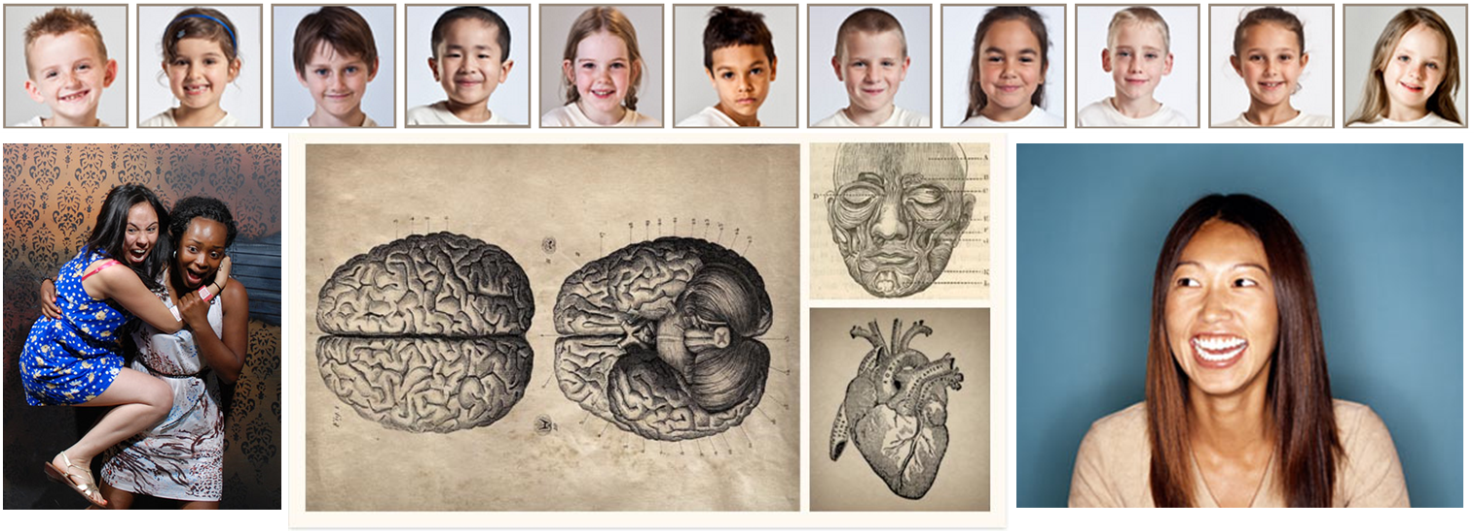
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**PSYCHOLOGY/NACS 612:**

***Affective Science Perspectives on Temperament & Personality (t&p)***

**a graduate-level seminar on Developmental origins, neurogenetic bases, and implications for psychopathology**

**professor alex shackman, uNIVERSITY OF MARYLAND**

**fall 2017**

*What makes each of us unique? Where do these differences come from? How do they contribute to enduring differences in health and wellness?*

*We will selectively review cutting-edge[[1]](#footnote-2) research in humans and non-human animal models aimed at understanding the mechanisms underlying lasting differences in personality and their implications for risk and resilience.*

*We will discuss the developmental origins of temperament, measurement issues, fundamental dimensions, mechanisms contributing to stability/plasticity, heritability, implications for psychopathology and therapeutic intervention, as well as broader implications for public policy.*

1. *A major focus of the course will be the neurobiology of trait-like differences in fear and anxiety, including neural circuits, molecular genetic pathways, and epigenetics.*
2. *A secondary focus will be on individual differences in behavior and biology that confer elevated risk for the development of depression and impulse control disorders (e.g., substance abuse), including neural circuits involved in hedonic pleasure, reward motivated-behavior, and the regulation of impulses in the face of temptation.*

*An extensive background in biology, genetics, neuroscience, statistics, or other ‘STEM’ fields is not necessary to enjoy and benefit from this course.*

**ADMINISTRATIVE INFORMATION**

* **Monday 9:00-11:45 AM in BPS 1234**
* **Instructor:** Dr.Alex Shackman ([shackman@umd.edu](mailto:shackman@umd.edu); 3123G BPS)
* **Teaching Assistant:** n/a
* **Required Materials**
  + **Textbooks**: n/a
  + **Technology**: n/a
  + **Readings:** Available in .pdf format via Canvas ([www.elms.umd.edu](http://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/**](http://www.provost.umd.edu/calendar/)
* **Office Hours**
  + Dr. Shackman: By appointment

**general learning objectives: *Course overview***

Welcome!

This course will introduce students to a diverse array of theoretical and empirical issues related to the study of stable individual differences in temperament and personality (T&P). We will discuss recent research in humans, monkeys, and rodents that helps to clarify:

* *The childhood origins of temperament*
* *The fundamental dimensions of T&P*
* *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*
* *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*

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: This is an introductory course and an extensive background in biology, genetics, neuroscience, statistics, or other “STEM” fields is *not* assumed. ###**

**detailed learning objectives: *can you be more specific about the CONTENT covered in the class?***

Sure! Here are the key concepts that students will learn in this course.

