BIOGRAPHICAL SKETCH

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NAME: Cohn-Sheehy, Brendan I.

eRA COMMONS USER NAME (credential, e.g., agency login): BCOHNSHEEHY

POSITION TITLE: Graduate Student Researcher

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
University of California, Berkeley	B.A. with Honors	08/2007	12/2011	Psychology
University of California, Davis School of Medicine	M.D.	07/2014	06/2023 (expected)	Medicine
University of California, Davis	Ph.D.	05/2016	05/2021 (expected)	Neuroscience

A. Personal Statement

I have twelve years of neuroscience research experience which has spanned studies of human memory, aging, and neurodegenerative diseases, and through which I have gained experience in brain imaging and behavioral assessments of human memory. I am now a fifth-year MD/PhD student in the non-NIH funded Physician Scientist Training Program, and a third-year graduate student and PhD Candidate in the Neuroscience Graduate Program, at the University of California, Davis (UC Davis). My continuing projects center on the basic neuroscience of human memory, and translating this neuroscience to the realm of cognitive aging. Along with prospective clinical training, these research endeavors will further my pursuits along a career track towards an academic faculty position in behavioral neurology, in which I intend to lead efforts to use imaging and cutting-edge behavioral tasks to study the basic mechanisms of cognitive impairment in neurodegenerative diseases, and to translate that mechanistic understanding into providing optimal early, preclinical diagnosis and care for patients with Alzheimer's and other dementias.

B. Positions and Honors

Positions and Employment

2006-2008 Research Assistant, Bronstein Lab, UCLA Reed Neurological Research Institute
2009-2010 Research Assistant, Shimamura Lab, UC Berkeley Helen Wills Neuroscience Institute
2010-2012 Lab Manager, Shimamura Lab, UC Berkeley Helen Wills Neuroscience Institute
2012-2014 Staff Research Associate, Rabinovici Lab, UCSF Memory and Aging Center
In collaboration with Jagust Lab, UC Berkeley Helen Wills Neuroscience Institute
2016-present Graduate Student Researcher, Ranganath Lab, UC Davis Center for Neuroscience

Honors and Fellowships

2007-2011 Regents' and Chancellor's Scholarship, UC Berkeley
2011 Honors designation in Psychology, UC Berkeley
2014-2016 MD/PhD Research Fellowship, UC Davis School of Medicine
2015 Letter of Distinction, Doctoring Course, UC Davis School of Medicine
2016-2017 Neuroscience Graduate Program Fellowship, UC Davis
2016-2019 Floyd and Mary Schwall Medical Research Fellowship, UC Davis

Leadership

2014-2016	Cofounder, Geriatrics Student Interest Group, UC Davis School of Medicine
2015	Panelist, Neuroscience Block, Committee for Educational Policy, UC Davis School of Medicine
2015-2016	President, Neurology Student Interest Group, UC Davis School of Medicine
2015-2016	Coalition for Health Equity member, UC Davis School of Medicine
2015-present	Treasurer, Physician Scientist Training Program Student Interest Group, UC Davis
2015-present	Student interviewer, MD/PhD admissions, UC Davis School of Medicine
2015-present	Reorganizing Committee member, MD/PhD and DVM/PhD Journal Club, UC Davis
2017-2018	Student Representative, Education Sub-Committee, Neuroscience Graduate Group, UC Davis
2017-present	Co-organizer, Seminar Outreach for Minority Advocacy (SOMA) series, UC Davis
2017-present	Organizer, Neuroimaging Journal Club, Neuroscience Graduate Group, UC Davis
2018	Ad-hoc reviewer, *Neuroimage: Clinical*

