Correa, C.G., Dasgupta, I., Marjeh, R., Hu, M., **Hawkins, R.D.**, Cohen, J., Daw, N., Narasimhan, K.R., Griffiths, T.L. (2022). Using natural language and program abstractions to instill human inductive biases in machines. *Proceedings of the 36th Annual Conference on Neural Information Processing Systems (NeurIPS)* [oral]
- Boyce, V., **Hawkins, R.D.**, Goodman, N.D., Frank, M.C. (2022). Two’s company but six is a crowd: Emergence of conventions in multiparty communication games. *Proceedings of the 44th Annual Conference of the Cognitive Science Society*. [oral]
- Wong, C., McCarthy, W., Grand, G., Friedman, Y., Tenenbaum, J., Andreas, J., **Hawkins, R.D.**, Fan, J.E. (2022). Identifying concept libraries from language about object structure. *Proceedings of the 44th Annual Conference of the Cognitive Science Society*. [poster]
- Yamakoshi, T., Griffiths, T.L., **Hawkins, R.D.** (2022). Probing BERT’s priors with serial reproduction chains. *Findings of the Association for Computational Linguistics (ACL)*.
- White, J., Poesia, G., **Hawkins, R.D.**, Sadigh, D., Goodman, N.D. (2021). Open-domain clarification question generation without question examples. *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP)*.
- Sumers, T., **Hawkins, R.D.**, Ho, M., Griffiths, T. (2021). Extending rational models of communication from beliefs to actions. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*. [oral]
- McCarthy, W.*, **Hawkins, R.D.***, Holdaway, C., Wang, H., Fan, J.E. (2021). Emergence of compositional abstractions in human collaborative assembly. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*. [oral]

- Kumar, A, Garg, K., **Hawkins, R.D.** (2021). Contextual flexibility guides communication in a cooperative language game. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*. [poster]
- Hawkins, R.D.**, Liu, I., Goldberg, A.E., Griffiths, T. (2021). Respect the code: speakers expect conventions to generalize within but not across social group boundaries. *Proceedings of the 43rd Annual Conference of the Cognitive Science Society*. [poster]
- Sumers, T., Ho, M., **Hawkins, R.D.**, Narasimhan, K., Griffiths, T. (2021). Learning rewards from linguistic feedback. *Proceedings of the AAAI Conference on Artificial Intelligence*. [oral]
- Hawkins, R.D.**, Kwon, M., Sadigh, D., Goodman, N.D. (2020). Continual adaptation for efficient machine communication. *Proceedings of the Twenty-Fourth Conference on Computational Natural Language Learning (CoNLL)*. [oral]
- Hawkins, R.D.***, Yamakoshi, T.*, Griffiths, T., Goldberg, A. (2020). Investigating representations of verb bias in neural language models. *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. [oral]
- Hawkins, R.D.**, Goodman, N.D., Goldberg, A.E., Griffiths, T.L. (2020). Generalizing meanings from partners to populations: Hierarchical inference supports convention formation on networks. *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. [oral]
- Leung, A., **Hawkins, R.D.**, Yurovsky, D. (2020). Parents scaffold the formation of conversational pacts with their children. *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. [oral]
- Achlioptas, P., Fan, J.E., **Hawkins, R.D.**, Goodman, N.D., Guibas, L. (2019). Shape-Glot: Learning language for shape differentiation. *Proceedings of the IEEE International Conference on Computer Vision (ICCV)*. [poster]
- Hawkins, R.D.***, Sano, M.*, Goodman, N.D., Fan, J.E. (2019). Graphical convention formation during visual communication. *Proceedings of the 41st Annual Conference of the Cognitive Science Society*. [oral]
- Mukherjee, K., **Hawkins, R.D.**, Fan, J.E. (2019). Communicating semantic part information in drawings. *Proceedings of the 41st Annual Conference of the Cognitive Science Society*. [poster]
- Hawkins, R.D.**, Franke, M., Smith, K., Goodman, N.D. (2018). Emerging abstractions: Lexical conventions are shaped by communicative context. *Proceedings of the 40th Annual Conference of the Cognitive Science Society*. [oral]
- Hawkins, R.D.**, Frank, M., Goodman, N.D. (2017). Convention-formation in iterated reference games. *Proceedings of the 39th Annual Conference of the Cognitive Science Society*. [oral]
- Graf, C., Degen, J., **Hawkins, R.D.**, Goodman, N.D. (2016). Animal, dog, or dalmatian? Level of abstraction in nominal referring expressions. *Proceedings of the 38th Annual Conference of the Cognitive Science Society*. [oral]
- Hawkins, R.D.**, Goodman, N.D. (2016). Conversational expectations account for apparent limits on theory of mind use. *Proceedings of the 38th Annual Conference of the Cognitive Science Society*. [oral]
- Hawkins, R.D.**, Stuhlmüller, A., Degen, J., Goodman, N.D. (2015). Why do you ask? Good questions provoke informative answers. *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. [poster]

