Curriculum Vita

John E. Hummel

***Current Position**:*

Professor
Department of Psychology
University of Illinois, Urbana-Champaign

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***Personal Record**:*

Date of Birth: May 30, 1964
Place of Birth: Wilmington, Delaware
Citizenship: U.S.A.

***Education**:*

Ph.D. University of Minnesota, 1990
Minneapolis, MN
Major: Experimental Psychology
Minor: Cognitive Science

B.S. Mary Washington College, 1986
Fredericksburg, Virginia
Major: Psychology
Magna Cum Laude, Phi Beta Kappa

Previous Positions:

Professor, Department of Psychology, UCLA, July, 2001 - June, 2005.
Associate Professor, Department of Psychology, UCLA, July, 1997 - June, 2001.
Assistant Professor, Department of Psychology, UCLA, July, 1991 - June, 1997.
Postdoctoral Fellow, Center for Psychophysical Investigation of Perceptual Representations, University of Minnesota, August, 1990 - July, 1991.

Honors and Awards:

Fellow, Association for Psychological Science, 2011
Graduate Student Organization Award for Excellence in Teaching and Advising, University of Illinois Dept. of Psychology, 2010
J. Arthur Woodward Graduate Mentoring Award, UCLA Dept. of Psychology, 2005
Faculty Distinguished Teaching Award, UCLA Dept. of Psychology, 2000
Distinguished Psychology Graduate in Residence, Mary Washington College, 1996
UCLA Faculty Career Development Award, 1993
Doctoral Dissertation Fellowship, University of Minnesota, 1990-1991
National Science Foundation Graduate Fellowship, 1987-90
Psychology Department Fellowship, University of Minnesota, July, 1990
NICHD Traineeship, 1986-1987

Publications*:*

Horne, Z., Powell, D., & Hummel, J. (in press). A single counterexample leads to moral belief revision. *Cognitive Science*.

Petters, D., Hummel, J., Jüttner, M., Wakui, E., & Davidoff, J. (in press). How different are the visual representations used for object recognition in middle childhood and adulthood. In G. Dodig-Crnkovic and R. Giovagnoli, Eds., *Representation and reality: Humans, animals and machines*. Springer.

Jung, W. & Hummel, J. E., (in press). Making probabilistic relational categories learnable. *Cognitive Science, doi: 10.1111/cogs.12199*

Jung, W., & Hummel, J. E. (2015). Revisiting Wittgenstein's puzzle: Hierarchical encoding and comparison facilitate learning of probabilistic relational categories. *Frontiers in Psychology,* 6:110. DOI: 10.3389/fpsyg.2015.00110

Hummel, J. E., Licato, J., & Bringsjord, S. (2014). Analogy, explanation, and proof. *Frontiers in Human Neuroscience*. http://journal.frontiersin.org/Journal/10.3389/fnhum.2014.00867/abstract

Clevenger, P. E., & Hummel, J. E. (2014). Working memory for spatial relations among objects. *Attention, Perception and Psychophysics*, DOI 10.3758/s13414-013-0601-3.

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Wakui, E., Jüttner, M., Petters, D., Surinder, K., Hummel, J. E., Davidoff, J. (2013). Earlier development of analytical than holistic object recognition in adolescence. *PLOSone*, *8(4)*: e61041. doi:10.1371/journal.pone.0061041

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Knowlton, B. J., Morrison, R. G., Hummel, J. E., & Holyoak, K. J. (2012). A neurocomputational system for relational reasoning. *Trends in Cognitive Sciences*, *17*, 373-381.

Licato, J., Bringsjord, S., and Hummel, J. E. (2012). Exploring the role of analogico-deductive reasoning in the balance-beam task. In *Rethinking Cognitive Development : Proceedings of the 42nd Annual Meeting of the Jean Piaget Society.*

Kogut, P., Gordon, J., Morgenthaler, D., Hummel, J., Monroe, E., Goertzel, B., Ethan Trewhitt, E., & Whitake, E. (2011). Recognizing geospatial patterns with biologically-inspired relational reasoning. In *Second International Conference on Biologically Inspired Cognitive Architectures (BICA 2011)*.

Biancaniello, P., Szumowski, T., Rosenbluth, D., Darvill, J., Hinnerschitz, N., Hummel, J., & Mihalas, S. (2011). Towards a biologically-inspired model for relational mapping using spiking neurons. In *Second International Conference on Biologically Inspired Cognitive Architectures (BICA 2011)*.

