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Keith James Holyoak

Personal Information

Address:

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Citizenship: United States & Canada

Education

University of British Columbia, B.A. (1971) in psychology
Stanford University, Ph.D. (1976) in psychology

Academic Appointments

Distinguished Professor of Psychology, University of California, Los Angeles, 2004-present
Visiting Scholar, Dept. of Cognitive Science, Johns Hopkins University, 2019
Visiting Professor of Psychology (honorary), National University of Singapore, 2014
Professor of Psychology, University of California, Los Angeles, 1986-2004
Vice-Chair for Academic Personnel, Dept. of Psychology, UCLA, 2002-2006
Co-Director, Cognitive Science Research Program, 1989-92
Member, Brain Research Institute, 1991-present
Professor of Psychology, University of Michigan, 1986
Associate Professor of Psychology, University of Michigan, 1981-1986
Visiting Scholar, LRDC, University of Pittsburgh, 1985-1986
Visiting Associate Professor of Psychology, Carnegie Mellon University, 1984-1985
Assistant Professor of Psychology, University of Michigan, 1976-1981

Research Interests

Analogy, induction, and problem solving
Computational models of cognition
Cognitive neuroscience
Educational applications of technology

Awards

Selected for "Gallery of Scientists" on website of the Federation of Associations in Behavioral & Brain Sciences, 2019
UCLA Dept. of Psychology Distinguished Service Award, 2005
James McKeen Cattell Fellow, 1999
John Simon Guggenheim Fellow, 1991
NIMH Research Scientist Development Award, 1981-1986
Rackham Faculty Fellowship, University of Michigan, 1976
Stanford University Fellowship, 1972-1975

British Columbia Psychological Association Gold Medal, 1971

Honorary Fellowships and Offices in Scientific Organizations

Member, American Academy of Arts and Sciences (from 2019)

Fellow, American Association for the Advancement of Science (from 2003)

Fellow, Cognitive Science Society (from 2006); Chair of Governing Board (1994-1995);

Member of Governing Board (1992-1998)

Fellow, Association for Psychological Science (from 1993)

Fellow, Society for Experimental Psychology (from 1990)

Nominating committee member, AAAS Section J (2007-2009, 2012-2014)

Professional Service

Editorships:

Editor, *Psychological Review*, 2016-2021

Editor, *Cognitive Psychology*, 1995-1999

Senior Editor, *Cognitive Science*, 1990-1992

Associate Editor, *Cognitive Psychology*, 2000-2016

Associate Editor, *Psychological Science*, 2012-2015

Guest Co-editor, Special section on analogy and metaphor, *J. of Experimental Psychology: Learning, Memory, and Cognition*, 2012

Member of Editorial Board:

Journal of Experimental Psychology: General, 1988-1995; 2007-2011

Thinking & Reasoning, 1993-present

Adaptive Behavior, 1991-2016

Cognitive Psychology, 1990-1995; 2000-2016

American Journal of Psychology, 1988-2008

Psychological Science, 2001

Cognitive Science, 1992-2000

Journal of Experimental Psychology: Learning, Memory, and Cognition, 1984-1987

Memory & Cognition, 1977-1990

Ad Hoc Reviewer:

Journals

American Psychologist, Applied Cognitive Psychology, Behavioral and Brain Sciences, Brain and Cognition, Brain Research, Cerebral Cortex, Child Development, Cognition, Cognition and Instruction, Cognitive Development, Cognitive Neuroscience, Cognitive Psychology, Cognitive Science, Cognitive Systems Research, Developmental Psychology, European Journal of Cognitive Psychology, Journal of Cognitive Neuroscience, Journal of Cognitive Psychology, Journal of Experimental Child Psychology, Journal of Experimental Psychology: Human Perception and Performance, Journal of Experimental Psychology: Learning, Memory, and Cognition, Journal of Experimental Social Psychology, Journal of General Psychology, Journal of Medical Informatics, Journal of Memory and Language, Journal of Neuroscience, Journal of Personality and Social Psychology, Nature Neuroscience, Neuropsychologia, Perception & Psychophysics, Perspectives on Psychological Science, PLoS Computational

Biology, Political Psychology, Proceedings of the National Academy of Sciences (USA), Psychological Bulletin, Psychological Review, Psychological Science, Psychological Science in the Public Interest, Psychology and Aging, Psychonomic Bulletin and Review, Review of General Psychology, Science, Scientific Study of Literature, Trends in Cognitive Sciences

