

KELLY S. MIX

ADDRESS: 3304 Benjamin Building
University of Maryland
College Park, MD 27042

EMAIL: kmix@umd.edu

PHONE: (301) 405-5914 (office/lab)
(517) 881-7830 (home)

EDUCATION: Ph.D., Developmental Psychology, 1995, University of Chicago, Chicago, IL
Dissertation: "Preschoolers' Recognition of Cardinal Equivalence"

M.A., Developmental Psychology, 1993, University of Chicago, Chicago, IL

B.A., Elementary Education, 1987, Western Michigan University, Kalamazoo, MI
Senior Honors Thesis: "Learning Styles and Underachievement in Gifted Children"

EMPLOYMENT: Department of Human Development and Quantitative Methodology
College of Education
University of Maryland
College Park, MD
Full Professor, 2016 – present
Chairperson, 2016- present

Program in Educational Psychology
College of Education
Michigan State University
East Lansing, MI
Full Professor, 2010-2016
Associate Professor, 2005-2010

Department of Psychology
Indiana University
Bloomington, IN
Associate Professor, 2003-2005
Assistant Professor, 1996-2003

Livermore Valley Unified School District
Livermore, CA
Elementary Teacher, 1987-1990

HONORS Boyd McCandless Award (American Psychological Association, Division 7, Early Career Award), 2002.

MAJOR RESEARCH GRANTS, AWARDS, AND FELLOWSHIPS: *Place Value as a System of Mappings*, \$1,800,000, National Science Foundation, 2016-2021 (Role; Lead PI, Collaborative Research Project with Linda Smith, Indiana University)

SL - CN: A Research-Practice Collaboration to Improve Math Learning in Young Children, \$749,998, National Science Foundation, 2015-2018, (Role: Group Leader; PIs are Susan Levine, Sian Beilock, & Jennifer Kubota, Univ. of Chicago).

Is Spatial Ability a Malleable Factor for Math Learning?, \$1,500,000, Institute of Education Sciences, 2012-16, (Role: Lead PI; Co-PI is Susan

Levine, Univ. of Chicago).

Support for Teachers' Implementation of the Common Core State Standards for Mathematics, \$700,000, Bill and Melinda Gates Foundation, 2013-16, (Role: Co-PI; Lead PI is William Schmidt, MSU).

Making Sense of Concrete Models for Mathematics, \$1,340,000, Institute of Education Sciences, 2008-2012, (Role: Lead PI; Co-PI was Linda Smith, Indiana Univ.)

Key Transitions in Preschoolers' Number and Arithmetic Development: The Psychological Foundations of Early Childhood Mathematics Education, \$460,050, Spencer Foundation, 2003-2008 (Role: Co-PI; Lead PI was Arthur Baroody, University of Illinois).

Early Number Development: A Domain General Approach, \$277,000, National Institutes of Health (NICHD), 1999-2004 (Role: Sole PI).

SMALL GRANTS, AWARDS, AND FELLOWSHIPS:

Advancing Family Math Fluency, \$15,000, McCormick Foundation, 2017, (Role: Co-PI; Lead PI is Ann Bradley of the Hatcher Group and Co-PI was Susan Levine, University of Chicago).

GRANT CONSULTANT/ADVISORY BOARD MEMBER:

Exploring the roles of pattern and spatial skills in early mathematics development, \$937,582. Institute of Education Sciences, 2016-2019 (Bethany Rittle-Johnson, Vanderbilt University, PI).

Refining and Validating a Number Sense Screener to Identify Young Children at Risk for Mathematical Difficulties in School, \$1,598,792. Institute of Education Sciences, 2015-2018 (Nancy Jordan, University of Delaware, and Alice Klein, Univ. of California-Berkeley, PIs).

The Origins of Numerical Concepts from Nonverbal Perception, \$1,200,000. National Science Foundation, 2015-2019 (Jessica Cantlon, University of Rochester, PI).

How Proportional Reasoning Relates to Whole Number Operations and Numerical Estimation in Elementary School Children, \$1,138,000, National Science Foundation, 2014-16 (Ty Boyer, Georgia Southern Univ., PI).