**Structural Models**

BIS/BAS; Behavioral Inhibition; Big 2; Big 3; Big 5 (OCEAN)

**Scientific Concepts**

Affective chronometry; Appetitive motivation; Approach/Withdrawal; Biomarkers, Endophenotypes & Intermediate Phenotypes; Epigenetics and Non-genomic transmission of acquired traits; Fear vs. Anxiety; Frontal EEG asymmetry; G \* E interactions; Hedonic hotspots; Heritability (common misconceptions); Incentive sensitization model; Liking vs. Wanting; Natural language hypothesis; Pavlovian fear conditioning; Scientific skepticism; Self-stimulation; Sensitivity, Specificity, and Reliability (e.g., test-retest); Serotonin transporter polymorphism; Spatial and temporal resolution; SNP; Strengths and weaknesses of prospective longitudinal studies

**Psychometric Concepts (Non-Technical Overview)**

Correlation (vs. causation); Construct validity; Factor analysis; Internal-consistency reliability; Meta-analysis (classical and ALE); Test-retest reliability;

**Brain Regions**

Basal forebrain cholinergic system; Extended amygdala, Hippocampus, HPA axis, Lateral prefrontal cortex, Medial forebrain bundle, Mesocorticolimbic dopamine system, Midcingulate cortex, Nucleus accumbens, Orbitofrontal cortex, Ventral striatum

**Methods (Non-Technical Introduction Focused on Strengths and Weaknesses)**

ASL MRI; BART; Cortisol; Daily diary; Deep brain stimulation (DBS); EDA/SCR/GSR; EEG/ERP (including N2, ERN, FRN, and P3b); Eriksen flanker; Excitotoxic lesions; Experience sampling; FDG-PET; Fear-potentiated startle; fMRI (task-related and resting-state functional connectivity); GWAS; Limitations of introspective measures and self-report (e.g., peak-end rule); NeuroSynth; Pharmacological methods (e.g., benzodiazepines); Stop-signal task

**Famous and Not-So-Famous Neuropsychological Patients**

B-19, EVR, SM, and Phineas Gage

**Neuropsychiatric Disorders (Epidemiology/Prevalence, Burden, Symptoms)**

Anxiety; Depression; Substance Abuse/Addiction; Impulse Control Disorders (e.g., gambling); Parkinsons

**Investigators**

Ralph Adolphs; Yair Bar-Haim; David Barlow; Kent Berridge; Jenni Blackford; Jack Block; Ryan Bogdan; Niall Bolger; Turhan Canli; Avshalom Caspi & Temi Moffitt; Lee Anna Clark; Michelle Craske; Tony and Hanna Damasio; Richie Davidson; Mike Davis; Hans and Mike Eysenck; Drew Fox; Nathan Fox; Jeffrey Gray; Christian Grillon; Dan Grupe; Amad Hariri; Jerry Kagan; Ken Kendler; Roman Kotov; Will Fleeson; Carl Lejuez; Joe Ledoux; Schmuel Lissek; Jerry Kagan; Ned Kalin; Ken Kendler; Roman Kotov; Seymour ‘Gig’ Levine; Colin Macleod; Michael Meaney; Walt Mischel; Jack Nitschke; Danny Pine; Diego Pizzagalli; Tony Rangel and Todd Hare; Terry Robinson; Kerry Ressler; Alex Shackman; Jerry Suls; Andy Tomarken; Mike Treadway; Peter Visscher; Nora Volkow; David Walker; David Watson; Paul Whalen; Tal Yarkoni; David Zald and many others

If this sounds interesting, you’re in the right place!

**a multi-disciplinary perspective on the contemporary science of t&p**

As we begin our adventure, it’s helpful to keep the following idea firmly in mind:

*When a scientist doesn’t know the answer to a problem, he is ignorant. When he has a hunch as to what the result is, he is uncertain. And when he is pretty damn sure of what the result is going to be, he is still in some doubt…Scientific knowledge is a body of statements of varying degrees of certainty—some most unsure, some nearly sure, but none absolutely certain.*

—Richard Feynman (1955), Nobel Laureate

Science is not a body of facts established by experts, but a set of methods for estimating and reducing uncertainty; a process, at times messy or tedious, of grappling with nature and our preconceived notions about how it works. There are many, many fundamental questions about T&P that remain unresolved. That’s one of the things that make this class so enjoyable. We haven’t figured it out and there are many challenges that remain for future research.

