OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.  
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Mitchell, William

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Predoctoral Student

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Start Date  MM/YYYY | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- | --- |
| Loyola University Maryland,  Baltimore, MD | B.S. | 08/2010 | 05/2014 | Psychology |
| Temple University,  Philadelphia, PA | Ph.D. | 08/2019 | 05/2025 (Expected) | Cognition & Neuroscience |

**A. Personal Statement**

I'm interested in studying how complex, context-dependent social phenomena are represented in neural and behavioral activity across early development. Adequately eliciting these responses demands research paradigms with high ecological-validity and analytic techniques sensitive to the intricate multivariate nature of their independent components. This proposed project will allow me to explore these interests at the end and beginning of my predoctoral and postdoctoral stages, respectively. Using feature-rich, dynamic video stimuli to elicit behavioral and neural responses to social uncertainty, I will apply a computational technique known as Intersubject Correlations (ISC) to identify adolescent and adult neural representations of social and non-social certainty judgments and their predictive utility towards behavioral markers of uncertainty. I have created naturalistic, feature-rich study designs to measure context-dependent phenomena in adult and developmental samples and analyzed the resultant data using a robust toolbox of computational and analytic techniques, including representational similarity analysis (RSA). However, I have not been able to directly collect developmental data during my predoctoral studies and my previous research has used techniques that focus on *intra*-subject similarities (e.g., how similarly one subject responds to different objects) rather than *inter*-subject similarities (e.g., how similarly many subjects respond to the same object), which is insufficient for identifying the larger scale commonalities that characterize distinct developmental groups. Gaining proficiency with ISC techniques and expertise in developmental neuroscience theory and data collection is crucial to my long-term goal of directing my own social affective developmental neuroscience lab at an R1 university to study context-dependent phenomena using highly ecologically-valid approaches. Completing my outlined project under the direction of my advising team and my outlined training course, including participating in relevant conferences, workshops, and extracurricular groups (e.g., lab meetings, journal clubs), will build the skills that I need to become a successful independent developmental neuroscientist.

My post-baccalaureate research experiences established a strong foundation of technical skills and project management which will facilitate my proposed project. Under the mentorship of Dr. Ryan Vandrey and Dr. Maxine Stitzer at Johns Hopkins University, I coordinated several behavioral pharmacology projects which explored the regulation of nicotine and cannabinoid substances. I was crucial to the data collection and management process, as well as biospecimen collection. I was first introduced to neuroimaging literature under the direction of Dr. Eric Strain at Johns Hopkins. As editorial office manager, I was responsible for revising all accepted manuscripts and coordinating daily operations for the journal *Drug and Alcohol Dependence.* I subsequently accepted a position as a research coordinator at the Children’s Hospital of Philadelphia under the mentorship of Dr. Natalie Terry. I worked with clinical developmental populations to collect and manage data and biospecimens in service of developing an extensive biobank of human tissue for designing new gastrointestinal treatments. I also worked to survey the gut microbiome of children suffering from short bowel syndrome with the ultimate goal of developing a course of treatment for those suffering from the ailment.

Under Dr. Chelsea Helion’s mentorship, my predoctoral work has largely focused on neural and behavioral representations of social and affective phenomena using feature-rich stimuli. During my first and second years, I co-directed a project exploring how high-intensity quasi-naturalistic contexts influence memory, self-regulation, and physiology. My specific interests were in how individuals self-regulate their emotions with minimal researcher intervention (Mitchell, *Under Review*). Across my first and second years I also reanalyzed a developmental neuroimaging dataset to explore differences in the representation of affective information using video stimuli (Mitchell, 2021). Across my third and fourth years, my research has focused upon uncertainty; its affective experience and how individuals resolve it. My behavioral study assigns roles (e.g., detective, friend of victim) to adult participants (n = 46) and continuously assesses their certainty of a predefined social outcome (e.g., guilt/innocence of a character) while watching short video clips. We found high intersubject synchrony within role, but not across role, supporting extant research finding that shared perspectives drive synchronous representations. We also found that subjects within a role were more synchronous because the roles influenced how they responded to ambiguous, but not unambiguous information, using methodology adopted from drift diffusion modeling (Mitchell et al., *In Preparation*). This study design and these results inform this proposal, though, with several modifications to improve the design and better adapt to the MRI setting.