- Krafft, P. **Hawkins, R.D.**, Pentland, A., Goodman, N.D., Tenenbaum, J. (2015). Emergent collective sensing in human groups. *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. [oral]
- BOOKS &
BOOK
CHAPTERS
- Frank, M.C., Braginsky, M., Cachia, J., Coles, N., Hardwicke, T., **Hawkins, R.D.**, Mathur, M., Williams, R. (*under contract*). *Experimentology: An open science approach to experimental psychology methods*. Cambridge, MA: MIT Press.
- Algom, D., Eidels, A., **Hawkins, R.D.**, Jefferson, B., Townsend, J. (2015). Features of response times: Identification of cognitive mechanisms through mathematical modeling. In *The Oxford Handbook of Computational and Mathematical Psychology* (pp. 63–98). New York, NY: Oxford University Press.
- TECHNICAL
REPORTS
- Hawkins, R.D.**, Goodman, N.D. (2018). Why do you ask? The informational dynamics of relevance in questions and answers. *PsyArXiv: 10.31234*.
- Stuhlmüller, A., **Hawkins, R.D.**, Narayanaswamy, S., Goodman, N.D. (2015). Coarse-to-fine sequential Monte Carlo for probabilistic programs. *arXiv:1509.02962*.
- INVITED TALKS
2023. Studies in Language, Information, Meaning and Expression Workshop, UCLA — ACL Workshop on Interactive Learning for Natural Language Processing (InterNLP) — Computational Summer School on Modeling Social and Collective Behavior (COSMOS) — SPSP Pre-Conference on Shared Reality — SPSP Pre-Conference on Psychology of Collectives
2022. Psychology Colloquium, UCLA — Psychology Colloquium, UW-Madison — Psychology Colloquium, Bowdoin College — Computational Psycholinguistics Seminar, University of Tokyo — Consortium for Interacting Minds Seminar, Dartmouth — Perception & Cognitive AI Seminar, Adobe Research — New Directions Seminar, Cooperative AI Foundation (Invited Discussant) — Machine Learning Day, ASU
2021. Psychology Colloquium, UCSD — Social Brain Brownbag, Dartmouth — Computational Linguistics Seminar, University of Amsterdam — Concepts and Categories (ConCats) Seminar, NYU — Philosophy of Language Workshop, NYU — NeurIPS Workshop: Meaning in Context — AI Group Seminar, Autodesk — Abralín ao Vivo, Brazilian Linguistic Association
2020. Robotics Science and Systems (*RSS*) Workshop: Emergent Behaviors in Human-Robot Systems — Computational Psycholinguistics Meeting, MIT — Language Seminar, DeepMind — Computation and Language Meeting, UC Berkeley
2019. Neuroscience and Social Decision Making (NSDM) Seminar, Princeton University — Center for Research in Language (CRL) Seminar, UC San Diego — TensorFlow and PyTorch User Group, Princeton University — Teaching Methods via Replication Studies Workshop, CogSci
2018. PDP Seminar, Princeton University — Concepts and Categories (ConCats) Seminar, NYU — Symbolic Systems Society Winter Symposium, Stanford University
2017. Linguistics Colloquium, University of Tübingen — Interacting Minds Center (IMC) Seminar, Aarhus University — Language Evolution Seminar, University of Edinburgh
2014. STARS Research Symposium, Indiana University

CONTRIBUTED
WORKSHOP
PAPERS &
CONFERENCE
ABSTRACTS

2022. Conference on Cognitive Computational Neuroscience (*CCN*) — California Meeting on Psycholinguistics (*CAMP*) — ACL Workshop: Learning with Natural Language Supervision (*LNLS*) — ICML Workshop: Human-Machine Collaboration and Teaming (*HMCaT*) — ICML Workshop: Beyond Bayes — NeurIPS Workshop: Language and Reinforcement Learning (*LaReL*)
2021. Society for Personality and Social Psychology (*SPSP*) — 47th Annual Meeting of the Society for Philosophy and Psychology (*SPP*) — ACL Workshop: Natural Language Processing for Programming (*NLP4Prog*) — NAACL Workshop: Visually Grounded Interaction and Language (*ViGIL*)
2020. NeurIPS Workshop: Object Representations for Learning & Reasoning (*ORLR*) — RSS Workshop: Emergent Behaviors in Human-Robot Systems.
2019. ICML Workshop: Adaptive and Multi-Task Learning (*AMTL*) — 45th Annual Meeting of the Society for Philosophy and Psychology (*SPP*).
2018. Vision Sciences Society Annual Meeting (*VSS*) — 12th International Conference on the Evolution of Language (*Evolang XII*)
2017. 7th Biannual Experimental Pragmatics Conference (*XPRAG*) — 30th Annual CUNY Conference on Human Sentence Processing — CSLI Workshop: “Computational and Psycholinguistic Approaches to the Study of Meaning” — 91st Annual Meeting of the Linguistic Society of America (*LSA*)
2016. 22nd Architectures & Mechanisms for Language Processing Conference (*AMLaP*).
2015. 56th Annual Meeting of the Psychonomic Society — 14th Annual Summer Interdisciplinary Conference (*ASIC*) — 10th Annual Network Science Society Conference (*NetSci*)
2014. 4th Annual Midwest Cognitive Science Conference (*MCSC*).
2013. Vision Sciences Society Annual Meeting (*VSS*) — 54th Annual Meeting of the Psychonomic Society.
2012. Vision Sciences Society Annual Meeting (*VSS*) — Midwest Undergraduate Cognitive Science Conference (*MUCSC*).
2011. Configural Processing Consortium (*CPC*) — Object Perception, Attention, and Memory (*OPAM*) — Midwest Undergraduate Cognitive Science Conference (*MUCSC*).

