Harvard Medical School Curriculum Vitae

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Place of Birth: Madison, WI

Education

1990	B.A. (*cum laude*)	Anthropology, Biology	Amherst College
1995	M.A.	Clinical Psychology	Duke University
2000	Ph.D.	Clinical Psychology	Duke University

Postdoctoral Training

09/00-08/02 Research Fellow MH-16259: "Clinical Research Training Program in Biological and Social Psychiatry" Psychiatry (Larry Seidman, Ph.D) Harvard Medical School

09/02-08/04 Research Fellow R25 MH 60485: "Training in Psychiatric Genetics" Psychiatry (Stephen V. Faraone, Ph.D) Harvard Medical School

Faculty Academic Appointments

2004 -	Instructor	Psychology in Dept. of Psychiatry	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

Past

09/02-08/08	Research Fellow	Radiology	Massachusetts General Hospital (HMS)
09/03-08/04	Research Fellow	Epidemiology	Harvard School of Public Health
09/08-08/10	Visiting Scientist	Radiology	Massachusetts General Hospital (HMS)

Current

07/09-07/13	Assistant in Research	Psychiatry	Massachusetts General Hospital (HMS)
10/12-	Visiting Scientist	McGovern Institute for Brain Research, Massachusetts Institute of Technology (MIT)	

Committee Service

Local

1993-1995	Colloquium Committee	Dept. of Psychology, Duke University
1994-1995	Graduate Admissions Committee	Dept. of Psychology, Duke University
2001-2002	Colloquium Committee	Clinical Research Training Program in Biological and Social Psychiatry, Harvard Medical School
2012-2013	Women's Careers Committee	Harvard Medical School

Professional Societies

1991-	American Psychological Association Division 12 (Clinical Psychology)	Member
1995-2004	American Academy for the Advancement of Science	Member
1998-1999	American Psychological Association Division 21 (Applied and Experimental Psychology) Division 40 (Neuropsychology)	Member
2011-	Society of Biological Psychiatry	Member

Editorial Activities

- Ad hoc Reviewer
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  Acta Psychiatrica Scandinavica

  American Journal of Medical Genetics (Part B): Neuropsychiatric Genetics

  Archives of General Psychiatry

  Biological Psychiatry

  Biomed Central

  Bipolar Disorders

Human Brain Mapping

Journal of Affective Disorders

Journal of Psychiatry and Neuroscience

Neurobiology of Aging

Neuropsychology

Psychiatric Research

Schizophrenia Bulletin

Schizophrenia Research

Honors and Prizes

1991-1996	Graduate Scholarship in Psychology	Duke University
1993-1994	Graduate Research Award	North Carolina Governor's Institute
1994-1995	Future Faculty Fellowship	Duke University
1999-2000	Dissertation Research Award	Theodore and Vada Stanley Foundation
2000-2001	Peter B. Livingston Foundation Award	Harvard Medical School
2002	Neal Alan Mysell Award Honorable Mention	Harvard Medical School
2003	Nelson Butters Award	Massachusetts Neuropsychological Society
2005	Young Investigator Award	International Congress on Schizophrenia Researc

Report of Funded and Unfunded Projects

Funding Information

Completed

1993-1994 "Predictors of Substance Abuse Relapse After Brief (10-day) Multimodal Treatment on a Dual-Diagnosis Unit." [Role: **PI: Wencel (now Thermenos)**] North Carolina Governor's Institute Graduate Research Fellowship.

The goal of this study was to characterize psychological traits associated with substance abuse relapse after brief inpatient treatment. The PI developed the research project, collected and analyzed the data and reported the findings at the North Carolina Governor's Institute Research Fellowship meeting.

1999–2000 "Brain Structure-Function Relationships in First-Degree Relatives of Schizophrenic Persons." [Role: **PI: Wencel (now Thermenos)**] Theodore and Vada Stanley Foundation Dissertation Research Fellowship.

The goal of this project was to 1) develop a novel method for the co-registration of structural and functional MRI data, and 2) determine how brain structural alterations in persons at genetic risk for schizophrenia are related to brain functional alterations (as measured by functional MRI).

2000-2001 "Proton Magnetic Resonance Spectroscopy of the Hippocampus in First-Degree Relatives of Schizophrenic Persons." [Role: **PI: Wencel (now Thermenos)**] Peter Livingston Foundation Fellowship Award.

The goals of this project were to 1. acquire training in MR proton spectroscopic methods, and 2. determine alterations in spectroscopic markers of neuronal integrity (i.e., N-acetyl-aspartate) in persons at genetic risk for schizophrenia, and 3. relate these alterations to neuropsychological and structural and functional MRI alterations.