I have crafted a comprehensive training plan in collaboration with my consultants (Dr. David Smith, Dr. Laurence Steinberg) and sponsors (Dr. Chelsea Helion, Dr. Jason Chein) to develop expertise in ISC techniques and the social developmental neuroscience literature. Dr. Smith is a rising star in the decision-making community and will use his conceptual and technical knowledge of multivariate techniques and brain-behavior relationships to advise my application and interpretation of intersubject correlations. As one of the most renowned experts in the field of adolescent social development and risky decision-making, Dr. Steinberg has agreed to lend his unparalleled experience to help me learn how my K99 proposed paradigm can be practically and theoretically adjusted for and analyzed using an adolescent population and to help identify an appropriately developmental neuroscience lab where I can conduct my postdoctoral training. As my sponsor, Dr. Helion has been integral to the development of this study design and offers her expertise in using feature-rich study designs and naturalistic methods to measure decision-making in social and affective phenomena. Dr. Chein directs Temple University’s Brain Research Imaging Center (TUBRIC) and is an expert on a diverse array of valuable neuroimaging techniques and tools, including using function magnetic resonance imaging of adult and adolescent populations. My consultants and sponsors have a demonstrated history of collaboration, having worked together on many previous projects. This strong and theoretically diverse mentorship team offers expertise for any given facet of my proposed project and will facilitate my own growth towards expertise.

Lastly, I would like to highlight my commitment to mentorship. As a first-generation higher education individual from a low-income background, I would not have achieved what I have without selfless mentors. My training plan also dedicates space to practice mentorship and lab management so that I can create a diverse and inclusive space for future trainees. I pursue this through my continued work co-directing Temple’s Coding Outreach Group (COG) which teaches others research-relevant computer programming skills while promoting open-science and open-source practices, ensuring that resources are never a barrier for learning.

**B. Positions, Scientific Appointments and Honors**

**Positions and Employment**

|  |  |
| --- | --- |
| 2019 - | Graduate Research Assistant, Temple University, Supervisor: Chelsea Helion, PhD. |
| 2017 - 2019 | Research Coordinator, Children’s Hospital of Philadelphia, Supervisor: Natalie Terry, M.D., PhD. |
| 2016 - 2018 | Editorial Office Manager, Elsevier (*Drug and Alcohol Dependence*), Supervisor: Eric Strain, M.D. |
| 2015 - 2017 | Research Coordinator, Johns Hopkins University, Supervisor: Ryan Vandrey, PhD., Maxine Stitzer, PhD |
| 2013 - 2015 | Research Assistant, Johns Hopkins University, Supervisor: Ryan Vandrey, PhD., Maxine Stitzer, PhD |

**Other Experience and Professional Memberships**

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| --- | --- |
| 2023 | Teaching Assistant, Behavioral Neuroscience, Temple University |
| 2022 - | Co-Director, Coding Outreach Group, Temple University |
| 2022 | Instructor of Record, Developmental Psych., Temple University |
| 2022 | Teaching Assistant, Intro. Statistics, Temple University |
| 2021 - | Member, Flux Society |
| 2021 - | Member, Society for Affective Science |
| 2021 | Instructor of Record, Intro. Statistics, Temple University |
| 2020 - | Member, Society for Personality and Social Psychology |
| 2020 - | Member, Social Affective Neuroscience Society |
| 2020 - 2021 | Teaching Assistant, Intro. Neuroscience, Temple University |

