BEHV 6140
ADVANCED STRATEGIES AND TACTICS IN BEHAVIOR ANALYTIC RESEARCH
Spring 2020

Instructor: Dr. April Becker
Office Hours: Monday 12:00-1:40 pm
AND by appointment Chilton 360G
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Course Meeting Information:
Mondays 6:00PM - 8:50PM
Chilton 363

OBLIGATORY SYLLABUS INSPIRATIONAL QUOTES

“That which we persist in doing becomes easier, not that the task itself has become easier, but that our ability to perform it has improved.”
Ralph Waldo Emerson

“The fact that we live at the bottom of a deep gravity well, on the surface of a gas covered planet going around a nuclear fireball 90 million miles away and think this to be normal is obviously some indication of how skewed our perspective tends to be.”
Douglas Adams

REFLECTIONS ON THE DESIGN OF THIS COURSE

Empirical research methods are not the same from field to field or from subject matter to subject matter, much as we tout our common “scientific method”. This can be positive since not all phenomena are ideally studied in the exact same way, however it can also restrict a field whose research may be enhanced by a larger set of methods. The aim of this course is to provide for a current behavioral expert an even more evolved, deep expertise of behavior analytic methods, some expertise in methods frequently used in adjacent fields or that may be useful (if nontraditional) in behavior analysis, and a global awareness of the variety of methods in science. You will be able to evaluate the quality of any such methods given questions and subject matter at hand, and you will understand and be able to work with the occasional tension (sometimes outright contradiction) between such considerations and the social/financial contingencies of research. This class focuses not only on methodology in behavior, health, and psychology but also in biology. These may be the most foreign sections to you; you should attend to them in terms of how biological subject matter may be critically similar to (and related to) behavioral subject matter and where the rationale behind the methods could bridge.
Course Objectives

Level 1:
- Students will be able to identify and define common single-case experimental designs
- Students will be able to determine the conditions under which different single-case experimental designs are applicable
- Students will be familiar with common strategies and tactics of measurement in behavior analysis, including direct observation and interobserver agreement
- Students will be able to identify common threats to internal validity
- Students will be able to describe general issues in single case research, including generality of results, direct and systematic replication, steady states and transition states, choosing an appropriate baseline, designing appropriate control conditions, and tracking down sources of variability
- Students will become familiar with statistical analysis in single-subject designs
- Students will be able to critically evaluate research methodology in both behavior analysis and related fields

Level 2:
- Students will understand the overlap and non-overlap between methodology optimized for scientific investigation and methodology called for by the environment of the sciences (publishing, grants, etc.)
- Students will be familiar with common concepts related to the scientific method (including their application or nonapplication to the behavior of scientists) and will be able to apply them to experimental design processes
- Students will be able to formulate clear experimental questions amenable to simple testing
- Students will be familiar with the variety of styles of hypotheses, including both inductive and deductive hypotheses, will be able to formulate appropriate hypotheses (or identify implicit hypotheses) involved with their research, and will be informed of the potential pitfalls of hypothesis-driven myopia
- Students will be familiar with experimental designs commonly used outside of behavior analysis including observational, experimental (necessity and sufficiency), and quasi-experimental designs
- Students will have a bird’s-eye understanding of qualitative, quantitative, and mixed-methods approaches to research
- Students will be able to evaluate and optimize the quality and veracity of their experimental designs through appropriate validations, controls, etc.
- Students will be able to appropriately utilize the concepts of statistical significance, effect sizes, biological significance/relevance, p values, and Prep values
- Students will have a bird’s-eye understanding of Bayesian methodology
- Students will understand theory development, its relationship to hypotheses, inductive investigation, deductive investigation, and abductive investigation
- Students will write a predoctoral fellowship or other funding application appropriate for NIH, NSF, or a different entity appropriate to career trajectory and will defend their proposal orally

Course Style

Typical:
- Hour 1 – 1.5 Student-led readings seminar
- Hour 1.5 – 3 Experimental Design or Grant

Substitute styles on particular weeks are indicated on the schedule

Since my courses are always in constant development, changes will most certainly occur. You must keep track of all changes announced in class, online, or via email. Please be active partners in my attempts to revise throughout the semester by communicating feedback, impressions, ideas, and suggestions

