BIOGRAPHICAL SKETCH

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NAME: Jennifer Strafford Stevens

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POSITION TITLE: Assistant Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Georgia, Athens, GA	B.S.	12/2006	Psychology
Emory University, Atlanta, GA	Ph.D.	08/2012	Cognitive and Developmental Psychology
Emory University School of Medicine, Atlanta, GA	Postdoctoral	05/2017	Psychiatry

A. Personal Statement

My expertise is in translational neuroscience, using neuroimaging approaches to probe brain function in healthy individuals, and neurobiological pathways promoting stress vulnerability or resilience. Neural circuits supporting emotional arousal and memory encoding are particularly important for adapting to trauma and other forms of environmental stress. I have investigated individual differences in these circuits in normative and trauma-exposed populations of adults and children. A major theme of my research has been to understand sex differences in emotion-related brain function, and the brain basis of women's increased risk for trauma-related psychopathology. I address these questions using cognitive tasks to probe behavioral and subjective aspects of emotion and memory, and neurobiological measures such as functional magnetic resonance imaging (fMRI), scalp electrophysiology, and autonomic physiological measures. My postdoctoral training has also given me a solid background in combining genomics and cognitive neuroscience research to characterize stress vulnerability pathways that link SNPs, expression and methylation, neural circuits, and behavior. I am a principle investigator at the Grady Trauma Project, where I am Associate Director of Research. I recently completed a post-doctoral NRSA, and am a collaborator on several active NIH grants and am a BIRCWH K12 trainee.

1. **Stevens, J.S.**, & Hamann, S.H. (2012). Sex differences in brain activation to emotional stimuli: A meta-analysis of neuroimaging studies. *Neuropsychologia*, *50*(7), 1578–1593. PMID: 22450197.
2. **Stevens, J.S.**, Jovanovic, T.J., Fani, N., Ely, T. Glover, E., Bradley, B., Ressler, K.J. (2013). Disrupted amygdala-prefrontal functional connectivity in civilian women with posttraumatic stress disorder. *Journal of Psychiatric Research,* online ahead of print. PMID: 23827769; PMCID: PMC3743923.
3. **Stevens, J.S.**, Almli, L.M., Fani, N., Gutman, D.A., Bradley, B., Norrholm, S.D., ... & Ressler, K.J. (2014). PACAP receptor gene polymorphism impacts fear responses in the amygdala and hippocampus. *Proceedings of the National Academy of Sciences, 111*(8), 3158-3163. PMID: 24516127; PMCID: PMC3939867.
4. **Stevens, J. S.,** Kim, Y. J., Galatzer-Levy, I. R., Reddy, R., Ely, T. D., Nemeroff, C. B., . . . Ressler, K. J. (2017). Amygdala reactivity and anterior cingulate habituation predict PTSD symptom maintenance after acute civilian trauma. *Biol Psychiatry*, *81*, 1023-1029. PMID: 28117048.

B. Positions and Honors

Employment

12/2006-05/2007 Research Assistant, Department of Psychology, University of Georgia, Athens, GA. Supervisor: Dr. Brett Clementz
08/2012-05/2017 Postdoctoral fellow, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA. Supervisors: Dr. Kerry Ressler, Dr. Tanja Jovanovic
05/2017-06/2018 Instructor, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA
07/2018-current Assistant Professor, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA

Honors and Awards

2003-2006 National Merit Scholar
2003-2006 Charter Fellow & Presidential Scholar, University of Georgia, Athens, GA
2006- Phi Beta Kappa
2006 University of Georgia Excellence in Undergraduate Research Travel Award Recipient
2006 Franklin Foundation Neuroimaging Program Travel Award Recipient
2007-2011 Emory Laney Graduate School Fellow
2011-2012 SIRE (Scholarly Inquiry and Research at Emory) Graduate Fellowship Recipient
2013 Travel award recipient for Wisconsin Symposium on Emotions organized by the HealthEmotions Research Institute at University of Wisconsin - Madison
2014-2017 Individual Ruth L. Kirschstein Fellowship Award Recipient (F32 MH101976)
2014 Best Poster in Neurobiology/Neuroscience, Emory Postdoctoral Research Symposium
2015 Elected trainee for the NSF-sponsored symposium "The Neurodevelopment of Stress Regulation, Social Buffering and Fear Learning: Integration and Crosstalk"
2015 Travel award recipient, American College of Neuropsychopharmacology (ACNP)
2015 Best Poster, ACNP annual meeting, Hollywood, FL
2018 Early Career Investigator Travel Award, Society of Biological Psychiatry