NATIONAL SERVICE:

Associate Editor, *Journal of Cognition and Development*, 2016-2021.

Standing Member, US Department of Education Institute of Education Sciences (IES), Basic Processes I Grant Panel, 2009-12; 2014-17.

Standing Member, National Science Foundation, Developmental and Learning Sciences Grant Panel, 2013-2016. (Ad hoc reviewer, 2017)

Consultant, Save the Children Network, 2017.

Conference Co-Organizer/Chair (with Susan Levine and Nora Newcombe), *Space and Mathematics: What's The Connection?* Conference Sponsored by the Spatial Intelligence Learning Center (SILC), University of Chicago, November 17-18, 2015

Member, National Science Foundation, Workshop on the Synthesis of Science of Learning, (David Lightfoot, George Washington University, Chair), February 5-6, 2015.

Treasurer, Cognitive Development Society, 2010-2014.

Member, Editorial Board, *Journal of Cognition and Development*, 2008-2016.

Section Co-Chair (with Julie Booth), AERA Program Committee (Div C, Section 3, Mathematics), Vancouver, 2012.

Adhoc Grant Reviewer: NICHD, NSF, US Department of Education, Institute of Education Sciences (IES), 1999-present.

Adhoc Conference Reviewer: AERA, ICIS, SRCD, SREE, 2002-present.

Editorial Consultant, *British Journal of Developmental Psychology*, 2003-2008.

Member, APA-SRCD Task Force on the Role of Psychology in Math and Science Education, Washington, D.C., 2007-08

Co-organizer (with Susan Levine and Nora Newcombe) and presenter, The art of science: A festschrift in honor of Janellen Huttenlocher, University of Chicago, 2005.

Chairperson, Boyd McCandless Award Committee, APA Division 7, 2003.

Member, Forum on Using Scientific Knowledge of Development to Inform Preschool Assessment, Temple University, 2003.

Member, NSF Blue Ribbon Panel, Transitions from Childhood to the Workforce, 2000.

Member, Program Committee, Annual Meeting of the Midwestern Psychological Association, 2000-2002.

Adhoc Journal Reviewer: *Animal Learning and Behavior*, *British Journal of Developmental Psychology*, *Child Development*, *Cognition*, *Cognitive Development*, *Cognitive Psychology*, *Cognitive Science*, *Developmental Psychology*, *Developmental Science*, *Early Childhood Research Quarterly*, *Early Education and Development*, *Infancy*, *Journal of Cognition and Development*, *Journal of Experimental Child Psychology*, *Journal of Experimental Psychology: General*, *Journal for Research in Mathematics Education*, *Psychological Bulletin*, *Psychological Review*, *Psychological Science*, *Psychonomic Bulletin and Review*, *Science*, *Trends in Cognitive Science*.

UNIVERSITY AND DEPARTMENTAL SERVICE:

Chairperson, Department of Human Development and Quantitative Methodology, UMD, 2016-present.

Program Director, Educational Psychology and Educational Technology, MSU, 2013-2015.

Chairperson, College Reappointment, Promotion and Tenure Committee, MSU, 2015.

Member, Math Education Search Committee, 2011-12.

Member, College Faculty Advisory Committee, MSU, 2009-2011.

Member, CEPSE Personnel Committee, MSU, 2010.

Member, College Curriculum Committee, MSU, 2007-2009

Chair, Early Childhood Search Committee, MSU, 2005-07

Member, CEPSE Faculty Advisory Committee, MSU, 2005-07.

Elected member, Bloomington Faculty Council, 2001-05.

Member, Indiana University Fringe Benefits Committee, 2001-04.

Member, Developmental Cognitive Neuroscience Search Committee, IU, 2001-03.

Area Spokesperson, IU, 2002-03.

Member, POSTCOM, (departmental chairperson's advisory panel), Department of Psychology, Indiana University, 1999-2002.

Member, Graduate Admissions Committee, Department of Psychology, Indiana University, 1997-2004.

Member, Minority Students Committee, Department of Psychology, Indiana University, 1997-99.

Member, Clinical Search Committee, Department of Psychology, Indiana University, 1997-98.

Faculty Mentor, Exploration of Careers in Science Program, NSF (at Indiana University), Summer, 1997.