2002-2005 "Towards the Primary Prevention of Schizophrenia: Neurobiological Studies of Families with Schizophrenia" (Role: Neuroimaging Coordinator; PI: Seidman). Mental Illness Neuroscience Discovery Institute.

The goal of this study was to identify the specificity of brain structural and functional changes in adolescents at genetic risk for schizophrenia. Dr. Thermenos oversaw and coordinated all aspects of neuroimaging data collection, functional MRI data analysis and manuscript preparation, that led to a number of publications.

2005-2007 "Specificity of Pre-illness Vulnerability in Bipolar Disorder versus Schizophrenia" (Role**: Co-PI**; PI: Seidman). National Association for Research on Schizophrenia and Depression

The goal of this study was to identify the specificity of brain structural and functional changes in adolescents at genetic risk for Bipolar Psychotic (BP) disorder compared to schizophrenia.

2007-2012 "Vulnerability to Progression in Schizophrenia" [Role: Project 1 Director ("Functional Anatomy of Neurocognitive Deterioration in Schizophrenia"); PI: McCarley; MGH Sub-contract PI: Seidman]. NIH/NIMH P50 MH 080272

This CIDAR application has 4 projects and 4 cores to test the hypothesis that schizophrenia is characterized by a progressive decline in brain, neurocognitive and executive functions from prodromal phase to chronic schizophrenia.

2009-2011 "Language and Risk for Schizophrenia" (Role: **Investigator**; PI: DeLisi). NIH/NIMH R21 MH083205

This study tests the hypothesis that a genetic disturbance in the brain language pathways makes people more vulnerable for development of schizophrenia.

2010-2012 "Predictors and Mechanisms of Conversion to Psychosis: A Functional MRI study" (Role: **Investigator**; MGH PI: Seidman). Staglin Foundation.

This private foundation funding supports the addition of functional MRI scanning to the MRI protocol for U01 MH081928 "3/8- Predictors and Mechanisms of Conversion to Psychosis" project listed above.

2008-2013 "3/8- Predictors and Mechanisms of Conversion to Psychosis." (Role: **Investigator**; PI: Cannon; MGH PI: Seidman) NIH/NIMH U01 MH081928

The aim of this 8 site study is to collect a sample at clinical high risk for psychosis with sufficient size and power to test rigorously elements critical to the liability for and development of psychosis in the biomarker domains of brain structure, electrophysiology, stress hormones, and genomics, and in the clinical domains of prodromal presentation and epidemiology. The project will expand our ability to identify persons at high risk for imminent

psychosis, to refine the predictors of true liability, and to expand understanding of the mechanisms by which schizophrenia unfolds in vulnerable persons.

2011-2013 "Genetic Imaging of Working Memory and Interference Control in ADHD." (Role: **Investigator**; PIs: Doyle & Seidman, MGH) NIH/NIMH R21 MH091461-01A1

This study proposes to use an existing data set to generate hypotheses about the relationship between three ADHD candidate genes (DRD4, SLC6A3 and SNAP-25), neuroimaging measures of working memory and interference control networks, neurocognitive measures of these functions and behavioral symptoms of ADHD.

2012- "Brain Function and Structure in Young Children at Familial Risk for Schizophrenia." (Role: **Investigator**; PIs: Seidman, Keshavan & Gabrieli, BIDMC) NIH/NIMH R21 MH R21 MH092840-01A1

The goal of this study is to characterize the neural and cognitive capacities of children ages 7-11 that are at familial risk for schizophrenia.

Active (Current)

2004- "Commonwealth Research Center (CRC) for Clinical Neuroscience and Psychopharmacological Research." (Role: **Director of Functional Neuroimaging**; PI: Seidman, BIDMC) Massachusetts Department of Mental Health SCDMH82101008006

The goal of this center is to develop new assessment and treatment strategies for persons at risk for psychosis to help identify, prevent and treat persons prior to or early in the course of their illness.

2012- "Brain Function and Structure in Young Children at Familial Risk for Schizophrenia." (Role: **Investigator**; PIs: Seidman, Keshavan & Gabrieli, BIDMC) NIH/NIMH R21 MH R21 MH092840-01A1

The goal of this study is to characterize the neural and cognitive capacities of children ages 7-11 that are at familial risk for schizophrenia.

