



PSYCHOLOGY 435: ADVANCED SEMINAR IN TEMPERAMENT AND PERSONALITY (T&P)
DEVELOPMENTAL ORIGINS, BIOLOGICAL BASES, AND IMPLICATIONS FOR PSYCHOPATHOLOGY
PROFESSOR ALEX SHACKMAN, UNIVERSITY OF MARYLAND
FALL 2018

In this advanced undergraduate course, we will review cutting-edge research in humans and animals aimed at understanding the mechanisms underlying stable individual differences in temperament and personality (T&P) and their implications for risk and resilience. We will discuss the developmental origins of T&P, measurement issues, fundamental dimensions, stability/plasticity, heritability, implications for psychopathology and therapeutic intervention, and broader implications for public policy. A major focus is on the neurobiology of fear and anxiety, including neural circuits, molecular genetic pathways, and epigenetics. A secondary focus is on differences in behavior and biology that confer risk for the development of depression and addiction, including neural circuits involved in hedonic pleasure, reward motivated-behavior, and the regulation of impulses in the face of everyday temptation.

The information in this document is designed to help you understand how the course works and to get you started. If you have any questions, please contact the instructor. We're excited to have you aboard and want you to get the most out of this opportunity to learn more about the science of individual differences!

Note: If you successfully completed PSYC 210 and have concerns about the degree of overlap between the two classes, I strongly encourage you to schedule a time to meet with me.

ADMINISTRATIVE INFORMATION

- Mondays and Wednesdays, 5:00 pm - 6:15 pm in BPS 1250 (Clicker Channel ##)
- Instructor: Dr. Alex Shackman (shackman@umd.edu; BPS 1147D)
- Teaching Assistant: Rachael Tillman (rtillma@umd.edu; BPS 1107/Shared TA space across from the Dept. office)
- Required Materials
 - Textbooks: n/a
 - Technology: Free 'clickers' mobile application
 - <https://it.umd.edu/news/2017/clickers> & <https://tinyurl.com/UMDClickers> & <https://tinyurl.com/RegisterTurningPoint>
 - Download the mobile app to your smart phone using GooglePlay or iTunes
 - iTunes guide at <https://help.turningtechnologies.com/turningpointapp/student/ios/>
 - Android guide at <https://help.turningtechnologies.com/turningpointapp/student/android/>
 - Web-browser guide at <https://help.turningtechnologies.com/responseware/web/>
 - Handheld clicker guide at <https://help.turningtechnologies.com/hardware/Default.htm#Hardware/Clickers/Clickers.htm>
 - Readings: Available in .pdf format via Canvas (www.elms.umd.edu)
- Class cancellation, room change, or other time-sensitive announcements: Will be directed to the email account listed in Canvas
- Academic Calendar: <http://www.provost.umd.edu/calendar/>
- Office Hours
 - Professor Shackman: By appointment
 - Ms. Tillman: By appointment.

LEARNING OBJECTIVES: COURSE OVERVIEW

Students who successfully complete this course will be able to demonstrate a thorough understanding of–

- *The fundamental dimensions of T&P*
- *Their childhood origins*
- *The psychological and neurobiological mechanisms that underlie trait-like differences in T&P*
- *The mechanisms that contribute to stability and plasticity in T&P across the lifespan and across generations*
- *The nature and nurture of T&P. We will delve into...*
 - *behavioral genetics (i.e., heritability)*
 - *molecular genetics and 'imaging genetics'*
 - *recent advances in epigenetics*
- *The complementary strengths and limitations of different tools and approaches for assaying T&P*
- *The nature of temptation and self-control*
- *Implications for mental health and physical wellbeing, public policy, and public safety*



¹ See <https://tinyurl.com/HowToEmailProfessors> for tips on emailing instructors.

- *Implications for understanding ourselves and our loved ones (our parents, our children or children-to-be) and becoming more thoughtful and informed tax payers, voters, and citizens*

COURSE STRUCTURE

1. Classroom Lectures on the Scientific Study of T&P

You are *strongly* encouraged to attend all course meetings. Each lecture or “module” will last approximately 75 minutes and will typically include the following components:

- (1) Conceptual roadmap outlining the new topics to be covered
- (2) The science of T&P drawn from your readings and other sources. The lectures will incorporate occasional multimedia elements, such as film clips. There will be plenty of time for questions and discussion. The lectures are designed to provide a broad overview of the core conceptual themes, methodological issues, and highlights from the recent empirical record.
- (3) Low-stakes quizzes, check-in’s, or surveys (conducted using Clickers).
- (4) Recap of the most important take-home points

It is critical that you regularly attend class in order to do well in this course

- I encourage you take notes during class to ensure comprehension of the material. It is important to emphasize that there are many opportunities for us to learn from one another in the classroom. Learning can stem from sharing knowledge or from asking questions.

