

NATHAN T. HALL

Department of Psychology and Neuroscience
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Education

2020-2025	The University of North Carolina at Chapel Hill Ph.D. Psychology and Neuroscience Dissertation: <i>Threat-induced interference in attention-guided reinforcement learning: initial validation and relevance for affective instability in borderline personality pathology</i> Advisor: Michael N. Hallquist, Ph.D.
2016-2020	The Pennsylvania State University M.S. Clinical Psychology Thesis: <i>Developmental changes in resting-state functional connectivity in borderline personality disorder: a network analysis approach</i> Advisor: Michael N. Hallquist, Ph.D.
2011-2015	Binghamton University (SUNY) B.A. Psychology, Philosophy <i>Magna Cum Laude</i>

Honors and Awards

2023	Dashiell Dissertation Start-up Award: Department of Psychology, The University of North Carolina at Chapel Hill
2022	Trainee Research Award: The Hierarchical Taxonomy of Psychopathology (HiTOP) Consortium
2017	Student Travel Award: Center for Brain, Behavior, and Cognition at Pennsylvania State University
2015	Phi Beta Kappa Academic Honor Society, Binghamton University (SUNY)

Peer-Reviewed Publications:

1. Schreiber, A. M., **Hall, N. T.**, Parr III, D. F., & Hallquist, M. N. (2025). Impulsive adolescents exhibit inefficient processing and a low decision threshold when decoding facial expressions of emotions. *Psychological Medicine*, 55, e105. <https://doi.org/10.1017/s0033291725000595>
2. **Hall, N.T.**, Hallquist, M.N., Martin, E.A., Lian, W., Jonas, K. G., Kotov, R (2024). Automating the analysis of facial emotion expression dynamics: A computational framework and application in psychotic disorders. *Proceedings of the National Academy of Sciences*, 121(14), e2313665121. <https://doi.org/10.1073/pnas.2313665121>

3. **Hall, N. T.**, & Hallquist, M. N. (2023). Dissociation of basolateral and central amygdala effective connectivity predicts the stability of emotion-related impulsivity in adolescents and emerging adults with borderline personality symptoms: A resting-state fMRI study. *Psychological Medicine*, 53(8), 3533–3547. <https://doi.org/10.1017/S0033291722000101>
4. Allen, T. A., **Hall, N. T.**, Schreiber, A. M., & Hallquist, M. N. (2022). Explanatory personality science in the neuroimaging era: The map is not the territory. *Current Opinion in Behavioral Sciences*, 43, 236–241. <https://doi.org/10.1016/j.cobeha.2021.11.009>
5. **Hall, N. T.**, Schreiber, A. M., Allen, T. A., & Hallquist, M. N. (2021). Disentangling cognitive processes in externalizing psychopathology using drift diffusion modeling: Antagonism, but not disinhibition, is associated with poor cognitive control. *Journal of Personality*, 89(5), 970–985. <https://doi.org/10.1111/jopy.12628>
6. Allen, T. A., Schreiber, A. M., **Hall, N. T.**, & Hallquist, M. N. (2020). From Description to Explanation: Integrating Across Multiple Levels of Analysis to Inform Neuroscientific Accounts of Dimensional Personality Pathology. *Journal of Personality Disorders*, 34(5), 650–676. <https://doi.org/10.1521/pedi.2020.34.5.650>
7. **Hall, N. T.**, Schreiber, A. M., & Hallquist, M. N. (2020). Good taxonomy can address classification challenges in personality pathology by providing informative priors that balance information compression and fidelity. In Lejuez, C. W., & Gratz, K. L. (Eds.), *Cambridge Handbook of Personality Disorders*. Cambridge University Press. <https://doi.org/10.1017/9781108333931.025>
 - A longer version of this commentary with figure can be found online [here](#).
8. Hallquist, M. N., **Hall, N. T.**, Schreiber, A. M., & Dombrowski, A. Y. (2018). Interpersonal dysfunction in borderline personality: a decision neuroscience perspective. *Current Opinion in Psychology*, 21, 94–104. <https://doi.org/10.1016/j.copsy.2017.09.011>
9. James, K. M., Owens, M., Woody, M. L., **Hall, N. T.**, & Gibb, B. E. (2018). Parental Expressed Emotion-Criticism and Neural Markers of Sustained Attention to Emotional Faces in Children. *Journal of Clinical Child & Adolescent Psychology*, 47(sup1), S520–S529. <https://doi.org/10.1080/15374416.2018.1453365>
10. Schreiber, A. M., **Hall, N. T.**, & Hallquist, M. N. (2017). Prototype Approach to Personality Disorders. In V. Zeigler-Hill & T. K. Shackelford (Eds.), *Encyclopedia of Personality and Individual Differences* (pp. 1–7). Springer International Publishing. https://doi.org/10.1007/978-3-319-28099-8_932-1