Hummel, J. E. (2011). Getting symbols out of a neural architecture. *Connection Science*, *23*, 109-118.

Jung, W., & Hummel, J. E. (2011). Progressive alignment facilitates learning of deterministic but not probabilistic relational categories. In *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*.

Hummel, J. E. (2010). Symbolic vs. associative learning. *Cognitive Science*, *34*, 958-965.

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Hummel, J. E., & Landy, D. H. (2009). From analogy to explanation: Relaxing the 1:1 mapping constraint… Very carefully. In B. Kokinov, K. Holyoak & D. Gentner (Eds.) *New Frontiers in Analogy Research: Proceedings of the Second International Conference on Analogy*. Sofia, Bulgaria.

Jung, W., & Hummel, J. E. (2009). Probabilistic relational categories are learnable as long as you don't know you're learning probabilistic relational categories. In *Proceedings of The 31st Annual Conference of the Cognitive Science Society*.

Knowlton, B. J., McAuliffe, S. P., Coelho, C. J., & Hummel, J. E. (2009). Visual priming of inverted and rotated objects. *Journal of Experimental Psychology: Learning, Memory and Cognition*, *35*, 837-848.

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Holyoak, K. J., & Hummel, J. E. (2008). No way to start a space program: Associationism as a launch pad for analogical reasoning. Commentary on R. Leech, D. Mareschal & R. P. Cooper, "Analogy as relational priming: A developmental and computational perspective on the origins of a complex skill." *Behavioral and Brain Sciences*, *31*, 388-389.

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Doumas, L. A. A., & Hummel, J. E. (2007). A computational account of the development of the generalization of shape information. In *Proceedings of 29th Annual Conference of the Cognitive Science Society.*

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Green, C. B., & Hummel, J. E. (2006). Familiar interacting object pairs are perceptually grouped. *Journal of Experimental Psychology: Human Perception and Performance*, *32* (*5*), 1107-1119.

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Doumas, L. A. A., & Hummel, J.E. (2004). A fundamental limitation of symbol-argument-argument notation as a model of human relational representations. In *Proceedings of the 26th Annual Conference of the Cognitive Science Society*, 327-332.

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Pedone, R., Hummel, J. E., & Holyoak, K. J. (2001). The use of diagrams in analogical problem solving. *Memory & Cognition*, *29*, 214-221.

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Hummel, J. E. (2000). Where view-based theories break down: The role of structure in shape perception and object recognition. In E. Dietrich & A. Markman (Eds.), *Cognitive dynamics: Conceptual change in humans and machines* (pp. 157 - 185). Mahwah, NJ: Erlbaum.

Hummel, J. E., & Choplin, J. M. (2000). Toward an integrated account of reflexive and reflective reasoning. In L. R. Gleitman and A, K. Joshi (Eds.) *Proceedings of the 22nd Annual Conference of the Cognitive Science Society* (pp. 232 - 237). Mahwah, NJ: Erlbaum.

Holyoak, K. J., & Hummel, J. E. (2000). The proper treatment of symbols in a connectionist architecture. In E. Dietrich and A. Markman (Eds.). *Cognitive Dynamics: Conceptual Change in Humans and Machines* (pp. 229 - 264). Hillsdale, NJ: Erlbaum.

Wagemans, J., Tarr, M. J., & Hummel, J. E. (1999). Editorial: Special issue on "Visual Object Perception". *Acta Psychologica*, *102*, 105-111.

Marcus, G. F., Hummel, J. E., Miikkulainen, R., & Shastri, L. (1999). Connectionism: What's structure got to do with it? *Proceedings of the 21st Annual Conference of the Cognitive Science Society* (p. 3). Mahwah, NJ: Erlbaum.

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Invited Colloquia and Talks:

Hummel, J. E. (2014). What happened to the human brain? University of Bristol, Bristol, England, May.

Hummel, J. E. (2013). What happened to the human brain? Invited talk at the 2013 Reflections and Projections conference, Department of Computer Science, University of Illinois, Urbana-Champaign, September.

Hummel, J. E. (2012). That *other* model of explanation. Cognitive Brown Bag, University of Illinois, Urbana-Champaign, January.

Hummel, J. E. (2011). Two (not necessarily incompatible) models of explanation. Cognitive Brown Bag, University of Illinois, Urbana-Champaign, February.

