

Nicole M. McNeil

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Notre Dame, IN 46556
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EDUCATION

- 2005-2006 Postdoctoral Research Associate in Psychology
Yale University
- 2005 Ph.D. in Psychology, Distributed Minor in Statistics and Computer Sciences
University of Wisconsin-Madison
- 1999 B.S. in Psychology, Minor in Chemistry
Carnegie Mellon University

PROFESSIONAL POSITIONS

- 2006- Assistant Professor, Department of Psychology, University of Notre Dame
- 2005-2006 Project Director, PACE Center, Yale University
- 2003-2005 Project Assistant, Wisconsin Center for Education Research, University of Wisconsin
- 1999-2003 Research Assistant, Department of Psychology, University of Wisconsin
- 1999 Research Assistant, Department of Psychology, Carnegie Mellon
- 1998 Undergraduate Intern, Western Psychiatric Institute and Clinic, Pittsburgh, PA

SCHOLARSHIPS AND FELLOWSHIPS

- 2001-2002 Marian Schwartz Fellowship in Experimental Psychology, University of Wisconsin
- 1999-2000 Henry Vilas Graduate Fellowship, University of Wisconsin [stipend, tuition, and fees]
- 1997-1999 Alumni Memorial Scholarship, Carnegie Mellon University
- 1997-1998 National Institute of Mental Health (NIMH) Undergraduate Fellowship

HONORS AND AWARDS

- 2008 2007 Presidential Early Career Award for Scientists and Engineers (PECASE)
- 2004-2005 American Psychological Association (APA) Dissertation Award [\$3000]
- 2003-2004 American Psychological Foundation E. M. Koppitz Graduate Travel Stipend [\$4000]
- 2001-2004 Graduate Student Travel Awards, University of Wisconsin [6 totaling \$2200]
- 1999 Phi Beta Kappa Honors Society, Upsilon of Pennsylvania
- 1999 Phi Kappa Phi Honors Society, Carnegie Mellon Chapter
- 1999 Phi Kappa Phi Research Award, First Place, Carnegie Mellon [\$250]
- 1998 Student Travel Award, Symposium for Research on Child Language Disorders [\$500]
- 1998 Sigma Xi Research Award, First Place, Carnegie Mellon [\$500]
- 1998 Mortar Board National Honors Society, Carnegie Mellon
- 1997 National Society of Collegiate Scholars, Carnegie Mellon

PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS

American Educational Research Association
 Association for Psychological Science
 Cognitive Development Society
 Cognitive Science Society
 Society for Research in Child Development

BOOKS AND MONOGRAPHS

NA

REFEREED JOURNAL ARTICLES

^G indicates graduate student author; ^U indicates undergraduate student author

McNeil, N. M., & Uttal, D. H. (in press). Rethinking the use of concrete materials in learning: Perspectives from development and education. *Child Development Perspectives*.

¹Brown, M. C., ¹**McNeil**, N. M., & Glenberg, A. M. (in press). Using concreteness in education: Real problems, potential solutions. *Child Development Perspectives*.
¹contributed equally, so listed alphabetically

Haefel, G. J., Thiessen, E. D., Campbell, M. W., Kaschak, M. P., & **McNeil**, N. M. (in press). Theory, not cultural context, will advance psychology. *American Psychologist*.

McNeil, N. M., Uttal, D. H., Jarvin, L., & Sternberg, R. J. (2009). Should you show me the money? Concrete objects both hurt and help performance on mathematics problems. *Learning and Instruction*, *19*, 171-184.

McNeil, N. M. (2008). Limitations to teaching children $2 + 2 = 4$: Typical arithmetic problems can hinder learning of mathematical equivalence. *Child Development*, *79*, 1524-1537.

Knuth, E. J., Alibali, M. W., Hattikudur, S., **McNeil**, N. M., & Stephens, A. C. (2008). The importance of equal sign understanding in the middle grades. *Mathematics Teaching in the Middle School*, *13*, 514-520.

McNeil, N. M. & Jarvin, L. (2007). When theories don't add up: Disentangling the manipulatives debate. *Theory Into Practice*, *46*, 309-316.

McNeil, N. M. (2007). U-shaped development in math: Seven year olds outperform nine year olds on mathematical equivalence problems. *Developmental Psychology*, *43*, 687-695.

Alibali, M. W., Knuth, E. J., Hattikudur, S., **McNeil**, N. M., & Stephens, A. C. (2007). A longitudinal examination of middle school students' understanding of the equal sign and performance solving equivalent equations. *Mathematics Thinking and Learning*, *9*, 221-247.

