

## Sabbatical Report, Spring 2018

Kimmy Kee-Rose, Ph.D.

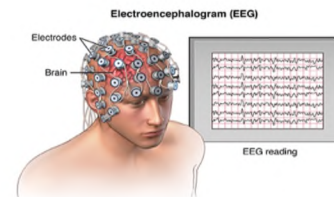
### Developing Research Skills in EEG and a Pilot Study on Schizotypal Personality Disorder

#### I. Summary of Purpose and Goals

I have been on faculty at CI for 14 years, and this was my first sabbatical leave. The objective for this leave was to allow me to receive hands-on training in using the electroencephalography (EEG) technology that was needed for data collection for a pilot study and future studies. Obtaining training in EEG was not otherwise possible through my normal workload assignments. The leave was particularly valuable in providing me with enhanced opportunities to increase mastery in using an EEG test and developing an EEG experimental paradigm. The acquired set of skills was needed to start data collection for a pilot study in a timely manner. This sabbatical project also assisted in my ability to advance in my scholarly work and improve my teaching effectiveness. Following are two specific aims pertaining to my sabbatical leave project:

**a. Specific Aim #1 (Skills Development):** To acquire new research skills in operating the EEG equipment, analyzing brain wave patterns, and designing EEG experimental paradigms.

Brain waves are produced by synchronized electrical pulses from neurons communicating with each other. They are detected using an EEG test that consists of sensors (electrodes) that are attached to participants' scalp and connected by wires to a computer. The computer would then record participants' brain electrical activity on the screen.



Although EEG is a valuable tool for research in neurophysiology, assessment of brain waves appears to be complex and fraught with methodological hurdles. Reliably assessing brain waves has been difficult and would require a considerable amount of training. In addition, it often takes a long time to connect participants to the EEG equipment as it requires precise placement of dozens of electrodes around the head. Signal-to-noise ratio is also poor; as such, sophisticated data analyses are needed to extract useful data from the EEG assessment. My sabbatical leave was to enable me to build upon my assessment skills by learning how to operate an EEG test to reliably collect data on the brain's electrical activity.

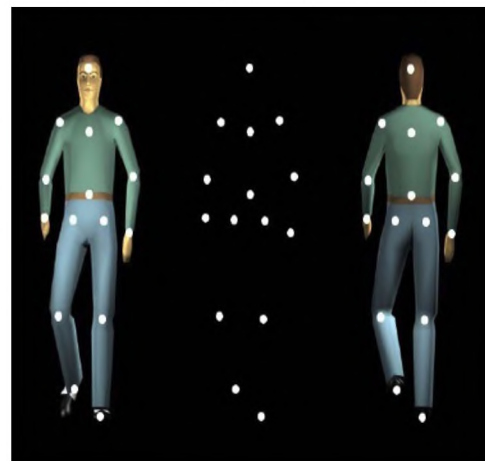
The second major set of skills I needed to develop through this specific aim was method development. I planned to learn how to design test stimuli to be used in the EEG experimental paradigm. Participants were asked to complete a task while their brain waves were simultaneously measured by the EEG. Acquiring these skills was essential to accomplish my pilot study (see Specific Aim #2 below). During the course of

the proposed training, I also planned to develop a third set of skills in analyzing and interpreting EEG data. These skills were to provide a foundation for making informed decisions in selecting the appropriate statistical procedures.

**b. Specific Aim #2 (Scholarship Activities):** To develop a pilot study that examined emotion regulation, social anxiety, brain wave frequencies, and psychosocial functioning in university students with schizotypal personality disorder.

I have remained very interested in extending my previous work in mental disorders to looking at applications with other populations, such as university students. Through my work in the psychopathology of schizophrenia, I became interested in studying neurocognition, emotional processing, and psychosocial functioning. Impairment in psychosocial functioning has long been recognized as one of the hallmarks of schizophrenia. Among the potential determinants of psychosocial outcome in schizophrenia, considerable attention has focused on processes involving cognition, emotion, and neurophysiology. For example, my studies of schizophrenia patients provided evidence that deficits in emotional processing predicted poorer academic adjustment, vocational functioning, and social functioning (e.g., Horan et al., 2011; Kee et al., 2009). My sabbatical research project attempted to tie these findings to non-clinical samples (i.e., individuals with schizotypal personality disorder). Schizotypal personality disorder (SPD) is conceptualized as a non-clinical manifestation of the same underlying biological factors that give rise to schizophrenia and other schizophrenia-spectrum disorders.