2012-2017 "Brain Imaging, Cognitive Enhancement and Early Schizophrenia." (Role: **Subcontract PI, MGH**: **Thermenos**; PIs: Keshavan and Eack;) NIH/NIMH R01 MH 092440 01A1

The purpose of this grant is to examine the effects of a novel cognitive rehabilitation program, Cognitive Enhancement Therapy (CET), on the brain in individuals with early course schizophrenia. Specifically, an 18-month clinical trial of CET will be conducted and use integrated neuroimaging techniques to repeatedly assess brain function, structure, and connectivity during the course of CET treatment, as well as the predictive contribution of brain reserves to treatment response. Further, a 1-year post-treatment durability study will be conducted to examine the degree to which neurobiologic, cognitive, and functional effects can be sustained post-treatment in early course schizophrenia patients.

2015-2019 "3/9- Predictors and Mechanisms of Conversion to Psychosis." (Role: **Investigator**; PI: Cannon; MGH PI: Seidman) NIH/NIMH U01 MH081928

The aim of this 8 site study is to further characterize psychosis risk biomarkers (brain structure, electrophysiology, stress hormones, and genomics, and in the clinical domains of prodromal presentation and epidemiology) in clinical high risk for psychosis, using repeated measurements conducted at 2-month intervals.

Pending

Report of Local Teaching and Training

Teaching of Students in Courses

Duke University College of Arts and Sciences, Department of Psychology (1991-1996)

1991 Health psychology. 50 undergraduates. Section Leader/ Tutor, 24 hrs/semester
1992 Introductory Psychology. 250 undergraduates. Exam Writer/ Tutor, 16 hours/semester
1993 Personality & Social Psychology. 100 undergraduate students. Section Leader/ Lecturer, 21 hrs/semester
1995 Personality & Social Psychology. 15 undergraduates. Lecturer, 24 hours/semester
1995 Personality Theory & Case Studies in Clinical Psychology. 10 college juniors/ seniors. Instructor, 24 hours/ semester.

Laboratory and Other Research Supervisory and Training Responsibilities

Psychiatry Research Fellows

2014-2015 Mentored HMS Psychiatry Visiting Research Fellow (Urvakhsh Mehta, MD) in functional MRI data analytic techniques and interpretation (supervision as needed to complete his research project).

Post-doctoral Research Fellows

2000-2001 Laboratory supervisor, 1 Post-doctoral Fellow (Eve Valera, Ph.D.). Weekly supervision (and additional supervision as-needed) for 12 months.

2006-2010 Laboratory supervisor, 1 Post-doctoral Fellow (Snezana Milanovic, MD, MA). Weekly supervision (and additional supervision as-needed) for 36 months.

2010-2013 Laboratory supervisor, 1 Post-doctoral Fellow (Andrea Pousada-Casal, Ph.D.). Weekly supervision (and additional supervision as-needed) on data analysis and manuscript writing for 18 months.

Doctoral Students

2006-2008 Laboratory supervisor, 1 Doctoral student (Ariel Brown, MA). Weekly supervision (and additional supervision as-needed) for 24 months.

2008-2009 Laboratory supervisor, 2 Doctoral students (Ariel Brown, MA; Samantha Huang, MA). Weekly supervision (and additional supervision as-needed) for 12 months.

Master's Students

2012-2015 Laboratory supervisor, 1 Master's student (Elena Molokotos). Weekly supervision (and additional supervision as-needed) for 12 months.

2014- Laboratory supervisor, 2 Master's students (Brandon Hager, Elena Molokotos). Weekly supervision (and additional supervision as-needed) (ongoing).

Bachelor's-level Research Assistants

2000-2002 Laboratory supervisor, 1 Research Assistant (Jennifer Koch). Daily supervision for 24 months

2002-2003 Laboratory supervisor, 2 Research Assistants (Jennifer Koch; Barbara Holland). Daily supervision for 12 months

2003-2006 Laboratory supervisor, 2 Research Assistants (daily) (Jennifer Koch; Nicole Peace) and 12 additional research assistants (as-needed) for 36 months (Andrea Crowell; Kristen Kelly; Jennifer Pacheco; Kalika Kelkar; Sharmila Bandyopadhyay; Emily Connally; Saul Miller; Julia Price; David Ziegler; Anya Potter; Vasanth Pappu; Stuart Wallace).

2009-2014 Laboratory supervisor, 1 Research Assistant (Richard Juelich). Daily supervision for 24 months; bi-weekly supervision for 36 months.

2013-2014 Laboratory supervisor, 1 Research Assistant (Ashley Ronzio). Weekly supervision as needed for 12 months.

2014- Laboratory supervisor, 3 Research Assistants (Katharine O'Neil , Anna Brunner, Ian Graf). Weekly supervision as needed (ongoing).