Hummel, J. E. (2010). The proper treatment of symbols in a neural architecture. Plenary address delivered at Compositional Connectionism II: Localist and Distributed Representations, a workshop held in conjunction with the 32nd Annual Conference of the Cognitive Science Society.

Hummel, J. E. (2010). Some odditities regarding the learning, representation and use of relational categories. Aston University. June.

Hummel, J. E. (2010). Visual working memory for spatial relations. Goldsmiths College, London, June.

Hummel, J. E. (2009). Representations of shape for object recognition: Theory and evidence. Goldsmiths College, London, May.

Hummel, J. E. (2009). Representations of shape for object recognition: Theory and evidence. Aston University, May.

Hummel, J. E. (2009). Representations of shape for object recognition: Theory and evidence. University of Birmingham, May.

Hummel, J. E. (2007). Representations of shape for object recognition: Theory and evidence. Visual Cognition and Human Performance Brown Bag, University of Illinois, Urbana-Champaign, September.

Hummel, J. E. (2007). Some oddities regarding the learning, representation and use of relational categories. Purdue University, March.

Hummel, J. E.. (2006). Learning and inference with schemas and analogies. University of Illinois, Urbana-Champaign.

Hummel, J. E.. (2006). Dual representations for object recognition: Theory and evidence. University of Illinois, Urbana-Champaign.

Hummel, J. E.. (2005). Some oddities regarding the learning, representation and use of relational categories. University of Illinois, Urbana-Champaign, December.

Hummel, J. E.. (2005). Relational reasoning in a neurally-plausible cognitive architecture: An overview of the LISA project. UCLA Linguistics Department, March.

Hummel, J. E.. (2004). Relational reasoning in a neurally-plausible cognitive architecture: An overview of the LISA project. University of Illinois, Urbana-Champaign, April.

Hummel, J. E.. (2003). The proper treatment of symbols in a neural architecture: Part II. UCLA Brain Mapping Center, April.

Hummel, J. E.. (2003). The proper treatment of symbols in a neural architecture. UCLA Brain Mapping Center, April.

Hummel, J. E.. (2003). The proper treatment of symbols in a neural architecture. SUNY Binghamton, February.

Hummel, J. E.. (2003). Representations of shape for object recognition: Theory and evidence. SUNY Binghamton, February.

Hummel, J. E.. (2002). Representations of shape for object recognition: Theory and evidence. Indiana University, January.

Hummel, J. E.. (2002). The proper treatment of symbols in a neural architecture. University of Illinois, January.

Hummel, J. E.. (2001). The proper treatment of symbols in a neural architecture. Indiana University, September.

Hummel, J. E.. (2001). The proper treatment of symbols in a neural architecture. Michigan State University, December.

Hummel, J. E.. (2000). The proper treatment of symbols in a neural architecture. Cornell University, October 27. (Distinguished Speaker)

Hummel, J. E. (2000). Representations of shape for object recognition: Theory and evidence. Cornell University, October 26.

Hummel, J. E.. (2000). Learning and inference with schemas and analogies. University of Iowa, March 10. (Distinguished Speaker)

Hummel, J. E.. (1999). Learning and inference with schemas and analogies. Indiana University, September 20. (Distinguished Speaker)

Hummel, J. E. (1998). Representations of shape for object recognition: Theory and evidence. University of California, San Diego, October 15.

Hummel, J. E. (1997). Representations of shape for object recognition: Theory and evidence. University of California, Berkeley, November 7.

Hummel, J. E. (1997). Symbolic connectionism. University of California, Los Angeles, October 13.

Hummel, J. E. (1997). Representations of shape for object recognition: Theory and evidence. Stanford University, Stanford, CA, May. (Distinguished Outside Speaker)

Hummel, J. E. (1997). Learning and inference with schemas and analogies. Stanford University, Stanford, CA, May. (Distinguished Outside Speaker)

Hummel, J. E. (1996). Object recognition: It's harder than you think. Invited paper presented at Mary Washington College as part of the 1996 Graduate in Residence. Fredericksburg, VA, September.

Hummel, J. E. (1996). Neural network models of human object recognition. Computer Science Department, Harvey Mudd College, Pomona CA, April.

Hummel, J. E. (1995). Recent progress toward a hybrid theory of object recognition. Department of Psychology, University of California, Los Angeles, Los Angeles, CA, October.

Hummel, J. E. (1994). An architecture for rapid, hierarchical structural description of visual information. Department of Psychology, University of Southern California, October.

