Justin Asbee, PhD

Curriculum Vitae

Department of Psychology
[redacted]
[redacted]
[redacted]
[redacted]
email: JustinAsbee@my.unt.edu

Education

Ph.D. Behavioral Science — University of North Texas — 2022
Advisor: Dr. Thomas Parsons
Dissertation title: "Computational and Statistical Modeling of the Virtual Reality Stroop Task"
Committee: Thomas Parsons (Chair), Kimberly Kelly (Co-chair), Heidemarie Blumenthal, Timothy (Fred) McMahan, Anthony Ryals.

M.A. Experimental Psychology — Radford University — 2017
Advisor: Dr. Dayna Hayes
Thesis title: "Ethanol but not Nicotine Administration during Adolescence Leads to Alterations in Neurogenesis in the Hippocampal Dentate Gyrus During Protracted Abstinence"
Committee: Dayna Hayes (Chair), Pamela Jackson, Sarah Redmond

B.S. Psychology — Lock Haven University of Pennsylvania — 2012

DOCTORAL ADVISOR

Thomas D. Parsons, Ph.D.
Grace Center Professor for
Innovation in Clinical Education,
Simulation, & Immersive Technology
Arizona State University

Academic Experience

2022 – Current *Postdoctoral Fellow*. Adaptive Neural Systems (ANS) group, The Institute for Integrative and Innovative Research (I^3R), University of Arkansas, Fayetteville.

- Assisted with lab/hardware setup and testing
- Provided support to other group members regarding experimental design and statistical procedures
- Developed virtual environment to examine impact of surface stimulation as a means of haptic feedback

2016 – 2022 *Graduate Research Assistant*. Computational Neuropsychology and

Simulation (CNS) Lab, Department of Learning Technologies, University of North Texas.

- Helped with running participants for studies
- Learned how to perform a quantitative meta-analysis for ongoing collaboration
- Preparing equipment for use in upcoming experiments and lab demonstrations

Summer 2021 *Internship.* Army Research Laboratory (ARL) Summer Student Experience (SSE).

- Conducted HLM analyses in R for upcoming publication
- Worked collaboratively with researchers from inside and outside academia
- Received hands-on experience working with the military in an industry setting

2016 – 2022 *Graduate Teaching Fellowship/Assistantship*. Department of Psychology, University of North Texas.

- Teaching students the fundamentals of writing APA style papers
- Lectured several classes of over 100 students
- Worked with Psychology department to submit student related documentation and grades

2019 – 2020 *Graduate Research Assistantship*. Sleep and Health in Everyday Life (SHEL) Lab Department of Psychology, University of North Texas.

- Conducted statistical analyses including HLM and Bayesian in R.
- Used python programming language to format data to send to CDC
- Worked collaboratively with graduate and undergraduate students

2014 – 2016 *Graduate Research Assistantship*, Department of Psychology, Radford University.

- Oversaw daily operations of the animal lab
- Conducted research on various projects such as increasing sustainability behaviors as directed by dean of graduate school
- Worked with IRB to implement new submission system for research protocols

RESEARCH INTERESTS & STATEMENT

- Assessment utilizing virtual reality
- Artificial intelligence and machine learning algorithms
- Neurocognitive and affective assessment influences of transcranial direct current stimulation combined with virtual environments.
- Brain-computer interfaces
- Affiliate member of the Human Factors and Ergonomics Society (HFES)

The overall focus of my research is the implementation and evaluation of novel technologies within the field of neuropsychology. Much of my research has focused on utilizing virtual reality (VR)

which falls under extended reality (XR) which is quickly becoming a mainstream technology. Additionally, I have investigated the use of artificial intelligence (AI) and machine learning (ML) for binary classification problems. Finally, I also focus on experimental rigor as evidenced by meta-analytic and systematic reviews, focusing on thorough reporting of data and experimental methods, and use of tools such as open science.

SOFTWARE AND PROGRAMMING

- Microsoft office
- SPSS
- Statistica
- R
- Python
- Matlab
- Unity/C#
- Some experience with
    - Cloudera, SQL, Hadoop, SAS
- Some example code at https://github.com/JustinAsbee?tab=repositories

AWARDS, FUNDING, AND OTHER SUPPORT

Title: Validation of the Woodcock-Johnson IV test of Cognitive Abilities and the Automated Neuropsychological Assessment Metrics in a teleneuropsychology setting

Role: Co-PI **Agency:** TWU Woodcock Institute **Period:** 4/01/21 - current
Type: Research Grant **Amount:** $14,978.00 (PI: Parsons)
Study: Teleneuropsychology, is a promising technology, however the strengths and weaknesses of teleneuropsychological assessments should be carefully evaluated. For example, the most widely studied medium in teleneuropsychology is video teleconferencing, which represents an excellent advance in the incorporation of advanced technology for connecting neuropsychologists with patients in underserved areas. Unfortunately, video teleconferencing is somewhat lacking in terms of stimulus presentation and data recording when compared to computerized neuropsychological assessments. Computerized neurocognitive batteries such as the Automated Neuropsychological Assessment Metrics (ANAM) are a core tool utilized for mTBI diagnostics and monitoring symptom recovery for management decisions, such as return to active duty. Key differences potentially exist when moving from an in-person assessment to teleneuropsychological assessments, the computerized version of ANAM and remote administrations of tests such as the Woodcock-Johnson IV tests of Cognitive Abilities (WJ IV COG) requires validation when used in different testing environments than originally intended, such as via video teleconferencing.