Point Allocations

<table>
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<th>Activity</th>
<th>Points</th>
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<td>MS-Level Final Exam</td>
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<td>Readings Documents / Seminar Leadership</td>
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<td>Experimental Design Challenges &amp; Critiques</td>
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<td>Funding Proposal Written</td>
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<td>Funding Proposal Defense</td>
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<td>Date</td>
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<tr>
<td>Jan 13</td>
<td>Welcome, Review</td>
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<td>Jan 20</td>
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<td>Jan 27</td>
<td>MS level mastery demonstration, Introduction</td>
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<td>Feb 3</td>
<td>Organizing ideas</td>
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<td>Feb 10</td>
<td>Formulating Questions</td>
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<td>Feb 17</td>
<td>Hypotheses (Inductive and Deductive)</td>
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<td>Feb 24</td>
<td>Single-Subject Science</td>
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<td>Mar 2</td>
<td>Science, broadly</td>
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<td>Mar 9</td>
<td>Spring Break – no class</td>
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<td>Mar 16</td>
<td>Science, broadly</td>
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<td>Mar 23</td>
<td>What counts as worthy? (Quality Control)</td>
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<td>Apr 6</td>
<td>Math (what you won’t get elsewhere)</td>
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<td>Variability</td>
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<td>Apr 20</td>
<td>Theories</td>
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<td>May 4</td>
<td>Presentations</td>
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ACCOMMODATIONS

The Department of Behavior Analysis, in cooperation with The Office of Disability Accommodation, complies with the Americans with Disabilities Act. Additionally, I consider all students to be need an accommodation of some kind since you are all unique and diverse individuals with complex histories and current situations. I request that you all submit a description of your accommodations using the attachment to this syllabus. If your accommodations need to go through ODA as well, please include ODA paperwork and make sure to get it to me by the 3rd week. The purpose of this course is to inspire, challenge, and establish knowledge and skills. The assignments and deadlines are designed to reach this goal. However, where called for and compatible with the learning of others, I will problem solve with you so that work, childcare, eldercare and other life responsibilities are compatible with your success.

POLICY ON CHILDREN

Respecting parenting status is part of my overall commitment to respecting the wonderful diversity of our UNT classrooms. All exclusively breastfeeding babies are welcome in class as often as necessary. While it is not meant to be a long-term care solution, bringing an older child or elder to class in response to unforeseen disruptions to life is also perfectly acceptable. I ask that other students work to reasonably create a welcoming environment for such children. If you do bring your child to class I ask that you sit near the door so that if your little one needs special attention or starts behaving in a way that is disruptive to the learning of other students, you may step outside until their needs have been met. Please use good judgement where this is concerned.

STUDENT PERCEPTIONS OF TEACHING (SPOT)

Student feedback is important and an essential part of participation in this course. There will be a mid-term informal evaluation of the course for the purposes of implementing mid-semester improvements. Formal SPOT evaluations will be available at the end of the semester. This student evaluation of instruction is a requirement for all organized classes at UNT. The short SPOT survey will be made available to you with an opportunity to evaluate how this course is taught. You will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Please look for the email in your UNT email inbox.

ABSENCES

Only unavoidable absences will be accommodated. If you must be absent for any reason, you must consult with the instructor at least two weeks before the date of the missed class. The instructor will determine how to proceed with the absence and makeup. The only allowable exceptions to this procedure are scenarios involving biohazard-level sicknesses or emergencies of the defcon-1 type. Please note that scenarios avoidable via forethought or planning do not constitute emergencies – at least not mine 😊.
**STUDENT CONDUCT**

Each student automatically certifies that any material submitted for grading is his/her own *independent work*. UNT policies require reporting of plagiarism or any suspected violations that constitute possible academic misconduct. Students are responsible for being familiar with the Code of Student Conduct.