Undergraduate Students

1994 -1995 Undergraduate Senior Honors Thesis Co-supervisor of 2 students. Bi-weekly supervision for 9 months.

2010- Supervised 3 undergraduate summer interns 2 days a week for 3.5 months (Kathryn Salwen, Elizabeth Apkin, Weiwen Li). Kathryn Salwen will be author on two manuscripts resulting from her work.

2011- Supervised 1-3 undergraduate interns 3 days a week for a 6 month periods as part of a formal Northeastern University Cooperative experience (Elizabeth Apkin, Shreya Divatia, Clay Riley, Lauren Beaton, Sofia Slaoui, John Efromson, Ashley Ronzio, Kathryn Sinclair, Samantha DiChiara, Anjali Mehta, Mathew Lai). Several students have been author on a manuscripts resulting from their work.

Formally Supervised Trainees

Post-doctoral Research Fellows

2000-2001 Eve Valera, Ph.D. Assistant Professor in Psychiatry, Harvard Medical School. Supervision in neuroimaging data collection and analysis methods. Trainee collected and analyzed data for her post-doctoral project and published one resulting first-author manuscript.

2006-2009 Snezana Milanovic, MD, MA. Instructor in Psychiatry, Harvard Medical School. Supervision in neuroimaging data collection and analysis methods, and scientific manuscript and grant writing. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory (resulting in 2 publications on which she is an author, one in the *Proceedings of the National Academy of Sciences* and one first-author manuscript).

2010-2011 Andrea Pousada-Casal, Ph.D. Post-doctoral fellow, Department of Psychiatry, Harvard Medical School. Supervision in neuroimaging data collection and analysis methods, and scientific manuscript and grant writing. Trainee will collect, database and analyze data for several ongoing projects in the laboratory. She will submit one second-author and one third-author manuscript for publication as a result of this mentorship.

Doctoral Students

2006-2009 Ariel Brown, Ph.D. Post-doctoral Fellow, Harvard Medical School. Supervision in neuroimaging data collection and analysis methods, scientific manuscript writing, and clinical procedures for interacting with clinical research subjects. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory, published 1 first-author manuscript and is an author on 1 manuscript under review and 3 others that are in progress.

2008- 2010 Samantha Huang, Ph.D. Research Fellow at the Massachusetts General Hospital,

Department of Radiology, Athinoula A. Martinos Center for Biomedical Imaging, Harvard Medical School. Supervision in neuroimaging data collection and analysis methods, scientific manuscript writing, and clinical procedures for interacting with clinical research subjects. Trainee was trained in data collection, databasing and analysis procedures for several laboratory projects. Her dissertation (defended in July 2010) was based on existing laboratory data, and she will be author on 2 additional manuscripts that are in progress.

Bachelor's-level Research Assistants

2009- Richard Juelich, BA. Supervision in neuroimaging data collection and analysis methods, databasing, and clinical procedures for interacting with clinical research subjects. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory, and will be an author on six manuscripts that are in progress.

2000-2005 Jennifer Koch, MPH. Senior Clinical Research Analyst, Perinatal and Reproductive Psychiatry Clinical Research Program, Massachusetts General Hospital, Boston, MA. Supervision in neuroimaging data collection and analysis methods, databasing, and clinical procedures for interacting with clinical research subjects. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory, and was an author on 4 manuscripts based on the resulting data.

2002-2003 Barbara Holland, MA. N/A. Supervision in neuroimaging data collection and analysis methods, databasing, and clinical procedures for interacting with clinical research subjects. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory.

2003- 2005 Nicole Peace, BA. Nurse Practitioner Program student, UMASS-Boston. Supervision in neuroimaging data collection and analysis methods, databasing, and clinical procedures for interacting with clinical research subjects. Trainee collected, databased and analyzed data for several ongoing projects in the laboratory, and was an author on 2 manuscripts based on the resulting data.

2005-2006 Jennifer Pacheco, MA. Doctoral student in Neuroscience, University of Texas. Supervision in neuroimaging data collection, clinical procedures for interacting with clinical research subjects, databasing and archiving for a multi-site research study. She is author on 4 manuscripts that were based on data she collected in the laboratory.

Local Invited Presentations

2003 "Functional neuroimaging abnormalities in family members at risk for schizophrenia and bipolar disorder." Lecture. Division of Cognitive and Behavioral Neurology Rounds, Brigham and Women's Hospital. None.

2004 "Sleep abnormalities and candidate genes for bipolar disorder." Lecture. Neuropsychology Laboratory Seminar, Department of Psychiatry, Massachusetts Mental Health Center, Harvard Medical School. None.