ADVISING &
TEACHING

Mentorship

- [Jess Mankewitz](#), PhD student at UW-Madison (2022-present)
- [Alina Chen](#), undergraduate at Princeton (2022-present)
- [Srija Makkapati](#), undergraduate at Princeton (2021-present)
- [Alicia Chen](#), PhD student at MIT (2021-present)
- [Anya Ji](#), undergraduate at Cornell (2021-present)
- [Takateru Yamakoshi](#), undergraduate at University of Tokyo (2019-present)
- [Nastasia Klevak](#), undergraduate at Princeton (2021-2022)
- [Sonia Murthy](#), undergraduate at Princeton (2020-2021)
- [Irina Liu](#), undergraduate at Princeton (2020-2021)
- [Megumi Sano](#), undergraduate at Stanford (2018-2019)
- [Kushin Mukherjee](#), undergraduate at Vassar (2018-2019)
- [Karl Mulligan](#), undergraduate at Rutgers (2017)
- [Nicole Maslan](#), undergraduate at Claremont McKenna (2016)

Guest Lectures

- Bayesian Models of Social Cognition (PSYC 272), Prof. Adena Schachner, UCSD
- Safety for Autonomous Systems (MAE 207), Prof. Sylvia Herbert, UCSD
- Topics in NLP and ML (CS 6741), Prof. Yoav Artzi, Cornell

Graduate Teaching Assistant, Stanford University

- Computation and Cognition: a Probabilistic Approach, Falls 2016, 2017, 2018
- Bayesian Statistics for Psychologists, Summer 2016
- Lab in Experimental Methods, Winter 2016
- Statistical Methods for Behavioral and Social Sciences, Fall 2015

Undergraduate Teaching Assistant, Indiana University

- Programming Languages, Fall 2012, Spring 2013
- Philosophical Foundations of Cognitive Science, Spring 2012

PROFESSIONAL
SERVICE

Associate Editor, *Open Mind*, 2022-Present

Ad Hoc Reviewing

- *Journals*: Behavior Research Methods — Child Development — Cognition — Cognitive Research: Principles and Implications — Cognitive Science — Computational Brain & Behavior — Frontiers in Psychology — iScience — Journal of Experimental Psychology: General — Journal of Experimental Psychology: Human Perception & Performance — Journal of Pragmatics — Mind & Language — Open Mind — PLOS ONE — PNAS — Psychological Review — Royal Society Open Science — Sage OPEN — Semantics & Pragmatics — Socius — Trends in Cognitive Sciences — Vision Research.
- *Conference proceedings*: ACL Rolling Review — Cognitive Science Society (annual) — EVOLANG (biannual)
- *Workshop program committee*: Workshop on Theory of Mind (ACL 2023) — Workshop on Information-Theoretic Principles in Cognitive Systems (NeurIPS 2022) — Workshop on Natural Language Supervision (ACL 2022) — Workshop on Social Intelligence in Humans & Robots (ICRA 2021) — Workshop on Bridging AI & Cognitive Science, (ICLR 2019)
- *Grant proposals*: NSF Perception, Action & Cognition program (PAC) — NSF Decision, Risk & Management Sciences program (DRMS) — NSF Linguistics program

Open Software

- Developer for Probabilistic Models of Cognition web book (<https://probmods.org/>)
- Primary maintainer for `mdsd` R package and `MWERT` JavaScript framework
- Contributor to `tidyboot` and `rwebppl` R packages

Conference Service

- Co-organizer for “Computational Social Cognition” workshop, 2022
- Co-organizer for “Emergence of Conventions” symposium, CogSci, 2016
- Co-organizer for Stanford-Berkeley Cognitive Area Meetup, 2015
- Co-organizer for Midwest Undergraduate Cognitive Science Conference, 2013

Departmental Service

- Stanford graduate program committee, 2015-2018
- Co-organizer for Stanford cognitive science training seminar, 2017-2018
- Co-organizer for Stanford Cog/Neuro area training seminar, 2016-2017
- Stanford graduate admissions committee, 2015-2016

President of IU Student Organization for Cognitive Science, 2011 - 2012
IU Vice Provost for Undergraduate Education Advisory Board, 2011 - 2012