

## Curriculum Vitae

### Elizabeth M. Mulligan, M.S.

Department of Psychiatry  
 University of Illinois at Chicago  
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#### EDUCATION

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- 2022 - Present      **University of Illinois at Chicago**  
 Chicago, IL  
 Department of Psychiatry  
 APA-Accredited Pre-doctoral Clinical Psychology Internship
- 2016 - Present      **Florida State University**  
 Tallahassee, FL  
 Department of Psychology  
 APA- Accredited Clinical Psychology Doctoral Program  
 Major Professor: Greg Hajcak, Ph.D.
- 2009 - 2013        **Florida State University**  
 Tallahassee, FL  
 Department of Psychology  
 B.S., Psychology

#### GRANT AND FUNDING APPLICATIONS

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- 2020 – 2022        **F31 Ruth L. Kirschstein Research Service Award**  
 National Institute of Mental Health  
*Modulation of Stress-Induced Anhedonia over the Menstrual Cycle: A Multi-method Investigation of Stress and Reward Mechanisms*  
 Award Number: 1 F31 MH125624 (Impact Score: 22, Percentile: 13<sup>th</sup>)  
 Total Costs: \$85,063.00  
 Principal Investigator: Elizabeth M. Mulligan  
 Faculty Sponsors: Greg Hajcak, Ph.D. & Lisa Eckel, Ph.D.  
 Consultants: Tory Eisenlohr-Moul, Ph.D. & Chris Schatschneider, Ph.D.
- 2018 – 2020        **T32 Pre-doctoral Ruth L. Kirschstein Research Service Award**  
 National Institute of Mental Health  
*Ovarian Hormones and Neural Markers of Depression and Externalizing Proneness*  
 Award Number: 2 T32 MH093311  
 Total Costs: \$83,568.00  
 Fellowship Trainee: Elizabeth M. Mulligan  
 Principal Investigators: Pamela Keel, Ph.D. & Lisa Eckel, Ph.D.  
 Faculty Sponsors: Greg Hajcak, Ph.D. & Lisa Eckel, Ph.D.

## PEER REVIEWED PUBLICATIONS

Underline represents trainee author

15. Santopetro, N., Brush, C. J., **Mulligan, E. M.**, Hajcak, G. (Accepted for publication). Influences of age and pubertal development on P300 amplitude trajectory across two years in female adolescents. *Developmental Cognitive Neuroscience*.
14. Gallyer, A. J., Burani, K., **Mulligan, E. M.**, Santopetro, N., Dougherty, S. P., Jeon, M. E., Nelson, B. D., Joiner, T. E., & Hajcak, G. (In press). Blunted neural reward responsiveness and recent suicidal ideation in children and adolescents: Failure to replicate across two independent samples. *Clinical Psychological Science*.
13. **Mulligan, E. M.**, Simon, J., Lowe, M., Santopetro, N., Flynn, H., Hajcak, G. (2022). The P300 and late positive potential in pregnancy prospectively predict increases in depressive and anxious symptoms in the early postpartum period. *Journal of Affective Disorders*, 317, 193-203.
12. Santopetro, N., **Mulligan, E. M.**, Brush, C. J., Hajcak, G. (2022). Reduced P300 amplitude is consistently associated with trait anhedonia across repeated assessments. *Psychophysiology*, e14127.
11. **Mulligan, E. M.** & Hajcak, G. (2022). Letter to the editor: Response to “A common neural correlate for affective and monetary reward”. *Biological Psychology*, 108347.
10. **Mulligan, E. M.**, Lowe, M., Flynn, H., Hajcak, G. (2021). The rewards of motherhood: Neural response to reward in pregnancy prospectively predicts maternal bonding with the infant in the postpartum period. *Biological Psychology*, 163, 108148.
9. **Mulligan, E. M.**, Hajcak, G., Crisler, S., Meyer, A. (2020). Increased dehydroepiandrosterone (DHEA) is associated with anxiety in adolescent girls. *Psychoneuroendocrinology*, 104751.
8. **Mulligan, E. M.**, Infantolino, Z., Klein, D., Hajcak, G. (2019). Developmental trajectory of the late positive potential: Using tempo-spatial PCA to characterize within-subject developmental changes in emotional processing. *Psychophysiology*, e13478.
7. **Mulligan, E. M.**, Hajcak, G., Klawohn, J., Nelson, B., Meyer, A. (2019). Effects of menstrual cycle phase on associations between the error-related negativity and checking symptoms in women. *Psychoneuroendocrinology*, 103, 233-240.
6. Olsen, R. K., Carr, V. A., Daugherty, A. M., La Joie, R., Amaral, R. S., Amunts, K., ... **Mulligan, E. M.**, ... & Boccardi, M. (2019). Progress update from the hippocampal subfields group. *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring*, 11, 439-449.
5. Burani, K., **Mulligan, E. M.**, Klawohn, J., Luking, K. R., Nelson, B., Hajcak, G. (2019). Longitudinal increases in reward-related neural activity in adolescence: Evidence from event-related potentials (ERPs). *Developmental Cognitive Neuroscience*. 100620.
4. **Mulligan, E. M.**, Flynn, H., Hajcak, G. (2018). Neural response to reward and psychosocial risk factors independently predict antenatal depressive symptoms. *Biological Psychology*, 147, 107622.