2010 "Overview of bipolar and psychotic disorders in children and adolescents." Neuropsychology Post-doctoral Program Weekly Seminar, Department of Psychiatry, Massachusetts Mental Health Center, Harvard Medical School. None.

2011 "Default network activity differentiates adolescent and young adult persons with bipolar disorder and schizophrenia." Seidman-Keshavan Research Weekly Seminar, Department of Psychiatry, Massachusetts Mental Health Center, Harvard Medical School. None.

2012 "Distinct Default Network Suppression and Resting Connectivity Patterns in Young Persons at Genetic Risk for Bipolar Psychotic Disorder and Schizophrenia." Faculty Colloquium Presentation for the Neal Alan Mysell Award Speaker, Shitij Kapur, Department of Psychiatry, Massachusetts Mental Health Center, Harvard Medical School. None.

Report of Regional, National and International Invited Teaching and Presentations

Regional, National and International Invited Presentations and Courses

2005 "Altered brain activation in the entorhinal cortex in adolescents and young adults at genetic risk for schizophrenia: An fMRI study of verbal encoding." Presentation, Poster Forum Review: "Strong Positive and Negative Claims Under Scrutiny: What is Pathophysiology?" (Chair: Dr. Timothy J. Crow, Dr. Michele Pato). World Congress on Psychiatric Genetics XIII, Boston, Massachusetts. None.

2007 "Altered brain activation during working memory in Bipolar Disorder and first-degree relatives at genetic risk for Bipolar Disorder" Presentation Session 2-2: "Functional Neuroimaging: Mechanisms of Vulnerability" (Chair: Dr. Stephan Taylor). International Congress on Schizophrenia Research, Colorado Springs, Colorado. None.

2011 "Altered language network activity in persons at genetic high-risk for schizophrenia." Presentation Session "Functional Neuroimaging: Novel analyses of dysfunctional neural circuitry in individuals with schizophrenia and at risk populations (Chair: Dr. Daphne J. Holt). International Congress on Schizophrenia Research, Colorado Springs, Colorado. None.

Report of Clinical Activities and Innovations

Practice Activities

Clinical Practicums, Internships and Fellowships:

1993-1995 Cognitive-behavioral group psychotherapy (suicidal behavior). Adult Inpatient Psychiatric Unit. Duke University Medical Center, Durham, NC. 2 sessions per week.

1993-1995 Cognitive-behavioral Group psychotherapy (substance abuse relapse). Adult Inpatient Psychiatry and Substance Abuse Unit. Duke University Medical Center, Durham, NC. 4 hours/ week.

1993-1995 Cognitive-behavioral Group psychotherapy (binge eating). Adult Outpatient Clinic. Duke University Medical Center, Durham, NC. 2 hours/ week.

1993-1995 Cognitive-behavioral Group psychotherapy (substance abuse relapse). Adult Outpatient Clinic. Duke University Medical Center, Durham, NC. 2 hours/ week.

1993-1996 Individual Psychotherapy and Psychological Testing. Adult Outpatient Clinic. Duke University Medical Center Outpatient Psychology Clinic, Durham, NC. 4 hours/ week.

1995-1996 Individual and Group Psychotherapy and Psychological Testing. Adolescent Inpatient Unit. John Umstead Hospital, Butner, NC. 8 hours/ week.

1996-1997 Individual Psychotherapy. Adult Outpatient Clinic. The Cambridge Hospital, Cambridge, MA. 20 hours/ week.

1996-1997 Individual and Group Psychotherapy and Psychological Testing. Adult Inpatient Unit. The Cambridge Hospital, Cambridge, MA. 20 hours/ week.

1997-1998 Neuropsychological Testing. Inpatient and Outpatient Clinics. The Cambridge Hospital, Cambridge, MA. 40 hours/ week.

2013- Clinical Service. Outpatient Clinic. Massachusetts Mental Health Center, Boston, MA. 20 hours/ week.

Report of Education of Patients and Service to the Community

Activities

1994-1995 Teaching in Durham, NC Public School System. Durham, NC
Primary prevention of high-risk sexual and substance abuse behavior in public school system with large low-income and minority populations.

Report of Scholarship

Publications

Note: My name was changed from Heidi E. Wencel to Heidi W. Thermenos in 2003.