Government & Private Agencies, Conferences, and Publishing Companies

Guggenheim Foundation, National Science Foundation, National Institute of Education, National Science and Engineering Council (Canada), Social Science & Humanities Research Council (Canada), Biotechnology & Biological Sciences Research Council (UK), Australian Research Council, Conferences of Cognitive Science Society, Program Committee, Advanced Computing in the Social Sciences, (Energy Division of Oakridge National Laboratory), Adjudicator: Ontario Premier's Discovery Awards Program, MIT Press, Harcourt Brace Jovanovich, Lawrence Erlbaum Associates, Prentice-Hall, Harvard University Press, Princeton University Press, Oxford University Press, Wiley & Sons

Advisory Panel Memberships and Workshops:

Member of Advisory Board, Society for the Neuroscience of Creativity (2017-)
 External review panel, UCSD Psychology Dept., 2020
 External advisory board, Grawemeyer Prize in Psychology, 2012
 External review panel, U. of British Columbia Psychology Dept., 2009
 Co-organizer, 2nd International Conference on Analogy, Sofia, Bulgaria, 2009
 NSF workshop on Higher Cognition in Adolescents, 2008
 NIH panel, 2005
 Chair of judging panel, APA Early Career Award in cognition/learning, 2004
 NSF workshop on Knowledge Transfer, 2002
 NSF Learning & Intelligent Systems initiative, 1997
 Co-organizer, 1st International Conference on Analogy, Sofia, Bulgaria, 1998
 NIMH Subcommittee on Thinking and Communication, 1993
 International Advisory Board, Dept. of Cognitive Science, New Bulgarian University
 Editorial Advisory Board, Issues in Thinking and Reasoning, Erlbaum (UK)
 Editorial Advisory Board, Advances in the Psychology of Thinking, Simon & Schuster
 NSF Memory and Cognitive Processes Panel, 1980-1981
 NSF/NIE Program in Science and Mathematics Education, 1978

Teaching Experience

University of California, Los Angeles 1986-present

Undergraduate

Psychology 10, Introduction to Psychology
 Psychology 120A, Cognitive Psychology
 Psychology 121, Laboratory in Cognitive Psychology
 Psychology 124F (Psychology Honors Program), Thinking
 Psychology 185, Cognitive Science

Graduate

Psychology 264, Thinking
 Psychology 269, Analogy in the Mind and Brain
 Psychology 269, Applications of Technology for Mathematics Teaching
 and Learning
 Psychology 269, Causal Knowledge and Cognitive Evolution
 Psychology 269, Induction and Knowledge Acquisition
 Psychology 269, Metaphor and Cognition
 Psychology 269, The Adaptive Character of Memory and Thinking
 Neuroscience 211A, Mental Imagery
 Anthropology 297, Cognitive Science & Anthropology of the Supernatural

University of Michigan, 1976-1986

Undergraduate

Psychology 310, Experimental Psychology Lab
 Psychology 443, Psychology of Thinking
 Psychology 447, Psychology of Language
 Psychology 448, Learning and Memory
 Psychology 518, Learning and Memory Lab

Graduate

Psychology 646, Pro-Seminar in Cognitive Psychology
 Psychology 745, Psychology of Language
 Psychology 746, Human Learning and Memory
 Psychology 908, Seminar on Categorization
 Psychology 948, Seminar on Language Induction

Stanford University, 1972-1976

Teaching Assistant for introductory psychology and psycholinguistics courses

Former PhD and Post-doctoral Students*Associate and Full Professors*

Bruce Burns (Psychology, U. of Sydney, Australia), Richard Catrambone (Psychology, Georgia Tech), Soohyun Cho (Psychology, Chung-Ang University, South Korea), Meredith Gattis (Psychology, Cardiff U., UK), Mary Gick (Psychology, Carleton U., Canada), Dan Krawczyk (Behavioral & Brain Sciences, U. of Texas at Dallas), Jim Kroger (Psychology, New Mexico State U.), Heeseung Lee (Education, Yonsei University, South Korea), Robert Morrison (Psychology & Neuroscience, Loyola U. Chicago), Laura Novick (Psychology & Human Development, Vanderbilt U.), Lindsey Richland (Education, UC Irvine), Carol Seeger (Psychology, Colorado State U.), Bobby Spellman (Psychology & Law, U. of Virginia), Regina Vollmeyer (Psychology, U. of Potsdam, Germany), Michael Waldmann (Psychology, U. of Goettingen, Germany), James Waltz (Psychiatry, U. of Maryland)

Assistant Professors

Patrick Plummer (Howard University), Derek Powell (Arizona State University),
Tage Rai (UCSD)

Research Scientists

Michael Vendetti (Oracle), Dawn Chen (Google)

Publications

Books (Cognitive Science)