Faculty Mentor, Developmental Training Grant Minority Research Fellowship, Indiana University, Summer, 1997.

PROFESSIONAL AFFILIATIONS:

Member, Society for Research in Child Development

(SRCD), American Educational Research Association (AERA), American Psychological Association (APA), National Council of Teachers of Mathematics (NCTM), Cognitive Development Society (CDS), Society for Research in Educational Effectiveness (SREE).

PUBLICATIONS

AUTHORED BOOKS

Mix, K. S., Huttenlocher, J., & Levine, S. C. (2002). *Quantitative development in infancy and early childhood*. New York: Oxford University Press.

EDITED BOOKS

Mix, K. S., Smith, L.B., & Gasser, M. (2010). *The spatial foundations of language and cognition*. New York: Oxford University Press.

Mix, K. S. & Battista, M. (in prep) *Spatial Visualization in Mathematics*. Springer.

BOOK CHAPTERS

1. Baroody, A. J., Lai, M.-L., & Mix, K. S. (2005). The development of young children's number and operation sense and its implications for early childhood education. In B Spodek & O. Saracho (Eds.) *Handbook of Research on the Education of Young Children*. (pp. 187-221). Mahwah, NJ: Lawrence Erlbaum Associates.

2. Mix, K. S., Sandhofer, C.M., & Baroody, A. J. (2005). Number words and number concepts: The interplay of verbal and nonverbal processes in early quantitative development. In R. V. Kail (Ed.) *Advances in Child Development and Behavior, Volume 33* (pp. 305-346). New York: Elsevier.

3. Mix, K. S. & Sandhofer, C. M. (2007). Do we need a number sense? In M. J. Roberts (Ed.). *Integrating the mind*. Hove, UK: Psychology Press.

4. Mix, K. S. (2010). Spatial tools for mathematical thought. In K. S. Mix, L.B. Smith & M. Gasser (Eds.) *The Spatial Foundations of Language and Cognition*, New York: Oxford University Press.

5. Mix, K. S. (2010). Early childhood numeracy. In: Tremblay RE, Barr RG, Peters RDeV, Boivin M, (Eds.) *Encyclopedia on Early Childhood Development* [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development; 2010:1-6. Available at: <http://www.child-encyclopedia.com/documents/MixANGxp.pdf>.

6. Mix, K. S. & Cheng, Y. L. (2012). The relation between space and math: Developmental and educational implications. In J. B. Benson (Ed.) *Advances in Child Development and Behavior, Volume 42* (pp. 201-247), New York: Elsevier.

7. Mix, K. S., Levine, S. C., & Newcombe, N. S. (2016). Development of quantitative thinking across correlated dimensions. In A. Henik (Ed.) *Continuous Issues in Numerical Cognition: How Many or How Much* (pp. 3-35), New York: Elsevier.

8. Congdon, E., Levine, S. C., Vasileyva, M., & Mix, K. S. (in prep.) XXXXXXXX To appear in K.S. Mix & M. Battista (Eds.) *Spatial Visualization in Mathematics*. Springer.

9. Young, C.J., Levine, S. C., & Mix, K. S. (in prep). XXXXXXXX To appear in K.S. Mix & M. Battista (Eds.) *Spatial Visualization in Mathematics*. Springer.

JOURNAL ARTICLES, COMMENTARIES, AND PROCEEDINGS

1. Barsalou, L.W., Yeh, W., Luka, B., Olseth, K., Mix, K. S., & Wu, L. (1993). Concepts and meaning. In K. Beals, G. Cooke, D. Kathman, K. E. McCullough, S. Kita, & D. Testen (Eds.) *Linguistic Society 29: Papers from a parasession on conceptual representations*. University of Chicago: Chicago Linguistics Society.