C. Contributions to Science

1. Multimodality in human cognition: As an undergraduate research assistant and senior honors student with Dr. Arthur Shimamura at UC Berkeley, I helped design, conduct, and analyze behavioral studies of how stimuli which incorporate multiple sensory modalities (e.g. sight/sound) interact with human perception, attention, and memory. Several anecdotal phenomena of human cognition arise when information from multiple sensory modalities are involved. For instance, many people listen to music (auditory modality) while performing other tasks (e.g. studying slides for an exam, visual modality), because they think the music benefits performance in concurrent tasks. I conducted independent work towards an undergraduate conference talk and a senior honors thesis, in which I studied whether perceptual qualities of background music (e.g. tempo) would impact concurrent learning of word lists, or their subsequent retrieval. I found that musical tempo impacts variability in processing speed during learning (but not retrieval success). Dr. Shimamura and I also studied a phenomenon cited by Hollywood film editors, that when a "cut" is made between two film clips during a continuous movement, extra time must be added at the cut for the movement to be perceived as continuous. We empirically verified that this phenomenon is akin to an "attentional blink," such that visual targets presented at these cuts are often missed ("edit blindness"). Moreover, edit blindness is exacerbated by background sound (i.e. multimodal). This research trained me in developing complex stimuli and tasks to study human cognition.

- **Cohn-Sheehy BI**. Honors Thesis: Dissecting the impact of background musical tempo on concurrent learning. Talk, 2011 Berkeley Psychology Undergraduate Research Conference.
- Shimamura AP, **Cohn-Sheehy BI**, Shimamura TA, & Pogue B (2012). How attention is driven by film edits: a multimodal experience. Psych Aesth Creat Arts, doi:10.1037/aca0000025.
- Shimamura AP, **Cohn-Sheehy BI**, Shimamura TA (2014). Perceiving movement across film edits: A psychocinematic analysis. Psych Aesth Creat Arts 8(1), 77-80.

2. Parietal cortex contributions to episodic memory retrieval: As a lab manager and research assistant with Dr. Arthur Shimamura at UC Berkeley, I helped design and collect data for studies which used functional magnetic resonance imaging (fMRI) to investigate how activity in the ventral posterior parietal cortex (vPPC) contributes to successful retrieval of episodic memories. The role of parietal cortex in episodic memory has been a subject of considerable debate, and Dr. Shimamura theorized that following an experience, vPPC activity enables information about an experience to be strengthened in memory ("consolidated") such that that experience becomes easier to retrieve through interactions between the prefrontal cortex and posterior cortex (i.e., the "default mode network"). We found that (1) vPPC activation just after exposure to information is predictive of the degree to which this information may be later retrieved as episodic memories, and (2) there is an anterior-posterior dissociation in activity within these regions during the successful retrieval of recently-learned versus autobiographical information. This evidence is consistent with Dr. Shimamura's theory, and I am currently expanding on this research to further elucidate how the default mode network supports episodic memories.

- Elman JA, Rosner ZA, **Cohn-Sheehy BI,** Shimamura AP. Parietal activity is indicative of contextual binding in episodic retrieval. Poster (presenter), 2012 Cognitive Neuroscience Society Annual Meeting, Chicago.
- Elman JA, **Cohn-Sheehy BI**, Shimamura AP (2012). Dissociable parietal regions facilitate successful retrieval of recently learned and personally familiar information. Neuropsychologia 51, 573-583. PMID: 23287568
- Elman JA, Rosner ZA, **Cohn-Sheehy BI**, Cerreta AG, Shimamura AP (2013). Dynamic changes in parietal activation during encoding: implications for human learning and memory. NeuroImage 82C, 44-52. PMID: 23732887

3. Alzheimer's pathology biomarkers in patients and healthy older adults: As a staff research associate with Dr. Gil Rabinovici at UCSF, and in collaboration with Dr. William Jagust at UC Berkeley, I helped design and analyze studies which used structural MRI and positron emission tomography of amyloid plaques (amyloid-PET) and metabolic activity (FDG-PET) to derive in vivo imaging biomarkers of Alzheimer's disease (AD) pathology among cohorts of dementia patients and cognitively normal older adults. I led an investigation which determined that cortical atrophy on structural MRI is more sensitive and specific than hippocampal volume to the presence of early-onset and atypical AD clinical phenotypes among older adults; I have prepared this as a first author manuscript for publication (in prep). I then collaborated on an investigation which found that early patterns of structural atrophy which vary among clinical AD phenotypes tend to converge on cortical areas in the "default mode network" (DMN) in later stages of AD-related decline. I then contributed analyses of amyloid-PET scans, and comparisons with postmortem pathology, from patients presenting with a variety of degenerative cognitive phenotypes, to a multi-institutional collaboration which determined (1) that liberal thresholds for classifying "amyloid PET positivity" allowed higher classification accuracy of postmortem amyloid pathology among dementia patients, and (2) that cognitively older adults who fall above these thresholds have meaningful amyloid PET uptake in the DMN. Through these studies, I gained experience in developing imaging biomarkers of neurodegeneration, and was inspired to continue studying the clinical relevance of the DMN. (See also: http://www.ncbi.nlm.nih.gov/pubmed/?term=cohn-sheehy+BI.)