Hummel, J. E. (1994). Dynamic binding and shape recognition in a neural network. Department of Psychology, University of Illinois, Urbana-Champaign, April.

Hummel, J. E., & Saiki, J. (1993). A neural network for rapid unsupervised learning of object structural descriptions. Department of Psychology, University of California, Irvine, March.

Hummel, J. E., & Stantiewicz, B. J. (1992). Visual representations mediating difficult shape classification. Department of Psychology, University of California, Los Angeles, Los Angeles, CA, November.

Hummel, J. E. (1992). Dynamic binding and shape recognition in a neural network. Department of Cognitive and Neural Sciences, California Institute of Technology, April.

Hummel, J. E. (1991). Parsing line drawings into volumetric parts for shape recognition. Cognitive Science Faculty Research Group, University of California, Los Angeles, Los Angeles, CA, October.

Hummel, J. E. (1991). Problems in the representation of structure for vision. Department of Psychology, University of California, Los Angeles, Los Angeles, CA, September.

Hummel, J. E. (1991). A neural network architecture for structural description and object recognition.

Department of Psychology, University of California, Santa Barbara, Santa Barbara, CA, January.

Center for Adaptive Systems, Boston University, Boston, MA, February.

Department of Psychology, University of Michigan, Ann Arbor, MI, February.

Vision Research Group, University of Michigan, Ann Arbor, MI, February.

Department of Psychology, Ohio State University, Colombus, OH, February.

Department of Psychology, University of Georgia, Athens, GA, February.

Department of Psychology, University of California, Los Angeles, Los Angeles, CA., February.

Department of Psychology, University of Utah, Salt Lake City, UT., February.

Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Boston, MA., March.

Department of Psychology, McGill University, Montreal, Quebec, March.

Department of Psychology, Stanford University, Stanford, CA, March.

Hummel, J. E. (1990). A neural network model of object recognition that solves the binding problem through temporal synchrony. Center for Research in Learning, Perception and Cognition, University of Minnesota, Minneapolis, MN, April.

Grants:

Great Computational Intelligence in the Formal Sciences via Analogical Reasoning. Co-Principal Investigator (Prof. Selmer Brinsjord, PI). AFOSR Grant FA9550-12-1-0003. January, 2012 – December, 2014. $150,000 direct + indirect

Consultant for Lockheed Martin on an IRARPA-funded grant to develop a neurally-inspired Artificial Intelligence, January, 2011 - December, 2013. $296,920 direct + indirect.

Learning and representation of relational categories. Internal grant from the University of Illinois Research Board, 6/2012 – 5/2013. $22,620.

Adaptive Problem Solving and Decision Making in Complex and Changing Environments: The Role of Understanding and Explanation. Principal Investigator (Brian Ross, co-PI). AFOSR Grant FA9550-07-1-0147. May 1, 2007 – April 30, 2010. $458,697 direct costs.

Scalable Instruction in Neuroinformatics at UCLA. Collaborator (Jackson Beatty, P.I.), National Institutes of Mental Health. July 1, 2000 - June 30, 2005. $295,265 direct costs.

Progressive Alignment and Relational Learning. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 2003 - June, 2004. $3,784.

Computational and Empirical Investigation of Relational Predication. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 2001 - June, 2002. Approx. $3,000

Learning and Inference with Schemas and Analogies. Principal Investigator (Keith Holyoak, Co-P.I.), National Science Foundation Grant SBR-9729023. February 1, 1998 - January 31, 2001. $171,279 direct costs.

HRL Laboratories (formerly Hughes Research Laboratories), Grant to investigate the representation and processing of structured information, especially in the domain of visualization and technology, January, 2000 - January 2001, $10,000.

Type-token Individuation in Reasoning by Analogy. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 2000 - June, 2001. Approx. $3,000

Modeling Perceptual Learning of Abstract Invariants. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1999 - June, 2000. $3,100.

Developing and Testing a Theory of Similarity. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1998 - June, 1999. $2,100.

Development of a Graphical Programming Platform for Teaching Neural Network Modeling. Internal Grant from the UCLA Office of Instructional Development, Chancellor's Committee on Instructional Improvement. July, 1997 - June, 1998. $9,835.

Memory for Object Views. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1997 - June, 1998. $3,000.

Schema Induction in a Structure-Sensitive Connectionist Network. Principal Investigator (Keith Holyoak, Co-P.I.), National Science Foundation Grant SBR-9511504. August 15, 1995 - July 31, 1997. $107,406 direct costs.