**Honors**

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| --- | --- |
| 2023 | Accepted, Summer Institute for Social and Personality Psychology |
| 2022 | Graduate Travel Award, SPSP Conference |
| 2022 | Psychology Honors Mentor of the Year, Temple University |
| 2022 | Attendee, Neurohackademy, University of Washington |
| 2021 | Best Poster Award, SPSP Emotion Preconference |
| 2021 | Outstanding Poster Award, SANS Conference |
| 2011 - 2014 | Presidential Scholarship, Loyola University Maryland |
| 2010 - 2014 | Dean's List, Loyola University Maryland |

**C. Contributions to Science**

1. **Comparing Neural Representations of Affective Phenomena Across Development:** A core focus of my research has been exploring how normative development influences affective neural representations. In my first first-author manuscript, I applied hierarchical linear modeling (HLM) and representation similarity analysis (RSA) to data collected from a sample of adults and children who passively watched valenced video stimuli. I hypothesized children should demonstrate greater similarity in neural activation patterns relative to adults while assessing positive and negative affective information, and that these differences would be more pronounced in regions which undergo more structural changes during development. These findings would highlight that observed behavioral differences between age groups are also observable neurally using multivariate pattern analyses. In line with my hypotheses, we found that neural activation patterns within the ventromedial prefrontal cortex, which undergoes dramatic early-life development, demonstrated far more complex and idiosyncratic representations in adults relative to children (Mitchell et al., 2021). These age-related differences were more muted in sub-cortical structures (e.g., amygdala, nucleus accumbens) that undergo fewer structural developments. Affective representation maturation from relatively simplistic to more nuanced is in line with rational constructivist theories of emotional development. These typically hold that humans start with proto-conceptual primitives to emotion that mature over time. I am using a similar technique to examine the representations of regulated affective information in a pre-existing developmental sample of 116 children, adolescents, and adults, though this manuscript is still in preparation. Neural representations occupy a pivotal role for normative development. Identifying neural mechanisms that underlie observable behavior is an important step towards building comprehensive models which can explain why normative age-related behavioral changes occur and in which situations these normative developments might become of clinical significance.
2. **Mitchell, W.J.**, Tepfer, L. J., Henninger, N. M., Perlman, S. B., Murty, V. P., & Helion, C. (2021). Developmental differences in affective representation between prefrontal and subcortical structures. *Social Cognitive and Affective Neuroscience*, nsab093. https://doi.org/10.1093/scan/nsab093.
3. **Mitchell, W.J.**, Tepfer, L. J., Henninger, N. M., Perlman, S. B., Murty, V. P., & Helion, C. (2021). Neural representations of affective information across developmental contexts. Invited presentation to Yale University’s Fundamentals of the Adolescent Brain Lab.
4. **Mitchell, W.J.**, Satpute, A.B., Nook, E.C., Cosme, D.J., Helion, C. (2022). Contextualizing Emotion – Influences of Context on Affective Representation, Experience and Regulation*.* Symposium at the 2022 Annual Conference of the *American Psychological Association*, Minneapolis, MN.
5. **Measuring Decision Making Using Naturalistic Methodology:** A common theme present through even my earliest research endeavors is the incorporation of high ecological validity in study design. In my post-baccalaureate position, I directed one of twelve labs across the country that used ecological momentary assessments and cognitive/biological measures to assess associations between reduced-nicotine cigarette usage and smoking behaviors, ultimately supporting the theory that reducing nicotine below a specific threshold would be a safe public policy decision to reduce addiction (Donny et al., 2015). This research informed the FDA’s decision to exert stronger regulatory control over cigarette content and highlighted for me the inherent value in modeling phenomena in the contexts in which they occur. My first predoctoral project leveraged the consistency and affective