- McNeil**, N. M., Grandau, L., Knuth, E. J., Alibali, M. W., Stephens, A. S., Hattikudur, S., & Krill, D. E. (2006). Middle-school students' understanding of the equal sign: The books they read can't help. *Cognition and Instruction*, *24*, 367-385.
- Knuth, E. J., Stephens, A. C., **McNeil**, N. M. & Alibali, M. W. (2006). Does understanding the equal sign matter? Evidence from solving equations. *Journal for Research in Mathematics Education*, *37*, 297-312.
- McNeil**, N. M., & Alibali, M. W. (2005b). Why won't you change your mind? Knowledge of operational patterns hinders learning and performance on equations. *Child Development*, *76*, 883-899.
- McNeil**, N. M., & Alibali, M. W. (2005a). Knowledge change as a function of mathematics experience: All contexts are not created equal. *Journal of Cognition and Development*, *6*, 385-206.
- Knuth, E. J., Alibali, M. W., **McNeil**, N. M., Weinberg, A., Stephens, A. C. (2005). Middle school students' understanding of core algebraic concepts: Equality and variable. *Zentralblatt für Didaktik der Mathematik / International Reviews on Mathematical Education*, *37*, 68-76.
- McNeil**, N. M., & Alibali, M. W. (2004). You'll see what you mean: Students encode equations based on their knowledge of arithmetic. *Cognitive Science*, *28*, 451-466.
- Evans, J. L., Alibali, M. W., & **McNeil**, N. M. (2001). Divergence of verbal expression and embodied knowledge: Evidence from speech and gesture in children with Specific Language Impairments. *Language and Cognitive Processes*, *16*, 309-331.
- McNeil**, N. M., & Alibali, M. W. (2000). Learning mathematics from procedural instruction: Goals influence learning from the outside in. *Journal of Educational Psychology*, *92*, 734-744.
- McNeil**, N. M., Alibali, M. W., & Evans, J. L. (2000). Role of gesture in children's language comprehension: Now they need it, now they don't. *Journal of Nonverbal Behavior*, *24*, 131-150.

REFEREED PAPERS IN CONFERENCE PROCEEDINGS

- ^UCrooks, N. M., & **McNeil**, N. M. (2009). Increased practice with "set" problems hinders performance on the water jar task. In N. A. Taatgen & H. van Rijn (Eds.), *Proceedings of the 31st Annual Conference of the Cognitive Science Society* (pp. 643-648). Austin, TX: Cognitive Science Society.
- ^GKeultjes, M. C., ^UGibson, M. H., & **McNeil**, N. M. (2009). Children's understanding of approximate arithmetic depends on problem format. In N. A. Taatgen & H. van Rijn (Eds.), *Proceedings of the 31st Annual Conference of the Cognitive Science Society* (pp. 329-334). Austin, TX: Cognitive Science Society.
- ^GPetersen, L. A., & **McNeil**, N. M. (2008). Using perceptually rich objects to help children represent number: Established knowledge counts. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 1567-1572). Austin, TX: Cognitive Science Society.

- McNeil, N. M.** (2004a). Don't teach me $2 + 2 = 4$: Knowledge of arithmetic operations hinders equation learning. In K. D. Forbus, D. Gentner, & R. Regier (Eds.), *Proceedings of the Twenty-sixth Annual Conference of the Cognitive Science Society* (pp. 938-943). Mahwah, NJ: Lawrence Erlbaum Associates.
- McNeil, N. M., Grandau, L., Stephens, A. C., Krill, D. E., Alibali, M. W., & Knuth, E. J.** (2004). Middle-school students' experience with the equal sign: *Saxon Math \neq Connected Mathematics*. In D. McDougall (Ed.), *Proceedings of the XXVI Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), Toronto, Canada* (Vol. 1, pp. 271-6). Columbus, OH: ERIC.
- McNeil, N. M., & Alibali, M.W.** (2002). A well-established schema can interfere with learning: The case of children's typical addition schema. In C. D. Schunn & W. Gray (Eds.), *Proceedings of the 24th Annual Conference of the Cognitive Science Society* (pp. 661-6). Mahwah, NJ: Lawrence Erlbaum Associates.
- McNeil, N. M., & Alibali, M. W.** (2001). Gesture production is associated with task motivation. In C. Cavé, I. Guaitella, & S. Santi (Eds.), *Oralité et gestualité: Interactions et comportements multimodaux dans la communication* [Orality and gestuality: Multimodal interaction and behavior in communication]. *Actes du colloque* [Proceedings of the meeting of] *ORAGE 2001* (pp. 247-252) Paris, France: L'Harmattan.
- Alibali, M. W., **McNeil, N. M.**, & Perrott, M. A. (1998). What makes children change their minds? Changes in encoding lead to changes in strategy selection. In M. A. Gernsbacher & S. Derry (Eds.), *Proceedings of the 20th Annual Conference of the Cognitive Science Society* (pp. 36-41). Mahwah, NJ: Lawrence Erlbaum Associates.

