

-CURRICULUM VITAE-

MARGARET M. GULLICK

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EDUCATION

DARTMOUTH COLLEGE **Ph.D., Cognitive Neuroscience**, Hanover, NH 2007-2012
Department of Psychological and Brain Sciences
Dissertation: Understanding Less than Nothing: Investigations into the neural representations of negative numbers
Committee: George Wolford (Chair), Michele Tine, Won Mok Shim, Daniel Ansari (External)

WESLEYAN UNIVERSITY **Bachelor of Arts**, Middletown, CT 2003- 2007
Double Major: Psychology and History
Member: ΨΧ (Psi Chi), Psychology Honors Society

HONORS & AWARDS

Dartmouth Graduate Studies Office **Arts & Sciences Poster Session Winner** April 2012

NIMH Summer Institute in Cognitive Neuroscience **Fellow** Summer 2011
Session: Cognitive Control; Higher Cognition (Numerical and Relational Processing)

Psi Chi, Graduate Research Grant 2010
"An Investigation of the Brain Function Supporting Historic Dates, Numbers, and Events," \$640

Dartmouth College, Marie A. Center **Award for Excellence in Teaching** 2009

National Science Foundation, Graduate Research Fellowship 2008-2011
Profiled as part of an NSF publication highlighting GRFP women in STEM 2011

Wesleyan University, Walkley Prize for Outstanding Original Research 2007

RESEARCH INTERESTS

I am interested in the development of educational skills, especially math and reading, and how the brain changes with age and experience in performing these demanding tasks. I have experience in both higher-level semantic and comprehension skills and basic number and letter understanding in both domains. I generally use functional magnetic resonance imaging (fMRI) to investigate the brain activity underlying these abilities. I am further interested in learning structural neuroimaging (DTI) to determining if reading ability and dyslexia can be predicted by white matter connectivity.

RESEARCH EXPERIENCE

Educational Neuroscience Lab, Graduate Researcher, Dartmouth College 2009-2012
Supervisors: Elise Temple (2009-2010), George Wolford (2011-current)

- Examining the development of number cognition in adults and children (ages 5+).
- Investigating basic number skills development; extra-numeric semantic associations for numbers; and negative number understanding.
- Using fMRI methodologies, with analysis through SPM8 and MarsBar.
- Facilitated collaborations with other labs on projects involving new analysis techniques, including multi-voxel pattern analysis (MVPA).

Reading Brains Lab, Graduate Researcher, Dartmouth College *Fall 2007-2008*
Supervisor: Donna Coch

- Investigated reading development using ERPs (event-related potentials) through ERPSS (in Unix).
- Developed and completed project on abstract and concrete word comprehension and visualization (currently in preparation for submission).
- Administered experimental sessions for participants ages 6-28.

Eye Movement Lab, Lab Manager, Research Assistant, Wesleyan University *Fall 2006-Summer 2007*
Supervisor: Barbara Juhasz

- Helped set up eyetracking and reading lab; acted as Lab Manager in coordination and training.
- Lead data collection and research efforts, including study proposals, stimulus creation, experiment administration, analysis, and writing.
- Ongoing collaboration on multiple articles and projects.

Cognitive Development Lab, Independent Research Assistant, Wesleyan University *Spring 2007*
Supervisor: Hilary Barth

- Ran experimental sessions on kindergarteners, first-graders, and college students to assess numerical and quantitative knowledge.
- Involved in data recoding and analysis.
- Created stimulus sets for multiple experiments with other lab members.

PUBLICATIONS & PRESENTATIONS

(for available reprints, see www.dartmouth.edu/~mgullick/publications.html)

Gullick, M.M., Temple, E., & Wolford, G. (accepted) Understanding less than nothing: neural distance effects for negative numbers. *NeuroImage*.

Gullick, M.M. & Wolford, G. (under review) Brain systems involved in arithmetic for positive versus negative numbers.

Gullick, M.M. & Wolford, G. (under review) Distance effects for double-digit negative numbers.

Gullick, M.M. & Temple, E. (2011) Brain function for numbers with semantic associations: Are historic years understood as numbers or events? *Brain & Cognition*, 77(3), 356-364.

Gullick, M.M., Sprute, L.A., & Temple, E. (2011) Individual differences in working memory, nonverbal IQ, and mathematics achievement and brain mechanisms associated with symbolic and non-symbolic number processing. *Learning and Individual Differences: Special Issue on Educational Neuroscience*, 21(6), 644-654.