Electronic Devices (phones, tablets, computers) are not permitted during our classroom meetings

- Exceptions for DSS accommodations and Clicker quizzes/surveys
- Research indicates that such devices present an irresistible distraction and interfere with learning and active participation

The Learning Objectives file available on Canvas provides a powerful tool to guide your independent study and review

- I strongly recommend using the Learning Objectives to guide your test preparation.
- They also provide an excellent means of identifying the most crucial pieces of information in each lecture. I strongly recommend bringing a hardcopy to each class meeting, and using it as a framework for your own notetaking

As an instructor, one of my central goals, is to create a safe, welcoming, and respectful environment for students of different genders, races, ethnicities, sexual orientations, socioeconomic groups, political parties, and religious and educational backgrounds.

- UMD is one of the nation’s most diverse campuses (<https://tinyurl.com/UMDDiversity2018>).
- Students of color comprise ~40% of all undergraduates.
- Many students are first-generation Americans or first-generation college students, and many transferred from smaller schools around the state (as did my own parents). Some of you hail from ‘liberal’ urban areas (like my father’s family), and others come from more conservative, traditional, or rural backgrounds (like my mother’s).
- I will treat all of you equally, without distinction, and do my best to foster an inclusive learning environment.

The course is designed to promote thoughtful conversation and active student engagement—inside and outside the classroom

- We'll begin the semester with a roundtable discussion and most of the lecture modules are peppered with explicit prompts ('Students: What do *you* think') and group discussion activities (e.g., 'pair-n-share').
- Given the sheer number of students and the preciously small amount of time that we have together, on occasion, I may need to redirect or pause the dialogue.
- Please don't mistake the necessities of time management for a lack of respect or interest. I'm interested in what you have to say and what you think. Please take advantage of other opportunities for continuing our conversation outside the classroom, whether that be via email, office hours, or participating in the optional 'Snack with Shack, Man.'

I know that many of you have first-hand experience with adversity, trauma, and mental illness, and you should be aware that our classroom discussions will occasionally touch on these potentially sensitive issues.

- Please do not hesitate to contact me with any concerns or suggestions. I am more than happy to work with you to create the best possible environment for learning about temperament and personality.

2. Background Readings

Readings for this course have been hand-picked by the instructor; many are empirical papers or reviews by leading scientists in the field. What better way is there to learn about T&P than straight from the most exciting researchers working in the field today?

To get the most out of this course, it is important that you understand the key take-home points from the readings

- **Please read the assigned papers before class (available on Canvas)**
 - This will allow for a better understanding of the lecture and also give you the opportunity to ask questions
- **Please do not hesitate to ask questions about anything you found confusing or challenging!**
- **Please focus on the larger take-home points and implications, not the more technical material**
- A helpful guide to deciphering the papers is provided later in the syllabus and is also available on Canvas.

My aim is to avoid overburdening students with reading. But in some cases, you may find yourself hungry to learn more. The optional readings posted on Canvas are a great place to start. The source material for the lectures is also cited within my slides and I am happy to provide the papers upon request.

ASSESSMENTS, ACTIVITIES, & GRADING

Grades are earned, not given. Out of fairness to other students, please refrain from asking for a higher grade or extra credit opportunities beyond those detailed in the syllabus

1. Three Cumulative Examinations (10%, 20%, and 30%; Total: 60%)

Three cumulative exams: 2 mid-terms and a final examination.

- The first exam is worth 10%, the second exam is worth 20%, and the final exam is worth 30% of the total grade
- Exams will consist of multiple-choice questions that involve critical thinking about concepts drawn from the lectures *as well as the readings*
- It is important to emphasize that much of what is covered in the exams is not contained verbatim in the lecture slides, so attendance and attention during class is absolutely critical to your success in the course.

You are welcome to bring a single index card of notes to exams

- 3" x 5" or smaller
- Double sided is OK
- Notes may be handwritten, printed, or photocopied. No other notes, notebooks, materials, or devices will be permitted.

The purpose of the exams is two-fold

- First, you should be able to demonstrate that you have read the material and understand the factual points and arguments
- Second, you should be able to synthesize and integrate the material such that this knowledge can be applied in a broader context
- Because the exams are cumulative and occur on a regular basis, you will need to continuously study in order to be successful. On the other hand, you probably will not need to cram for any particular exam.

Make-up exams will only be considered in exceptional circumstances

- Make-up exams will involve different questions than the standard exam (Advice: you want to avoid having to take a make-up exam).

2. Homework (Total: 25%; Two lowest grades dropped; ~8 papers total)

Most weeks, you will be required to submit a short Reaction Paper (~1-2 pages) describing the 6 major elements of one of the assigned readings (Aims, Background/Significance, Approach, Key Results, Background/Significance, and Limitations/Future Challenges). The goal is to help you to organize your thoughts about the material prior to the classroom discussion. Assignments will be submitted using Canvas.

Detailed instructions: <https://tinyurl.com/ShackReactionPaper2018b>

At the end of the semester, your 2 lowest response grades will be dropped—so there is no need to stress when the occasional unexpected issue crops up (e.g. illness, spaced out, etc.).

3. In-Class Quizzes/Surveys Using Clickers (10-17 quizzes; Total: 15%; 3 lowest grades dropped)

Beginning the second week of class, most lectures will include low-stakes quizzes, surveys, or check-in's conducted using Clickers.