Only recently, however, have the implications of social anxiety for everyday functioning of individuals with SPD emerged as an area of considerable interest. Social anxiety, which involves fears of being embarrassed or negatively evaluated by others, is common in schizophrenia-spectrum disorders (Morrison & Cohen, 2014). Goldin et al. (2009) found that people who exhibited higher levels of social anxiety also experienced deficits in emotional regulation, indicating that this aspect of emotional processing contributes to social anxiety. Severe social anxiety in early psychosis has further been found to be related to reduced quality of life (e.g., Romm et al., 2012). While informative, this line of investigation typically examines social anxiety using self-report measures. Missing from the existing studies are other means of assessing social anxiety. My research addressed this issue by applying an innovative experimental paradigm involving human biological movements and neurophysiology to help better understand the role social anxiety in SPD. This study was to compare emotion regulation, social anxiety, brain wave frequencies, and psychosocial functioning (i.e., academic/vocational functioning; social adjustment; and family relationships) between approximately university students with SPD versus their counterparts with no SPD (control group).



## II. Summary of Outcomes

The outcomes of the two specific aims for my sabbatical project, along with an auxiliary outcome, are described below:

**a. Specific Aim #1 (EEG Skills Development).** My sponsor for the skills development activities was Dr. Michael Green, Professor-in-Residence in the Department of Psychiatry and Biobehavioral Sciences and the Semel Institute for Neuroscience and Human Behavior at the Geffen School of Medicine at UCLA. He is also the Director of the Treatment Unit of the Department of Veteran Affairs (VA) VISN 22 Mental Illness Research, Education, and Clinical Center (MIRECC). Dr. Green is a pre-eminent authority on the cognitive neuroscience of mental illness, with extensive experience in schizophrenia research.

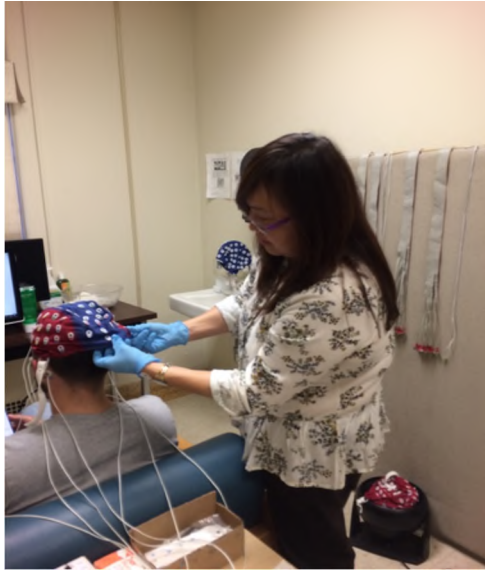
Under the guidance of Dr. Green and his research team, I was supposed to start training on how to operate a 64-channel BioSemi EEG equipment and learned how to design test stimuli to be used in the EEG experimental paradigm at his laboratory at UCLA/VA VISN 22 in West Los Angeles in January 2018. However, there were unforeseen VA Human Resources delays in processing the paperwork for my work without compensation appointment. As such, the training for my activities in Specific Aim #1 did not commence until March 1, 2018 (see Appendix 1). Then from March through to mid-June, I traveled to the VA about 4 days a week and spent 90% of my time on developing skills with the EEG paradigm. In addition, I met with Dr. Green weekly to discuss research design and methodology of my pilot study in Specific Aim #2).

As part of the training, I set up the EEG equipment, carefully prepared participants for the experiments, and collected data (see the images below).