Title: Internship: Army Research Laboratory (ARL) Summer Student Experience (SSE)

Role: Intern **Agency:** Army Research Laboratory **Period:** 5/10/21 – 9/24/21
Type: Research assistant **Amount:** $24,000.00 (Mentor: Scott Kerick, Ph.D.)
Study: Previous neurofeedback research has shown training-related frontal-medial theta increases and performance improvements on some executive tasks in real feedback versus sham control groups. However, typical sham control groups receive false or non-contingent feedback, making it difficult to know whether observed differences between groups are associated with increased frontal theta, accurate contingent feedback, or both. To address this question, we investigated differences between two frontal theta training groups, each receiving accurate

contingent feedback, but with different top-down goals: (1) increase and (2) alternate increase/decrease frontal theta. We hypothesized that the increase group would exhibit greater increases in frontal theta compared to the alternate group, which would exhibit lower frontal theta during down- versus up-modulation blocks over sessions. We also hypothesized that the alternate group would exhibit greater performance improvements on a Go-NoGo shooting task requiring alterations in behavioral activation and inhibition, as the alternate group would be trained with greater task specificity, suggesting that receiving accurate contingent feedback may be the more salient learning mechanism underlying frontal theta neurofeedback training gains. Thirty young healthy volunteers were randomly assigned to increase or alternate groups. Training consisted of an orientation session, five neurofeedback training sessions (six blocks of six 30-s trials of FCz theta modulation (4-7 Hz) separated by 10-s rest intervals), and six Go-NoGo testing sessions (four blocks of 90 trials in both Low and High time-stress conditions). Multilevel modeling revealed greater frontal theta increases in the alternate group over training sessions. Further, Go-NoGo task performance increased at a greater rate in the increase group. Overall, these results reject our hypotheses and suggest that changes in frontal theta and performance outcomes were not explained by reinforcement learning afforded by accurate contingent feedback. We discuss our findings in terms of alternative conceptual and methodological considerations.

Title: AVatar-Administered Neuropsychological Testing

Role: Graduate Research Assistant **Agency:** TATRC/CDMRP **Period:** 8/01/15-5/31/18
Type: W81XWH-14-C-0016 **Amount:** $998,888 (PI: Parsons)
Study: Topic A13-090 – Advanced Automated Assessment of Cognitive Changes Associated with Brain Injury and Neurological Disease. The work focuses on developing an artificially intelligent virtual human agent for neurocognitive assessment. The automated language-based assessment system is primarily self-administering with clearly presented directions to a patient using both visual illustrations and avatar-based verbal instructions. Computational modeling of user neurocognitive and psychophysiological responses enhances the cognitive architecture.

- Member of Psi Chi: The International Honors Society in Psychology
- Ernest. H. Harrell Memorial Scholarship
- Mary D. Walsh Endowed Scholarship
- Psychology Department Excellence Scholarship
- Academic Achievement Scholarship

PUBLICATIONS AND SCHOLARLY WORK

Publications (Peer reviewed: journal articles)

- Kerick, S.E., **Asbee, J.**, Spangler, D.P., Brooks, J.B., Garcia, J.O., Parsons, T.D., Bannerjee, N.D., & Robucci, R. (2023) Neural and behavioral adaptations to frontal theta neurofeedback training: A proof of concept study. *PLOS ONE, 18*(3), e0283418. [IF = 3.752*]