**STUDENT RESOURCES**

Office of Disability Accommodation - http://disability.unt.edu/
Learning Center - http://learningcenter.unt.edu/ UNT
Writing Lab - http://writinglab.unt.edu/
GUIDELINES FOR ACTIVATES AND ASSIGNMENTS (EXCEPT FUNDING PROPOSAL)

MS-Level Final Exam
On the first week, you will be given a previous reading list. You have either had these readings before (UNT folks) or you’ve hopefully had a similar list for your MS Research Methods Course. In the first two weeks of class, you will review all of this material, skimming and/or focusing as individually necessary to bring yourself back up to speed on all covered concepts. If you are unfamiliar with any of the concepts, this is your chance to get up to speed. You are encouraged to review in groups as this will speed your process.

Once you have finished reviewing, you will design a final exam to probe for mastery on this material. Do not make an open-ended exam; ask specific questions relevant to all important points. Because there are many points to test for, you are encouraged to make questions somewhat short. A student should be able to take this exam in about an hour or less.

On the third week of class, we will randomly re-distribute your tests so that you will take one of your classmate’s tests and one of your classmates will take yours. Come prepared to both distribute and take such a test.

After distributing and taking exams, you will write a critique (note: a critique can consist of positive as well as negative responses) of the exam that you just took. Your grade will be an evaluation of the quality of your written exam, the quality of your critique, and (lastly and loosely) your performance on the test you took.

Reading Documents
Each week, we will have a set of readings. Each student will produce a document about the readings, including:

1. A bulleted outline covering the main and important topics from each reading
2. A section about how the readings form a big picture and what that picture is
3. A section explaining in specific terms how these concepts could inform your current experimental work outside of class and/or your proposal.

I am looking for completeness here in the sense that I don’t want you to leave out big concepts, but I am even more interested in parsimony. It is easy to make an outline complete and easy to make it parsimonious, but to balance both will contribute to your clear thinking. Your goal is to produce the simplest document that still accounts for all vital concepts in the readings. Tools to achieve brevity include bulleting and visual rather than verbal conveyance (feel free to make a drawing or figure!).

Seminar Leadership
Each week, one student will utilize their readings document to lead a seminar on the readings. Other students may also use the concepts in their document to participate in the discussions. The role of the leader will be to:

1. Make sure the conversation is complete (covers all aspects of the week’s material). This means you may need to redirect or keep us on topic. Use your best judgement when redirecting interesting diversions.
2. Prompt participation in quiet people, guide participation with talkative people.
3. Play devil’s advocate if ideas are going unchallenged.
**Experiment Critiques**
In dyads, you will read and critique experiments from the published literature. Experiments for critique will be selected the week before the critiques will be presented. Critiques will be presented by each dyad in the second half of class.

**Experimental Design Challenges**
In dyads, you will occasionally solve an experimental design challenge. Your job is to take the information provided in a hypothetical research scenario and design an experiment to address the challenge. Keep in mind that you may need more than one experiment to thoroughly address the issue, and if you don’t have enough information to design a good experiment you may need to start with proposed methods to gather that information. One group will be randomly chosen to present their solution to the class for discussion, critique, and brainstorming.

**REVIEW READINGS (ALL FROM YOUR PREVIOUS CLASS EXCEPT *)**

Baer, D. (1975). In the beginning there was the response.


WEEKLY READINGS

Reading guidance: Page numbers for each reading precede the reference, and approximate weekly totals antecede the header to help you with your study/time management. “Quick read” means skim all material that is not new to you and do a moderate-speed read only of those parts that are of particular novelty or interest. “Lay reading” means that this paper was taken from a popular source and should therefore be a faster read.

This class will involve a lot of reading. You will have to learn to be a strategic reader in order to avoid getting lost, panicking, or creating disruptive holes in your learning process. We will discuss strategies to this end on the first day, which include: 1. knowing when to skim, when to skip, and when to focus, 2. Scheduling lay reads for bedtime or times when you’re not fresh/need to relax, difficult reads for your best, most focused “on” times, and multiple reading windows (subdivided by sections/headings) for long/complex reads.

Disclaimer: Some of these readings are old and were written at a time before good social standards of respect were implemented. Please be advised that there may be some inappropriate wording from bygone eras, and that by assigning such readings I do not condone any disrespectful attitude in gender, race, sexual orientation or identity, or any other frame. I believe that awareness of this problem both historically and presently is part of your education, so we will read this material with an eye to understanding the pervasive nature of such problems in the past in order to better combat them in the future. To this end, our “art of self-deception” week will also explicitly address social biases in science, its history of sponsoring unethical social norms, and the need for scientists to consciously combat these tendencies while designing experiment.