3. **Mulligan, E. M.**, Nelson, B. D., Infantolino, Z., Luking, K. R., Sharma, R., Hajcak, G. (2018). Effects of menstrual cycle phase on electrocortical response to reward and depressive symptoms in women. *Psychophysiology*, e13268.
2. **Mulligan, E. M.** & Hajcak, G. (2017). The electrocortical response to aversive and rewarding stimuli: The reward positivity does not reflect salience in simple gambling tasks. *International Journal of Psychophysiology*, 132, 262-267.
1. Riggins, T., Blankenship, S.L., **Mulligan, E.**, Rice, K., Redcay, E. (2015). Developmental differences in relations between episodic memory and hippocampal subregion volume during early childhood. *Child Development*, 86, 1710-1718.

#### MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

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1. Schafer, K., **Mulligan, E. M.**, Shapiro, M. O., Flynn, H., Joiner, T., Hajcak, G. Antenatal anxiety symptoms outperform antenatal depression symptoms as a risk factor for postpartum suicidal ideation. [Manuscript submitted for publication].
2. **Mulligan, E. M.**, Eisenlohr-Moul, T., Eckel, L., Hajcak, G. Characterizing cyclical changes across the menstrual cycle in event-related potentials associated with positive and negative valence systems: the Reward Positivity and the Error-Related Negativity. [Manuscript in preparation].
3. **Mulligan, E. M.**, Eisenlohr-Moul, T., Eckel, L., Hajcak, G. Menstrual cycle modulation of neural reward responsiveness and its associations with anhedonia. [Manuscript in preparation].
4. **Mulligan, E. M.**, Feurer, C., Burkhouse, K. (2018). Effects of life stress on reward responsiveness and depressive symptoms. [Manuscript in preparation].
5. **Mulligan, E. M.**, Meyer, A., Flynn, H., Hajcak, G. (2017). An enhanced error-related negativity prospectively predicts increased maternal depression and stress from pregnancy to postpartum. [Manuscript in preparation].

#### CONFERENCE PROCEEDINGS

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\*Equal Contribution; underline represents trainee author

25. **Mulligan, E. M.**, Eisenlohr-Moul, T., Eckel, L., Hajcak, G. (September 2022). Menstrual cycle modulation of neural reward responsiveness and its associations with anhedonia. Oral presentation at the Annual Meeting of the *International Society of Psychoneuroendocrinology*, Chicago, IL.
24. **Mulligan, E. M.**, Simon, J., Lowe, M., Santopetro, N., Flynn, H., Hajcak, G. (September 2022). The antenatal P300 and late positive potential prospectively predict increased postnatal depression and anxiety. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*, Vancouver, Canada. Presented virtually due to COVID-19.
23. St. Juste, K., **Mulligan, E. M.**, Brush, C. J., Hajcak, G. (April 2022). Effects of menstrual cycle phases on the association between the neural response to rewards and anhedonia symptoms. Poster presentation at the *Florida State University Undergraduate Research Day*, Tallahassee, FL.