2. Mix, K. S., Huttenlocher, J., & Levine, S. C. (1996). Do preschool children recognize auditory-visual numerical correspondences? *Child Development*, *67*, 1592-1608.
3. Mix, K. S., Levine, S. C., & Huttenlocher, J. (1997). Numerical abstraction by infants: Another look. *Developmental Psychology*, *33*, 423-428.
4. Mix, K. S. (1998). Development of numerical equivalence judgments: Appearances count. In B. Kokinov, D. Gentner, and K. Holyoak, (Eds.), *Proceedings of the Advances in Analogy Research Workshop :Integration of Theory and Data from the Cognitive, Computational, and Neural Sciences*. New Bulgarian University: AMBR Analogy Research Group.
5. Clearfield, M. W. & Mix, K. S. (1999). Number versus contour length in infants' discrimination of small visual sets. *Psychological Science*, *10*, 408-411.
6. Mix, K. S. (1999). Preschoolers' recognition of numerical equivalence: Sequential sets. *Journal of Experimental Child Psychology*, *74*, 309-332 (Special Issue: The Development of Mathematical Cognition, J. Bisanz, Ed.)
7. Mix, K. S. (1999). Similarity and numerical equivalence: Appearances count. *Cognitive Development*, *14*, 269-297.
8. Mix, K. S., Levine, S. C., & Huttenlocher, J. (1999). Early fraction calculation ability. *Developmental Psychology*, *35*, 164-174.
9. Drake, P. D., Mix, K. S., & Clearfield, M.W. (2000). Precursors to number: Making the most of continuous amount. In L. R. Gleitman & A. K. Joshi (Eds.) *Proceedings of the Twenty-Second Annual Conference of the Cognitive Science Society*. Mahwah, N.J.: Erlbaum.
10. Clearfield, M., & Mix, K.S. (2001). Amount versus number: Infants' use of area and contour length to discriminate small sets. *Journal of Cognition and Development*, *2*(3), 243-260.
11. Mix, K. S. (2002). The construction of number concepts. *Cognitive Development*, *17*, (Special issue: Constructivism Today, J. Langer & E. Turiel, Eds.), 1345-1363.
12. Mix, K. S. (2002). Trying to build on shifting sand: Commentary on Cohen and Marks. *Developmental Science*, *5*, 205-206.
13. Mix, K. S., Huttenlocher, J., & Levine, S. C. (2002). Multiple cues for quantification in infancy: Is number one of them? *Psychological Bulletin*, *128*, 278-294.
14. Paik, J. H., & Mix, K. S. (2003). Children's comprehension of fraction names: A re-examination of cross-national differences, *Child Development*, *74*, 144-154.
15. Paik, J. H. & Mix, K. S. (2006). Preschoolers' use of surface similarity in object comparisons: Taking context into account. *Journal of Experimental Child Psychology*, *95* (3), 194-214.
16. Mix, K. S. (2008). Getting developmental: A commentary on Rips, Bloomfield & Asmuth, *Behavioral and Brain Sciences*, *31*, 662.
17. Mix, K. S. (2008). Surface similarity and label knowledge impact early numerical comparisons, *British Journal of Developmental Psychology*, *26*, 13-32.
18. Mix, K.S. (2008). Children's equivalence judgments: Cross-mapping effects. *Cognitive Development*, *23*, 191-203.
19. Mix, K. S. & Paik, J. H. (2008). Do Korean fraction names promote part-whole reasoning? *Journal of Cognition and Development*, *9*(2), 145-170.
20. Paik, J. H. & Mix, K. S. (2008). It's all relative: Different levels of relational similarity used in children's comparisons, *British Journal of Developmental Psychology*, *26*, 495-505.
21. Mix, K. S. (2009). How Spencer made number: First uses of the number words. *Journal of Experimental Child Psychology*, *102*, 427-444.