- Holyoak, K. J. (2019). *The spider's thread: Metaphor in mind, brain, and poetry*. Cambridge, MA: MIT Press.
- Holyoak, K. J., & Morrison, R. G. (Eds.) (2012). *The Oxford handbook of thinking and reasoning*. New York: Oxford University Press.
- Kokinov, B., Holyoak, K. J., & Gentner, D. (2009). *New frontiers in analogy research: Proceedings of the Second International Conference on Analogy*. Sofia, Bulgaria: New Bulgarian University Press.
- Holyoak, K. J., & Morrison, R. G. (Eds.) (2005). *The Cambridge handbook of thinking and reasoning*. Cambridge, UK: Cambridge University Press.
- Gentner, D., Holyoak, K. J., & Kokinov, B. N. (Eds.) (2001). *The analogical mind: Perspectives from cognitive science*. Cambridge, MA: MIT Press.
- Holyoak, K. J., Gentner, D., & Kokinov, B. N. (Eds.) (1998). *Advances in analogy research: Integration of theory and data from the cognitive, computational, and neural sciences*. Sofia, Bulgaria: New Bulgarian University Press.
- Shanks, D. R., Holyoak, K. J., & Medin, D. L. (Eds.) (1996). *The psychology of learning and motivation, Vol. 34: Causal learning*. San Diego: Academic Press.
- Grafman, J., Holyoak, K. J., & Boller, F. (Eds.) (1995). *Structure and functions of the human prefrontal cortex*. New York: New York Academy of Sciences.
- Holyoak, K. J., & Thagard, P. (1995). *Mental leaps: Analogy in creative thought*. Cambridge, MA: MIT Press. Paperback edition, 1996. Japanese translation, 1998.
- Holyoak, K. J., & Barnden, J. A. (Eds.) (1994). *Advances in connectionist and neural computation theory, Vol. 2: Analogical connections*. Norwood, N.J.: Ablex.
- Barnden, J. A., & Holyoak, K. J. (Eds.) (1994). *Advances in connectionist and neural computation theory, Vol. 3: Analogy, reminding, and metaphor*. Norwood, N.J.: Ablex.
- Holland, J. H., Holyoak, K. J., Nisbett, R. E., & Thagard, P. (1986). *Induction: Processes of inference, learning, and discovery*. Cambridge, MA: MIT Press. Paperback edition, 1989. Japanese translation, 1991. Portions of Ch. 4 reprinted in L. Davis (Ed.) (1987), *Genetic algorithms and simulated annealing* (pp. 116-128). London: Pitman. Portions of Ch. 9 reprinted in A. I. Goldman (Ed.) (1993), *Readings in philosophy and cognitive science* (pp. 23-41). Cambridge, MA: MIT Press. Chapter 1 reprinted in N. Lazaric & E. Lorenz (Eds.) (2003), *Critical studies in economic institutions: Knowledge, learning and routines* (pp. 25-56). Camberley, UK: Edward Elgar.
- Glass, A. L., & Holyoak, K. J. (1986). *Cognition*, 2nd edition. New York: Random House.
- Glass, A. L., Holyoak, K. J., & Santa, J. L. (1979). *Cognition*. Reading, MA: Addison-Wesley.

Books (Poetry)

- Holyoak, K. (2019). *Oracle Bones: Poems from the Time of Misrule*. Seattle, WA: Goldfish Press.
- Holyoak, K. (2015). *The Gospel According to Judas*. Loveland, OH: Dos Madres Press.
- Holyoak, K. (2012). *Foreigner: New English Poems in Chinese Old Style*. Loveland, OH: Dos Madres Press.
- Holyoak, K. (2010). *My Minotaur: Selected Poems 1998-2006*. Loveland, OH: Dos Madres Press.
- Holyoak, K. (translator) (2007). *Facing the Moon: Poems of Li Bai and Du Fu*. Durham, NH: Oyster River Press.