22. **Mulligan, E. M., Lowe, M.**, Flynn, H., Hajcak, G. (October 2021). The antenatal error-related negativity prospectively predicts the impact of Covid-19 on postnatal mental health via increased internalizing symptoms across the perinatal period. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*. Presented virtually due to COVID-19.
21. Santopetro, N., **Mulligan, E. M.**, Brush, C. J., Hajcak, G. (October 2021). Effects of multiple assessment and depressive symptoms on P300 amplitude. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*. Presented virtually due to COVID-19.
20. \*Evans, E., \*Keith, L., **Mulligan, E. M.**, Hajcak, G. (October 2021). The effects of menstrual cycle phase on the late positive potential to erotic images. Poster presentation at the Annual Meeting of the Society for Psychophysiological Research. Presented virtually due to COVID-19.
19. **Mulligan, E. M.**, Hajcak, G., Klawohn, J., Nelson, B., Meyer, A. (October 2020). The error-related negativity (ERN) and the menstrual cycle: Effects of ovarian hormones on the ERN and obsessive-compulsive symptoms. “Big Ideas” Paper Symposium on Sex Differences and Women’s Health presented at the Annual Meeting of the *Society for Psychophysiological Research*. Presented virtually due to COVID-19.
18. **Mulligan, E. M., Lowe, M.**, Flynn, H., Hajcak, G. (October 2020). The joys of motherhood: Associations between neural reward responsiveness in the antenatal period and postnatal mother-infant attachment quality. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*. Presented virtually due to COVID-19.
17. Lowe, M., **Mulligan, E. M.**, Flynn, H., Hajcak, G. (October 2020). The P300 to target stimuli in pregnancy is associated with change in depression symptoms in the postnatal period. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*. Presented virtually due to COVID-19.
16. **Mulligan, E. M.**, Flynn, H., Hajcak, G. (October 2019). Neural insensitivity to reward: A potential risk factor for perinatal depression. Oral presentation at *Florida’s 4<sup>th</sup> Annual Perinatal Mental Health Conference* in Gainesville, FL.
15. **Mulligan, E. M.**, Infantolino, Z., Klein, D., Hajcak, G. (September 2019). The developmental trajectory of the late positive potential: Temporospacial PCA as a tool for examining within-subject developmental changes in ERPs. Poster presentation at the Annual Meeting for the *Society for Psychophysiological Research*, Washington D.C.
14. Day, J., Lowe, M., **Mulligan, E. M.**, Hajcak, G. (September 2019). Stability and internal consistency of ERPs across four assessments I: The reward positivity. Poster presentation at the Annual Meeting for the *Society for Psychophysiological Research*, Washington D.C.
13. Lowe, M., Day, J., **Mulligan, E. M.**, Hajcak, G. (September 2019). Stability and internal consistency of ERPs across four assessments II: The error-related negativity. Poster presentation at the Annual Meeting for the *Society for Psychophysiological Research*, Washington D.C.
12. **Mulligan, E. M.**, Hajcak, G., Klawohn, J., Nelson, B., Meyer, A. (March 2019). Menstrual cycle phase and progesterone modulate associations between the error-related negativity and checking symptoms.

Poster presentation at the Annual Meeting of the *Anxiety and Depression Association of America*, Chicago, IL.