Manuscripts Under Review:

1. **Hall, N. T.**, & Hallquist, M. N. (under review). Right anterior insula effective connectivity impairs intrinsic BOLD fluctuations in dorsal attention network in adolescents and young adults with borderline personality symptoms. bioRxiv, 2022–08. <https://doi.org/10.1101/2022.08.08.503183>

Manuscripts in Preparation:

**Denotes Trainee

1. **Hall, N.T.**, Vig, Z. A., Schreiber, A. M., Paolizzi, S. G., Okan, A., Allen, T.A., & Hallquist, M. N., (in preparation) *Constructing validity in theory-based computational psychiatry: a critical review of methods for integrating individual differences and cognitive process models*
2. **Hall, N.T.**, Radulescu, A., & Hallquist, M.N. (in preparation). Threat-induced interference in attention-guided reinforcement learning: initial validation and relevance for affective instability in borderline personality pathology.
3. **Hall, N.T.**, & Hallquist, M. N. (in preparation). Attention-guided reinforcement learning offers an algorithmic perspective on attention in psychopathology: a proposal for an integrated computational psychiatry.
4. Paolizzi, S. G., **Hall, N.T.**, & Hallquist, M. N (in preparation). *Decomposing Arousal-Valence Dimensions in Categorization Processing to Understand Affective Instability in Borderline Personality Disorder*
5. Allen, T.A., Schreiber, A. M., Azfali, K., Blain, S. DeYoung C.G., Docherty A., Fornito, A., Gillan, C., Goghari, V., **Hall, N.T.**, Homan, P., Kaczkurkin, A., Kotov, R., Krueger, R. F., Latzman, R., Okan, A., Pisciandaro, J., Tackett, J., & Hallquist, M.N. (in preparation) *Integrating HiTOP and Computational Psychiatry to Usher in a New Era of Clinical Science.*
6. **Sands, B., **Hall, N.T.**, Schreiber, A.M., Alexander, N., Mittal, V., Haase C.M. (in preparation). *Positivity Resonance in Youth at Clinical High Risk for Psychosis and Caregivers: Findings from a Dyadic Automated Facial Expressions Analysis Approach.*
7. **Velasquez, R.C.L., **Hall, N.T.**, Allen, T.A., Hallquist, M. N. (in preparation). *Investigating associations among borderline personality symptoms and aberrant social learning.*

Invited Presentations and Tutorials:

Hall, N.T. (2024, January) *Uncertainty in the Land of Latent Variables: An introduction to computational psychometrics and reflections on a path forward.* Emory University Department of Psychology Weekly Seminar.

Hall, N.T. (2022, August) *The role of cognitive processes in the HiTOP framework: insights from computational and statistical innovations and an application to Externalizing traits.* Flash Talk given at the Annual Meeting of the HiTOP Consortium.

Hall, N.T. (2020, August) *Personality pathology in the clinic: what is it and what can we do?* University of North Carolina Family Medicine Center at Chapel Hill.


Hall, N.T. (2019, August) [The Grammar of ggplot](#). Penn State psychology department R Bootcamp.

Hall, N.T. (2018, December) *Introduction to Resting-state fMRI*. Penn State Academic and eXperimental Organization for Neuroscience Students (AXONS)

Hall, N.T. (2017, November) [An introduction to brain network analysis using igraph](#). We R user's group at Penn State University.