Clicker quiz/survey grades will be curved *at the end of the semester*

- If your raw score on a clicker quiz was 70% or greater, then you will receive full credit for that quiz or survey (that is, it will be curved to 100%)
- If your raw score on a clicker quiz was <70%, then you will receive your raw percentage
- For example, if Jill correctly answers 71% of the items on a quiz, then she will be assigned a curved grade of 100%. On the other hand, if she correctly answers 69% of the items, then she will receive a grade of 69%.

If you occasionally forget your Clicker or encounter a technical issue, don't sweat—the three lowest grades will be dropped.

4. Two Opportunities for Earning Extra Credit

Extra credit points will be added directly to those that you earned based on the exams and critical thinking assignments. For example, if a student earned a total of 89 points and completed the extra credit, his or her final letter grade would be based on $89 + 2 + 1 = 92 / 100$ points. Final grades will not be curved or otherwise transformed.

a) In-Class Presentation (2 Points)

You have the option to participate in an extra credit assignment worth 2 points toward your final grade. The assignment will take the form of a brief in-class presentation. This can be done as a group or solo. **The presentation will be in the form of a “flash talk” (~5-10 minutes)**, and must be related to class material, but can be in any format you choose. Examples include:

- A live powerpoint presentation
- A pre-recorded video (e.g. public service announcement)

The presentation could be focused on

- A nano-lecture (e.g. a course-relevant topic incorporating outside scholarly readings)
- A mobile-friendly app that you develop to nudge T&P
- A proposed solution or intervention to a public health problem that is related to the class material
- An intervention targeting a facet of T&P discussed in class
- An (informal) analysis of your own traits (e.g. present the results of a 10+ day daily diary study)
- A hypothetical experiment aimed at discovering some aspect of T&P

Groups of 4 or more can stage a scientific debate. Debates will be allotted 10 min total.

Feel free to be creative on this assignment, but the topic and format must be pre-approved by the TA (deadline for proposing TBA).

b) SONA - Department of Psychology Mass Survey (1 Point)

An additional 1 point of extra credit will be available to students who complete the Department Mass Survey using the SONA system (see below for details).

5. Optional Snack with Shack, Man

Large, lecture-format courses can be very impersonal. To help address this, I would like to invite small groups of students to join me for a snack at *The Coffee Bar* (Stamp Union). Your choice of coffee, tea, juice and a pastry on me!



My hope is that this will provide an opportunity to get to know one another a little better and a relaxed, informal setting for chatting about the material covered in the class, other aspects of psychological science, your experiences as students on campus, or professional development (e.g. advice about working in a lab or applying to graduate programs).

Most of the time, we will meet up after class and walk over to the Union together.

Additional details are provided in the Timetable. Please let me know as soon as possible if your assigned date and time does not work for you and we can determine a suitable alternative. Please note that ‘Snack with Shack, Man’ is completely optional!

TIMETABLE

Date	Activity
Mon 8/27	Module 1: Introductions, Course Mechanics, and Fundamental Questions Roundtable
Wed 8/29	**No class
Mon 9/3	Labor Day Holiday
Section 1: Foundational Issues in the Scientific Study of Temperament & Personality	
Wed 9/5	Module 2: Is T&P Impactful? <i>Optional Snack with Shack, Man: Bree Allen, Jordan Brown, Amy Buck, Cecilia Urrutia</i>
Mon 9/10	Module 3: How is T&P Defined? What are the Fundamental Dimensions of T&P? <i>Optional Snack with Shack, Man: Natalia Camp-Nunez, Jacob Citron, Hillary Cohen, Madeleine Wasko</i>
Wed 9/12	**No class
Mon 9/17	Module 4: How Did We Discover and How Should We Measure Individual Differences in T&P? <i>Optional Snack with Shack, Man: Casey Dillard, Caraline Donovan, Amanda Duckett, Zaynab Yunis</i>
Wed 9/19	Module 5: How Are Traits and States Related? (Part 1) <i>Optional Snack with Shack, Man: Eva Freites, Jennifer Frost, Maria Gianelle</i>