Professional Societies and Public Advisory Committees

2007- Member, Cognitive Neuroscience Society
2013- Member, Anxiety and Depression Association of America
2015- Member, International Society for Traumatic Stress Studies
2017- Member and Travel Award Committee, Society of Biological Psychiatry

1. **C. Contributions to Science**

Sex differences in the neurobiology of emotion and memory: A major theme of my research, beginning with my Ph.D. training with Dr. Stephan Hamann, has been differences in the way that women and men respond to and remember emotional events, focusing on sex differences in amygdala function. Understanding sex differences in emotional processing in a healthy population is critical to understanding basic mechanisms underlying differential risk for psychopathology in men and women, and to the development of personalized treatments for mood and anxiety disorders. In a meta-analysis of neuroimaging studies, we identified several important differences in female and male neural responses to emotional stimuli. For example, the left amygdala was more responsive to negative stimuli in women than men, but more responsive to positive stimuli in men than women. Women also showed greater reactivity to negative stimuli in the ventromedial prefrontal cortex (vmPFC). A follow-up fMRI study also showed a stronger relationship between amygdala activation and later memory in women than men. Research with collaborator Dr. Kim Wallen indicated that sex differences in amygdala function are not produced by Y-chromosome-linked factors, but are instead likely attributable to the effects of androgens. We found that the male pattern of enhanced amygdala reactivity to positive stimuli was not observed in individuals with complete androgen insensitivity (CAIS), who have an XY karyotype but are phenotypically female.

   a. Parent, M.B., Krebs-Kraft, D.L., Ryan, J.P., **Wilson, J.S.**, Harenski, C., & Hamann, S. (2011). Glucose administration enhances fMRI brain activation and connectivity related to episodic memory encoding for neutral and emotional stimuli. *Neuropsychologia, 49(*5), 1052-1066. PMID: 21335014.
   b. **Stevens, J.S.,** & Hamann, S.H. (2012). Sex differences in brain activation to emotional stimuli: A meta-analysis of neuroimaging studies. *Neuropsychologia*, *50*(7), 1578–1593. PMID: 22450197.

c. Hamann, S., **Stevens, J.S**., Vick, J.H., Bryk, K., Quigley, C.A., Berenbaum, S., & Wallen, K. (2014). Brain responses to sexual images in 46,XY women insensitive to androgens are female-typical. *Hormones & Behavior, 66*, 724-730. PubMed PMID: 25284435.

2. **Emotional memory development:** To better understand the emergence of sex differences in emotion and emotional declarative memory, I also studied emotional memory development in pre-pubertal children. We used event-related potentials (ERP) and psychophysiology to measure memory-related brain processes and emotional reactivity in healthy school-aged children. A longstanding body of research demonstrates robust developmental change during infancy, and later during adolescence, in brain systems critical for emotion such as the amygdala and its subcortical and cortical projections. We provided novel evidence that emotion-related brain processes continue to develop in the window from ages 5 – 9. Specifically, older children showed an earlier emergence of the emotional late positive potential (LPP), an ERP index of increased attention to emotional versus neutral stimuli. Furthermore, the findings pointed to an increasing interaction between neural systems supporting emotion and memory across this age range. Older, but not younger children, showed evidence of an ERP correlate of recollection memory that was specific to negative emotional stimuli. Later research in children with early trauma exposure showed that children ages 8-10 show better learning of threat and safety cues in the presence of their mother, whereas older children show no such benefit, suggesting a developmentally-contingent maternal effect on learning.
    a. Bauer, P.J., **Stevens, J.S.**, Jackson, F.L., & San Souci, P. (2012). Electrophysiological indices of emotion processing during retrieval of autobiographical memories by school-age children. *Cognitive, Affective, and Behavioral Neuroscience, 12*(1), 99-114. PMID: 22135090.
    b. *Leventon, J., ***Stevens, J.S.**, & Bauer, P.J. (2014). Development in the neurophysiology of emotion processing and memory in school-age children. *Developmental Cognitive Neuroscience, 10*, 21-33. *Shared first authorship. PMID: 25160677.
    c. **Stevens, J.S.,** Van Rooij, S.J.H., & Jovanovic, T. (2016). Developmental contributors to trauma response: The importance of sensitive periods, early environment, and sex differences. In *Current Topics in Behavioral Neurosciences*, Springer, Berlin, Heidelberg. PMID: 27830573; PMCID: PMC5425320.
    d. van Rooij, S. J., Cross, D., **Stevens, J. S**., Vance, L. A., Kim, Y. J., Bradley, B., . . . Jovanovic, T. (2017). Maternal buffering of fear-potentiated startle in children and adolescents with trauma exposure. *Social Neuroscience, 12*(1), 22-31. PMID: 27056324; PMCID: PMC5253076.