22. Newcombe, N. S., Ambady, N., Eccles, J., Gomez, L., Klahr, D. Linn, M., Miller, K. F., & Mix, K. S. (2009). Psychology's role in mathematics and science education. *The American Psychologist*, 64, 538-550.
23. Mix, K. S., Moore, J. A., & Holcomb, E. (2011). One-to-one toys promote development of number concepts, *Journal of Cognition and Development*, 12 (4), 463-480.
24. Mix, K. S., Sandhofer, C. M., Moore, J., & Russell, C. (2011). Acquisition of the cardinal word principle: The role of input, *Early Childhood Research Quarterly*, 27(2), 274-283.
25. Cook, E. & Mix, K. (2012). Comparing rich and sparse manipulatives in narrative comprehension in second graders. *Red Cedar Undergraduate Research: Michigan State University*, 3, 34-40.
26. Cheng, Y.L. & Mix, K. S. (2014). Spatial training improves children's mathematical ability. *Journal of Cognition and Development*, 15(1), 2-11 (published online in Oct., 2013).
27. Byrge, L. Smith, L.B., & Mix, K.S. (2014). Beginnings of place value: How preschoolers write three-digit numbers. *Child Development*, 85, 437-443.
28. Mix, K. S., Prather, R. W., Smith, L. B., & Stockton, J. D. (2014). Young Children's Interpretations of Multi-Digit Number Names: From Emerging Competence to Mastery. *Child Development*, 85, 1306-19.
29. Newcombe, N., Levine, S.C. & Mix, K.S. (2015). Thinking about quantity: The intertwined development of spatial and numerical cognition. *WIREs Cognitive Science*, 6 (6), 491-505. doi: 10.1002/wcs.1369.
30. Mix, K. S., Levine, S. C., Cheng, Y., Young, C., Hambrick, D. Z., Ping, R. & Konstantopolous, S. (2016). Separate but correlated: The latent structure of space and mathematics across development. *Journal of Experimental Psychology: General*, 145(9), 1206-1227.
31. Mix, K. S., Smith, L. B., Stockton, J. D. & Barterian, J. A. (2017). Grounding the symbols for place value: Do concrete models help? *Journal of Cognition and Development*, 18(1), 129-151.
32. Mix, K. S., Newcombe, N. S. & Levine, S. C. (2017). Commentary on Leibovich et al.: What next? To appear in *Brain and Behavioral Sciences*.
33. Mix, K. S., Levine, S. C., Cheng, Y.-L., Young, C. J., Hambrick, D. Z., & Konstantopoulos, S. (2017). The latent structure of spatial skills and mathematics: Further evidence from Wave 2. *Journal of Cognition and Development*.
34. Young, C. J., Levine, S. C., & Mix, K. S. (accepted) The connection between spatial and mathematical ability across development. To appear in H.-C. Nuerk, K. Cipora, F. Domahs, & M. Haman (Eds.) Special Issue: On the Development of Space-Number Relations: Linguistic and Cognitive Determinants, Influences, and Associations. *Frontiers in Psychology*.
35. Cheng, Y.-L., Mix, K. S., Reckase, M. D., Levine, S. C., & Freer, D. (under review). The Dimensionality of Visuo-Spatial Working Memory and Arithmetic Computation in Third Grade Students., *Cognitive Science*.
36. Mix, K. S., Satyam, V. R., Cheng, Y.-L., Hambrick, D. Z., & Levine, S. C. (under review). The latent structure of spatial skill: A test of the 2x2 typology. *Cognitive Psychology*.
37. Rinne, L., Mix, K. S., Levine, S.C., & Young, C. J. (in prep). *Developmental Sex Differences at the Intersection of Spatial and Mathematics Abilities*.
38. Mix, K. S., Smith, L. B., Liao, M. & Stockton, J. D. (in prep). *Using Concrete Models to Ground the Symbols for Place Value: Do Timing and Comparison Matter?*
39. Mix, K. S., Levine, S. C., Cheng, Y.-L. & Stockton, J. D. (in prep). *Does Spatial Training Improve Mathematics Performance? A Comparison of Training Type, Age, and Mathematics Outcome*.
40. Mix, K. S., Crespo, S. & Smith, L. B. (in prep). *Leveraging structure mapping to improve elementary mathematics instruction*.