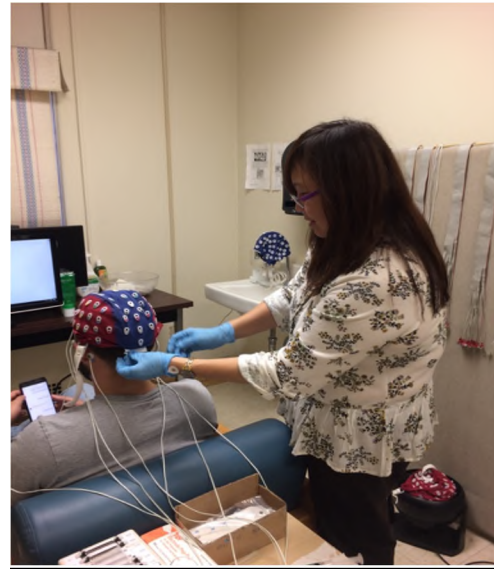
### Step 1



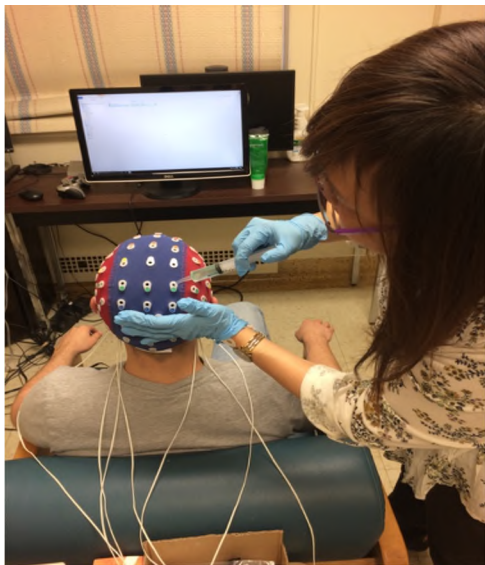
Step 2



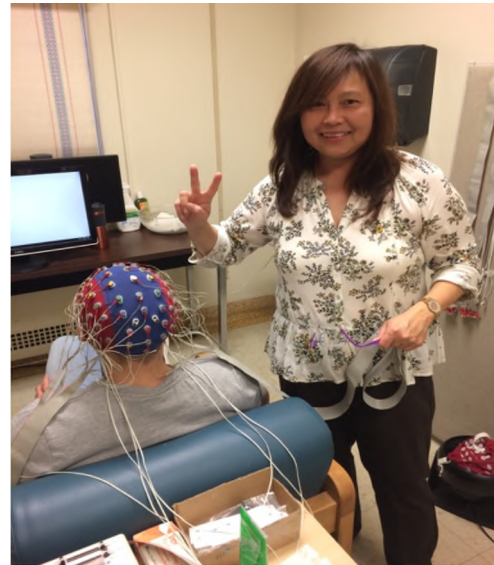
Step 3



Step 4



Step 5



I also assisted the research personnel to pre-process and analyze EEG data (see the image below). Unfortunately, given the constrained timeline, I was not able to spend as much time needed to fully acquire the necessary skills to analyze data for the EEG paradigm, which can be overwhelming and complex.



**b. Specific Aim #2 (Scholarship Activities).** The second major set of skills I needed to develop through this specific aim was method development. With guidance provided by Dr. Green's team, I learned to design test stimuli to be used in the EEG experimental paradigm. The test stimuli I created were adapted from the human biological motion task, which consisted of a series of 40 video clips presented on the computer screen. Each video clip depicted 15 white dots presented on a black background. The dots were arranged and animated in a manner that corresponds to human walking, which is known as a point-light walker. Please see the images below for samples of the test stimuli.

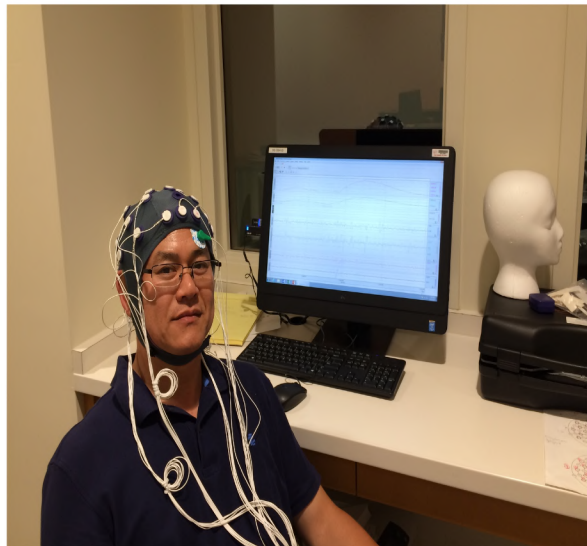


Each stimulus was presented for 1 second, and then followed by a 1-second delay before the screen prompts the participants to select whether the walker was moving forward, backward, left, or right. Participants would be asked to complete this task while their brain waves are simultaneously measured by the EEG. Based on the previous

literature in the area, I hypothesized that individuals with higher levels of social anxiety would perceive the point-light figures walking away from them (moving backward), whereas individuals with lower levels of social anxiety would perceive the point-light figures walking towards them (moving forward).

For this study, I also planned to test participants on the Schizotypal Personality Questionnaire: Brief (SPQ-B; Raine & Benishay, 1995), which would be used to categorize participants into SPD and control groups. Participants' emotion regulation would be assessed using the Difficulty in Emotion Regulation Scale (Gratz & Roemer, 2004), whereas their psychosocial functioning would be assessed using the Social Adjustment Scale (Weissman, 1999). Lastly, the test of social anxiety would include the Liebowitz Social Anxiety Self-Report Scale (Liebowitz, 1987). Data will be collected according to the approved protocol at CI in the coming academic year.