3. **Neurobiology of emotion in adults with PTSD:** As a postdoctoral fellow I began studying the brain basis of vulnerability and resilience to traumatic stress. This research focused on amygdala hyper-reactivity and connectivity as risk factors for pathological responses to trauma such as post-traumatic stress disorder (PTSD). We found that, relative to resilient individuals, those with PTSD show greater amygdala reactivity to threat stimuli, and reduced functional connectivity between the amygdala and vmPFC. Communication between these regions is central to healthy emotion regulation. We also observed that deficits in inhibition-related function within the vmPFC were most prominent in individuals who reported a history of childhood maltreatment, suggesting that function in this region was shaped by early experiences, potentially leading to risk for later PTSD. To directly test whether amygdala and vmPFC function contributed to risk for PTSD, we conducted a prospective study with MRI acquired shortly after an emergency department trauma, and following individuals at 1, 3, 6, and 12 months post-trauma exposure. Here, amygdala hyper-reactivity to threat and deficits in engaging the vmPFC predicted poor future recovery from PTSD symptoms, implicating this circuit in the etiology of PTSD. This work also led to collaborative efforts through the PTSD-ENIGMA working group, to identify PTSD-related effects on brain morphometry in samples of >1,500.
    a. **Stevens, J.S.**, Jovanovic, T.J., Fani, N., Ely, T. Glover, E., Bradley, B., Ressler, K.J. (2013). Disrupted amygdala-prefrontal functional connectivity in civilian women with posttraumatic stress disorder. *Journal of Psychiatric Research, 47*(10), 1469-1478. PMID: 23827769; PMCID: PMC3743923.
    b. **Stevens, J.S.**, Ely, T.C., Sawamura, T., Guzman, D., Bradley, B., Ressler, K.J., & Jovanovic, T. (2016). Childhood maltreatment predicts reduced inhibition-related activity in the rostral anterior cingulate in PTSD, but not resilient individuals. *Depression & Anxiety*, *33*(7), 614-622. PMID: 27062552; PMCID: PMC4930398.

c. **Stevens, J. S.,** Kim, Y. J., Galatzer-Levy, I. R., Reddy, R., Ely, T. D., Nemeroff, C. B., . . . Ressler, K. J. (2017). Amygdala reactivity and anterior cingulate habituation predict PTSD symptom maintenance after acute civilian trauma. *Biol Psychiatry*, *81*, 1023-1029. PMID: 28117048.
d. Logue, M. W., van Rooij, S. J., Dennis, E. L., Davis, S. L., Hayes, J. P., **Stevens, J. S.**, ... & Korgaonkar, M. (2018). Smaller hippocampal volume in posttraumatic stress disorder: A multisite ENIGMA-PGC study: Subcortical volumetry results from posttraumatic stress disorder consortia. *Biological psychiatry*, *83*(3), 244-253. PMID: 29217296.