Individual Papers

- Lu, H., Ichien, N., & Holyoak, K. J. (in press). Probabilistic analogical mapping with semantic relation networks. *Psychological Review*.
- Holyoak, K. J. (in press). Poet and psychologist: A conversation. *Metaphor and Symbol*.
- Stamenković, D., Milenković, K., Ichien, N., & Holyoak, K. J. (in press). An individual-differences approach to poetic metaphor: Impact of aptness and familiarity. *Metaphor and Symbol*.
- Ichien, N., Lu, H., & Holyoak, K. J. (2021). Predicting patterns of similarity among abstract semantic relations. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.
- Lee, D. G., & Holyoak, K. J. (2021). Coherence shifts in attribute evaluations. *Decision*, 8(4), 257–276.
- Morsanyi, K., Hamilton, J., Stamenković, D., & Holyoak, K. J. (2021). Linking metaphor comprehension with analogical reasoning: Evidence from typical development and Autism Spectrum Disorder. *British Journal of Psychology*. DOI: 10.1111/bjop.12542
- Gray, M. E., & Holyoak, K. J. (2021). Teaching by analogy: From theory to practice. *Mind, Brain, and Education*, 15, 250-263.
- Wong, E. F., & Holyoak, K. J. (2021). Cognitive and motivational factors driving sharing of internet memes. *Memory & Cognition*, 49, 863-872.
- Lee, J., Priniski, J. H., Valderrama, S., & Holyoak, K. J. (2021). Disgraced professionals: Revelation of immorality decreases evaluations of professional competence and accomplishment. In T. Fitch, C. Lamm, H. Leder, & K. Teßmar-Raible (Eds.), *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. Victoria, Canada: Cognitive Science Society.
- Priniski, J. H., McClay, M., & Holyoak, K. J. (2021). Rise of QAnon: A mental model of good and evil stews in an echochamber. In T. Fitch, C. Lamm, H. Leder, & K. Teßmar-Raible (Eds.), *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. Victoria, Canada: Cognitive Science Society.
- Ichien, N., Liu, Q., Fu, S., Holyoak, K. J., Yuille, A. L., & Lu, H. (2021). Visual analogy: Deep learning versus compositional models. In T. Fitch, C. Lamm, H. Leder, & K. Teßmar-Raible (Eds.), *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. Victoria, Canada: Cognitive Science Society.
- Holyoak, K. J., & Lu, H. (2021). Emergence of relational reasoning. *Current Opinion in Behavioral Sciences*, 37, 118-124.
- Chiang, J. N., Peng, Y., Lu, H., Holyoak, K. J., & Monti, M. M. (2021). Distributed code for semantic relations predicts neural similarity during analogical reasoning. *Journal of Cognitive Neuroscience*, 33, 377-389.

- Holyoak, K. J., & Monti, M. M. (2021). Relational integration in the human brain: A review and synthesis. *Journal of Cognitive Neuroscience*, 33, 341-356.
- Morsanyi, K., Stamenković, D., & Holyoak, K. J. (2020). Metaphor processing in autism: A systematic review and meta-analysis. *Developmental Review*, 57, article 100925.
- Stamenković, D., Ichien, N., & Holyoak, K. J. (2020). Individual differences in comprehension of contextualized metaphors. *Metaphor and Symbol*, 35(4), 285-301.
- Simon, D., & Holyoak, K. J. (2020). Ex ante coherence shifts. *Behavioral and Brain Sciences*, 43, e47.
- Ichien, N., Lu, H., & Holyoak, K. J. (2020). Verbal analogy problem sets: An inventory of testing materials. *Behavior Research Methods*, 52, 1803-1816.
<https://doi.org/10.3758/s13428-019-01312-3>
- Morsanyi, K., Stamenković, D., & Holyoak, K. J. (2020). Analogical reasoning in autism: A systematic review and meta-analysis. In K. Morsanyi & R. M. J. Byrne (Eds.), *Thinking, reasoning, and decision making in autism* (pp. 59-87). Milton Park, UK: Routledge.
- Lee, J., & Holyoak, K. J. (2020). "But he's my brother": The impact of family obligation on moral judgments and decisions. *Memory & Cognition*, 48(1), 158–170.
- Gray, M. E., & Holyoak, K. J. (2020). Individual differences in relational reasoning. *Memory & Cognition*, 48(1), 96–110.
- Priniski, J. H., & Holyoak, K. J. (2020). Crowdsourcing to analyze belief systems underlying social issues. In S. Denison, M. Mack, Y. Xu, & B. Armstrong (Eds.), *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society* (pp. 443-449). Cognitive Science Society.
- Holyoak, K. J., & Powell, D. (2019). Moral judgment as reasoning by constraint satisfaction. *Behavioral and Brain Sciences*, 42, e156.
- Lu, H., Liu, Q., Ichien, N., Yuille, A. L., & Holyoak, K. J. (2019). Seeing the meaning: Vision meets semantics in solving visual analogy problems. In A. Goel, C. Seifert, & C. Freksa (Eds.), *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 2201-2207). Austin, TX: Cognitive Science Society.
- Wong, E. F., Schauer, G. F., Gordon, P. C., & Holyoak, K. J. (2019). Semantic and visual interference in solving pictorial analogies. In A. Goel, C. Seifert, & C. Freksa (Eds.), *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 3115-3120). Austin, TX: Cognitive Science Society.
- Ichien, N., Lu, H., & Holyoak, K. J. (2019). Individual differences in judging similarity between semantic relations. In A. Goel, C. Seifert, & C. Freksa (Eds.), *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 464-470). Austin, TX: Cognitive Science Society.
- Lu, H., Wu, Y. N., & Holyoak, K. J. (2019). Emergence of analogy from relation learning. *Proceedings of the National Academy of Sciences, USA*, 116, 4176-4181.
- Stamenković, D., Ichien, N., & Holyoak, K. J. (2019). Metaphor comprehension: An individual-differences approach. *Journal of Memory and Language*, 105, 108-118.
- Lee, J., & Holyoak, K. J. (2018). "But he's my brother": How family obligation impacts moral judgments. In C. Kalish, M. Rau, J. Zhu & T. T. Rogers (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 677-682). Austin, TX: Cognitive Science Society.
- Gray, M. E., & Holyoak, K. J. (2018). Individual differences in relational reasoning. In C. Kalish, M. Rau, J. Zhu & T. T. Rogers (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 1741-1746). Austin, TX: Cognitive Science Society.

