Boston University School of Medicine
Division of Graduate Medical Sciences

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ANNOUNCEMENT OF FINAL ORAL EXAMINATION
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

CANDIDATE:	**Kayle Slay Sawyer**
DEPARTMENT OR PROGRAM:	**Behavioral Neuroscience**
TITLE OF DISSERTATION:	**"Cerebellar Abnormalities in Alcoholism"**
DATE, TIME, AND PLACE:	**Tuesday, April 1, 2014 at 9:15a.m.** **Boston Veteran's Administration Medical Center** **150 South Huntington Ave. Room F-204** **Boston, MA 02130**

EXAMINING COMMITTEE

FIRST READER:	**Dr. Marlene Oscar Berman**	
SECOND READER:	**Dr. Gordon Harris**	
THIRD READER:	**Dr. Michael Esterman**	
CHAIRMAN OF THE EXAMINING COMMITTEE:	**Dr. Carole Palumbo**	**Phone: (857) 364-4754** **Email:cpalumbo@bu.edu**
ADDITIONAL COMMITTEE MEMBERS:	**Dr. Scott Hayes**	
	Dr. Eve Valera	

Members of the committee are asked to confirm attendance by replying directly to the Chairman of the Examining Committee.

ALL MEMBERS OF THE SCHOOL OF MEDICINE FACULTY ARE INVITED TO ATTEND.

CEREBELLAR ABNORMALITIES IN ALCOHOLISM

KAYLE SLAY SAWYER

Boston University School of Medicine, 2014

Major Professor: Marlene Oscar Berman, Ph.D., Professor of Neurology; Professor of Psychiatry; Professor of Anatomy and Neurobiology; Director of Ph.D. Program in Behavioral Neuroscience

ABSTRACT

Alcoholism has been linked to cognitive, behavioral, and emotional defects, and damage to the cerebellum has been associated with aspects of these impairments. However, little is known about the role of damage to specific cerebellar subregions in the deficits, nor about possible gender differences in alcoholism-related cerebellar abnormalities. In this study, volumetric analyses of specific cerebellar regions were performed in relation to the interactions of alcoholism, gender, and measures of drinking history. Structural brain scans of 44 alcoholics (23 men) and 39 nonalcoholic controls (18 men) were obtained using T1 magnetic resonance imaging at 3T. Scans were manually labeled according to cerebellar features, using methodology developed at the Center for Morphometric Analyses, Massachusetts General Hospital, Boston. Each lobule was parcellated and mediolateral divisions were delineated. In addition to measuring total cerebellar gray and white matter, along with the anterior and posterior lobes, we also measured volumes for a priori regions of interest that have been shown to correspond to functions impaired in alcoholism: emotion, executive functions, working memory, motor abilities, and spatial abilities. Total cerebellar white matter volume was observed to be smaller in alcoholic than in nonalcoholic participants, but this difference was not

observed for total gray matter volume. Moreover, the volumes of the cortical parcellation units we selected varied with drinking history, including negative associations between (a) years of heavy drinking, and (b) volumes of the anterior and flocculonodular lobes, and of the spinocerebellar region. The negative association between anterior volume and years of heavy drinking was driven primarily by alcoholic men. Additionally, we observed that white and gray cerebellar volumes for alcoholic women were significantly larger than for alcoholic men, but this pattern of gender differences was not significant for the control group. The identification of drinking-related abnormalities in cerebellar subregions builds upon prior findings in other regions of the brain, and lays a foundation that can be utilized to inform how cerebro-cerebellar networks are perturbed in this pathological condition. The results also provide estimates of how individual differences in drinking history can predict cerebellar volumes, and how the impact of drinking differs for men and women.