- **Asbee, J.,** Slavish, D.C., Taylor, J.D., & Dietch, J.R. (2023). Using a frequentist and Bayesian approach to examine video game usage, substance use, and sleep among college students. *Journal of Sleep Research, 32*(4), e13844. https://doi.org/10.1111/jsr.13844. [IF = 5.296*]
- **Asbee, J.,** Kelly, K., McMahan, T., & Parsons, T.D. (2023) Machine learning classification analysis for an adaptive virtual reality Stroop task. *Virtual Reality*, 1-17. [IF = 4.697*]
- **Asbee, J.,** Kelly, K., McMahan, T., & Parsons, T.D. (2022). Factor Analysis of the Virtual Reality Stroop Task. *Journal of Clinical and Experimental Neuropsychology, 44*(8), 604-617 [IF = 2.475*]
- Parsons, T. D., **Asbee, J.**, Courtney, C. G. (2022) Interaction of Cognitive and Affective Load Within a Virtual City. *IEEE Transactions on Affective Computing*, doi: 10.1109/TAFFC.2022.3220953. [IF = 10.506*]
- **Asbee, J.,** & Parsons, T.D. (2021). Effects of Transcranial Direct Current Stimulation on Cognitive and Affective Outcomes Using Virtual Stimuli: A Systematic Review. *Cyberpsychology, Behavior, and Social Networking*. [IF = 4.157*]
- Slavish, D., **Asbee, J.**, Veeramachaneni, L., Messman, B., Scott, B., Dietch, J., & Taylor., D. (2020) The cycle of daily stress and sleep: Sleep measurement matters. *Annals of Behavioral Medicine , 55*(5), 413-423. [IF = 3.575*]
- Parsons, T. D., Duffield, T., & **Asbee, J.** (2019). A Comparison of Virtual Reality Classroom Continuous Performance Tests to Traditional Continuous Performance Tests in Delineating ADHD: a Meta-Analysis. *Neuropsychology review, 29*, 338-356 [IF = 7.432*]

*Impact factors are at time of publication

Publications (Under review)

- Parsons, T.D., McMahan, T., & **Asbee, J.** Feasibility study to identify machine learning predictors for a Virtual Environment Grocery Store. Virtual Reality.

Publications (Peer reviewed: conference papers)

- **Asbee, J.** & Parsons, T. D. (2021). Exploratory Factor Analysis of the Virtual Reality Stroop Task. *Annual Review of Cybertherapy and Telemedicine 2021*.
- **Asbee, J.**, Slavish, D.C., Taylor, D.J., & Dietch, J.R. (2021). Video Game Usage, Substance Use, and Sleep Among College Students. *In 15th European Conference on Game Based Learning ECGBL 2021, Brighton, UK, 23-24 September 2021* (pp. 25-32). Academic Conferences International Limited.
- **Asbee, J**., & Parsons, T. (2019). Cognitive Effects of Transcranial Direct Current Stimulation and Virtual Environments. *Annual Review of Cybertherapy And Telemedicine 2019*, 11.
- Parsons, T. D., Schermerhorn, P., McMahan, T., **Asbee, J.**, & Russo, N. (2017). An initial validation of virtual human administered neuropsychological assessments. *Annual Review of CyberTherapy and Telemedicine*, 123.

Thesis/Dissertation

- Asbee, J., *Ethanol but not Nicotine Administration during Adolescence Leads to Alterations in Neurogenesis in the Hippocampal Dentate Gyrus During Protracted Abstinence* M.A. Thesis, Radford University, Department of Psychology, 2017.

- Asbee, J., Computational and Statistical Modeling of the Virtual Reality Stroop Task. Ph.D. Dissertation, University of North Texas, Department of Psychology, 2022.

TEACHING

My teaching interests involve research methods in general, as well as brain and behavior. I believe that all students are able to learn and sometimes the best approach is to find a way to personalize information for the students. I tend to incorporate multiple examples and I love using tons of pictures and videos to keep students engaged.

Teaching Experience (courses taught)

Course Title	Terms/Dates	Institution
PSYC 302: Research Methods in Psychology Lab Section	F 2014	Radford University
PSYC 2950: Experimental Methods Lab Section	F 2017, Sp 2018, & Sp 2019	University of North Texas
PSYC 1630: General Psychology I	F 2018 – F 2019 & F 2020	University of North Texas
PSYC 3000: Positive Psychology	Sp 2020	University of North Texas

Grading & Teaching Assistant Experience

Course Title/Duties	Terms/Dates	Institution
PSYC 443: Research in Social Psychology	Sp 2015	Radford University
POSC 120: Introduction to American Government	F 2015	Radford University
PSYC 3620: Developmental Psychology	F 2016 & F 2018	University of North Texas
PSYC 1650: General Psychology II	Sp 2017	University of North Texas
PSYC 2950: Experimental Methods (TA)	F 2017	University of North Texas
PSYC 4640: Psychophysiology	Sp 2018	University of North

REFERENCES

Thomas D. Parsons, Ph.D.
Grace Center Professor for
Innovation in Clinical Education,
Simulation, & Immersive Technology
Arizona State University
1151 South Forest Avenue, Tempe,
Arizona 85281, United States
E-mail: Thomas.Parsons@unt.edu

Scott Kerick, Ph.D.
Army Futures Command (AFC)
US Army Research Laboratory (ARL)
Aberdeen Proving Ground, MD 21005
Email: scott.e.kerick.civ@army.mil

Danica Slavish, Ph.D.
Assistant Professor of Psychology
Department of Psychology
University of North Texas
Office: 372 Terrill Hall
E-mail: Danica.Slavish@unt.edu

Kimberly Kelly, Ph.D.
Associate Professor of Psychology
Department of Psychology
University of North Texas
Office: 347 Terrill Hall
E-mail: Kimberly.Kelly@unt.edu