- Peng, Y., Javangula, P. R., Lu, H., & Holyoak, K. J. (2018). Behavioral oscillations in verification of relational role bindings. In C. Kalish, M. Rau, J. Zhu & T. T. Rogers (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (2223-2228). Austin, TX: Cognitive Science Society.
- Stamenković, D., & Holyoak, K. J. (2018). Individual differences in both fluid and crystallized intelligence predict metaphor comprehension. In C. Kalish, M. Rau, J. Zhu & T. T. Rogers (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 2542-2547). Austin, TX: Cognitive Science Society.
- Holyoak, K. J., & Stamenković, D. (2018). Metaphor comprehension: A critical review of theories and evidence. *Psychological Bulletin*, *144*, 641-671.
- Tyumeneva, Y. A., Larina, G., Alexandrova, E., DeWolf, M., Bassok, M., & Holyoak, K. J. (2018). Semantic alignment across whole-number arithmetic and rational numbers: Evidence from a Russian perspective. *Thinking & Reasoning*, *24*, 198-220.
- Gray, M. E., DeWolf, M., Bassok, M., & Holyoak, K. J. (2017). Dissociation between magnitude comparison and relation identification across different formats for rational numbers. *Thinking & Reasoning*, *24*, 179-197.
- DeWolf, M., Son, J. Y., Bassok, M., & Holyoak, K. J. (2017). Relational priming based on a multiplicative schema for whole numbers and fractions. *Cognitive Science*, *41*, 2053-2088.
- Powell, D., Yu, J., DeWolf, M., & Holyoak, K. J. (2017). The love of large numbers: A popularity bias in consumer choice. *Psychological Science*, *28*, 1432-1442.
- Kubricht, J. R., Lu, H., & Holyoak, K. J. (2017). Intuitive physics: Current research and controversies. *Trends in Cognitive Sciences*, *21*, 749-759.
- Plummer, P., DeWolf, M., Bassok, B., Gordon, P. C., & Holyoak, K. J. (2017). Reasoning strategies with rational numbers revealed by eye-tracking. *Attention, Perception, & Psychophysics*, *79*, 1426-1437.
- Kubricht, J. R., Lu, H., & Holyoak, K. J. (2017). Individual differences in spontaneous analogical transfer. *Memory & Cognition*, *45*, 576-588.
- Chen, D., Lu, H., & Holyoak, K. J. (2017). Generative inferences based on learned relations. *Cognitive Science*, *41*, 1062-1092.
- Holyoak, K. J., & Lee, H. S. (2017). Inferring causal relations by analogy. In M. R. Waldmann (Ed.), *Oxford handbook of causal reasoning* (pp. 459-473). New York: Oxford University Press.
- DeWolf, M., Bassok, M., & Holyoak, K. J. (2017). Numbers as mathematical models: Modeling relations and magnitudes with fractions and decimals. In D. C. Geary, D. B. Berch, R. J. Ochsendorf & K. M. Koepke (Eds.), *Mathematical cognition and learning, Vol. 3: Acquisition of complex arithmetic skills and higher-order mathematical concepts* (pp. 141-163). London: Academic Press.
- Holyoak, K. J., & Powell, D. (2016). Deontological coherence: A framework for commonsense moral reasoning. *Psychological Bulletin*, *142*, 1179-1203.
- DeWolf, M., Chiang, J. N., Bassok, M., Holyoak, K. J., & Monti, M. M. (2016). Neural representations of magnitude for natural and rational numbers. *NeuroImage*, *141*, 304-312.
- DeWolf, M., Bassok, M., & Holyoak, K. J. (2016). A set for relational reasoning: Facilitation of algebraic modeling by a fraction task. *Journal of Experimental Child Psychology*, *152*, 351-366.
- Powell, D., Merrick, M. A., Lu, H., & Holyoak, K. J. (2016). Causal competition based on generic priors. *Cognitive Psychology*, *86*, 62-86.