Accordingly, in this class you will learn about the current state of our scientific knowledge about facets of T&P, their organization in the brain, and the implications for understanding psychopathology and other important outcomes. You will also learn about some of the key behavioral and physiological techniques used for measuring and understanding facets of T&P. But we will not systematically review the history of personality research (e.g., Galen, Freud, Jung — a.k.a. the *Hall of Fame or Graveyard Tour* approach). As several leading researchers recently noted,

*Personality psychology has long been identified in the minds of many people with the first (and perhaps only) course in the subject that they took in college. Too often, this was (and sometimes still is) the classic “tour of the graveyard” that focuses on brilliant but long-deceased theorists and leads students to end the semester thinking the burning concern of the field is the disagreement between Freud and Jung…A course that is restricted to theorists like these is an unforgivable misrepresentation of the field, a failure in one’s duty to educate students, and a slap in the face to every contemporary personality researcher*

*It is unacceptable that personality psychology remains, generally, a side trip through the history of psychology while the rest of the science of psychology is presented to students through the lens of the most cutting-edge research.*

—Benet-Martínez, Donnellan, Fleeson, Fraley, Gosling, King, Robins, & Funder (APA Handbook of Personality and Social Psychol, 2015)

In general, my emphasis will be on a multi-disciplinary perspective, in which research at different levels of analysis, using different tools, samples, or species, is viewed as complementary and mutually informative. Put another way, the class will not be organized around “biological theories,” “psychoanalytic theories,” and so on.

course structure

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

You are *strongly* encouraged to attend all course lectures. Each meeting will be organized around two 75-minute modules with a 15 minute break from 10:15 to 10:30 AM. Each 75-minute module 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. Recap of the most important take-home points
4. Homework: Critical take-home questions (see below)
5. Summary of key learning objectives

On occasion, we may have special invited guest lectures.

**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.

**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. Please review them before you dive into the PowerPoint to forage for crucial pieces of information.**

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 then 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.** 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! Readings will be available for download via the course website on Canvas. Again, there is no text book.

While many of the readings were written for a general scientific audience, some of the empirical reports employ complex or unfamiliar methods. My expectation is that you will be able to discern the larger take-home points and implications, even if some of the techniques are unclear. Throughout the Readings section (below), I have identified papers where I do not expect you to invest the time required to fully understand the more technical aspects of the methods.

**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.

# course REQUIREMENTS & GRADING

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

**3 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 45% of the total grade.

Exams will consist of multiple-choice questions that involve critical thinking about concepts drawn from the readings and lectures.

Exams will take place in class on the assigned date in the syllabus.

**You are welcome to bring a single index card (3” x 5”) of notes to exams (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).

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.

**2. Homework (Collectively worth 25%; two lowest grades dropped)**

For Modules 2-19, there are take-home assignments (‘homework’).

There is 1 assignment per module and each assignment consists of 2 parts: (CTQ or LO) + CAQ.

**Part 1. Critical-thinking questions (CTQ’s) –or- Learning Objectives.** The CTQs are designed to cultivate your capacity to critically assess the material covered in lecture, other recent empirical research, or science in the media. The CTQs are available on Canvas. Please respond to any 1 of the CTQs for the relevant module.

Another aim of the written homework is to encourage on-going review and learning (and minimize the need for cramming). To encourage this, you are welcome to substitute the Learning Objectives for the CTQ’s. What do I mean? For any particular lecture, ignore the CTQ’s altogether and simply provide short written responses to all of the “prompts” for the current Module, which are conveniently provided on Canvas.

**Part 2. Create-A-Question.** Create-A-Questions are designed to test your understanding of the assigned readings. To this end, I will ask you to generate your own critical thinking question for one of the ‘required’ papers for the relevant module. Multi-part prompts are ideal. Your question should be designed to assess high level understanding of the material—does the respondent grasp the key aims, significance of the aims; the take-home points; and implications for theory, clinical practice, &/or public policy? Do not worry about nitty gritty methodological details. Questions should probe the “10,000 foot” perspective; don’t get stuck in the weeds ☺

You will submit your responses using the “assignment” tab in Canvas. Responses should include 2 components (with each component clearly labeled using headers). Total length should range between ½ to 1 single-spaced page.

The homework is due by 9 AM one week following the classroom discussion of the relevant module.

Each assignment (i.e. pair of responses) will be assigned one of the following grades: 1 (full credit), 1⁄2 (half-credit), 0 (no credit). Grades will be made available in Canvas. Unexcused late responses will be assigned a score of 0.

At the end of the semester, your 2 lowest response grades will be dropped (cf. <http://www.sfcollege.edu/cat/?section=techTips/ExcelLowVal>)—so there is no need to stress when the occasional unexpected issue crops up (e.g. illness, spaced out, etc.).

**3. Informal Flash Talk (15%)[[2]](#footnote-3)**

This assignment will take the form of a brief, in-class presentation (5-10 minute “flash talk”). The flash talk can be done solo or with a group. It 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
* A videotaped interview(s) focused on a key aspect of T&P or the measurement of T&P

Groups of 2 or more can stage a scientific debate. Debates will be allotted (*N* \* 10 min) total, where N is the number of debaters.