Hall, N.T. (2017, October) *Developmental differences in segregation and integration of functional brain networks across adolescents with borderline personality disorder: a graph theoretical analysis*. Talk given at the Penn State psychology department clinical grand rounds.

Computational/Programming Skills:

-  GitHub: <https://github.com/natehall329>
- (Statistical) Programming Languages:
 - o R (Advanced)
 - o MATLAB (Intermediate)
 - o Python (Beginner/Intermediate)
- R packages:
 - o [experiment.pipeline](#): A preprocessing suite for multimodal data collected during experimental psychology tasks. I am the author of the eyetracking functions, and some of the supporting pipeline architecture. We are currently working on integrating physiological and behavioral data for data fusion analyses before making the package publicly available.
 - o [nate_utils](#): A collection of handy utility functions I often use on data analysis projects.
 - o [psych.pipeline](#) [under construction]: A simple and debuggable framework for multimodal data analysis.
 - o [ee.dyn](#) [under construction]: I am in the early stages of porting code from our recent analysis of facial emotion expression dynamics into an R package.
- Computational Modelling Software
 - o hierarchical Bayesian estimation of the drift diffusion model (HDDM package; python)
 - o Variational Bayesian model inversion for fitting reinforcement learning models (VBA toolbox; MATLAB)
- Selected Computational Skills
 - o High-performance computing (HPC) using Portable Batch System (PBS) and slurm Workload Manager (sbatch): Intermediate
 - o Linux shell scripting with bash: Intermediate
 - o PsychToolbox stimulus presentation software (MATLAB): Intermediate
 - o fMRI processing and analysis (FSL/AFNI): Intermediate

Clinical Experience

Note: While I was a clinical psychology/psychotherapy trainee for 6 years, I decided to forgo the internship process in favor of pursuing a post-doctoral position in computational psychiatry. This means that **I am not a clinical psychologist**, despite having accrued approximately 600 hours of clinical intervention hours over my graduate training at PSU and UNC-CH in addition to approximately 80 hours of psychiatric diagnostic experience in my post-baccalaureate year.

June 2021-May 2022

Triangle Area Psychological Clinic

Durham, North Carolina

Position: Clinical Trainee

Director: Kathryn Byars, Ph.D.

Clinical Supervisor: Kirk Mochrie, Ph.D.

- *Intervention Hours:* 80
- *Supervision Hours:* 30
- *Psychotherapeutic Modality:* Dialectical Behavioral Therapy (DBT; Adolescent Track)
- *Primary Responsibilities:*
 - Led and co-led group therapy sessions with teens (ages 13-18) with documented emotion dysregulation or self-harming behaviors and their parents.
 - Led mindfulness exercises at the beginning of group, homework review, teaching all modules of manualized DBT for adolescents (including the adolescent-specific “Walking the Middle Path” module.)
 - Wrote notes on group sessions in accordance with DBT guidelines.
 - Attended Treatment and Training Teams to discuss ongoing cases and received didactic instruction from DBT-certified staff therapists.

Sept. 2016-July 2020

Pennsylvania State University Psychological Clinic

University Park, Pennsylvania

Position: Staff therapist

Director: Michael Wolff, Ph.D.

Clinical Supervisors (chronological): Michael Wolff, Ph.D., Michelle G. Newman, Ph.D., José A. Soto, Ph.D., Sandra Testa, Ph.D., Kenneth Levy, Ph.D., Kristen Kelly, Ph.D., CRNP, Michael Keil, Ph.D., Peter A. Arnett, Ph.D.