- Lee, H. S., DeWolf, M., Bassok, M., & Holyoak, K. J. (2016). Conceptual and procedural distinctions between fractions and decimals: A cross-national comparison. *Cognition*, *147*, 57-69.
- Guthormsen, A. M., Fisher, K. J., Bassok, M., Osterhout, L., DeWolf, M., & Holyoak, K. J. (2016). Conceptual integration of arithmetic operations with real-world knowledge: Evidence from event-related potentials. *Cognitive Science*, *40*, 723-757.
- Holyoak, K. J. (2016). Editorial. *Psychological Review*, *123*, 1.
- Horne, Z., Powell, D., Hummel, J. E., & Holyoak, K. J. (2015a). Countering antivaccination attitudes. *Proceedings of the National Academy of Sciences, USA*, *112*, 10321-10324.
- Horne, Z., Powell, D., Hummel, J. E., & Holyoak, K. J. (2015b). Reply to Betsch et al.: Highlighting risks of diseases shifts vaccine attitudes. *Proceedings of the National Academy of Sciences, USA*, *112*, E6727.
- Chen, D., Lu, H., & Holyoak, K. J. (2015). Learning and generalizing cross-category relations using hierarchical distributed representations. In R. Dale, C. Jennings, P. Maglio, D. Noelle, A. Warfaumont & J. Yoshimi (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- Kubricht, J., Lu, H., & Holyoak, K. J. (2015). Animation facilitates source understanding and spontaneous analogical transfer. In R. Dale, C. Jennings, P. Maglio, D. Noelle, A. Warfaumont & J. Yoshimi (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- DeWolf, M., Bassok, M., & Holyoak, K. J. (2015). Modeling relational priming and multiplicative reasoning with rational numbers. In R. Dale, C. Jennings, P. Maglio, D. Noelle, A. Warfaumont & J. Yoshimi (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- DeWolf, M., Son, J. Y., Bassok, M., & Holyoak, K. J. (2015). Implicit understanding of arithmetic with rational numbers: The impact of expertise. In R. Dale, C. Jennings, P. Maglio, D. Noelle, A. Warfaumont & J. Yoshimi (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- Lee, H. S., DeWolf, M., Bassok, M., & Holyoak, K. J. (2015). Semantic alignment of fractions and decimals with discrete versus continuous entities: A cross-national comparison. In R. Dale, C. Jennings, P. Maglio, D. Noelle, A. Warfaumont & J. Yoshimi (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- DeWolf, M., Bassok, M., & Holyoak, K. J. (2015). From rational numbers to algebra: Separable contributions of decimal magnitude and relational understanding of fractions. *Journal of Experimental Child Psychology*, *133*, 72-84.
- Powell, D., Horne, Z., Pinillos, A., & Holyoak, K. J. (2015). A Bayesian framework for knowledge attribution: Evidence from semantic integration. *Cognition*, *139*, 92-104.
- Rapp, M., Bassok, M., DeWolf, M., & Holyoak, K. J. (2015). Modeling discrete and continuous entities with fractions and decimals. *Journal of Experimental Psychology: Applied*, *21*, 47-56.
- DeWolf, M., Bassok, M., & Holyoak, K. J. (2015). Conceptual structure and the procedural affordances of rational numbers: Relational reasoning with fractions and decimals. *Journal of Experimental Psychology: General*, *144*, 127-150.

- Vendetti, M., Wu, A., Rowshanshad, E., Knowlton, B.J., & Holyoak, K. J. (2014). When reasoning modifies memory: Schematic assimilation triggered by analogical mapping. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *40*, 1172-1180.
- Rai, T. S., & Holyoak, K. J. (2014). Rational hypocrisy: A Bayesian analysis based on informal argumentation and slippery slopes. *Cognitive Science*, *38*, 1456-1467.
- DeWolf, M., Rapp, M., Bassok, M., & Holyoak, K. J. (2014). Semantic alignment of fractions and decimals with discrete versus continuous entities: A textbook analysis. In B. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 2133-2138). Austin, TX: Cognitive Science Society.
- DeWolf, M., & Holyoak, K. J. (2014). Reciprocal and multiplicative relational reasoning with rational numbers. In B. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 2139-2144). Austin, TX: Cognitive Science Society.
- Powell, D., Merrick, M. A., Lu, H., & Holyoak, K.J. (2014). Generic priors yield competition between independently-occurring preventive causes. In B. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 2793-2798). Austin, TX: Cognitive Science Society.
- Vendetti, M., Wu, A., & Holyoak, K. J. (2014). Far out thinking: Generating solutions to distant analogies promotes relational thinking. *Psychological Science*, *25*, 928-933.
- Chen, D., Lu, H., & Holyoak, K. J. (2014). The discovery and comparison of symbolic magnitudes. *Cognitive Psychology*, *71*, 27-54.
- DeWolf, M., Grounds, M. A., Bassok, M., & Holyoak, K. J. (2014). Magnitude comparison with different types of rational numbers. *Journal of Experimental Psychology: Human Perception and Performance*, *40*, 71-82.
- Rai, T. S., & Holyoak, K. J. (2013). Exposure to moral relativism compromises moral behavior. *Journal of Experimental Social Psychology*, *49*, 995-1001.
- Holyoak, K. J., & Richland, L. E. (2014). Using analogies as a basis for teaching cognitive readiness. In H. F. O'Neil, R. S. Perez, & E. L. Baker (Eds.), *Teaching and measuring cognitive readiness* (pp. 223-238). New York: Springer.
- Holyoak, K. J. (2013). Thinking, broad and deep (review of *Surfaces and Essences* by D. Hofstadter & E. Sander). *Science*, *340*, 550-551.
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- Knowlton, B. J., Waltz, J. A., Holyoak, K. J., Boone, K. B., & Miller, B. L. (1997). Relational complexity and reasoning in fronto-temporal dementia. *Society for Neuroscience Abstracts*, *23*, 258.
- Waltz, J. A., Knowlton, B. J., Holyoak, K. J., Boone, K. B., & Miller, B. L. (1997). Relational reasoning in fronto-temporal dementia. *Society for Neuroscience Abstracts*, *23*, 258.