variability of a quasi-naturalistic context (i.e., a haunted house) to identify how predictive affective intensity is of the emotion regulation (ER) strategies people use when not trained or directed to regulate their emotions. This association is very strong in choice paradigms (r+ = 0.46 – 0.61) which train and prompt participants to regulate, but training and prompting may deviate from how ER occurs for the average person. Contrary to previous lab work, we did not observe an association between affective intensity and which ER strategies people used across two studies (n = 57; n = 118). We found that disengagement strategies, including distraction and suppression, were significantly less effective at higher intensity levels in this dynamic, high-intensity environment; an effect that contradicts lab findings. A third study (n = 157) found an association between affective intensity and ER choice, but only when participants were tasked with choosing a strategy in response to *descriptions* rather than *experiences* within the haunted house. Our results suggest individuals in some high-intensity situations may use disengagement strategies both more frequently and less efficiently than observed in lab choice paradigms (Mitchell et al., *under review*). These results can be especially important for informing trauma related treatments but also emphasize that diversity in task design is required to capture the full variability around complex affective constructs like emotion regulation or uncertainty.
   1. **Mitchell, W. J.**, Stasiak, J., Martinez, S. A., Cliver, K., Gregory, D. F., Reisman, S., … Helion, C. (*Under Review*). Emotion regulation strategy usage in a quasi-naturalistic context. *psyarxiv*. https://doi.org/10.31234/osf.io/23wtz
   2. Donny, E. C., Denlinger, R. L., Tidey, J. W., Koopmeiners, J. S., Benowitz, N. L., Vandrey, R. G., … Hatsukami, D. K. (2015). Randomized Trial of Reduced-Nicotine Standards for Cigarettes. *New England Journal of Medicine*, 373(14), 1340–1349. https://doi.org/10.1056/NEJMsa1502403
   3. **Mitchell, W.J.**, Stasiak, J., Gregory, D., Reisman, S., Murty, V., & Helion, C. (2020). Why We Regulate: Regulation Beyond the Lab. Invited presentation for the *Maladaptive Motivational Behavior Seminar Series* in Philadelphia, PA.
   4. Stasiak, J., **Mitchell, W.J.**, Reisman, S., Gregory, D., Murty, V., & Helion, C. (2022). Physiological arousal guides situational appraisals and metacognitive recall for naturalistic experiences. *Neuropsychologia*, 180:108467. https://doi.org/10.1016/j.neuropsychologia.2023.108467
6. **Documenting Biological Systems in Childhood and Adolescence:** Through my initial post-baccalaureate experience, I developed a substantial research skillset, but was not able to work with developmental populations or observe biological systems. I thus transitioned to the Children’s Hospital of Philadelphia where I coordinated two microbiome projects. The first used human tissue, which I collected during endoscopies and resections, to generate a biobank of 150 enteroids, or replicable patient cells from diseased or non-diseased gastrointestinal tract tissue. This biobank provides an effective means of testing GI-related treatments without subjecting children to unjustified harm in the process. The second project surveyed gut microbiota in patients suffering from short bowel syndrome (SBS), which typically complicates the use of traditional antibiotic treatments and impacts developing health and cognition. In both projects, I was responsible for collecting, organizing, and maintaining all data and biospecimens, managing all regulatory affairs, identifying and interacting with eligible participants, and a portion of data curation. These efforts produced a recommended course of treatment for children with SBS on which I was a co-author.
7. Kastl, A., Zong, W., Gershuni, V. M., Friedman, E. S., Tanes, C., **Mitchell, W. J**., ..., Wu, G. D. (2022). Dietary fiber-based regulation of bile salt hydrolase activity in the gut microbiota and its relevance to human disease. *Gut Microbes*, 14(1), 2083417. https://doi.org/10.1080/19490976.2022.2083417
8. Kastl, A., Zong, W., Gershuni, W., Friedman, E.S., Tanes, C., **Mitchell, W.J.**,..., Wu, G.D. (2022). Clinical phenotyping of patients with short bowel syndrome via effects of diet and the gut microbiota on bile acids. Presented at the 2022 Annual Meeting for the *North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition.*