Feel free to be creative on this assignment, but the topic and format must be pre-approved by the Dr. Shackman by November 15th.

Flash talks will be assigned one of the following grades: 1 (full credit), 1⁄2 (half-credit), 0 (no credit). Grades will be made available in Canvas. Unexcused late responses will be assigned a score of 0.

**SCHEDULE**

Please check the course website for the most up-to-date information.

|  |  |
| --- | --- |
| Date | Activity |
| August 28 | Module 1: Introductions, Course Mechanics, and Fundamental Questions Roundtable |
| September 4 | No Class, Labor Day ☺ |
|  | |
| Section 1: Foundational Issues in the Scientific Study of Temperament & Personality | |
| September 11 | Module 2: Is T&P Impactful? |
| September 11 | Module 3: How is T&P Defined? What are the Fundamental Dimensions of T&P? |
| September 18 | Module 4: How Did We Discover and How Should We Measure Individual Differences in T&P? |
| September 18 | Module 5: How Are Traits and States Related? (Part 1) |
| September 25 | Module 6: How Are Traits and States Related? (Part 2) |
| September 25 | Module 7: What Do Traits Do? (Part 3) |
|  | |
| Section II: The Nature and Nurture of Temperament & Personality | |
| <On your own> | Module 8: Intermediate Phenotypes and Brain Imaging Tools, Part 1 |
| October 2 | Module 9: Intermediate Phenotypes and Brain Imaging Tools, Part 2 |
| October 2 | Module 10: Nature & Nurture (Part 1): Behavioral Genetics and Heritability |
| October 9 | Module 11: Nature & Nurture (Part 2): Molecular Genetics |
| October 9 | Module 12: Nature & Nurture (Part 3): Neurogenetics and Epigenetics |
| October 16 | Flex / Self-Study |
| October 23 | **Midterm Exam #1** (May be led by Proctor) |
|  | |
| Section IV: Neuroticism and Negative Emotionality | |
| October 30 | Module 13: Neuroticism/Negative Emotionality and Psychopathology |
| October 30 | Module 14: Behavioral Inhibition and Psychopathology |
| November 6 | Module 15: Role of the Extended Amygdala in Negative Emotionality, Behavioral Inhibition, and Psychopathology |
| November 6 | Module 16: Splitting Negative Emotionality into Its Constituents, Part 1 |
| November 13 | Module 17: Splitting Negative Emotionality into Its Constituents, Part 2 |
| November 13 | Flex / Self-Study |
| November 15 | Flex / Self-Study **/ Deadline for submitting your flash talk proposal to Dr. Shackman** |
| November 20 | **Midterm Exam #2** ((May be led by Proctor) |
|  | |
| Section V: Extraversion/Positive Emotionality and Constraint/Self-Control | |
| November 27 | Module 18: Positive Emotionality, Self-Control, and Dopamine (Part 1): Depression and Anhedonia |
| November 27 | Module 19: Positive Emotionality, Self-Control, and Dopamine (Part 2):Substance Abuse, Impulse Control Disorders, and Everyday Temptation |
| December 4 | **Student flash talks (5-10 minutes apiece)** |
| December 4 | **Student flash talks (5-10 minutes apiece)** |
| December 11 | Module 21: Semester Recap |
| December 11 | Flex / Self-Study |
| TBA | **Final Exam** (May be led by Proctor) |

Please note: This schedule is subject to change. Any required updates will be announced in class and posted on the course website. All readings will be available on the course website. Examinations may be proctored by the TA or another member of the Department staff.

**readings**

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

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

Required

* Spotting Bad Science
* Spotting Logical Fallacies
* Carl Sagan’s ‘Baloney Detection Kit’ – Popova Brain Pickings 2015

**Module 2: Is T&P impactful?**

Required

* **Moffitt et al. PNAS 2011** [do not worry about the technical details of the analyses]
* **Duckworth PNAS 2011** [brief scientific commentary on Moffitt]
* **Kelly Psych Today 2010** [brief popular press summary of work linking neuroticism to divorce]
* **Barker Time 2014** [brief popular press summary of work linking conscientiousness and neuroticism to diverse outcomes]

Optional

* **Shackman et al. Psychol Bull 2016** [review detailing the myriad consequences of N/NE; highlights are described in lecture]
* **Moffitt et al. Amer Sci 2013** [popular scientific press summary of Moffitt et al. PNAS 2011; reviewed in lecture]
* **Duckworth et al. Perspectives on Psychol Sci 2016** [accessible review focused on strategies for enhancing and situations that can undermine self-control]
* **Caspi et al Nature Hum Behav 2016** [self-control and implications for public policy]

**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]
* **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]

Optional

* **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-word 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]
* **Fox & Walker 2015**
* **Shiner** chapter 3 *in press*
* **Shiner** chapter 14 *in press*
* **Clark & Watson** chapter 2008
* **Zentner & Shiner** chapter 2012
* **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 psychophysiologists and neurobiologists]