4. **Brain mechanisms contributing to stress vulnerability in women:** Relative to men, women have ~2:1 risk of PTSD following a trauma. I am interested in studying biological pathways that may contribute to this vulnerability. In addition to the findings showing that women with PTSD show hyperactive amygdala responses to threat, I recently found that women with high levels of PTSD re-experiencing symptoms showed a greater involvement of both the amygdala and hippocampus in the encoding of new episodic memories for negative emotional stimuli. In contrast, women with high levels of depressive symptoms following trauma showed reduced involvement of the amygdala in memory encoding, and reduced connectivity between the amygdala and high-level visual associative regions. Women are at greater risk than men for both PTSD and depression following trauma, and these findings point to different patterns of brain function associated with these different symptom profiles. To better understand the molecular basis of stress vulnerability in women, we have taken a data-driven translational approach. By comparing the overlap between genome-wide analysis of PTSD in humans, and gene expression changes in the brains of stressed or fear-conditioned mice, we have found several genomic risk factors that correlate with amygdala hyper-reactivity and dysregulated connectivity in traumatized women. For example, a polymorphism in the gene *ADCYAP1R1,* encoding the receptor for a stress-regulating neuropeptide PACAP, was associated with PTSD symptoms in women but not men, and in women was associated with amygdala hyper-reactivity to threat, and reduced functional connectivity with the hippocampus.
    a. **Stevens, J.S.**, Almli, L.M., Fani, N., Gutman, D.A., Bradley, B., Norrholm, S.D., ... & Ressler, K.J. (2014). PACAP receptor gene polymorphism impacts fear responses in the amygdala and hippocampus. *Proceedings of the National Academy of Sciences, 111*(8), 3158-3163. PMID: 24516127; PMCID: PMC3939867.
    b. Wingo, A. P., Almli, L. M., **Stevens, J. S.**, Klengel, T., Uddin, M., Li, Y., . . . Stein, D. J. (2015). DICER1 and microRNA regulation in post-traumatic stress disorder with comorbid depression. *Nature Communications, 6*.
    c. *Wingo, A. P., *Almli, L. M., ***Stevens, J. S.**, Jovanovic, T., Wingo, T. S., Tharp, G., . . . Ressler, K. J. (2017). Genome-wide association study of positive emotion identifies a genetic variant and a role for microRNAs. *Molecular Psychiatry, 22*(5), 774-783.
    d. **Stevens, J. S.**, Reddy, R., Kim, Y. J., van Rooij, S. J., Ely, T. D., Hamann, S., ... & Jovanovic, T. (2018). Episodic memory after trauma exposure: Medial temporal lobe function is positively related to re-experiencing and inversely related to negative affect symptoms. *NeuroImage: Clinical*, *17*, 650-658.

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/jennifer.stevens.2/bibliography/47509744/public/?sort=date&direction=ascending

D. Research Support
Active Support
K12 HD085850 (Stevens, Trainee) 07/15/2018 – 07/14/2020
Predicting risk for post-traumatic stress disorder in African American women with breast cancer
Role: Trainee
This mentored research award will support a study of the prevalence of and risk factors for PTSD related to breast cancer diagnosis and treatment in a population of African-American women.

Pilot Research Grant (Stevens, PI) 05/01/2018 – 04/30/2019
Emory University Research Council / Georgia Clinical and Translational Research Alliance
Pilot investigation of neuroendocrine risk mechanisms for post-traumatic stress disorder in women
Role: PI

This pilot study will measure the associations between trauma exposure and female hormones that vary over the menstrual cycle in African-American women.

1U01 MH110925-01 (McLean, PI) 06/01/2016-05/31/2021
NIH/NIMH
Longitudinal Assessment of Post-Traumatic Syndromes (U01)
Role: Co-Investigator
This study uses a structural equation modeling approach to (1) identify and characterize the development and early course of the most common adverse posttraumatic neuropsychiatric sequelae (APNS) of trauma in 5,000 trauma-exposed individuals using the RDoC framework, (2) gain important new insights into the pathogenesis of APNS, and (3) develop tiered clinical decision support algorithms that identify those at high risk of specific APNS in the early aftermath of trauma.

1R01 MH111682 (Jovanovic, PI) 09/23/2016-6/30/2021
NIH/NIMH
Impact of Trauma Exposure on Critical Periods in Brain Development and Fear Processing in Children
Role: Co-Investigator
This longitudinal study will examine the timing and duration of trauma exposure in children ages 9-11.

Completed Research Support

F32 MH101976 Stevens (PI) 05/01/2014 – 05/01/2017
Impact of trauma on emotional systems neurobiology
The goal of this study is to investigate the relative impacts of trauma and PTSD on brain processes supporting declarative memory encoding in a low-income urban civilian population. This grant supports training in clinical aspects of psychiatric research, new neuroimaging techniques, and integrating genetic and neuroimaging data.
Role: PI