Mon 9/24	**No class
Wed 9/26	Module 6: How Are Traits and States Related? (Part 2) <i>Optional Snack with Shack, Man: Jordan Greenberg, Matthew Hicks, Junita Hughes</i>
Mon 10/1	Module 7: What Do Traits Do? (Part 3) <i>Optional Snack with Shack, Man: Javiera Johnson Julio, Emily Johnston, David Jorge</i>
Wed 10/3	Module 8: Intermediate Phenotypes and Brain Imaging Tools, Part 1 <i>Optional Snack with Shack, Man: Madeline Kallmyer, Melanie Katz, Erica Kelman</i>
Mon 10/8	Module 9: Intermediate Phenotypes and Brain Imaging Tools, Part 2 <i>Optional Snack with Shack, Man: Anastassia Kerasidis, Rachael Lansing, Rachel Lawrence</i>
Wed 10/10	In-Class Review Session
Mon 10/15	Cumulative Midterm Exam #1 (Led by TA or Proctor)
Section II: The Nature and Nurture of Temperament & Personality	
Wed 10/17	Module 10: Nature & Nurture (Part 1): Behavioral Genetics and Heritability <i>Optional Snack with Shack, Man: Margot Lichtenthal, Zachary Lingo, Elianna Lopez</i>
Mon 10/22	Module 11: Nature & Nurture (Part 2): Molecular Genetics <i>Optional Snack with Shack, Man: Lauren Madison, Julia Maney, Rebecca Martins</i>
Wed 10/24	Module 12: Nature & Nurture (Part 3): Neurogenetics and Epigenetics <i>Optional Snack with Shack, Man: Audrey McMaster, William Meeder, Carlos Melendez</i>
Section IV: Neuroticism/Negative Emotionality	
Mon 10/29	Module 13: Neuroticism/Negative Emotionality and Psychopathology <i>Optional Snack with Shack, Man: Joey Mitchell, Simone Murphy, Grace Myers</i>
	Extra Credit Flash Talk Proposals Due to TA
Wed 10/31	Module 14: Behavioral Inhibition and Psychopathology <i>Optional Snack with Shack, Man: Corey Nadelbach, MacY Nowakowski, Joanna Omestad</i>
Mon 11/5	Module 15: Role of the Extended Amygdala in Negative Emotionality, Behavioral Inhibition, and Psychopathology <i>Optional Snack with Shack, Man: Felipe Paccagnella, Yutian Pan, Ashley Pearce</i>
Wed 11/7	Module 16: Splitting Negative Emotionality into Its Constituents, Part 1 <i>Optional Snack with Shack, Man: Cecilia Porto, Sebastian Preilipper, Akhila Ramanathan</i>
Mon 11/12	Module 17: Splitting Negative Emotionality into Its Constituents, Part 2 <i>Optional Snack with Shack, Man: Tabitha Raskin, Clara Schmetter, Lucas Shapiro</i>
Wed 11/14	In-Class Review Session
Mon 11/19	Cumulative Midterm Exam #2 (Led by TA or Proctor)
Wed 11/21	Thanksgiving Holiday
Section V: Extraversion/Positive Emotionality and Constraint/Self-Control	
Mon 11/26	Module 18: Positive Emotionality, Self-Control, and Dopamine (Part 1): Depression and Anhedonia <i>Optional Snack with Shack, Man: Jessica Sidhu, Allison Sugarman, Samuel Tolub</i>
Wed 11/28	Module 19: Positive Emotionality, Self-Control, and Dopamine (Part 2): Substance Abuse, Impulse Control Disorders, and Everyday Temptation

Fri 11/30	Flash Talk A/V Materials Due to TA for those presenting on Monday, December 3 rd <i>You will not be allowed to present if you do not share your A/V Materials at least 24 hours before your scheduled presentation time</i>
Mon 12/3	Student Flash Talks
Mon 12/3	Flash Talk A/V Materials Due to TA for those presenting on Wednesday, December 5 th <i>You will not be allowed to present if you do not share your A/V Materials at least 24 hours before your scheduled presentation time</i>
Wed 12/5	Student Flash Talks
Mon 12/10	Semester Re-Cap and In-Class Review Session
TBA	Cumulative Final Exam (Led by TA or Proctor)

Please note: This schedule is subject to change. Any updates will be announced in class and posted on Canvas.

READINGS

- Please check Canvas for the most up-to-date list of readings
- <https://tinyurl.com/ShackReadings2018a>

TIPS FOR DECIPHERING THE ASSIGNED PAPERS

Please see this handy guide:

- <https://tinyurl.com/DecipheringPapers2018>

GET SOME HELP!

I expect you to take responsibility for your own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting <http://ter.ps/learn> and schedule an appointment with an academic coach. Or, if you just need someone to talk to, I encourage you to visit <http://www.counseling.umd.edu>.

Remember, everything is free because you already paid for it and everyone needs help...all you have to do is ask for it.

ADDITIONAL POLICIES

Students are responsible for knowing relevant course and University policies

- <http://www.ugst.umd.edu/courserelatedpolicies.html>
- <https://tinyurl.com/ShackPolicies2018>

ABOUT THE COURSE

Professor Alex Shackman

Dr. Shackman is an Assistant Professor in the Department of Psychology & Neuroscience (Clinical & CNS Area Groups), a member of the executive board for the interdepartmental Neuroscience and Cognitive Science (NACS) Program, a core faculty member of the Maryland Neuroimaging Center (MNC), and the Director of the Affective and Translational Neuroscience Laboratory at the University of Maryland. His work is supported by the NIMH (R01-MH107444, 2016-21) and NIDA (R21-DA040717, 2016-18) and has led to more than 60 papers and chapters. Dr. Shackman is Co-Editor of *The Nature of Emotion* (Oxford University Press), serves as Associate/Consulting Editor at several journals (e.g., *Emotion*), and has co-edited two special issues focused on the neurobiology of emotional states, traits, and disorders. He regularly chairs symposia at international scientific meetings and regularly lectures at other institutions around the world. Dr. Shackman is an active member of the Hierarchical Taxonomy of Psychopathology (HiTOP) consortium, helped organize the SOBP annual meeting for 3 years, and frequently reviews grant applications for the NIH and NSF. To learn more about his lab, please visit <http://shackmanlab.org>.