INVITED COLLOQUIA/KEYNOTE ADDRESSES

University of Michigan

University of Iowa
Indiana University
Universite de Provence
Boston University
University of Illinois
Michigan State University
University of Chicago
Ready at Five, Baltimore MD
Erikson Institute/Center for Early Childhood Research
Carnegie Mellon University
Temple University
Grand Valley State University
Cognitive Development Society
University of Maryland
Towson University/Maryland State Department of Education
University of Delaware
Boston College
Kent State University

CONFERENCE PRESENTATIONS

1. Mix, K. S., Huttenlocher, J., & Levine, S. C. (1993, April). *The recognition of intermodal numerical correspondences by preschool children.* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago.
2. Mix, K. S. (1994, January). *Recognition of auditory-visual numerical correspondences in infancy and early childhood: Are babies really smarter than you think?* Paper presented at the Workshop on Mathematics Teaching and Learning, University of Chicago.
3. Mix, K. S., Levine, S. C., & Huttenlocher, J. (1994, May). *Infants' detection of auditory-visual numerical correspondences: Another look.* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago.
4. Mix, K. S., Huttenlocher, J., & Levine, S. C. (1994, June). *Recognition of auditory-visual numerical correspondences in infancy and early childhood.* Poster presented at the annual meeting of the Jean Piaget Society, Chicago.
5. Mix, K. S. (1996, June). *Preschoolers' recognition of cardinal equivalence.* Paper presented at the annual meeting of the Jean Piaget Society, Philadelphia.
6. Levine, S. C., Huttenlocher, J., & Mix, K. S. (1997, February). *Early quantitative development.* Invited lecture at the annual meeting of the Learning Disabilities Association of America, Chicago.
7. Mix, K. S. & Levine, S. C. (1997, April). *Fraction and mixed number calculation ability in four- to seven-year-olds.* Poster presented at the biennial meeting of the Society for Research in Child Development, Washington, D. C.
8. Mix, K. S. (1997, May). Numerical abstraction in infancy and early childhood. In J. Huttenlocher (Chair), *Recent advances in cognitive development.* Invited symposium conducted at the annual meeting of the Midwest Psychological Association, Chicago.
9. Mix, K. S. (1999, April). Are fractions harder than whole numbers? In J. Huttenlocher (Chair), *Concepts of continuous amount.* Symposium conducted at the biennial meeting of the Society for Research in Child Development, Albuquerque, N.M.
- 10.. Clearfield, M. W. & Mix, K. S. (1999, April). *Infants use contour length—not number—to discriminate small sets.* Poster presented at the biennial meeting of the Society for Research in Child Development, Albuquerque, N.M.
11. Mix, K. S. & Waxman, S. (1999, October). *Are color concepts easier to learn than number concepts?* Poster presented at the first annual meeting of the Cognitive Development Society, Chapel Hill, N.C.
12. Mix, K. S. (2000, July). How specific interactions drive quantitative development. In N. S. Newcombe and K. Hirsh-Pasek (Chairs) *Standing at the radical middle: Interactionism in infant development in the linguistic, spatial, and*

quantitative domains. Symposium conducted at the biennial meeting of the International Conference of Infant Studies, Brighton, England.

13. Mix, K. S. (2000, July). Changes in early quantitative representation. In S. Carey (Chair), *Infants' numerical cognition: Current issues and new directions*. Symposium conducted at the biennial meeting of the International Conference of Infant Studies, Brighton, England.

14. Clearfield, M. W., Mix, K. S., & Drake, P. D. (2001, April). Infants' discrimination of small and large sets. In K. S. Mix (Chair) *The role of overall amount in early quantification*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.

15. Mix, K. S. (2001, April). The differentiation of continuous and discrete quantification. In K. S. Mix (Chair) *The role of overall amount in early quantification*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.

16. Paik, J. H. & Mix, K. S. (2001, April). *U. S. children learning fractions: Do English fraction names interfere?* Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN.

17. Paik, J. H. & Mix, K. S. (2001, May). *U. S. children learning fractions: Do English fraction names interfere?* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

18. Mix, K. S. (2002, July). Do human infants perceive quantities in terms of discrete number? In M. West (Chair) *The ultimate and proximate infant*. Symposium conducted at the annual meeting of the Animal Behavior Society, Bloomington, IN.

19. Paik, J. H. & Mix, K. S. (2003, April). Context effects on preschoolers' comparisons. In J. H. Paik & K. S. Mix (Chairs) *Flexibility in children's comparisons and categories*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Tampa, FL.

20. Sandhofer, C. M. & Mix, K. S. (2003, April). Number language and number concepts: Evidence from a long-range microgenetic study. In K. S. Mix & C. M. Sandhofer (Chairs) *Multiple approaches to understanding the interaction of language and cognition*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Tampa, FL.