- *Intervention Hours:* 287
- *Supervision Hours:* 341
- *Integrated Reports:* 4
- *Psychotherapeutic Modalities:*
 - Cognitive Behavioral Therapy (CBT: 2017-2018 [Newman, Soto])
 - Transference-Focused Psychotherapy (TFP: 2018-2020 [Testa, Levy, Kelly])
 - Neuropsychological Assessment (2019-2020 [Keil, Arnett])
- *Primary Responsibilities:*
 - Conducted detailed intake assessments and wrote diagnostic and treatment recommendation reports using semi-structured diagnostic interviews including

- the Anxiety and Related Disorders Interview Schedule (ADIS-5) and the International Personality Disorders Examination (IPDE)
- One year of supervised training in Cognitive Behavioral Therapy (CBT) for treatment of clinical syndromes, including Social and Generalized Anxiety Disorders, Post-Traumatic Stress Disorder, Major Depressive Disorder, and Adjustment Disorder.
 - Two years of supervised training in Transference-Focused Psychotherapy (TFP) for treatment of personality disorders, including Borderline Personality Disorder, Narcissistic Personality Disorder, and Avoidant Personality Disorder.
 - One year of supervised training in neuropsychological assessments for ADHD and Learning Disorders. Included 6 cases and 4 integrated reports that also included detailed personality assessments (Millon Clinical Multiaxial Inventory)

Sept. 2016-January 2023

Developmental Personality Neuroscience Lab

University Park, Pennsylvania; Chapel Hill, North Carolina

Position: Graduate Research Assistant

Director and Supervisor: Michael N. Hallquist, Ph.D.

- *Intervention (Psychiatric Assessment) Hours: 280*
- *Supervision Hours: 120*
- *Psychiatric Diagnostic Interviews (Research): 60*
- *Semi-structured Diagnostic Interviews:*
 - Structured Clinical Interview for DSM-5 (SCID)
 - Structured Interview for DSM-IV Personality (SIDP)
- *Primary Responsibilities:*
 - Completed diagnostic assessments for two NIH-funded grants (K01, R01) on teens and young adults, focused on Borderline Personality Disorder and Social Anxiety Disorders
 - Co-mentoring of junior graduate students and research staff
 - Compiling and presenting informal case conceptualization and recommendation for enrollment at case conference

Conference Abstracts:

**Denotes Trainee

Sands, B., **Hall, N.T., Schreiber, A.M., Alexander, N., Mittal, V., Haase C.M. (2025, March). *Positivity Resonance in Youth at Clinical High Risk for Psychosis and Caregivers: Findings from a Dyadic Automated Facial Expressions Analysis Approach*. Society for Affective Science, Portland, OR.

Hall, N.T., Hallquist, M.N. (2024, July). *Integrating Individual Differences and Cognitive Processes: Moving Beyond Sum Scores in Computational Psychiatry*. Computational Psychiatry. Computational Psychiatry Conference, Minneapolis, MN.

****Velasquez, R.C.L., Hall, N.T., Allen, T.A., Hallquist, M. N. (2024, July). *Investigating associations among borderline personality symptoms and aberrant social learning*. Computational Psychiatry Conference, Minneapolis, MN.**

Hall, N. T., Dombrowski, A.Y, Hallquist, M.N. (2023, September). *Resting State Effective Connectivity of the Anterior Insula is Associated with Altered Reinforcement Learning in Adolescents and Young Adults with Borderline Personality Disorder Symptoms*. Society for Research in Psychopathology, St. Louis, MO.

Paolizzi, S.G., Hall, N.T., Pilkonis, P., Hallquist, M.N. (2023, September). *Cognitive processes underlying emotion-related phenomena in personality disorders: capturing the roles of valence and arousal in categorization tasks*. Society for Research in Psychopathology, St. Louis, MO.

Hall, N.T., Radulescu, A., Hallquist, M.N. (2023, July). *Threat-induced interference in attention-guided reinforcement learning: initial validation and relevance for affective instability in borderline personality pathology*. Computational Psychiatry Conference, Dublin, IRE.

Hall, N.T., & Hallquist, M. N. (2019, September). *Aberrant connectivity of dorsal attention and salience network in adolescents with borderline personality disorder: evidence from resting-state fMRI*. Annual meeting of the Society for Research in Psychopathology, Buffalo, NY.

Hall, N.T., Pilkonis, P., & Hallquist, M. N. (2019, April). *Categorization of emotionally-valenced stimuli is moderated by borderline symptoms and interpersonal dysfunction*. Annual meeting of the North American Society for the Study of Personality Disorders (NASSPD), Pittsburgh, PA.