Acknowledgements

This course was developed more or less from scratch by Dr. Shackman, but it owes a heavy debt of gratitude to a number of individuals, including Dr. June Gruber (Boulder), Dr. Leah Somerville (Harvard), Tara Augenstein, Dr. Hill Goldsmith (Wisconsin), Dr. Heather Abercrombie (Wisconsin), Dr. Brad Bushman (OSU), Dr. Brent Roberts (UIUC), Dr. Rebecca Shiner (Colgate), Dr. Koraly Perez-Edgar (Penn State), Dr. Ned Kalin (Wisconsin), Dr. Richie Davidson (Wisconsin), Gloria Kim (Maryland), Dr. Jason Smith (Maryland), Dr. Dave Yager (Maryland), Dr. Scott Roberts (Maryland), Dr. Ryan Curtis (Maryland), and Dr. Andrew Fox (Davis). The feedback that I have received from students enrolled in prior semesters has also proven invaluable for refining and strengthening the course.

APPENDIX: READINGS

- Please check Canvas for the most up-to-date list of readings
- <https://tinyurl.com/ShackReadings2018a>

SECTION I: FOUNDATIONAL ISSUES IN THE SCIENTIFIC STUDY OF TEMPERAMENT & PERSONALITY

Module 1: Introductions, course mechanics, and fundamental questions roundtable

Required

- The Syllabus!!

Module 2: Is T&P impactful?

Required

- Shackman et al. Psychol Bull 2016 [pages 1279-1280]
- Moffitt et al. PNAS 2011 [do not worry about the technical details of the analyses] –or– Moffitt et al. Amer Sci 2013 [pop sci summary of Moffitt et al. PNAS 2011; reviewed in lecture]
- Duckworth PNAS 2011 [brief scientific commentary on Moffitt]
- Barker Time 2014 [brief popular press summary of work linking conscientiousness and neuroticism to diverse outcomes]

Optional

- Caspi et al Nature Hum Behav 2016 [self-control and implications for public policy]
- Starr Science 2018 [short popular science piece on Mofitt, Caspi, and the continuing scientific value of the Dunedin study]

Module 3: How is T&P defined? What are the fundamental dimensions of T&P?

Required

- Caspi et al Ann Rev Psychol 2005 [you are welcome to skip the sections on Behavioral Genetics & Social Development]
- Wikiwand “Big 5” 2018 [Wiki entries; provides a quick 'nuts-and-bolts' summary of the Big 5 and ways of measuring them]

Optional

- Jarrett Brit Psychol Soc Res Digest 2018 [pop sci commentary on recent work suggesting that ‘grit’ is little more than C/SC]
- Srivastava 2016 [blog post - provides a quick 'nuts-and-bolts' summary of the Big 5 and ways of measuring them; written in a conversational style]
- Kendler & Halberstadt Molec Psychiatry 2013 [incredibly compelling case study of adult twins, focused on the interactive effects of personality and experience on psychopathology, divorce, and other important real-world outcomes across the lifespan]
- Dahl NY Mag 2017 [short popular science article on the science of personality change]
- Goldsmith et al Child Dev 1987 [seminal roundtable discussion of childhood temperament]
- Shiner et al Child Dev 2012 [updated roundtable discussion of childhood temperament]
- Clark & Watson chapter 2008 [classic perspective]
- Zentner & Shiner chapter 2012 [classic perspective with a focus on development]
- Soto & John J Personality & Soc Psychol 2016 [updated Big 5 Inventory]

Module 4: How should we measure T&P?

Required

- Block Psychol Bull 1995a [*critical review of the history and discovery of the Big 5/OCEAN*]
- Tomarken Psychol Assessment 1995 [*psychometrics for psychophysicologists and neurobiologists*]
- Wikiwand “Psychometrics” 2018 [*Wiki entries; provides a quick 'nuts-and-bolts' summary of reliability*]
- Wikiwand “Factor Analysis” 2018 [*Wiki entries; provides a non-technical summary of factor analysis*]

Optional

- *Myers-Briggs test is nearly worthless*
 - Ahmed Financial Times 2016
 - Stromberg & Caswell Vox 2015
 - Wikipedia
 - Pittenger CPJPAR 2005
 - Cunningham Washington Post 2012
 - Capraro & Capraro Educ and Psychol Measurement 2002
 - Druckman & Bjork National Academy of Sci/National Res Council Report 1991
 - Costa & McCrae & Costa J Personality 1989
- Funder Psychol Inquiry 1994 [*short, entertaining essay on the strengths and weaknesses of trait theory*]
- Epstein Psychol Inquiry 1994 [*short, entertaining essay on the limitations of the Big 5 and similar descriptive models of T&P*]
- McRae Psychol Inquiry 2010 [*Updated rebuttal of Block; I found this to be very compelling*]
- John, Naumann & Soto Handbook of Personality 2008 [*definitive defense of the Big 5 and FFM*]
- Hedge et al Behav Res 2017 [*reliability paradox: why robust tasks don't produce reliable traits*]
- Munafò et al Nature Human Behaviour 2017 [*very readable discussion of the 'reproducibility crisis' in the social/biomedical sciences with specific recommendations for on-going and future research*]