11. **Mulligan, E. M.**, Flynn H., Hajcak, G. (October 2018). The electrocortical response to rewards relates to perinatal depressive symptoms. Poster presentation at the Annual Meeting for the *Society for Psychophysiological Research*, Quebec City, Canada.
10. **Mulligan, E. M.**, Nelson, B., Infantolino, Z., Luking, K., Sharma, R., Hajcak, G. (October 2017). Menstrual cycle phase and progesterone relate to electrocortical response to monetary gains and losses and depressive symptoms in women. Poster presentation at the Annual Meeting for the *Society for Psychophysiological Research*, Vienna, Austria.
9. Campanella, C., Canada, K., Clark, M., **Mulligan, E. M.**, Geng, F., Spencer, R., Riggins, T. (April 2017) Preliminary support for maturational links between memory, sleep, and hippocampal development in early to middle childhood. Poster presentation at the Biennial Meeting for the *Society for Research in Child Development*, Austin, TX.
8. Riggins, T., Zehra, A., Clark, M., **Mulligan, E. M.** (September 2016) Relations between source memory and hippocampal volume in early childhood. Poster presentation at the Annual Meeting of the *Flux Society*, St. Louis, MO.
7. Riggins, T., **Mulligan, E.**, Blankenship, S.L., Rice, K., Redcay, E. (March 2015). Relations between episodic memory and hippocampal subregion volumes in early childhood. Oral presentation at the Biennial Meeting for the *Society for Research on Child Development*, Philadelphia, PA.
6. **Mulligan, E. M.**, Blankenship, S.L., Leppert, K., Merwin, S., Dougherty, L.R., Riggins, T. (March 2015). Developmental differences in relations between episodic memory and hippocampal subregion volume during early to middle childhood. Poster presentation at the Annual Meeting of the *Cognitive Neuroscience Society*, San Francisco, CA.
5. \*Sundel, M., \*Hsiung, A., Blankenship, S., Marti, L., **Mulligan, E. M.**, Riggins, T. (March 2015). The effects of emotional valence and arousal on item and source memory across development. Poster presentation at the Biennial Meeting of the *Society for Research on Child Development*, Philadelphia, PA.
4. \*Patel, P., \*Zehra, A., **Mulligan, E. M.**, Redcay, E., Dougherty, L.R., Riggins, T. (Spring 2015). Influence of age and gender on hippocampal subregion volumes during childhood. Poster presentation at the *University of Maryland Undergraduate Research Day*, College Park, MD.
3. Olson, L.A., Byrnes, L., \*Diaz, J., \***Mulligan, E.M.**, Beyko, A., Bernat, E.M., Joiner, T. (November 2013). The influence of Dialectical Behavior Therapy skill use on emotional experience and risky behaviors. Poster presentation at the Annual Meeting of the *Association for Behavioral and Cognitive Therapies*, Nashville, TN.
2. **Mulligan, E.M.**, Cartabuke, M., Brewer, S., Kothur, S., Bernat, E., Boot, W., Vorstius, C., Morgan, C. (September 2012). Coordinated gambling feedback processing indexed by feedback negativity and reward positivity ERP components, and pupil dilation. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*, New Orleans, LA.

1. Bachman, M.D., **Mulligan, E.M.**, Byrnes, L., Nair-Collins, S., Bernat, E. (September 2012). Common time-frequency theta and delta processes across tasks: Gambling feedback, Oddball N2, and Go/No-Go N2. Poster presentation at the Annual Meeting of the *Society for Psychophysiological Research*, New Orleans, LA.

## PROFESSIONAL RESEARCH POSITIONS

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- 2022 – Present **Psychology Intern Researcher – Clarifying the Endocrinology of Acute Risk (CLEAR) Lab, University of Illinois at Chicago, Department of Psychiatry**  
Supervisor: Dr. Tory Eisenlohr-Moul
- Lead a research project examining variability in affective symptoms across the menstrual cycle and associated risk for psychopathology
  - Assist in data collection (e.g., clinical diagnostic interviews) and data management tasks
- 2022 – Present **Psychology Intern Researcher – Families, Affective Neuroscience, and Mood Disorders (FAM) Lab, University of Illinois at Chicago, Department of Psychiatry**  
Supervisor: Dr. Katie Burkhouse
- Lead a research project examining prospective associations between stress exposure, neural reward responsiveness, and course of depressive symptoms over six months
  - Assist in EEG data preprocessing and scoring
- 2017 – Present **Graduate Student Researcher – Risk for Anxiety and Depression Lab Florida State University, Department of Psychology**  
Supervisor: Dr. Greg Hajcak
- NIMH fellow and principal investigator on two NIH-funded studies (NIMH T32 and F31) examining neurobiological predictors of depression and anxiety in adult women
  - Primary lab experimenter in NIH R21-funded study investigating neural predictors of perinatal depression and anxiety
  - Conducted diagnostic interviews (K-SADS, SCID), processed ERP data, and wrote manuscripts
- 2018 – Present **Graduate Student Researcher – Behavioral Neuroendocrinology Lab Florida State University, Department of Psychology**  
Supervisor: Dr. Lisa Eckel
- Independently processed salivary and hair samples and conducted ELISAs to examine concentrations of estradiol, progesterone, cortisol, and inflammatory cytokines
- 2016 – 2017 **Graduate Research Assistant – Cognitive and Affective Psychophysiology Lab, Stony Brook University, Department of Psychology**  
Supervisor: Dr. Greg Hajcak
- Primary lab experimenter in a project examining effects of the human menstrual cycle on reward and error processing
  - Processed and analyzed EEG and self-report data and prepared manuscripts for publication
- 2014 – 2016 **Faculty Research Assistant – Neurocognitive Development Lab**