Optional

* **Stromberg & Caswell Vox 2015** [magazine article on why the popular Meyers-Briggs test is worthless]
* **Funder Psychol Inquiry 1994** [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]**

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

Required

* **Chap 4 in Matthews, Deary & Whiteman 2009** [pp. 85-89 as well as pp. 107-end]
* **Suls & Martin J Personality 2005**
* **Watson & Clark Psychol Bull 1984**

Optional

* **Fleeson JPSP 2001**
* **Fleeson JPSP 2009**
* **Shackman et al. Psychol Bull 2016**

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

Required

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

Optional

* **Canli et al PNAS 2006** [please do not worry about the technical details; focus on the description of phasic vs. tonic models]
* **Bolger & Schilling J Personality 1991**
* **Shackman et al. Psychol Bull 2016**

**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]

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]
* Lecture slides available at http://www.fmri4newbies.com

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

Required

* **Patrick Psychophysiol 2014** [brief non-technical commentary on ‘the end of endophenotypes’]
* **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]

Optional

* Iacono et al Psychophysiol 2014c [summary of a large-scale, largely unsuccessful effort at Minnesota to link psychophysiological and electrophysiological endophenotypes to genetic variants; please do not worry about any of the technical details]
* 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: value and challenges]
* Lilienfeld & 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 necessaily yield reliable intermediate phenotypes]
* Iacono et al International J of Psychophysiol 2017 [highly recommended, very readable, and current commentary on the opportunities and challenges of endophenotypes]

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

Required

* Visscher et al Nat Rev Genetics 2008 [please do not worry about the finer details]
* Plomin et al. Perspectives on Psychol Sci 2016

Optional

* Miller Perspectives on Psychol Sci 2010 pp 18-23 [critical perspective on genetic reductionism]
* Dar-Nimrod & Heine Psychol Bull 2011 [review focused on how misunderstandings about genetics facilitate stereotyping and prejudice, influence morality, and can mis-lead decision-making about interventions for the self (e.g. dieting) and others (e.g prison vs. rehab/treatment)]

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

Required

* Caspi & Moffitt Nat Rev Neuro 2006
* Hyman Nature 2014 [brief non-technical commentary by the former director of the NIMH]
* Couzin-Frankel Science 2014 [science writer’s personal story about getting genetic testing for familial breast cancer]
* Pinker NY Times Magazine 2009 [science writer’s personal story about getting genetic testing]

Optional

* 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]
* Smoller Neuropsychopharm 2016 [comprehensive, but approachable review of the genetics of mood and anxiety disorders]
* Iacono et al Psychophysiol 2014 [accessible overview of molecular techniques with a glossary]
* Topol Cell 2014 [very readable discussion of personal genomics]
* Moffitt et al Perspectives Psychol Sci 2006 [a wonderful introduction to G\*E interactions that also provides a very useful tutorial on study design]
* Okbay & Rietveld Emotion 2015 [critical analysis of candidate gene studies with methodological recommendations]
* Ritter Associated Press 2017 [short news piece on commercial genetic testing, with a focus on the impact it had on the NIH Director’s lifestyle choices]

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

Required

* Hughes Nature 2014 [brief non-technical commentary on Dias & Ressler Nature Neurosci 2014]
* Meaney Ann Rev Neurosci 2001 [please do not worry about the finer technical details; seminal review paper by one of the key pioneers]
* Mukherjee New Yorker 2016b [science writer’s story about his family, twins, and epigenetics]

Optional

* Bogdan et al Neuropsychopharm 2016 [sobering updated discussion of neurogenetics]
* Dias & Ressler Nature Neurosci 2014 [please do not worry about the finer 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 genes]

**SECTION III: NEUROTICISM / NEGATIVE EMOTIONALITY**

**Module 13: Neuroticism/Negative Emotionality and Psychopathology**

Required

* Shackman et al Psychol Bull 2016
* Smith Nature 2014 [infographic on the global burden of neuropsychiatric disease]
* 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

Optional

* Jeronimus et al Psychol Med 2016
* Zinbarg et al Clin Psychol Sci 2016
* Barlow et al Clin Psychol Sci 2013
* 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]
* Lahey et al Psychol Bull 2017

**Module 14: Behavioral Inhibition and Psychopathology**

Required

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

Optional

* Fox & Walker 2015 [for those hungry to learn more about BI]
* Kagan et al. Science 1988 [for those interested in delving more deeply into BI; seminal study]
* Schwartz et al. Science 2003 [please do not worry about technical aspects of fMRI; for those interested in delving more deeply into BI; seminal study]
* Clauss & Blackford J Amer Acad Child & Adol Psychiatry 2013 [please 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 for a cost-effective targeted prevention program]