- **Cohn-Sheehy BI**, Ossenkoppele R, Ghosh PM, Lehmann M, Madison C, Wirth M, Gorno-Tempini ML, Miller ZA, Miller BL, Jagust WJ, Rosen HJ, Rabinovici GD. Temporoparietal cortical thickness outperforms hippocampal volume as a biomarker for atypical and early-onset Alzheimer's disease. 2013 Talk, Alzheimer's Association International Conference.
- **Cohn-Sheehy BI,** Ghosh PM, Villeneuve S, Tammewar G, Madison CM, Lehmann M, Miller BL, Grinberg LT, Seeley WW, Rosen HJ, Jagust WJ, Rabinovici GD. Liberal Thresholds for PIB-Positivity Optimally Capture High-Burden Postmortem Amyloid Pathology. 2014 Talk, Human Amyloid Imaging meeting, Miami.
- Ossenkoppele R**, Cohn-Sheehy BI**, La Joie R, Vogel JW, Moller C, Lehmann M, van Berckel BN, Seeley WW, Pijnenburg YA, Gorno-Tempini ML, Kramer JH, Barkhof F, Rosen HJ, van der Flier WM, Jagust WJ, Miller BL, Scheltens P, Rabinovici GD (2015). Atrophy Patterns in Early Clinical Stages Across Distinct Phenotypes of Alzheimer's Disease. Hum Brain Mapp 36(11), 4421-37. PMCID: PMC4692964
- Villeneuve S & Rabinovici GD (co-first authors), **Cohn-Sheehy BI**, Madison C, Ayakta N, Ghosh PM, La Joie R, Arthur-Bentil SK, Vogel JW, Marks SM, Lehmann M, Rosen HJ, Reed B, Olichney J, Boxer AL, Miller BL, Borys E, Jin LW, Huang EJ, Grinberg LT, DeCarli C, Seeley WW, Jagust WJ (2015). Existing Pittsburgh Compound B–positron emission tomography thresholds are too high: statistical and pathological evaluation. Brain 138(7), 2020-33. PMCID: PMC4692964

4. Real-life memory organization in human behavior and neural activity: As a graduate student research in Dr. Charan Ranganath's lab, I have endeavored to understand how memories for complex real-life experiences are organized through activity in the human brain, especially in terms of networks of cortical regions which interact with the hippocampus. Toward this end, I have conceptualized and developed behavioral and imaging studies which incorporate narrative stimuli that simulate the complex structure of real-life events, and through which I can test how memories for events that are separate in time, but "coherent," are organized in human memory, supported by neural activity (via fMRI) in a posterior medial cortical network (PM network, a.k.a. "default mode network"). I have published a first-author review which summarizes previous findings, and I have presented behavioral data at multiple conferences. I have also prepared a first-author manuscript (in prep, unpublished). I am currently collecting fMRI data in young adults, and will soon collect behavioral data in older adults in collaboration with Dr. Charles DeCarli.

- **Cohn-Sheehy BI**, Ranganath C (2017). Time regained: How the human brain constructs memory for time. Current Opinion in Behavioral Sciences 17, 169-177.
- **Cohn-Sheehy BI**, Ranganath C. (2018). Recalling lifelike events in the context of coherent narratives. Poster, 2018 Context and Episodic Memory Symposium, Philadelphia.
- **Cohn-Sheehy BI**, Ranganath C. (2018). Consolidation Promotes Retention of Events That Form a Coherent Narrative: Evidence for Higher-Order Structure in Episodic Memory. Talk, 2018 Bay Area Memory Meeting; poster, 2018 Society for Neuroscience meeting, San Diego.