Hall, N. T., Schreiber, A.M., & Hallquist, M. N. (2017, October). *Maladaptive personality traits are associated with cognitive control decision parameters: evidence from hierarchical Bayesian drift diffusion modeling*. Poster presented at the 2017 annual meeting of the Society for NeuroEconomics, Toronto, ONT.

Schreiber, A. M., Hall, N. T., & Hallquist, M. N. (2017, October). *Developmental changes in the influence of emotional interference on perceptual decision-making in borderline personality*. Poster presented at the 12th Annual Society for Neuroeconomics Meeting, Toronto, Canada.

Hall, N.T., & Hallquist, M. N. (2017, September). *Aberrant connectivity of cingulate cortex and default mode network: developmental changes in resting-state functional connectivity*

in borderline personality disorder revealed through graph analysis. Poster presented at the 2017 annual meeting of the Flux Society, Portland, OR.

Schreiber, A.M., **Hall, N. T.**, & Hallquist, M. N. (2017, September). *Developmental changes in evidence accumulation and decision thresholds in borderline personality*. Poster presented at the 2017 annual meeting of the Flux Society, Portland, OR.

Hall, N.T., & Hallquist, M. N. (2017, June). *Developmental changes in resting-state functional connectivity in borderline personality disorder*. Poster presented at the 2017 annual meeting of the Organization for Human Brain Mapping, Vancouver, BC.

Hall, N.T., & Hallquist, M. N. (2017, March). *Developmental changes in resting-state functional connectivity in borderline personality disorder: a network analysis approach*. Poster presented at the 2017 annual meeting of the American Psychopathological Association, New York, NY.

James, K. M., Owens, M., **Hall, N. T.**, & Gibb, B.E. (2017, April). *Expressed Emotion and Attention: Evidence of Parental Criticism's Impact on Children's Neural Processing of Emotional Faces*. Poster presented at the biennial convention of the Society for Research in Child Development, Austin, TX.

Hall, N. T., Kudinova, A. Y., Owens, M., Deak, T., James, K. M., Lawlor, C., Gano, A., & Gibb, B. E. (2016, September) *Neural and biological indices of interpersonal stress sensitivity and their relation to borderline personality features*. Poster presented at the 2016 annual meeting of the Society for Research in Psychopathology, Baltimore, M.D.

Teaching Experience:

Graduate Teaching Assistant

Introduction to Structural Equation Modelling (Spring, 2019)
Adolescence (Fall, 2018)
Introduction to Behavioral Neuroscience (Spring, 2018)
Intimate Relationships (Fall, 2016)

Undergraduate Teaching Assistant

Statistical Analysis and Design (Spring, 2014)
Plato and Aristotle (Fall, 2012)

Relevant Predoctoral Experience:

Feb. 2015-June 2016	Binghamton Mood Disorders Institute Binghamton University (SUNY) Position: Lab manager and diagnostician Principal Investigator: Brandon E. Gibb, Ph.D.
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- Assessed psychopathology diagnoses and symptoms in adults and children for NIH-funded grant (RO1) through semi-structured diagnostic interviews (i.e., SCID, K-SADS, HRSD, HARS, CDRS-R). Completed roughly 30 diagnostic interviews (~80 hours)
- Collected and preprocessed multimodal experimental data (behavior, EEG, psychophysiology) to assess children's (ages 7-11) attentional biases

Sept. 2013 – May 2015

Laboratory of Consciousness and Cognition

Binghamton University (SUNY)

Position: Undergraduate Research Assistant

Director: Steven J. Lynn, Ph.D.

Sept. 2014-May 2015

Binghamton Psychological Clinic

Binghamton University (SUNY)

Position: Undergraduate Clinic Intern

Director: Steven J. Lynn, Ph.D.

Sept. 2013-Dec. 2013

United Health Services (UHS): Binghamton General Hospital

Psychiatric Inpatient Units

Position: Behavioral Health Intern

Supervisor: Diane Schaffer