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

Required

* Shackman et al Psychol Bull 2016
* Feinstein et al Curr Biol 2011
* Adolphs Ann NY Acad Sci 2010 [addresses the contribution of the amygdala to social cognition]

Optional

* Fox & Shackman Neurosci Letters in press
* Shackman & Fox J Neuro 2016
* Davis et al Neuropsychopharm 2010
* Oler, Fox, Shackman & Kalin in press [lesions in monkeys, relevance to BI and social anxiety disorder]
* Fox & Kalin Amer J Psychiatry 2014 [please do not worry about the technical details]
* Shackman et al PNAS 2013 [please do not worry about the technical details]
* Fox et al Trends in Neurosci 2015
* Fox et al PNAS 2015 [please do not worry about the technical details]
* Etkin & Wager Amer J Psychiatry 2007 [please do not worry about the technical details; seminal meta-analysis]
* Davis & Whalen Mol Psychiatry 2001
* Adolphs et al Nature 1998 [reviewed in lecture and worth skimming]
* Kennedy et al Nat Neurosci 2009 [reviewed in lecture and worth skimming]
* Choi & Kim PNAS 2010 [please do not worry about the technical details] [reviewed in lecture and worth skimming]

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

Required

* Grupe & Nitschke Nature Rev Neurosci 2013
* La Rosa Buzzfeed 2014
* Shackman et al. J Exp Psychopath 2016

Optional

* Mogg & Bradley Behav Res & Ther 2016 [comprehensive review of ABM work and anxiety-attention more generally]
* MacLeod & Mathews Ann Rev Clin Psychol 2012 [ABM/CBM: reviewed in lecture and worth skimming]
* 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, Waters & Bradley Clin Psychol Sci 2017 [skeptical analysis of the ABM literature with thoughtful methodological recommendations for future work]
* Price et al Clin Psychol Rev 2016 [recent meta-analysis of ABM]
* Duits et al Dep and Anx 2015 [please do not worry about the technical details of the meta-analysis] [reviewed in lecture and worth skimming]

**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 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
* Pizzagalli Ann Rev Clin Psychol 2014
* Thomsen et al Frontiers in Behav Neurosci 2015
* Smith & Marshall Nature Disease Primers 2016 [infographic on depression]

Optional

* Fleming Intell Life Mag 2015 [journalist hangs out with Kent Berridge for a week]
* Berridge & Robinson Brain Res Rev 1998 [seminal early review]
* Berridge & Robinson Neuron 2015
* 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]
* Volkow et al Nature Reviews Neurosci 2017 [comprehensive recent review of depression/addiction relevant circuitry]
* Zald & Treadway Ann Review Clin Psychol 2017 [comprehensive recent review]
* Luking et al Trends in Cog Sci 2016 [very readable, recent review with a developmental focus]
* Rizvi et al Neurosci and Biobehav Reviews 2016 [comprehensive review of paper-and-pencil and behavioral measures of anhedonia]

**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 more 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]
* Meurk International J of Drug Policy 2016 [how do addicts think about addiction]

Optional

* Kelley et al. Ann Rev Neurosci 2015
* Lehrer New Yorker 2009 [popular press piece on Walt Mischel]
* Mischel 2015 [Press release for the 2015 Congressional Golden Goose award to Walt Mischel]
* Kotov et al. Psychol Bull 2010 [meta-analysis of associations between T&P and psychopathology; covered in lecture]
* 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 early review]
* Berridge & Robinson Neuron 2015 [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.]
* Konnikova New Yorker 2014
* Druckerman New York Times 2014
* Lake Slate 2014 [short popular press piece on the stigma associated with substance abuse and mental illness]

**Module 20: Semester Recap**

Required

* None

**tips for deciphering the assigned papers**

Here are some helpful tips to keep in mind as you read the assigned papers. Most of these apply equally well to review or empirical papers.