UNREFEREED PUBLICATIONS

- Gubbins, E. J., Housand, B., Oliver, M., Schader, R., de Wet C. F., Moon, T. R., Hertberg-Davis, H., Callahan, C. M., Brighton, C., Sternberg, R. J, Grigorenko, E., Jarvin, L., **McNeil, N. M.**, Connolly, K. (2008). Unclogging the mathematics pipeline through access to algebraic understanding. Storrs, CT: National Research Center on the Gifted and Talented.

OTHER PUBLICATIONS

- McNeil, N. M.** (2004b). Test item file to accompany *Children's Thinking* 4th edition by R. S. Siegler & M. W. Alibali. Upper Saddle River, NJ: Prentice Hall.

MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

- McNeil, N. M., Weinberg, A., Stephens, A. C., Hattikudur, S., Asquith, P., Knuth, E. J., & Alibali, M. W.** (under review). A is for apple: Mnemonic symbols hinder students' interpretation of algebraic expressions.
- McNeil, N. M., Rittle-Johnson, B., Hattikudur, S., & Petersen, L. A.** (under review). Continuity in representations between children and adults: Arithmetic practice hinders undergraduates' algebraic problem solving.

McNeil, N. M., ^GWagner Fuhs, M. C., ^GKeultjes, M. C., ^UGibson, M. H. (in preparation).
Experience with the canonical arithmetic problem format affects understanding of approximate number.

McNeil, N. M., ^UFyfe, E. R., Dunwiddie, A. E., ^GPetersen, L. A., Brletic-Shipley, H. (in preparation).
Benefits of practicing $4 = 2 + 2$: Nontraditional problem formats facilitate children's understanding of mathematical equivalence.

INVITED LECTURES AND ADDRESSES

- 2009 Institute of Education Sciences, Fourth Annual IES Research Conference
- 2009 Institute of Education Sciences, Meeting of the National Board of Education Sciences
- 2008 Institute of Education Sciences, PECASE Colloquium
- 2008 University of Chicago, Department of Psychology, Developmental Seminar Series
- 2008 University of Portland, Symposium on Education
- 2006 Michigan State University, School of Education
- 2006 University of Notre Dame, Department of Psychology
- 2006 University of Oregon, Department of Psychology
- 2006 University of Colorado, Institute of Cognitive Science
- 2006 Colgate University, Department of Psychology
- 2006 Boston College, Lynch School of Education
- 2006 Oklahoma State University, Department of Psychology
- 2006 University of Miami, Department of Psychology
- 2006 Emory University, Department of Psychology
- 2006 Florida State University, Department of Psychology
- 2006 Wake Forest University, Department of Psychology
- 2006 Syracuse University, Department of Psychology
- 2006 University of Pittsburgh, Department of Psychology and LRDC
- 2006 University of Illinois—Chicago, Department of Psychology
- 2005 Yale University, Center for the Psychology of Abilities, Competencies, & Expertise
- 2005 Texas Tech University, Human Development & Family Studies
- 2005 Indiana University, School of Education
- 2005 University of North Carolina—Chapel Hill, School of Education
- 2005 University at Buffalo (SUNY), Department of Psychology
- 2005 Northwestern University, School of Education and Social Policy
- 2005 University of Missouri, Department of Psychology
- 2005 Northwestern University, Department of Psychology
- 2004 University of Iowa, Department of Psychology

CONFERENCE PRESENTATIONS

McNeil, N. M., Dunwiddie, A. E., ^GPetersen, L. A., ^UFyfe, E. R., & Brletic-Shipley, H. (2009, June). Arithmetic practice that promotes conceptual understanding and computational fluency: Year 2. Poster presented at the Annual Research Conference of the Institute of Education Sciences (IES), Washington, DC.