1. **Wencel HE**, Smothers C, Opara EC, Kuhn CM, Feinglos MN, Surwit RS (1995). Impaired second phase insulin response of diabetes-prone C57BL/6J mouse islets. Physiology and Behavior 57(6):1215-20. PMID: 7652047

2. **Thermenos HW**, Seidman LJ, Breiter H, Goldstein JM, Goodman JM, Poldrack R, Faraone SV, Tsuang MT (2004). Functional magnetic resonance imaging during auditory verbal working memory in non-psychotic relatives of persons with schizophrenia: a pilot study. Biological Psychiatry 55(5):490-500. PMID: 15023577

3. Stone WS, **Thermenos HW**, Tarbox SI, Poldrack RA, Seidman LJ (2005). Medial temporal and prefrontal lobe activation during verbal encoding following glucose ingestion in schizophrenia: A pilot fMRI study. Neurobiology of Learning and Memory 83: 54-64. PMID: 15607689

4. **Thermenos HW**, Goldstein JM, Buka SL, Poldrack RA, Koch JK, Tsuang MT, Seidman LJ (2005). The effect of working memory performance on functional MRI in schizophrenia. Schizophrenia Research 74 (2-3): 179-94. PMID: 15721998

5. Seidman LJ, **Thermenos HW**, Poldrack RA, Peace NK, Koch JK, Faraone SV, Tsuang MT (2006). Altered brain activation in dorsolateral prefrontal in adolescents and young adults at genetic risk for schizophrenia: A FMRI study of working memory. Schizophrenia Research 85: 58-72. PMID: 16632333

6. **Thermenos HW**, Seidman LJ, Poldrack RA, Peace NK, Koch JK, Faraone SV, Tsuang MT (2007). Elaborative verbal encoding and altered anterior parahippocampal activation in adolescents and young adults at genetic risk for schizophrenia using fMRI. Biological Psychiatry 61 (4): 564-74. PMID: 17276751

7. Seidman LJ, **Thermenos HW**, Koch JK, Ward M, Breiter H, Goldstein JM, Goodman, JM, Faraone SV, Tsuang MT (2007). Auditory verbal working memory load and thalamic activation in non-psychotic relatives of persons with schizophrenia: A FMRI replication. Neuropsychology 21 (5): 599-610. PMID: 17784808

8. MacDonald AW 3rd, **Thermenos HW**, Barch DM, Seidman LJ (2009). Imaging genetic liability to schizophrenia: Systematic review of fMRI studies of patients' nonpsychotic relatives. Schizophrenia Bulletin 35(6):1142-62. PMC2762618

9. Whitfield-Gabrieli S, **Thermenos HW**, Milanovic S, Tsuang MT, Faraone SV, McCarley RW, Shenton ME, Green AI, Castañón AN, Peter LaViolette P, Wojcik J, Gabrieli JDE, Seidman LJ (2009). Hyperactivity and hyperconnectivity of the default network in schizophrenia and in first-degree relatives of persons with schizophrenia. Proceedings of the National Academy of Sciences 106 (4):1279-84. PMC2633557

10. **Thermenos HW**, Goldstein JM, Milanovic SM, Whitfield-Gabrieli S, Makris N, LaViolette P, Koch JK. Faraone SV, Tsuang MT, Buka SL, Seidman LJ (2010). An fMRI study of working memory in persons with bipolar disorder or at genetic risk for bipolar disorder. American Journal of Medical Genetics Part B: Neuropsychiatric Genetics 153B(1):120-31. PMID: 19418510

11. Kremen W, Prom-Wormley E, Panizzon M, Eyler L, Fischl B, Neale M, Franz C, Lyons M, Pacheco J, Perry M, Stevens A, Schmitt JE, Grant M, Seidman L, **Thermenos H**, Tsuang M, Eisen S, Dale A, Fennema-Notestine C (2010): Genetic and environmental influences on the size of specific brain regions in midlife: The VETSA MRI study. Neuroimage 49(2):1213-23. PMID: 19786105

12. Rimol, LM, Eyler, LT, Fennema-Notestine C, Fischl B, Franz CE, Hagler D, Lyons MJ, Neale MC, Pacheco J, Perry ME, Panizzon MS, Schmitt JE, Seidman LJ, **Thermenos H**, Tsuang MT, Kremen WS, Dale AM (2010). Cortical thickness is influenced by regionally-specific genetic factors. Biological Psychiatry 67: 493-499. PMID: 19963208

13. Kremen WS, O'Brien R, Panizzon M, Prom-Wormley E, Eaves L, Eisen S, Eyler L, Hauger R, Fennema-Notestine C, Fischl B, Grant M, Hellhammer D, Jak A, Jacobson K, Jernigan T, Lupien S, Lyons M, Mendoza S, Neale M, Seidman L, **Thermenos H**, Tsuang M, Dale A, Franz C (2010). Salivary cortisol and prefrontal cortical thickness in middle-aged men: A twin study. Neuroimage 53(3):1093-102. PMID: 20156572