**University of Maryland, College Park, Department of Psychology**Supervisor: Dr. Tracy Riggins

- Assisted in study design and spearheaded scheduling and running of child participants in an NIH R01-funded longitudinal fMRI and EEG investigation of episodic memory development
- Operated 3T Siemens MRI Scanner for functional and structural scans
- Managed lab operations and trained over 30 undergraduate research assistants

2011 – 2014

**Undergraduate Research Assistant – Clinical and Cognitive Neuroscience Lab, Florida State University, Department of Psychology**Supervisor: Dr. Edward Bernat

- Assisted with EEG data collection for college-aged participants
- Completed an honor thesis examining coordinated responses of event-related potentials and pupil dilation during reward processing

**CLINICAL EXPERIENCE**

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2022 – Present

**UIC Mood and Anxiety Disorders Clinic**Supervisors: Dr. Gustavo Medrano & Dr. Tory Eisenlohr-Moul

- Provide evidence-based individual therapy for six-client caseload
- Dialectical Behavioral group therapy for a ten-client group

2022 – Present

**UIC Family Medicine (Behavioral Medicine Team)**Supervisor: Dr. Adrienne Williams

- Provided precepting and clinical supervision in behavioral medicine for five different family medicine residents
- Trained family medicine residents on behavioral medicine techniques including BATHE, SBIRT, and motivational interviewing.

2019 – 2022

**FSU Anxiety and Behavioral Health Clinic (ABHC)**Supervisor: Dr. Brad Schmidt

- Provide weekly evidence-based individual therapy for a four-client caseload
- Perform evidence-based suicide risk assessment and management
- Participate in weekly supervision meetings

2019

**Neuropsychology Externship****Tallahassee Memorial Hospital Memory Disorders Clinic**Supervisor: Dr. Carlton Gass

- Provide evidence-based neuropsychological assessment for one client per week
- Trained to assess neuropsychological functioning using the Halstead-Russell Neuropsychological Evaluation System, Revised (HRNES-R) and the Minnesota Multiphasic Personality Inventory-2 (MMPI-2)

2017 – 2022

**FSU Risk for Anxiety and Depression Lab**Supervisors: Dr. Greg Hajcak, Dr. Alexandria Meyer

- Conducted diagnostic interviews using the Kiddie-Schedule for Affective Disorders and Schizophrenia for School Aged Children (K-SADS) with research participants
- Participated in weekly diagnostic consensus meetings

- 2017 – 2019 **Florida State University Psychology Clinic**  
Supervisors: Dr. Thomas Joiner, Dr. Therese Kemper, Dr. Brad Schmidt, Dr. Michael Kofler, Dr. Jessica Ribeiro, Dr. Christina Riccardi, Dr. Kristin Austin
- Provided evidence-based individual therapy for four-client caseload
  - Cognitive Processing group therapy for a seven-client group
  - Dialectical Behavior group therapy for an eight-client group
  - Conducted screening interviews for clients seeking clinic services
  - Provided evidence-based psychoeducational assessment
  - Participated in weekly supervision and staffing meetings
  - Trained in empirical suicide risk assessment and response procedures
  - Trained to assess achievement using the Kaufman Test of Educational Achievement, Third Edition
- 2016 – 2017 **Stony Brook University Psychology Department**  
Supervisor: Dr. Dina Vivian
- Trained in Structured Clinical Interview for DSM-5 (SCID-5) administration
  - Trained in Kiddie-Schedule for Affective Disorders and Schizophrenia for School Aged Children
  - Trained to assess intelligence and achievement using Wechsler Adult Intelligence Scale (WAIS), Wechsler Intelligence Scale for Children (WISC), and Woodcock-Johnson Cognitive Abilities Assessment