Module 5: How are traits and states related? (Part 1)

Required

- Chap 4 in Matthews, Deary & Whiteman 2009 [*pp. 85-89; pp. 107-end*]
- Shackman et al. chapter 2018 [*pages 67-68*]

Optional

- Fleeson JPSP 2001
- Fleeson JPSP 2009

Module 6: How are traits and states related? (Part 2)

Required

- Shackman et al. Psychol Bull 2016 [*pages 1280-1283*]

Optional

- Fox et al PlosOne 2008 *[please do not worry about the technical aspects of FDG-PET imaging]*
- Kaczurkin et al Biol Psychiatry 2016 *[please do not worry about the technical details; you are welcome to skip the material focused on developmental and sex differences]*

Module 7: What do traits do? (Part 3)

Required

- Davidson Cog and Emo 1998 *[please read Sections I and II only]*
- Gable, Reis & Elliot JPSP 2000 *[please do not worry about technical details of the analytic strategy; focus on Studies 2-3]*

Optional

- Shackman et al. Psychol Bull 2016

SECTION II: THE NATURE AND NURTURE OF TEMPERAMENT AND PERSONALITY

Module 8: Intermediate phenotypes and brain imaging tools, Part 1

Required

- Ariely & Berns Nature Rev Neurosci 2010 *[you only need to read Box 2 on page 288; feel free to read more!]*
- Schwartz et al. Amer Psychol 2016 *[you only need to read pp. 59-61; feel free to read more!]*
- <https://miykael.github.io/nipype-beginner-s-guide/neuroimaging.html>

Optional

- Lillienfeld Behav Res Ther 2014 *[cautionary note on the use of biological measures and the search for biomarkers]*
- Logothetis Nature 2008 *[please do not worry about the finer details; for those interested in delving more deeply into brain imaging techniques]*
- Slides available at <http://www.fmri4newbies.com>

Module 9: Intermediate phenotypes and brain imaging tools, Part 2

Required

- The Neuroskeptic 2014, *Psychiatry: End of the Road for “Endophenotypes”?*
- Wager & Woo Sci Transl Med 2015 *[brief commentary highlighting the potential value of developing sensitive and specific imaging biomarkers]*
- Shackman & Fox Trends in Cog Sci 2018 *[brief comment on biomarkers]*

Optional

- Hur, Tillman, Fox & Shackman Behav & Brain Sci in press *[brief comment on the value of biomarkers and clinical neuroscience]*
- Roiser The Psychol 2015 *[brief, entertaining piece on the value of neuroscience for developing novel intervention strategies]*
- Woo et al Nature Neurosci 2017 *[fMRI biomarkers: opportunities and challenges]*
- Lillienfeld & Treadway Ann Rev of Clinical Psychol 2016 *[thoughtful commentary on the promise and potential pitfalls of developing intermediate phenotypes]*
- Hedge et al Behav Res 2017 *[reliability paradox: why robust tasks don't necessarily yield reliable intermediate phenotypes]*

- Iacono et al International J of Psychophysiol 2017 [*highly recommended, very readable, and up-to-the-minute commentary on the opportunities and challenges of endophenotypes*]
- Fried Expert Review of Neurotherapeutics 2017 [*highly readable, relatively short description of clinical heterogeneity and low reliability of clinical diagnoses, with implications for developing intermediate phenotypes/endophenotypes*]
- Rodgers Encyclopedia of Behavioral Neuroscience 2010 [*very readable, thoughtful critique of widely used animal models of fear and anxiety*]

Module 10: The Nature & Nurture of T&P (Part 1): Behavioral Genetics and Heritability

Required

- Visscher et al Nat Rev Genetics 2008 [*seminal review; please do not worry about the more technical details*]
- Kendler Mol Psych 2013 [*short, entertaining essay on genetics, free will, chance, and psychiatric disease*]
- Wikiwand “Genetics” 2018 [*Wiki entries; provides a quick 'nuts-and-bolts' summary of heritability and genetics*]
- Fisher Twitter 2018 [*heritability in 5 easy tweets*]

Optional

- Plomin et al. Perspectives on Psychol Sci 2016
- Sauce & Matzel Psychol Bull 2018 [*very readable review focused on the paradox of high malleability in the face of high heritability in the context of IQ; highly recommended*]

Module 11: The Nature & Nurture of T&P (Part 2): Molecular Genetics

Required

- Sullivan et al Amer J Psychiatry 2018 [*moderately technical summary of psychiatric genetics, from its historical origins in mid-20th C twin studies of schizophrenia to contemporary GWAS consortia, and onward with a description of the most fruitful avenues for future research; do not worry about the technical details, just the overall gist and most important take-home points*].
 - **You may find these Glossaries useful**
 - Briley et al Euro J of Personality 2018
 - NCBI Genetics Glossary 2018
- Wikiwand “Genetics” 2018 [*Wiki entries; provides a quick 'nuts-and-bolts' summary of heritability and genetics*]
- Resnick Vox 2018 [*popular science story on the strengths, weaknesses, and potential applications of GWAS to medicine and drug discovery*]