14. Kremen WS, Panizzon MS, Neale MC, Fennema-Notestine C, Prom-Wormley E, Eyler LT, Stevens A, Franz CE, Lyons MJ, Grant MD, Jak AJ, Jernigan TL, Xian H, Fischl B, **Thermenos H,** Seidman LJ, Tsuang MT, Dale AM (2012). Heritability of brain ventricle size: Converging evidence from inconsistent results. Neurobiology of Aging 33(1): 1-8. PMID: 20363053

15. Eyler, LT, Prom-Wormley E, Fennema-Notestine C, Panizzon MS, Neale MC, Jernigan TL, Fischl B, Franz CE, Lyons MJ, Stevens A, Pacheco J, Perry ME, Schmitt JE, Spitzer NC, Seidman LJ, **Thermenos H,** Tsuang MT, Dale AM, Kremen WS (2011). Genetic patterns of correlation among subcortical volumes in humans: Results from a magnetic resonance imaging twin study. Human Brain Mapping 32 (4): 641-53. PMID: 20572207

16. Rosso IM, Makris N, **Thermenos HW**, Hodge SM, Brown A, Kennedy D, Caviness VS, Faraone SV, Tsuang MT, Seidman LJ (2010). Regional prefrontal volumes in young adults at familial risk for schizophrenia from the Harvard Adolescent High Risk Study. Schizophrenia Research 123:15-21. PMC2939267

17. **Thermenos HW**, Makris N, Whitfield-Gabrieli S, Brown AB, Giuliano AJ, Lee EH, Faraone SV, Tsuang MT, Seidman LJ (2011). A functional MRI study of working memory in adolescents and young adults at genetic risk for Bipolar Disorder: Preliminary findings. Bipolar Disorders 13 (3): 272-286. PMID: 21676130

18. Eyler LT, Prom-Wormley E, Panizzon MS, Kaup AR, Fennema-Notestine C, Neale MC, Jernigan TL, Fischl B, Franz CE, Lyons MJ, Grant M, Stevens A, Pacheco J, Perry ME, Schmitt JE, Seidman LJ, **Thermenos HW**, Tsuang MT, Chen C, Thompson WK, Jak A, Dale AM, Kremen WS (2011). Genetic and environmental contributions to regional cortical surface area in humans: A magnetic resonance imaging twin study. Cerebral Cortex 21 (10): 2313-21. PMID: 21378112

19. Milanovic SM, **Thermenos HW**, Goldstein JM, Brown A, Whitfield-Gabrieli S, Makris N, Tsuang MT, Buka SL, Seidman LJ (2011). Medial prefrontal cortical activation during working memory differentiates schizophrenia and bipolar psychotic patients. Schizophrenia Research 129 (2-3): 208-10. PMID: 21440419

20. Seidman LJ, Meyer EC, Giuliano AJ, Breiter HC, Goldstein JM, Kremen WS, **Thermenos HW**, Toomey, R, Stone WS, Tsuang MT, Faraone SV (2012). Auditory working memory impairments in individuals at familial high risk for schizophrenia. Neuropsychology 26(3): 288-303. PMID: 22563872

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Huang S, **Thermenos HW**, Brown AB, Valera EM, Ahveninen J, Albert ML, Biederman J, Makris N, Faraone SV, Tsuang MT, Seidman LJ. A Developmental fMRI Study of Medial Temporal Lobe Activity During Verbal Working Memory in Healthy Controls Ages 12 to 29. June 26-30, 2011. Quebec City, Canada.

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Thermenos HW, Whitfield-Gabrieli S, Seidman LJ, Juelich RJ, Divatia S, Riley C, Jabbar GA, Shenton M, Kubicki M, Kuperberg G, Manschreck T, Keshavan M, Delisi LE. Altered language network activity in young people at familial high-risk for schizophrenia. April 21-25, 2013. Orlando, FL.

Francis AN, Seidman LJ, Jabbar GA, **Thermenos HW**, Juelich RJ, Proal A, Shenton M, Kubicki M, Keshavan M, DeLisi LE. Neuroanatomical Alterations in Regions Mediating Language in Young Adults at High Risk for Inheritance of Schizophrenia. April 21-25, 2013. Orlando, FL.