Coch, D., & Gullick, M.M. (2011) *Event-related potentials and development*. In: S.J. Luck & E.S. Kappenman (Eds.) *The Oxford Handbook of Event-Related Potential Components*.

Juhasz, B.J., Yap, M.J., Dicke, J., Taylor, S.C., & Gullick, M.M. (2011) Tangible words are recognized faster: The grounding of meaning in sensory and perceptual systems. *Quarterly Journal of Experimental Psychology*, 64(9), 1683-1691.

Juhasz, B.J., Gullick, M.M., & Shesler, L.W. (2011) The effects of Age-of-Acquisition on ambiguity resolution: Evidence from eye movements. *Journal of Eye Movement Research*, 4(1), 1-14.

Gullick, M.M. & Juhasz, B.J. (2008) Age of Acquisition's role in memory for semantically associated word-pairs. *Quarterly Journal of Experimental Psychology*, 61(8), 1177-1185.

Gullick, M. (2007) Incomplete input as evidence for Poverty of the Stimulus. *Mind Matters: The Wesleyan Journal of Psychology*, 2, 37-47.

IN PREPARATION:

Gullick, M.M., Mitra, P., & Coch, D. Imagining the truth and the moon: an electrophysiological study of abstract and concrete word processing.

Gullick, M.M. & Wolford, G. Brain activity supporting negative number processing in pre- and post-instruction children.

Juhasz, B J. & **Gullick, M.M.** Investigations of the effects of Age of Acquisition in patient populations.

PRESENTATIONS:

Gullick, M.M. & Wolford, G.. (2012, April) *Understanding less than nothing: A developmental fMRI study of negative number comparisons.* Poster session presented at the annual meeting of the Cognitive Neuroscience Society, Chicago, IL.

Gullick, M.M., Wolford, G., & Temple, E. (2011, April) *Understanding less than nothing: an fMRI study of negative number comparisons.* Poster session presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Gullick, M.M. & Temple, E. (2010, November) *Brain function for numbers with semantic associations: Are historic years understood as numbers or events?* Poster session presented at the annual meeting of the Society for Neuroscience, San Diego, CA.

Sprute, L.A., **Gullick, M.M.,** & Temple, E. (2010, November) *Neural correlates of the Distance Effect for nonsymbolic and symbolic numerosities.* Poster session presented at the annual meeting of the Society for Neuroscience, San Diego, CA.

Gullick, M.M. & Temple, E. (2010, April) *Timelines and number lines: Are historic dates understood as numbers or events?* Poster session presented at the annual meeting of the Cognitive Neuroscience Society, Montreal, Quebec, CA.

Coch, D., George, E., Mitra, P., Berger, N., & **Gullick, M.M.** (2009, April) *An ERP letter-name rhyming effect as a measure of phonological processing in children.* Poster session presented at the Biennial Meeting of the Society for Research in Child Development, Denver, CO.

Juhasz, B.J., Taylor, S.C., & **Gullick, M.M.** (2008, November) *Sensory experience ratings: A new word recognition variable.* Poster presented at the annual meeting of the Psychonomics Society, Chicago, IL.

Gullick, M.M., George, E., Mitra, P., & Coch, D. (2008, April) *The N200 as an index of orthographic processing in a Reicher-Wheeler paradigm.* Poster session presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Juhasz, B.J. & **Gullick, M.M.** (2007, November) *Late semantic Age-of-Acquisition effects in reading: Evidence from eye movements.* Poster session presented at the annual meeting of the Psychonomics Society, Long Beach, CA.

TEACHING EXPERIENCE AT DARTMOUTH COLLEGE

Professional Ethics Program for First-Year Graduate Students, Facilitator

Fall 2011

Held weekly discussion-based sessions for departmental first-year graduate students on topics such as professionalism, mentoring, authorship/peer review, and data collection, using case studies.

Systems Neuroscience / Physiology of Behavior, **Teaching Assistant** *Spring 2009, 2010, 2011**
Instructor: Dr. Jeffrey Taube **Denotes extra TAship beyond program requirements*
Directed weekly lab sessions, including sheep brain dissections and demonstrations of multiple neuroscience techniques (including behavioral neuroscience, ERP, psychophysiology) with co-teaching assistant. Created lab exam. Lectured lab sections, and full class on "Neuroanatomy of Language and Reading" (2009, 2010), "Symbolic Systems and the Brain" (2011).

Systems Neuroscience, **Guest Lecturer** *Fall 2009*
Provided lecture on the "Neuroanatomy of Language and Reading."