Department and University Service

University of California, Los Angeles:

Vice Chair for Academic Personnel

Chair, Cognitive Science Development Committee

Chair, Cognitive Area

Chair, Cognitive Search Committee (multiple times)

Chair, Assistant Professor Guidance Committee

Psychology Dept. Executive Committee

Merit Review Committee
 Departmental Long-Range Planning Committee
 Graduate Admissions Committee

University of Michigan:

Graduate Studies Committee
 Experimental Area Graduate Admissions Committee
 Search Committees in Developmental and Experimental Psychology
 Human Subjects Review Committees (for both College and Psychology Department)
 Experimental Area Graduate Student Progress Committee
 Experimental/ Mathematical Areas Training Grant Committee
 Departmental Executive Committee
 College Internal Grant Review Board
 Undergraduate Academic Counselor
 Coordinator of Psychology 170 (Introductory Experimental)

Grants

National Science Foundation (with H. Lu, S. Bunge, & D. Kraemer)
 Title: Collaborative Research: How Does the Brain Represent Abstract Concepts?
 Dates: September 1, 2020 to August 31, 2023
 Amount: \$136,959 (\$87,794 direct)

National Science Foundation (with H. Lu & A. Yuille)
 Title: Collaborative Research: CompCog: Achieving Analogical Reasoning via Human and Machine Learning
 Dates: August 15, 2018 to July 31, 2022
 Amount: \$477,000 (\$318,113 direct)

Google Faculty Research Award
 Title: Human Relational Reasoning and Creativity: Experimental and Computational Studies
 Dates: April 1, 2018 (no end date)
 Amount: \$64,500

UCLA Academic Senate
 Title: Neuroimaging of Analogical Reasoning
 Dates: July 1, 2015 to June 30, 2016
 Amount: \$9000

Office of Naval Research
 Title: Analogical Reasoning: Integration of Neural, Behavioral and Computational Analyses
 Dates: March 1, 2008 to February 28, 2014
 Amount: \$927,215

Institute of Education Sciences (Co-PI; Eva Baker, PI)

Title: Center for Advanced Technology in Schools
Dates: September 14, 2010 to September 14, 2013
Amount: \$592,000

Canon, Inc.

Title: Analogical Reasoning and Creative Product Design
Dates: February 1, 2010 (no end date)
Amount: \$87,500 (gift to Holyoak lab)

Intelligence Advanced Research Project Activities (UCLA PI; with Lockheed Martin)
Title: FRAMES: Framework for Analogy and Memory Embodied as Spiking Neurons
Dates: December 12, 2010 to December 5, 2012
Amount: \$705,140

Air Force Office of Scientific Research (Co-I; Alan Yuille, PI)
Title: Hidden Causal Structure for Reasoning and Learning: Human Cognition,
Machine Intelligence, and Statistics
Dates: October 1, 2008 to September 30, 2011
Amount: \$900,000

Office of Naval Research (in collaboration with Medantic Technology)
Title: Distributed Training for Force Mobilization: CBRNE
Dates: December 1, 2006 to August 31, 2007
Amount: \$24,998

National Institute of Mental Health
Title: Neuroimaging of Analogical Reasoning
Dates: July 1, 2005 to June 30, 2008
Amount: \$129,976 (\$100,000 direct)

National Science Foundation (with D. Simon & S. Read)
Title: Coherence-Based Decision Making: A Theoretical Framework and Practical
Applications
Dates: April 15, 2004 to March 31, 2007
Amount: \$143,250 (\$98,436 direct)