- McNeil**, N. M. (2009, May). Effect of arithmetic practice on mathematical thinking. In C. L. O'Donnell & E. R. Albros (Co-Chairs), *Developing preschool through middle school students' understandings of fundamental concepts in mathematics*. Symposium presented at the Annual Convention of the Association for Psychological Science, San Francisco, CA.
- McNeil**, N. M. (2009, April). Invited Discussion: Evaluating the role of input in children's (mis)understanding of mathematical equivalence. In M. M. Capraro (Chair), *An international perspective on sixth graders' interpretation of the equal sign*. Symposium presented at the Annual Meeting of the American Education Research Association, San Diego, CA.
- ^GPetersen, L. A., & **McNeil**, N. M. (2009, April). Effect of concrete objects on counting skill: An interaction between perceptual richness and established knowledge. In P. G. Matthews (Organizer), *Unpacking concreteness: Understanding how symbol choice impacts learning and transfer*. Symposium presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Denver, CO.
- Alibali, M. W., Prather, R. W., & **McNeil**, N. M. (2009, April). Are abstract or concrete materials most beneficial for learning? It depends on problem difficulty and learners' skills. In M. J. Nathan (Organizer), *The role of concrete examples in learning math: Resolving some paradoxes*. Symposium presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Denver, CO.
- McNeil**, N. M., Dunwiddie, A. E., Brletic-Shipley, H., ^GPetersen, L. A., & ^UGibson, M. H., (2008, June). Arithmetic practice that promotes conceptual understanding and computational fluency. Poster presented at the Annual Research Conference of the Institute of Education Sciences (IES), Washington, DC.
- ^GPetersen, L. A., & **McNeil**, N. M. (2007, October). How do different types of objects affect children's developing counting skill? Poster presented at the Biennial Meeting of the Cognitive Development Society (CDS), Santa Fe, NM.
- McNeil**, N. M., Jarvin, L., Sternberg, R. J., Uttal, D. H. (2007, March). Trade offs between more and less concrete manipulatives. In D. H. Uttal (Organizer), *Concreteness and cognitive development: New perspectives on a classic developmental issue*. Symposium presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Boston, MA.
- McNeil**, N. M. (2007, March). Tales of a fourth-grade misconception: U-shaped development in children's performance on mathematical equivalence problems. In J. H. Bisanz & J. L. Sherman (Organizers), *Overcoming misconceptions: Mechanisms of positive change for a common mathematical misunderstanding*. Symposium presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Boston, MA.
- Jarvin, L., **McNeil**, N. M., & Sternberg, R. J. (2006, June). Understanding students' mathematical competencies: An exploration of the impact of contextualizing math problems. Poster presented at the Institute of Education Sciences (IES) Research Conference, Washington, DC.

- McNeil**, N. M., Weinberg, A., Alibali, M. W., & Knuth, E. J. (2005, April). Children's prior knowledge of letters influences the interpretation of algebraic expressions. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Atlanta, GA.
- Weinberg, A., Stephens, A. C., **McNeil**, N. M., Krill, D.E., Knuth, E. J., & Alibali, M. W. (2004, April). Students' initial and developing conceptions of variable. Paper presented at the 2004 meeting of the American Educational Research Association (AERA), San Diego, CA.
- Evans, J. L., Alibali, M. W., Mainela-Arnold, E., **McNeil**, N. M., Ryan, K. E., & Simon, L. C. (2003, June). The role of gesture in comprehension of spoken language in children with E-SLI and ER-SLI. Poster presented at the Symposium for Research on Child Language Disorders (SRCLD), Madison, WI.
- McNeil**, N. M., & Alibali, M. W. (2002, June). A well-established schema can interfere with learning: Evidence from children's mathematical problem solving. Poster presented at the Fourteenth Annual Convention of the American Psychological Society (APS), New Orleans, LA.
- McNeil**, N. M., & Alibali, M. W. (2001, October). Don't be too sure about that: Certainty about an incorrect strategy hinders cognitive change. Poster presented at the Second Biennial Meeting of the Cognitive Development Society, Virginia Beach, VA.
- McNeil**, N. M. (2001, April). Mental sets and flexibility in the development of mathematical skill. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Minneapolis, MN.
- McNeil**, N. M., Alibali, M. W., & Evans, J. L. (1998, June). *Cognitive deficits in children with Specific Language Impairments: Do gestures reveal hidden knowledge?* Poster presented at the Symposium for Research on Child Language Disorders (SRCLD), Madison, WI.