* First Steps
  + Begin by reviewing the title of the article. The title will indicate the central focus of the paper.
  + Next, read the abstract. The abstract will provide an overview of the study’s main research question, goals, and results. Don’t worry too much about the details or get hung up, just try to identify the big picture.
* Introduction
  + The introduction typically describes what the author hoped to achieve and states the problem being investigated. Normally, the introduction provides background and significance. It will summarize or at least foreshadow the experiment, the hypothesis(es) and the general experimental design or method.
  + Aims?
    - What were the aims of the paper? It can sometimes even be helpful to highlight the main study goals and hypotheses as you are reading the introduction. This will allow you to easily reference the aims as you dig deeper into the methods, results, and conclusions.
    - If a review paper, what was the scope of the review? In other words, what are the authors trying to accomplish?
  + Background & Significance?
    - What is at stake? Why is this line of research worthwhile or important? Are the goals important or trivial? Often, the larger significance of the work is highlighted at the beginning of the Introduction (and the end of the Discussion).
* Method and Participants?
  + **I do not expect students to fully understand every methodological detail or technique. But it is important that students do their best to understand the *gist* of what was done.**
  + What did the authors do? Are the methods a good fit for the aims or is there a gap of some sort?
  + Who participated and how were they enrolled in the study?
  + How representative is the sample? Is it a good fit for the aims or does it limit the conclusions that can be drawn from the study?
* Key results?
  + Did the results support the hypotheses?
* Discussion
  + The purpose of the Discussion is put the findings in the context of prior literature, acknowledge limitations of the current study, and suggest specific implications for future research and applications to prevention, intervention, or policy.
  + Often, the first paragraph of the Discussion summarizes the key results
  + Often, the final paragraph of the Discussion summarizes the broad implications
  + In between, the authors usually discuss the meaning and implications of the results as well as key limitations
  + Implications?
    - What are the implications for our understanding of T&P?
    - What are the main implications of the findings for theory and for practice?
    - Are there broader implications for our daily lives?
  + Limitations/Caveats, stated or otherwise?
    - Provide strong evidence for the stated conclusions?
    - Are the claims convincing? If not, what further evidence is needed? Are there other experiments or work that would strengthen the paper further?
    - Were important aspects of T&P neglected in the paper?
  + Future challenges—What are the most profitable, impactful future steps?

**additional course policies**

***Students are responsible for making themselves aware of the relevant course and University policies. Some of these are described below. Others can be found at*** [***http://www.ugst.umd.edu/courserelatedpolicies.html***](http://www.ugst.umd.edu/courserelatedpolicies.html)***.***

Late Policy

Students will lose 10% of total possible points for each day late without prior approval (barring compelling reasons). Prior approval requires at least 48 hours advance notice.

Grade Disputes

In the case of disputed grades, students are required to submit a written claim within 48 hours of receiving the disputed grade that describes the disputed item/grade, rationale for altering the grade, and suggested alteration.

Curving

Your grade will be determined by your individual performance on the exams and written response exercises. The course will *not* be graded on a curve. With the exception of calculation errors, no changes will be made to your final grade at the end of the semester. If earning a particular grade is important to you, please speak with Professor Shackman or the TA at the beginning of the semester so that we can offer some helpful suggestions for achieving your goal.

Final Grade for the Course

Final grades will be assigned in accord with the following rubric

>97 A+

94-96 A

90-93 A-

87-89 B+

84-86 B

80-83 B-

77-79 C+

74-76 C

70-73 C-

67-69 D+

64-66 D

60-63 D-

<60 F

XF-denotes failure due to academic dishonesty.

W indicates withdrawal from a course in which the student was enrolled at the end of the schedule adjustment period. This mark is not used in any computation of quality points or cumulative average totals at the end of the semester.

Course Evaluations

You will have a formal opportunity to evaluate the effectiveness of this course, although I first want to encourage you to schedule a meeting with me (Professor Shackman) if you have any questions, concerns, or suggestions for how we can help support your learning and engagement. Specifically, the University will ask you to evaluate all of your courses through the online system ([www.courseevalum.umd.edu](http://www.courseevalum.umd.edu)) at the end of the semester. As members of the campus learning community your feedback is crucial to the success of our program and therefore to the value of your degree. All I ask is that in evaluating of all your courses you approach it in the same way that you expect instructors to evaluate your performance: be open, honest, and objective.

Academic Integrity

Academic integrity is the foundation of science and the policies will be strictly enforced. **My goal is to protect the value and integrity of the grades that have been fairly earned by the vast majority of students.** Any indication of academic dishonesty (including but not limited to cheating, plagiarism and falsification) will be referred to the Office of Student Conduct ([www.osc.umd.edu](http://www.osc.umd.edu)) without hesitation. You are responsible for reviewing the Department of Psychology’s policy statement on academic integrity (<http://psychology.umd.edu/about-us/documents/documents/Syllabus_Supplement_on_Ethics_of_Scholarhip_in_Psychology.pdf>) for details.

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware that the consequence for cheating, fabrication, facilitation, and plagiarism in this class is a grade of “F”. For more information on the Code of Academic Integrity or the Student Honor Council, please visit: <http://www.studenthonorcouncil.umd.edu/whatis.html>. The student-administered Honor Code and Honor Pledge prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents and forging signatures.

**On every examination, paper or other academic exercise not specifically exempted by the instructor, students must write by hand and sign the following pledge: *I am not a cheater.* *I completed this with honor.***

Compliance with the code is administered by the Student Honor Council, which strives to promote a community of trust on the College Park campus. Allegations of academic dishonesty should be reported directly to the Honor Council (301-314-8450) by any member of the campus community. For additional information, consult the Office of Student Conduct. For a description of the University's definition of academic dishonesty, suggestions on how to prevent cheating, and practical answers to frequently asked questions about the Code of Academic Integrity, consult the Student Honor Council's webpage and click on the faculty tab.