Optional

- Couzin-Frankel Science 2014 [*science writer’s personal story about getting genetic testing for familial breast cancer*]
- Ritter Associated Press 2017 [*very short news piece on commercial genetic testing, with a focus on the impact it had on the NIH Director’s lifestyle choices*]
- Pinker NY Times Magazine 2009 [*science writer’s personal story about getting genetic testing*]
- Mitchell Eur J Neurosci 2018 [*short, very readable introduction to neurogenetics, challenges and opportunities*]
- Mukherjee New Yorker 2016b [*science writer’s story about his family and psychiatric genetics*]
- Chabris et al. Curr Dir Psychol Sci 2015 [*very accessible overview of GWAS*]
- Topol Cell 2014 [*very readable discussion of personal genomics*]

Module 12: The Nature & Nurture of T&P (Part 3): Neurogenetics and Epigenetics

Required

- Meaney Ann Rev Neurosci 2001 *[please do not worry about the technical details; seminal review paper by a key pioneer]*
 - **You may find the Glossaries useful**
 - Briley et al Euro J of Personality 2018
 - NCBI Genetics Glossary 2018
- Hughes Nature 2014 *[brief non-technical commentary on Dias & Ressler Nature Neurosci 2014]*
- Mukherjee New Yorker 2016b *[science writer's story about his family, twins, and epigenetics]*

Optional

- Dias & Ressler Nature Neurosci 2014 *[please do not worry about the technical details]*
- Grabitz et al J Cog Neurosci 2017 [logical and methodological issues affecting genetic studies of humans reported in top neuroscience journals]
- Sullivan Biol Psychiatry 2017 [short, entertaining commentary on the demise of candidate gene studies]

SECTION III: NEUROTICISM / NEGATIVE EMOTIONALITY

Module 13: Neuroticism/Negative Emotionality and Psychopathology

Required

- Barlow et al Clin Psychol Sci 2013
- Shackman et al Psychol Bull 2016 *[page 1280]*
- Smith Nature 2014 *[infographic on the global burden of neuropsychiatric disease]*
- Wheaton 2018 *[blogpost on Wil's personal experience with anxiety, depression, and getting better over time]*
- Lipka Chronicle of Higher Educ 2018 *[short popular science/academic media piece on anxiety symptoms and disorders among undergraduate and graduate students]; please watch the accompanying video at <https://www.chronicle.com/article/Facing-Anxiety/241968>]*

Optional

- Nutt Washington Post 2018 *[university students are forming mental health clubs]*
- Nutt Washington Post 2018 *[rising rates of depression and anxiety disorders among US youth]*
- CDC Suicide Update 2018 *[current suicide statistics in the US]*
- Reilly Time Magazine 2018 *[anxiety and depression in undergraduates and the growing burden on counseling centers]*
- Denizet-Lewis NY Times Magazine 2017 *[anxiety and depression in teens]*
- Schrobsdorff Time Magazine 2016 *[anxiety and depression in teens]*
- Morrison Vox 2014 *[short essay describing one patient's experience living with generalized anxiety]*
- Orlando et al. Houstonia 2015
- ACHA-National College Health Assessment 2015 *[national survey of undergraduate mental health]*
- Craske et al Nature Disease Primers 2017 *[quick end-to-end primer on the anxiety disorders]*
- Otte et al Nature Disease Primers 2016 *[quick end-to-end primer on major depressive disorder]*

- Clark et al Psychol Sci in the Public Interest 2017 [*comprehensive review of historical and contemporary perspectives on classifying and diagnosing mental illness, with substantial implications for research, clinical practice, public policy, and patient experience; highlights the truth and consequences of different iterations of DSM and RDoC, including the 'smoke-filled back room' decisions that led to DSM-5; this is not for the fainthearted, but should be rewarding for those willing to invest the time. EXCELLENT SOURCE MATERIAL FOR FLASH TALKS!*]

Module 14: Behavioral Inhibition and Psychopathology

Required

- Fox et al Ann Rev Psychol 2005
- NY Times Magazine article on behavioral inhibition

Optional

- Oler, Fox, Shackman & Kalin 2016 [*mechanistic studies in monkeys and their relevance to understanding BI and social anxiety disorder*]
- Fox & Walker 2015 [*for those hungry to learn more about BI*]
- Kagan et al. Science 1988 [*seminal BI study*]
- Schwartz et al. Science 2003 [*please do not worry about technical aspects of fMRI; seminal BI study*]
- Clauss & Blackford J Amer Acad Child & Adol Psychiatry 2013 [*do not worry about technical aspects of the meta-analysis; for those interested in delving more deeply into BI*]
- Mihalopoulos et al. J Child Psychol & Psychiatry 2015 [*detailed analysis of what makes a cost-effective targeted prevention program*]

Module 15: Role of the Extended Amygdala in Negative Emotionality, Behavioral Inhibition, and Psychopathology