21. Mix, K. S. (2003, May). *Research on children's comparisons informs research on numerical equivalence (and vice versa)*. Invited paper presented at the annual meeting of the Midwest Psychological Association, Chicago.

22. Mix, K. S. (2003, October). *Are early number concepts spatial?* Paper presented at the workshop, The Spatial Foundation of Cognition and Language, hosted by Indiana University, Bloomington, IN.

23. Sandhofer, C. M. & Mix, K. S. (2003, October). Children learning properties: Are domain-specific mechanisms necessary? In B. Morris & V. Sloutsky (Chairs). *Core competencies: In search of domain-general mechanisms*. Symposium conducted at the annual meeting of the Cognitive Development Society, Park City, UT.

24. Anderson, J. & Mix, K. S. (2004, May). *A longitudinal analysis of children's one-to-one correspondence behaviors*. Poster presented at the biennial meeting of the International Conference of Infant Studies, Chicago, IL.

25. Paik, J. H. & Mix, K. S. (2005, April). Preschoolers' similarity judgments: Taking context into account. In J. B. Childers (Chair). *Structural Alignment and Comparison: Evidence of a New Mechanism for Cognitive Development* Symposium conducted at the biennial meeting of the Society for Research in Child Development, Atlanta, GA.

26. Paik, J. H. & Mix, K. S. (2005, April) *Young children's performance on verbal and nonverbal fraction measures*. Poster presented at the biennial meeting of the Society for Research in Child Development, Atlanta, GA.

27. Mix, K. S. (2005, September). *Hearing voices*. Paper presented at *The art of science: A festschrift in honor of Janellen Huttenlocher*, Chicago, IL.

28. Baroody, A. J., Lai, M. L., & Mix, K. S. (2005, December). Changing views of young children's numerical and arithmetic competencies. In B. Spodek & O. N. Saracho (Chairs) *Presenting the knowledge base of early childhood education*. Symposium conducted at the annual meeting of the National Association for the Education of Young Children, Washington, D.C.

29. Baroody, A. J., & Mix, K. S. (2006, April). *Changing views of young children's numerical and arithmetic competencies*. Paper presented at the meeting of World Association of Early Childhood Educators (sponsored by the UNESCO). Madrid, Spain.
30. Mix, K. S. & Baroody, A. J. (2007, April). Beyond competence versus performance: Context-specificity in learning about number. Paper presented in K. S. Mix (Chair) *What learning is: A psychological perspective on early childhood*. Symposium conducted at the annual meeting of the American Education Research Association, Chicago, IL.
31. Mix, K.S., Sandhofer, C. M., & Moore, J. (2009, April). How input helps and hinders acquisition of the cardinal word principle. In B. J. Morris & A. M. Masnick (Chairs). *Counting and beyond: Number representations and the development of mathematical processing*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Denver, CO.
32. Mix, K. S., Smith, L. B., Barterian, J. & Kereluik, K. (2009, June). *What first-graders do with place value blocks*. Poster presented at the annual Institute of Education Sciences Research Conference, Washington, D.C.
33. Barterian, J., Mix, K. S., Hayter, C., Kereluik, K. (2010, March). *Mathematics anxiety in elementary students*. Poster presented at the annual meeting of the National Association of School Psychologists, Chicago, IL.
34. Mix, K. S. (2010, March). Groups, individuals, and the acquisition of quantitative language. Discussion presented in L. Cantrell & J. Zapf (Chairs) symposium, *Early links among number knowledge, the plural, and discrete objects*, conducted at the biennial meeting of the International Conference on Infant Studies, Baltimore, MD.
35. Mix, K., Prather, RW, Stitzel, C., Smith, L. (2010, June). *Place-value concepts and multidigit calculation: Effects of concrete models*. Poster presented at the Institute of Education Sciences Research Conference, Washington, D.C.
36. Cheng, Yi Ling & Mix, K. S (2011, September). *Does spatial training improve children's mathematical performance?* Poster presented at the annual meeting of the Society for Research on Educational Effectiveness, Washington, D.C.
37. Mix, K.S., Smith, L.B., Stockton, J. D., & Barterian, J. (2013, April). Learning place value: Do concrete models help? Paper presented in K. Mix (Chair) symposium, *Learning from Concrete Models*, presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.
38. Mix, K.S. (2013, April). Multicausality: Everything matters. Discussion presented in G. Ramani (Chair) symposium, *The Role of Input and Interaction in Early Numeracy Development*, presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.
39. Mix, K. S. (2013, May). *Understanding units in fractions*. Paper presented at the annual meeting of the International Mind, Brain and Education Society, Quito, Ecuador.
40. Cheng, Y-L, Mix, K. S., Levine, S. C. Berkowitz, T. Young, C., & Ping, R. (2013, October). *The Relations between Space and Math: A MIMIC Model Approach*. Poster presented at the biennial meeting of the Cognitive Development Society, Memphis, TN.
41. Cheng, Y.L., Reckase, M., Mix, K. S., Cook, E., & Levine, S. C. (2014, April). *The use of cognitive diagnostic models with a hierarchical structure*. Poster presented at the annual meeting of the National Council on Measurement in Education, Philadelphia, PA.
42. Mix, K. S. (2014, July). Looking and knowing: The broader implications. Discussion presented in L. B. Smith (Chair) symposium, *Screens Versus the World: Fundamentally Different Properties of Gaze Allocation?*, presented at the biennial meeting of the International Conference on Infant Studies, Berlin, Germany.
43. Young, C.J., Levine, S.C., & Mix, K.S. (2014, July). *Linear Estimation and Mental Rotation Predict Children's Early Math Abilities*. Poster presented at the annual meeting of the Cognitive Science Society, Quebec City, Canada.
44. Mix, K. S., Levine, S.C., Cheng, Y.L. & Young, C.J. (2015, March). The relation between space and math: An exploratory factor analysis. Paper presented in Zack Hawes and Nora Newcombe (Chairs) symposium, *The Relationship between Spatial Thinking and Mathematics*, presented at the biennial meeting of the Society for Research in Child Development, Philadelphia, PA.