#### CLINICAL WORKSHOPS AND TRAININGS

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- 2021 **Interpersonal Psychotherapy (IPT) Workshop (7 hours)**  
Presented by Dr. Heather Flynn  
Florida's Perinatal Mental Health Conference
- 2019 **Cognitive Behavioral Therapy (CBT) Workshop (4 hours)**  
Presented by Dr. Steve Hollon  
Florida State University
- 2017 **FSU Allies and Safe Zones Workshop (3 hours)**  
Presented by Josh Kinchen, M.Ed.  
Florida State University
- 2017 **Introduction to Motivational Interviewing (12 hours)**  
Presented by Dr. Therese Skubic Kemper, MI Network of Trainers (MINT) Member  
Florida State University
- 2017 **Suicide Risk Assessment and Management (2 hours)**  
Presented by Dr. Thomas Joiner  
Florida State University



## TEACHING EXPERIENCE

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- Fall 2020                    **Instructor of Record**  
*PSY 2012 – General Psychology*  
 Department of Psychology  
 Florida State University
- Fall 2016                    **Teaching Assistant**  
*PSY103 – Introduction to Psychology*  
 Department of Psychology  
 Stony Brook University

## HONORS AND AWARDS

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- 2022                    Society for Psychophysiological Research Student Poster Award (\$300)  
 2021                    FSU Psychology Graduate Research Development Award (\$600)  
 2019                    FSU Psychology Graduate Research Development Award (\$600)  
 2018                    FSU Psychology Graduate Research Travel Award (\$500)  
 2017                    Society for Psychophysiological Research Student Poster Award (\$300)  
 2013                    Florida State University Honors Medallion Recipient  
 2012                    Psi Chi National Honor Society Member  
 2012                    Florida State University Honors Conference Presenter Award  
 2011                    National Society of Collegiate Scholars Member

## PROFESSIONAL SOCIETY MEMBERSHIPS

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Society for Psychophysiological Research  
 Anxiety and Depression Association of America  
 Association for Behavioral and Cognitive Therapies  
 Association for Psychological Science  
 Society for Research in Child Development  
 International Association for Premenstrual Disorders  
 International Society for Psychoneuroendocrinology

## PROFESSIONAL SERVICE

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- 2021 – 2022                    Society for Psychophysiological Research  
*Women in Science and Education (WISE) Committee*, Student Chair
- 2020 – 2022                    Society for Psychophysiological Research  
*Committee to Promote Student Interests*

## AD HOC PEER REVIEW

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- 2017 – Present                    *Psychophysiology*  
 2019 – Present                    *Anxiety, Stress, & Coping*  
 2020 – Present                    *International Journal of Psychophysiology*  
 2021 – Present                    *Neurobiology of Stress*  
 2021 – Present                    *Psychoneuroendocrinology*

2021 – Present      *Basic and Applied Social Psychology*  
 2022 – Present      *International Journal of Women's Health*  
 2022 – Present      *Biological Psychology*  
 2022 – Present      *Development and Psychopathology*

#### RESEARCH WORKSHOPS AND TRAININGS

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2020                  Salimetrics Salivary Bioscience Workshop  
 2018                  Hierarchical Linear Modeling Workshop (SPR Annual Meeting)  
 2014                  Maryland Neuroimaging Center MRI Operator Training  
 2014                  BESA EEG Data Processing and Analysis Research Workshop  
 2014                  NIH Analysis of Functional Neuroimages (AFNI) Bootcamp  
 2014                  Maryland Neuroimaging Center Safety Training

#### SOFTWARE/PROGRAMMING EXPERIENCE

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Analysis of Functional Neuroimages (AFNI)  
 Brain Electrical Source Analysis (BESA)  
 Brain Vision Analyzer (BVA)  
 EEGLAB  
 ERP PCA Toolkit  
 E-Prime  
 FreeSurfer  
 MATLAB  
 Microsoft Office Suite  
 M-Plus  
 PROCESS Macro for SPSS by Hayes  
 R Studio  
 Statistical Package for Social Sciences (SPSS)