Accommodations for Disabilities

The campus's Disability Support Service Office (DSS) works with students and faculty to address a variety of issues ranging from test anxiety to physical and psychological disabilities. If an instructor believes that a student may have a disability, DSS should be consulted (4-7682 or dissup@umd.edu). Note that to receive accommodations, students must first have their disabilities documented by DSS. The office then prepares an Accommodation Letter for course instructors regarding needed accommodations. Students are responsible for presenting this letter to their instructors by the end of the drop/add period ([www.counseling.umd.edu/DSS](http://www.counseling.umd.edu/DSS)).

Medical Absences

For medically necessitated absences: Students may, one time per course per semester, provide a self-signed excuse as documentation of an absence from a single class (e.g., lecture, recitation, or laboratory session) that does not coincide with a major assessment or assignment due date. For all other medically necessitated absences, a course instructor may request that students provide documentation from a physician or the University Health Center to verify an absence. In cases where students are asked to provide verification, the course instructor may request the dates of treatment or the time frame that the student was unable to meet academic responsibilities, but may not request diagnostic information.

Religious Observances

Students will not be penalized because of observances of religious beliefs. Please note that it is your responsibility to notify the instructor by email ASAP regarding any absences for religious observances.

Electronic Devices

I expect you to make the responsible and respectful decision to refrain from the temptation to use your cell phone or other mobile electronic devices, such as tablets and notebook computers in class. If you have critical communication to attend to, please excuse yourself from the room and return when you are finished. If I find myself or other students to be distracted by your behavior, I may ask you to leave the room.

Inclement Weather or Campus Emergency

If the University is closed due to inclement weather or a campus emergency (you can find this out by looking at the campus website <http://www.umd.edu> or the snow phone line (301-405-SNOW), classroom activities will be cancelled.

Learning Assistance Center

If you are experiencing difficulties in keeping up with the academic demands of this course, you are strongly encouraged to contact the Learning Assistance Service (www.counseling.umd.edu/LAS). Their educational counselors can help with time management, reading, math learning skills, note-taking and exam preparation skills. All their services are free to UM students.

Students in Distress

Services for students in various forms of distress are offered by the Counseling Center and the Mental Health Service in the Health Center. During evenings and weekends, the student peer-counseling hotline (4-HELP or 4-4357) is available. Faculty who wish to consult with professionals may call 4-7651 for immediate assistance. For non-emergency issues, faculty can call the Warmline (4-7653). A therapist will respond within a few hours.

**ABOUT THE course**

Professor Alex Shackman

I am an Assistant Professor in the Department of Psychology, a member of the executive board for the Neuroscience and Cognitive Science (NACS) Program, a core faculty member of the Maryland Neuroimaging Center, and the Director of the Affective and Translational Neuroscience Laboratory at the University of Maryland. My research program is supported by awards from UMD, NIMH, and NIDA and has appeared in *PNAS, Molecular Psychiatry, Nature Reviews Neuroscience, J Neuroscience, Psychological Bulletin, and Psychological Science*. I am Co-Editor of *The Nature of Emotion* (Oxford University Press, 2018) and serve as an Associate or Consulting Editor several journals (*Emotion*; *Cognition & Emotion*; *Cognitive, Affective & Behavioral Neuroscience*). My program of research highlights the importance of circuits centered on the extended amygdala and mid-cingulate cortex (MCC) for trait-like individual differences in dispositional negativity, one of the most prominent risk factors for the development of anxiety disorders, depression, and co-morbid substance abuse. This is particularly important because these disorders are highly prevalent, frequently debilitating, and often treatment-resistant. From a translational perspective, my work has identified novel intermediate phenotypes and sets the stage for accelerating the development of more effective, personalized, and neurobiologically-grounded prevention and treatment strategies. From a basic psychological science perspective, my work begins to address fundamental questions about the origins of childhood temperament and adult personality—questions that cannot readily be addressed using traditional behavioral or psychometric data alone. Key methods used by the Shackman lab include multimodal neuroimaging (fMRI, PET, VBM); peripheral physiological techniques (cortisol, facial EMG, fear-potentiated startle), and behavioral assays (eyetracking and experience sampling). Populations of interest include monkeys, children, adolescents, healthy adults, and psychiatric patients. To learn more about the lab, please visit our website at <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, Dr. Leah Somerville, Tara Augenstein, Dr. Hill Goldsmith (Wisconsin), Dr. Heather Abercrombie (Wisconsin), Dr. Brad Bushman (OSU), Dr. Brent Roberts (UIUC), and Dr. Rebecca Shiner (Colgate). The feedback that I have received from students enrolled in prior semesters has also proven invaluable for refining and strengthening the course.

1. The median year of publication for the assigned and optional readings is 2014! [↑](#footnote-ref-2)
2. I piloted the flash talks in several undergraduate courses and it invariably proved to be one of the highlights of each semester. Both the students and I really enjoyed them. This is the first time that I am including it as an assigned component of the graduate seminar. [↑](#footnote-ref-3)