Attention and Visual Priming for Object Images. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1996 - June, 1997. $3,000.

Representing Spatial Relations in Memory. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1995 - June, 1996. $3,000.

Connectedness and Spatial Relations in Object Perception. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1994 - June, 1995. $3,202.

Career Development Award, UCLA Academic Senate. June, 1993.

Computer Facilities for Neural Network Modeling in the UCLA Undergraduate Cognitive Science Laboratory. Internal Grant from the UCLA Office of Instructional Development, Chancellor's Committee on Instructional Improvement. July 1, 1992. $2,500.

Spatial Relations in Object Recognition. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1993 - June, 1994. $4,027.

Image Segmentation in a Neural Network. Internal Grant from the UCLA Academic Senate, Committee on Research. July, 1992 - June, 1993. $3,000.

Apparent Motion and Perceptual Grouping. Internal Grant from the UCLA Academic Senate, Committee on Research. January, 1992 - June, 1992. $2,900.

Courses Taught:

Experimental Methods for Cognitive Psychology Laboratory
Perception and Illusion: Cognitive Science, Literature and Art
Introduction to Cognitive Science
Cognitive Psychology
Cognitive Science Laboratory (Neural Networks)
Cognitive Science Laboratory (Theory and Simulation)
Graduate Seminars: Cognitive Architectures, Computational Vision, Neural Networks, Visuospatial Reasoning, Perceptual Learning
Visual Information Processing

Professional Societies:

Association for Psychological Science, Fellow.
Behavioral and Brain Sciences, Associate.
Cognitive Science Society, Member.
Psychonomic Society, Member.

Editorial Activities:

Editorial Board. *Frontiers in Neuroscience*, 2013 -
Editorial Board, *Frontiers in Cognitive Science*, 2012 -
Editorial Board, *Psychological Science*, 2011 -
Editorial board, *Psychological Review*, 1998-2005, 2015-
Editorial board, *Psychonomic Bulletin and Review*, 1998-2002
Guest Editor for issues 2 and 3 of *Acta Psychologica*, 1999, vol. 102
I have served as a reviewer for:
Attention and Performance, XVI
Behavioral and Brain Sciences
Cognition
Cognitive Psychology
Cognitive Science
Current Directions in Psychological Science
Current Psychology Letters: Behaviour, Brain & Cognition
Handbook of Brain Theory and Neural Networks
IEEE Transactions on Pattern Analysis and Machine Intelligence
International Journal of Applied Mathematics and Computer Science
Journal of Experimental Child Psychology
Journal of Experimental Psychology: General
Journal of Experimental Psychology: Human Perception and Performance
Journal of Experimental Psychology: Learning, Memory and Cognition
Journal of Mathematical Psychology
Memory and Cognition
Neural Computation
Neural Networks
Perception
Perception and Psychophysics
Psychological Bulletin
Psychological Review
Psychological Science
Psychonomic Bulletin and Review
Quarterly Journal of Experimental Psychology
Science
Air Force Office of Scientific Research
National Science Foundation: Cognitive Psychological and Language Studies
National Science Foundation: Economics

Administrative Activities (UCLA):

Cognitive Area Chair, 1999-2001, 2002-2004
Graduate Admissions Committee, 1992-1998
Undergraduate Affairs Committee, 1992-1999
Computer Use Committee, 1991-1999
Cognitive Science Major Committee, 1991-1999
Ad Hoc Personnel Review Committee, 1993, 1994, 1997, 1998, 1999, 2000, 2001, 2002
Campus Ad Hoc Personnel Review Committe, 1999

Merit Review Committee, 1994-1998
Cognitive Search Committee, 1994, 1995
Executive Committee, 1994-1996; 1999-2001

Administrative Activities (UIUC):

Tenure Committee, 2005
Graduate Student Awards Committee, 2005 – 2006
Graduate Curriculum Committee, 2006 –
Advisory Alternate, 2006 –
LAS Courses and Curricula Committee, 2007 –
Academic Senate, 2007 - 2009

Other Professional Activities:

Member, NIH Study Section on Perception and Cognition, January 2006
Organizer, *OPAM '95*, the 1995 meeting of Object Perception And Memory.

References:

Professor Irving Biederman
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University of California
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(310) 625-8174

Professor Keith Holyoak
Department of Psychology
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