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Seidman, LJ, **Thermenos HW**, Juelich, RJ, Mesholam-Gately, R, Woodberry K, McCarley RW. Alterations in Working Memory and Default Network Circuitry in the Psychosis Prodrome, Symposium (organized by Raquel Gur). May 16, 2012. San Franscisco, CA

Society of Biological Psychiatry – 2012 Annual Meeting 2012

Thermenos HW, Whitfield-Gabrieli S, Juelich RJ, Makris N, Faraone SV, Tsuang MT, Gabrieli JDE, Seidman LJ (2012). Specific Default Network Connectivity Patterns in Adolescent and Young Adult Relatives of Individuals with Bipolar Psychotic Disorder or Schizophrenia. Biological Psychiatry 71: 256S. May 5, 2012. Philadelphia, PA

Society of Biological Psychiatry – 2014 Annual Meeting

Doyle AE, Thermenos HW, McGrath LM, Juelich R, Giakoumatos CI, Fagerness J, Chaponis J, Ferreira MAR, Blais J, Ditmars H, Keshavan M, Biederman J, Faraone SV, Seidman LJ (2014). Multivariate association between CDH13 variants and cortical thickness in ADHD: a pilot study. Biological Psychiatry. May 8, 2014. New York, NY

Narrative Report

Overview. Schizophrenia and Bipolar Disorder are common, serious illnesses with significant cost to society and unknown pathophysiology. Neurophysiological characteristics that place youth at risk to develop psychosis are also poorly understood. Further characterization of this risk can be used to design early treatment for populations at risk for psychosis, with the aims of preventing or delaying onset, preserving function and/or slowing functional decline.

Area of Excellence. As Director of Functional Neuroimaging at the Commonwealth Research Center, my work is focused on application functional magnetic resonance imaging (fMRI) techniques to examine people with familial (or genetic) high-risk (HR), and those with clinical features of the psychosis prodrome. This work has involved development of a wide variety of cognitive and emotional probes to study evoked brain activity, as well as resting brain activity, in risk populations and those in early stage psychosis populations. While I have authored a number of first-author publications as a result of this work, one of my most impactful contributions was as second-author on a publication in the *Proceedings of the National Academy of Sciences,* which was the first to report of hyperactivity and hyperconnectivity in the default mode network in HR on a continuum of abnormalities seen in Schizophrenia.

In addition to studying biomarkers of risk in HR, I have a strong interest characterizing the effect of novel treatments for psychosis in the brain. As sub-contract PI of an NIH R-01, I am currently examining the effect of cognitive remediation training on brain function over a 30-month period in early stage Schizophrenia. Preliminary results (at 9 months) suggest that cognitive remediation enhances dorsolateral prefrontal connectivity as well as suppression of the default mode network. My recent review of the neuroimaging literature conducted to date in young HR (*American Journal of Medical Genetics (Part B): Psychiatric Genetics)* identified neurophysiological markers that potentially discriminate risk and resilience in HR (with both risk and resilience markers significantly deviating from the pattern seen in controls). Future work, if funded, will further characterize resilience markers and serve to pilot novel treatment methods (e.g., combining remediation, biofeedback and real-time fMRI) that are designed to "train" resilience networks. The identification plastic, intervention-susceptible functional risk nodes may ultimately assist in preservation of function (or slow decline) in populations vulnerable to psychosis.

Teaching and Education: I have supervised undergraduate interns, Bachelor's level research assistants, Masters, Doctoral and Post-Doctoral students. I developed and direct a cooperative internship program for undergraduate students majoring in psychology, neuroscience and pre-medicine, during which students receive 1:1 mentorship and training in neuroimaging data acquisition, statistical analysis, preparation of abstracts, posters and scientific manuscripts, and career development. In the next 5 years, I seek to expand my teaching role to include clinical supervision of Psychology interns and post-doctoral fellows in the Department of Psychiatry.

Clinical: Over the past 2 years I have provided clinical service to patients seen in Department Mental Health Outpatient Clinics, as well as the Southard and PREP-UP Outpatient Clinics in the Beth Israel Deaconess Medical Center Division of Public Psychiatry / Massachusetts Mental Health Center. While service to patients with psychosis and HR has been a focus, I also specialize in treatment of Axis II disorders. Client-centered clinical methods include a combination of psychodynamic, existential, dialectical behavioral therapy and psychoeducational approaches, which are applicable to a wide variety of clinical presentations on both Axis I and II.

Summary. Over the next 2 years, I hope to obtain funding to characterize resilience markers and pilot novel treatment methods designed to "train" resilience networks in populations vulnerable to psychosis. My long-term goals are to 1) work as part of a multi-disciplinary team developing evidenced-based early interventions for HR populations, and 2) serve in clinical and teaching roles within the Department of Psychiatry.

8/13/15

Heidi Thermenos, Ph.D. date