**D. Scholastic Performance**

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| --- | --- | --- |
| YEAR | COURSE TITLE | GRADE |
|  | Loyola University Maryland |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2010 | AH111 | Survey of Art History: Renaissance to Modernity | | | B+ |
| 2010 | PY101 | Introductory Psychology | | | A- |
| 2010 | FE100 | First Year Experience | | | S\* |
| 2010 | WR100 | Effective Writing | | | A |
| 2010 | ST110 | Introduction to Statistical Methods & Data Analysis | | | A |
| 2010 | SN103 | Intermediate Spanish I | | | B |
| 2011 | HS101 | History of Modern Western Civilization | | | B+ |
| 2011 | SN104 | Intermediate Spanish II | | | B+ |
| 2011 | PY201 | Social Psychology | | | A |
| 2011 | BL105 | Introduction to Anatomy & Physiology | | | B |
| 2011 | AH312 | Art History: The Renaissance in Italy | | | B+ |
| 2011 | PL201 | Foundations of Philosophy | | | A |
| 2011 | SC103 | Sociology: American Society | | | A |
| 2011 | PY221 | Psychology of Learning | | | B- |
| 2011 | HS312 | History of Ancient Greece | | | B+ |
| 2011 | PY291 | Research Methods I | | | B+ |
| 2012 | TH201 | Introduction to Theology | | | A |
| 2012 | PL202 | Philosophical Perspectives: Project Modernity | | | A |
| 2012 | PY254 | Psychology of Women | | | A |
| 2012 | PY292 | Research Methods II | | | A- |
| 2012 | EN101 | Understanding Literature | | | A- |
| 2012 | PY202 | Psychopathology | | | A- |
| 2012 | PY255 | Psychology of Religion | | | A- |
| 2012 | PY421 | Forensic Psychology | | | A- |
| 2012 | TH266 | Christian Theology & World Religions | | | A |
| 2012 | PY412 | Evolutionary Psychology | | | A- |
| 2012 | PY353 | Contemporary Issues in Psychology | | | A |
| 2013 | PL220 | Philosophical Perspectives: Art & Imagination | | | A |
| 2013 | PY203 | Psychology of Personality | | | A- |
| 2013 | PY415 | Psychological Systems & Theories | | | A |
| 2013 | CH110 | Chemistry and Society | | | A |
| 2013 | PL314 | Environmental Ethics | | | A- |
| 2013 | PY244 | Life Span Development | | | A |
| 2013 | PY331 | Biopsychology | | | A- |
| 2013 | PY417 | Psychology: Beginning & End of Life | | | A- |
| 2013 | PY435 | Field Experience in Psychology | | | A |
| 2013 | EN203 | Major Writers in American Literature | | | A- |
| 2014 | SC365 | Neighborhood & Community Development and Decay in America | | | A |
| 2014 | MU201 | Music Fundamentals | | | A |
| 2014 | WR230 | Art of Poetry and Fiction | | | A |
| 2014 | PL317 | Philosophical Perspectives: The Experience of Evil | | | A- |
|  | Temple University | | | |  |
| 2019 | PSY8510 | | Developmental Psychology | | A |
| 2019 | PSY8017 | | Professional Issues in Psychology Careers | | A |
| 2019 | PSY8011 | | Graduate Statistics I | | A- |
| 2020 | PSY8310 | | Neuromodulation of Learning and Memory | | A |
| 2020 | PSY8021 | | Graduate Statistics II | | A |
| 2020 | PSY8015 | | Teaching of Psychology | | A |
| 2020 | PSY8312 | | Cognitive Neuroscience | | A |
| 2020 | PSY8031 | | Survey in Multivariate Techniques | | A |
| 2021 | PSY8110 | | Seminar on Human Neuroimaging | | A |
| 2021 | PSY8033 | | Hierarchical Linear Modeling | | A |
| 2021 | PSY8430 | | Grant Writing | | A |
| 2021 | PSY8310 | | Social Neuroscience & Self-Control | | Audited |
| 2022 | NSCI8010 | | fMRI Methods & Analysis | | A |
|  |  | | |  | GPA: 3.97 |

**\*‘S’ indicates a satisfactory or passing grade in a pass/fail grading system.  
GRE Test Scores:** Verbal: 163, 93rd percentile; Quantitative: 159, 73rd percentile; Analytical Writing: 5.0, 93rd percentile.