GRANTS AND SPONSORED PROGRAMS

- 2007-2011 Institute of Education Sciences, U.S. Department of Education, R305B070297 (role: PI)
 "Arithmetic practice that promotes conceptual understanding and computational fluency." [\$761,425 total costs (\$605,461 direct)]
- 2002-2004 Graduate Student Research Grants, University of Wisconsin [4 totaling \$1700]
- 1997-1999 Small Undergraduate Research Grants, Carnegie Mellon [3 totaling \$1200]

MASTER'S THESES DIRECTED

Lori Petersen (Current, passed proposal November 2008)

DOCTORAL DISSERTATIONS DIRECTED

NA

OTHER NOTABLE CONTRIBUTIONS

Teaching

Courses Taught

Cognitive Development (Graduate), University of Notre Dame, 2008
Cognitive Development (Undergraduate), University of Notre Dame, 2007, 2008
Research Methods (Undergraduate), University of Notre Dame, 2006
Learning and Instruction (ACE Program), University of Notre Dame, 2007, 2008, 2009
Developmental and Moral Psychology (ACE Program), University of Notre Dame, 2007, 2009
Introduction to Psychology (American Collegiate Adventures), University of Wisconsin, 2000, 2001

Courses TAed

Statistical Analysis of Psychological Experiments (Graduate), University of Wisconsin, 2003, 2004
Introduction to Psychology (Undergraduate), University of Wisconsin, 2000
Introduction to Psychology (Undergraduate), Carnegie Mellon, 1999
Research Methods (Undergraduate), Carnegie Mellon, 1998

Undergraduate Student Advising

Erica Pepitone (2009-present)

Research: TBA

Joanna Thurnes (2009-present)

Research: TBA

Jenny Heil (2008-present)

Research: Early symbolic understanding

Honors: Honors Thesis

Emily Fyfe (formerly Conrad) (2007-present)

Research: Advantages and disadvantages of concrete vs. abstract representations in mathematics

Honors: Loughrey Award (summer UROP); Honors Thesis

Noelle Crooks (2008-2009)

Research: Effects of practice on problem solving

Honors: Honors Thesis

After Notre Dame: Graduate student in psychology at University of Wisconsin-Madison

Krysten Williams (2007-2008)

Research: Arithmetic practice that promotes conceptual understanding and computational fluency

After Notre Dame: Research Assistant at NY State Psychiatric Institute's Division on Substance Abuse

Matthew Gibson (2006-2008)

Research: Effects of problem format on young children's conceptual understanding of addition

Honors: McGrath Scholar (summer UROP), Honors Thesis, Santos Award for Distinction in Psychology

After Notre Dame: Teach for America

Christopher Howard (McNair/Notre Dame Scholars Program, summer 2007)

Research: Association between visual-spatial working memory and math performance

Graduate Student Advising

Lori Petersen (2007-present)

Research: Use of concrete objects and abstract symbols to represent mathematics concepts

M. Claire Keultjes (2008-present)

Research: Effects of formal mathematics instruction on informal mathematics reasoning

Masters, Preliminary Examination, and Dissertation Committees

Andrea Tamplin (Masters, 2007-2009)

Melissa Mitchell (Masters, 2008-2009)

M. Windy McNerney (Preliminary Examination, 2008)

Andrea Christensen (Masters, 2008)

University and Departmental Service

2009 Member, Search Committee for IEI Postdoc in Curriculum & Instruction
2008-present Member, Colloquium Committee
2008-present Member, Space, Parking, and Security Committee
2008-present Member, Ad-hoc Committee to Develop Protocol for Participant Payment
2008-2009 Member, Cognitive Search Committee
2008-2009 Member, Search Committee for the IEI Postdoc and Dissertation Award in Education
2007-2008 Member, Committee for Research Opportunities in the IEI
2007-2009 Faculty Mentor, Academic Honors Program for Student-Athletes at Notre Dame
2006-present Chair, E. M. Koppitz Child Psychology Graduate Fellowship Nomination Committee
2006-2009 Member, Committee for Change in Teaching Load
2007, 2009 Member, ACE Selection Committee
2007-2008 Member, Developmental Area Preliminary Examination Committee

Professional Service

Manuscript reviewer (ad hoc)

Child Development

Cognition and Instruction

Developmental Psychology

Developmental Science

Journal of Educational Psychology

Journal of Experimental Psychology: Learning, Memory, & Cognition

Learning and Individual Differences

Learning and Instruction

Memory & Cognition

Conference submission reviewer

Annual Conference of the Cognitive Science Society

Annual Meeting of the American Educational Research Association

Conference program committee member

APA Division 7 Program Committee, 2008 Convention

AERA Division C, Section 3 Review Panel, 2010 Annual Meeting

Grant reviewer

National Science Foundation, Developmental and Learning Sciences (ad hoc reviewer), 2008

National Science Foundation, Division of Research on Learning (grant panel member), 2008

Grant advisory board member

National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) grant: "Transfer of Perceptually Grounded Principles," Robert Goldstone, PI (Indiana University), 2009-2012.

Book reviewer

John Wiley & Sons, Inc.

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