The Psychology laboratory in Sierra Hall is equipped with computers and three sets of wireless Biopac equipment that are capable of recording 32-channel EEG. Because no faculty members in the CI Psychology Program have received the necessary training required to become proficient in the use of EEG, this advanced technology system has not been able to be put to use. To carry out my planned activities for this specific aim, I was to successfully install the wireless Biopac EEG operating system and its necessary software in the Sierra Hall lab (see the images below).



**c. Auxiliary Outcome.** During the initial time period of my sabbatical, I collaborated with Dr. Green and colleagues at UCLA/VA on a study examining the learning potential of individuals with schizophrenia. This joint effort resulted in a paper published in a widely read, peer-reviewed journal in psychiatry.

Clayson, P. E., Kern, R. S., Nuechterlein, K. H., Knowlton, B. J., Bearden, C. E., Cannon, T. D., Fiske, A. P., Ghermezi, L., Hayata, J. N., Helleman, G. S., Horan, W. P., **Kee, K.**, Lee, J., Subotnik, K. L., Sugar, C. A., Ventura, J., Yee, C. M., &

Green, M. F. (2019). Social vs. Non-Social Measures of Learning Potential for Predicting Community Functioning Across Phase of Illness in Schizophrenia. *Schizophrenia Research*, 204, 104-110. doi:10.1016/j.schres.2018.07.046. (Impact Factor = 3.958)

### III. Sabbatical Benefits

**a. Specific Aim #1 (EEG Skills Development):** I plan on continuing to develop and refine teaching skills that would enable me to provide the types of learning experiences to help students better understand the field of psychology and to become prepared to succeed in their future careers, particularly for those planning on furthering their studies in the field cognitive neuroscience. The EEG methodology will be incorporated in several of the courses that I teach (e.g., PSY 300 and PSY 301 Psychological Research and Statistical Methods and Laboratory, PSY 494 Independent Research in Psychology, etc.). My advancement in teaching EEG technology will further allow for many excellent opportunities over time for motivated students to gain “hands-on” research skills in neurophysiological assessment, developing research questions and methodology, and data management and analysis. In addition, the sabbatical skills development activities have allowed me to continue my collaboration with researchers at the UCLA Department of Psychiatry and Biobehavioral Sciences and Department of Veteran Affairs (VA) VISN 22 Mental Illness Research, Education, and Clinical Center (MIRECC).

**b. Specific Aim #2 (Scholarship Activities):** Findings from this sabbatical research project will be incorporated in several of the courses I am teaching. With my own work as a guide, students will also be able to obtain greater development of critical thinking and writing skills for research and publication. Data obtained from this study may be used to develop an extramural grant proposal with public and/or private funding agencies. I may also submit findings from this pilot research for presentation at a professional conference. In addition, I may submit the final results of this study for publication as a brief report article in a peer-reviewed academic journal.



Appendix 1

DEPARTMENT OF  
VETERANS AFFAIRS

Memorandum

Date:

From: Director, Mental Illness Research, Education & Clinical Center (MIRECC 210 A)  
Subj: Without Compensation Appointment

To: Director Human Resources (10A2)

1. Approval is requested for the appointment of Kimmy S. Kee-Rose to the position of  
Research Assistant beginning 02/28/ 2018 to 06/20/2018  
Start Date End Date

Selection of this candidate is in accordance with DVA regulations concerning citizenship and veteran preference requirements.

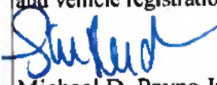
2. As a WOC (without compensation) appointee, the candidate will receive no monetary compensation, does/does not receive payment-in-kind, and will not be entitled to benefits normally given to paid employees, such as leave, retirement, etc.

  
\_\_\_\_\_  
Principal Investigator Signature Date 01/12/ 2018

I request appointment to the position indicated above and agree to the conditions specified.

  
\_\_\_\_\_  
Applicant Signature Date 01/12/ 2018

~~Recommend Approval/Disapproval:~~  
  
\_\_\_\_\_  
Stephen R. Marder, MD  
MIRECC Director Date 01/12/ 2018

TO: Mental Illness Research, Education & Clinical Center (MIRECC 210A) 01/25/18  
Date  
FROM: Director, Human Resources (10A2)  
The WOC appointment requested above is approved. All regulatory requirements have been met and this individual may be appointed as of today. This agreement may be terminated at any time by either party by written notice of such intent. Please give a copy of this letter to the employee with instructions to obtain an identification badge from the Human Resources Security Service, building #218, and vehicle registration if the employee will be driving on the facility grounds from Police and Security, Building. # 236  
  
Michael D. Payne Jr.