Institute of Education Sciences
Title: A Multidisciplinary Study of Analogical Transfer in Children's Mathematics
Dates: January 1, 2004 to December 31, 2006
Amount: \$300,715 (\$202,195 direct)

Office of Naval Research (in collaboration with Medantic Technology)
Title: An Intelligent System for Case-Based Instruction
Dates: July 1, 2004 to January 31, 2005
Amount: \$29,926 (\$19,496 direct)

National Science Foundation (with D. Simon & S. Read)

Title: Collaborative Research: Applying Constraint Satisfaction Models to Legal Reasoning

Dates: August 1, 2000 to June 30, 2004

Amount: \$178,330

Office of Naval Research (in collaboration with Medantic Technology)

Title: Authoring Shell for Case-based Reasoning

Dates: January 25, 2002 to July 24, 2002

Amount: \$16,191

National Science Foundation (with J. Hummel)

Title: Learning and Inference with Schemas and Analogies

Dates: February 1, 1998 to January 31, 2001

Amount: \$250,000

National Science Foundation (with J. Hummel)

Title: Schema Induction in a Structure-Sensitive Connectionist Model

Dates: August 15, 1995 to July 31, 1998

Amount: \$150,000

National Institute of Neurological Disorders and Stroke (with J. Grafman & F. Boller)

Title: Structure and Functions of the Human Prefrontal Cortex

Dates: September 30, 1994 to September 29, 1995

Amount: \$17,000

National Science Foundation

Title: Mechanisms of Analogical Reminding and Priming

Dates: August 15, 1993 to August 14, 1995

Amount: \$150,000

Army Research Institute (with P. Thagard)

Title: A Cognitive Architecture for Analogy and Problem Solving

Dates: September 1, 1989 to August 31, 1992

Amount: \$599,793

National Science Foundation (Co-PI; 4 others)

Title: Maintenance and Support for Parallel Computation in Cognitive Science
and Cognate Areas

Dates: August 1, 1991 to July 31, 1994

Amount: \$600,000

Biomedical Research Support Grant

Title: Conditioning and Learning Within Rule-based Default Hierarchies

Dates: June 14, 1989 to June 30, 1990

Amount: \$15,420

National Science Foundation (Co-PI; 9 others)
Title: Center for Research in Computational Neuro-Cognition
Dates: July 1, 1987 to June 30, 1988
Amount: \$994,700 (plus \$300,000 supplement, August 1988)

Keck Foundation (Co-PI; 7 others)
Title: Center for Research in Computational Neuro-Cognition
Dates: July 1, 1988 to June 30, 1990
Amount: \$750,000

Army Research Institute (with P. Thagard)
Title: A Cognitive Model for Solving Ill-Defined Problems
Dates: September 1, 1986 to August 31, 1989
Amount: \$400,840

National Science Foundation (with M. Bassok)
Title: Instruction and Transfer Between Isomorphic Topics in Algebra and Physics
Dates: September 1, 1986 to August 31, 1989
Amount: \$106,108

National Science Foundation (with R. Nisbett)
Title: Formal versus Pragmatic Approaches to Deductive Reasoning
Dates: October 1, 1984 to September 30, 1986
Amount: \$45,000

National Science Foundation
Title: Cognitive Processing of Analogy
Dates: April 1, 1983 to September 30, 1986
Amount: \$118,445

Spencer Foundation (with P. Cheng and R. Nisbett)
Title: Influence of Logic Training and Substantive Knowledge on Deductive Reasoning
Dates: January 1, 1983 to June 1, 1984
Amount: \$5,000

Systems Development Foundation (with J. Holland, R. Nisbett, and P. Thagard)
Title: The Process of Induction
Dates: August 1, 1983 to September 30, 1984
Amount: \$15,500

National Science Foundation (with L. S. Fried)
Title: Perceptual Learning with Ill-Defined Categories
Dates: June 1, 1979 to January 31, 1984
Amount: \$115,247

National Institute of Mental Health

Title: Cognitive Processing of Magnitude and Order Information
Dates: June 1, 1979 to December 31, 1982
Amount: \$120,745

National Science Foundation

Title: Decision Processes in Judgments of Order and Relative Magnitude
Dates: June 1, 1977 to December 31, 1979
Amount: \$59,900

Rackham Faculty Grant, University of Michigan

Title: Perceptual Learning with Ill-Defined Categories
Dates: January 1, 1978 to December 31, 1978
Amount: \$5,028

Rackham Faculty Grant, University of Michigan

Title: Decision Processes in Judgments of Order and Relative Magnitude
Dates: January 1, 1977 to December 31, 1977
Amount: \$5,004