Required

- Shackman et al J Exp Psychopathol 2016
- Feinstein et al Curr Biol 2011
- Adolphs Ann NY Acad Sci 2010

Optional

- Feinstein et al 2016 [*this chapter provides a more detailed description of work with Patient SM, including additional descriptions of her real-world trials and tribulations*]
- Fox & Shackman Neurosci Letters in press
- Davis et al Neuropsychopharm 2010 [*seminal review*]
- Fox et al PNAS 2015 [*please do not worry about the technical details*]
- Etkin & Wager Amer J Psychiatry 2007 [*seminal meta-analysis*]
- Davis & Whalen Mol Psychiatry 2001 [*seminal review*]

Module 16: Splitting Negative Emotionality into its Key Constituents (Part 1)

Required

- Grupe & Nitschke Nature Rev Neurosci 2013
- La Rosa BuzzFeed 2014 [*entertaining set of what-if and worry-related memes*]

Optional

- MacLeod & Grafton Beh Res & Ther 2016 [*updated review of ABM; make the point that ‘target engagement,’ that is reductions in attentional biases, are an essential ingredient for positive therapeutic effects*]
- Mogg & Bradley Behav Res & Ther 2016 [*comprehensive review of ABM work and anxiety-attention more generally*]
- Mogg, Waters & Bradley Clin Psychol Sci 2017 [*skeptical analysis of the ABM literature with thoughtful methodological recommendations for future work*]

Module 17: Splitting Negative Emotionality into its Key Constituents (Part 2)

Required

- Shackman et al Nature Rev Neurosci 2011
- Cavanagh & Shackman J Physiol Paris 2015 [*please do not worry about the finer details of the meta-analysis*]

SECTION IV: EXTRAVERSION / POSITIVE EMOTIONALITY & CONSTRAINT / SELF-CONTROL

Module 18: Positive Emotionality, Self-Control, and Dopamine (Part 1): Depression and Anhedonia

Required

- Kringelbach & Berridge Sci Amer 2012
- Smith & Marshall Nature Disease Primers 2016 [*infographic on depression*]
- Husain & Roiser Nature Rev Neurosci 2018 [*contemporary science of depression and anhedonia; do not sweat the technical sections on computational models*]

Optional

- Nutt Washington Post 2018 [*university students are forming mental health clubs*]
- Nutt Washington Post 2018 [*rising rates of depression and anxiety disorders among US youth*]
- CDC Suicide Update 2018
- Woolston Nature 2018 [*interviews with graduate students who have battled depression and anxiety*]
- Brosh Hyperbole-And-A-Half 2013 [*amazing blogpost on the author’s experience with depression*]
- Sohn Nature 2018 [*stories of surviving and thriving with depression*]
- Fleming Intell Life Mag 2015 [*journalist hangs out with Kent Berridge for a week; discusses mindfulness, HH the Dalai Lama, scientific progress, and more!*]
- Berridge & Robinson Brain Res Rev 1998 [*seminal early review*]
- Berridge & Robinson Neuron 2015 [*seminal recent review*]
- The Neurocritic DBS RCT 2015 [*popular science blog post on failed randomized clinical trials of deep brain stimulation for major depression*]
- Scult Sci Amer 2016 [*short blog post on the neural circuitry of reward and neurofeedback training*]
- Otte et al Nature Disease Primers 2016 [*quick end-to-end primer on major depressive disorder*]
- Berridge & Robinson Amer Psychol 2016 [*updated mini-review*]
- Zald & Treadway Ann Review Clin Psychol 2017 [*comprehensive recent review*]
- Rizvi et al Neurosci and Biobehav Reviews 2016 [*comprehensive review of paper-and-pencil and behavioral measures of anhedonia*]

- Pizzagalli Ann Rev Clin Psychol 2014

Module 19: Positive Emotionality, Self-Control, and Dopamine (Part 2): Substance Abuse, Impulse Control Disorders, and Everyday Temptation

Required

- Lopez et al. Psychol Sci 2014 *[please do not worry about the technical aspects of fMRI or EMA]*
- Hare et al. Sci 2009 *[please do not worry about any of the more technical aspects of this complex neuroeconomics study]*
- Munro Nature 2015 *[infographic on the psychoneurobiology of addiction]*
- Yong The Atlantic 2016 *[brief popular press piece on the neurobiology of impulsivity and risk aversion]*

Optional

- Meurk International J of Drug Policy 2016 *[how do addicts think about addiction]*
- Kotov et al. Psychol Bull 2010 *[meta-analysis of associations between T&P and psychopathology; covered in lecture and worth skimming]*
- Knutson & Greer Philo Trans Royal Soc B 2008 *[review work linking the VS/NAcc to wanting and positive emotionality]*
- Berridge & Robinson Brain Res Rev 1998 *[seminal review]*
- Berridge & Robinson Neuron 2015 *[seminal recent review]*
- Duckworth et al. Perspectives on Psychol Sci 2016 *[highly recommended review focused on strategies for enhancing self-control in the real world; e.g. dieting, planning for retirement, quitting substances, etc.]*
- Lake Slate 2014 *[short popular press piece on the stigma associated with substance abuse and mental illness]*