Introduction 29


“The” scientific method, induction, deduction, abduction, & the pervasiveness of paradigm 128

88 Russel, Bertrand (1962). Scientific Knowledge and Scientific Technique. In The Scientific Outlook. (pp. 1-100). New York: W.W. Norton & Company. NOTE: this is an intensive but important reading. Your focus this week should be on understanding this one as a priority.


**FURTHER READING 9** Staddon, J. (Draft). Chapter 2, Experiment. In: Scientific Method. (pp. 23-31)

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**How do we know? (including The Art of Self-Deception) 119**


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**Testing Guesses: The Variety Show 86**


Expansions on Single-case Research Methods 116


Wider Research Methods 143

71 Campbell, D. T. & Stanley, J. C. (1963) Experimental and quasi-experimental designs for research. NOTE: this is a classic piece, and you will eventually read all of it. For this week, do a typical, focused read on pp. 1-42 excluding sections on validity (we will return to those later) and a quick read on the rest, skipping over any sections that are just on statistics (you’ll have plenty of statistics elsewhere).


Various Designs & Methodological Approaches 119 (plus skim 80)


SURVEY 47 Selwyn, M.R. (1996). Common designs in biological experimentation and Sequential Clinical Trials. In: Principles of experimental design for the life sciences. Boca Raton, New York, London, Tokyo: CRC Press. Quick Read. Aim to simply understand each design and not to absorb every single sentence. Skip section 5.5. Note that the optional reading is attached to this PDF so know where to stop if you’re not reading that one.


RIDICULOUSLY QUICK SURVEY ~80 Wahed, Abdus S., et al. (2012). (hand-selected entries). In: Encyclopedia of research design. SAGE Publications, Inc. Ridiculously quick read NOTE: I selected these concepts because they are frequently used or may be useful for you to be aware of in the future. You don’t need to understand them in detail; just peruse
what’s in there and keep it as a reference. DO NOT READ EVERY PAGE – read each heading and skim anything interesting underneath


*Reproducibility, Rigor & Validity*

6 Henderson, D. (19 Jan 2017). Why should scientific results be reproducible? NOVANEXT. **Lay reading**


71 Campbell, D. T. & Stanley, J. C. (1963) Experimental and quasi-experimental designs for research. **NOTE: We are returning to this piece to focus on its sections on validity. Please review those only.**


*Controls, Blinding, & Validity*


New stats, Significance vs. relevance, Killeen's Prep, Bayesian Methods 24


OPTIONAL READING 64 Berry, D.A., & Stengal, D.K., (1996). Bayesian Methods in Health Related Research. In: Bayesian Biostatistics. New York, Basel, Hong Kong: Marcel Dekker, Inc. Quick read NOTE: in reality this probably won’t be very quick, but the point is: don’t labor if it doesn’t click right away, just introduce yourself


Signal or Noise? 84

REVIEW 72 Sidman, M. (1960). Parts V and VI (pp. 141-212). Tactics of scientific research: Evaluating experimental data in psychology. Boston: Authors Cooperative. NOTE: This should be a quick, review read NOT ON CANVAS


FURTHER READING 16 Salsburg, D. (2001). The skew distributions. In The lady tasting tea. (pp. 9-24) NOTE: read with attention to a shift in thinking from determinism to inherent randomness in nature—what Sidman refers to as intrinsic versus imposed variability
Beyond a collection of inductive conclusions 76

Theories:


Pervasive problems with theories:


NAME_________________________________

ABOUT YOU:

Please write your name and a short description of:

1. The global reason you are studying behavior analysis and science

2. Your dissertation research (or probable research) question, topic, or description

3. What you hope this class will provide for your education, dissertation, career, or other

ACCOMMODATIONS DESCRIPTIONS:

Please describe any points of your unique life that will or may weigh on the logistical implementation of this class. For each, please tell me if it’s just something I should be aware of or if there is a particular point of reasonable accommodation or flexibility that can be provided.