Laboratory in Psychological Science, **Teaching Assistant**
Instructor: Dr. Paul Whalen *Winter 2009*
Instructor: Dr. David Bucci *Summer 2008*
Responsible for running lab section, directing lab activities. Guided small-group research project idea generation, experimental design, analysis, and presentation. Lectured section and full class.

TRAINING:
Ethics Institute Training for Trainers, **Participant**, Ethics Institute *Winter 2011*
Participated in a 4-week workshop on how to effectively lead ethics discussions in small groups, aimed at training facilitators for Professional Ethics Program for First-Year Graduate Students.

Teacher Training Series, **Participant**, Center for the Advancement of Learning *Summer 2008*
Participated in 5-week workshop on effective teaching, learning styles, and course design, culminating in a short lecture presentation.

OUTREACH & MENTORING EXPERIENCE

Science Cafés, **Presenter: fMRI for Kids, Real Brains** *2011-2012*
Presented multiple Science Cafés, aimed at introducing students to aspects of science research in an interactive conversational format at local public schools (NH & VT). Talked with fourth, sixth, and eighth-graders about exploring real brains and how we study the living, thinking brain using fMRI.

Brain Science Curriculum, **Presenter**, Richmond Middle School *November 2011*
Presented interactive talk on "Math and the Brain" to 100 sixth-graders as a "professional brain scientist." Discussed how we understand numbers and amounts, how we use fMRI to study the brain; generated group ideas about how negatives are different from positives and hypotheses of how we might understand them; examined real fMRI results with students.

Education Exchange Workshop, **Presenter**, Hopkins Center for the Arts, Dartmouth *September 2011*
Lead small-group discussion with local middle-school teachers about how brain research may speak to classroom practice, and connecting a presented dance piece to research on learning.

Brain-O-Mania, **Presenter**, Dothan Brook Elementary School *April 2011*
Took part in the "Real Brains" portion of Brain-O-Mania's kick-off night. Presented images of real brains and discussed how we take pictures of the brain using MRI to kindergarten through fifth-grade students.

Delta Kappa Gamma International Society for Women Educators, **Guest Speaker** *November, 2010*
Spoke to Dutchess County, NY (Alpha) chapter of teachers and administrators on "Teaching brains that change: How an understanding of brain development can inform how we teach and learn" at fall meeting. Presented on changeable intelligence, brain development, plasticity, and intervention.

HHMI Science Camp, Science Mentor, Dartmouth College *Winter 2010*
Volunteered weekly in low-income district third-grade classroom. Lead hands-on, small-group lessons; discussed hypothesis formation, scientific questioning, and research recording. Worked with two undergraduate students to coordinate classroom management and individual student help. Created and implemented an original final lesson on the brain and its functions.

MENTORING:

Experience mentoring multiple lab interns through the WISP (*Women in Science Program: freshmen*) and HHMI (*Howard Hughes Medical Institute: sophomores*) programs. Ensured comfort with lab projects and techniques and gave conceptual background. Oversaw poster projects for multiple interns examining my data through analysis, creation, and presentation.

<i>Intern</i>	<i>Program</i>	<i>Year</i>
Daniel Akinola-Odosula	Volunteer	Summer 2011
Alexandra Lucas	WISP, HHMI	Winter/Spring 2010; Fall 2010/Winter 2011
Jennifer Bares	HHMI	Fall 2009/Spring 2010
Elizabeth Trandel	HHMI	Fall 2009/Winter 2010
Neera Chandani	WISP	Winter/Spring 2009

RELATED PROFESSIONAL EXPERIENCES

NSF GRFP Workshop, Student Volunteer, Dartmouth College *Fall 2008-2011*
Helped first- and second-year graduate students prepare their applications for the NSF graduate research fellowship. Reviewed research proposals and personal statements, gave feedback and advice from the perspective of a successful applicant.

NHPA Student Convention, Panelist, Colby-Sawyer College *April 2010*
Guest speaker and panelist on "Surviving and Thriving in Graduate School" session for New Hampshire Psychology Association conference. Spoke about PhD graduate program applications, program qualities, and student life.

Cognitive Brown Bag Series, Co-Organizer, Dartmouth College *Summer 2008-Spring 2010*
Invited and hosted researchers from Dartmouth and other regional universities for informal biweekly departmental talks on topics related to cognitive neuroscience/psychology.

PROFESSIONAL AFFILIATIONS

Cognitive Neuroscience Society
International Mind, Brain, and Education Society
Society for Neuroscience