45. Mix, K. S. (2015, April). Lost in translation: Cognitive developmental research meets educational practice. Discussion presented in Nina Simms and Lindsey Richland (Chairs) symposium, *Relational Reasoning in STEM Domains: What Empirical Research Can Contribute to the National Dialogue*, presented at the annual meeting of the American Educational Research Association, Chicago, IL.

46. Mix, K. S., & Smith, L. B. (2015, October). *Acquiring the place value system: Statistical learning, concrete models, and the power of symbols*. Invited address to be presented at the biennial meeting of the Cognitive Development Society, Columbus, OH.

47. McLean, T. & Mix, K. S. (2015, November). *Mathematical equivalence and algebra: Functions, variables, and expressions*. Poster presented at the annual meeting of the International Group for the Psychology of Mathematics Education (North American Chapter), East Lansing, MI.

48. Baroody, A. J., Lai, M.-L., & Mix, K. S. (2017, April). *Assessing early cardinal number concepts*. Paper to be presented at the annual meeting of the American Educational Research Association, San Antonio, TX.

49. Baroody, A. J., Lai, M.-L., & Mix, K. S. (2017, October). *Assessing early cardinal number concepts*. Poster to be presented at the annual meeting of the International Group for the Psychology of Mathematics Education (North American Chapter), Indianapolis, IN.

50. Mix, K. S., Levine, S. C., & Cheng, Y.-L. (2017, October). *Effects of spatial training on elementary mathematics*. Paper to be presented in N. Jordan and C. Barbieri (Chairs) Usable knowledge for improving mathematics learning: Bridging research in cognition and development with educational practice in diverse contexts. Symposium to be presented at the biennial meeting of the Cognitive Development Society, Portland, OR.

COURSES TAUGHT

Michigan State University Cognitive Development, Socio-Cultural Development, Proseminar in Educational Psychology, Reflections on Learning (Intro to Ed Psych), Qualitative Research Methods, Learner Commonalities and Learner Differences.

Indiana University Introduction to Developmental Psychology, Developmental Psychology Laboratory Course, Topical seminars on (a) Mathematical Development, (b) Themes in Developmental Research and (c) Ontogeny and Phylogeny.