Chapter 2: Where to Start

Demonstration: Applying Systematic Observation to Figure Out *What's in the Bag*

Relevant Learning Objectives: 1, 2, 5 plus vocabulary (e.g., parsimony, falsifiability)
Estimated In-Class Time: 30-40 minutes, including discussion
Class Size: easier with smaller classes (<50), but manageable with at least 100

This demonstration relies on metaphor to enable students to experience the iterative process of scientific inquiry. Each group of 4-5 students is given an opaque sealed bag with a mysterious object in it. Their task is to guess what is in the bag through a repeated process of generating hypotheses, gathering "data" to test them, revising their hypotheses, and so on. It is discussed fully by Powner (2006); let me describe how it looks in my classroom.

Planning ahead. Determine how many bags you need to prepare, so that each group of 4-5 students receives one bag. For my class of 100 students, I prepare 20 bags. Acquire opaque, cloth bags that seal completely so the students can't peak (e.g., with Velcro, or staples or whatever). The cloth will need to be thin enough for students to be able to feel the objects within. If you're handy with the sewing machine, make your own. I purchased brown pillow cases and seal them at the top by tying ribbon around them. Then, gather oddly-shaped objects from the dollar store or around your house. Powner discusses some of the objects she has used; I have also used sealed lip balm (which can get a bit messy!), a toy doctor's kit, stickers, cat toys, a bicycle bell, and even left a bag empty once.

Successful execution. I highly recommend reading Powner's description and taking the time to visualize how this will work. I'll summarize here. Divide the class into groups of 4-5, and set one of the bags on the table/desk for each team. Explain that their task is to identify the object in the bag with as much detail as possible. For the first two minutes, they are to generate hypotheses about what it is likely to be based only on what they can observe as it sits on the table. After two minutes are up, announce it is time to use any method *except* opening or peeking in the bag to develop a detailed hypothesis about what it is. Suggest they consider size, colour, materials, and uses or functions. You might choose to have each group nominate a recorder who notes the hypotheses as they change throughout the process.

As they test out and revise their hypotheses, you as the instructor can circulate and observe. Ask questions to press for more complete or detailed descriptions. If two groups finish early, trade objects and let them do another. If a group is stuck between two hypotheses, prompt them to devise a test to discriminate between them. Ask groups to identify what assumptions their making, to acknowledge what they might never be able to find out. If a group is really stuck and has no idea, ask them to try to link it to concepts from memory (how is it similar to or different from other objects).

Discussion. The discussion is critical to help students gain educational value from this fun

activity. You might start by mapping on the item that's in their bag to unobservable psychological constructs in general – or let the students come up with this metaphor. Basically, my message is this: We never get to crack open someone's skull and measure the size of a personality trait or self-esteem or whether they just lied to us, etc. We gather data in the most systematic ways we can, recognizing it's imperfect, but gain more knowledge as we modify our hypotheses and gather more data. From there, Powner offers numerous options. One option is to start the discussion is to have students open their texts to Chapters 1 and 2 and identify vocabulary words and other ideas that they can connect to this activity. Common connections will include *hypothesis*, *falsifiability, observation, description (without manipulation)*. From my experience, some of the richest discussions surround falsifiability. It can be a challenging concept for students to grasp at first because they need to realize that just because a hypothesis is falsifiable doesn't mean it's false. Moving from round one of this activity (where they can't touch the object) to round two (where they can) tends to illuminate this particular point quite well.

Demonstration: You are the Reviewer!

Relevant Learning Objectives: 1, 2, 5
Estimated In-Class Time: 20 minutes
Class Size: any

I use this demonstration for two purposes: (1) to highlight differences among predictions, hypotheses, and theories, and (2) to bridge toward operational definitions and designing their own research. Basically, I describe an obviously flawed study after warning students that they will have the chance to be reviewers. They should note any problem with the method on a sticky note (one problem per note). My description goes something like this…

> Let's say that we know from past research that people with high self-esteem not only feel good about themselves, but they also feel good in general. Let's also say we know from past research that people who feel good in general tend to be more productive than those who don't. These two lines of research lead us to our theory: High self-esteem leads to positive outcomes. [Pause to have students identify independent variable and dependent variable, noting that this is a causal statement.]
>
> First we want to find out if there is any relationship between self-esteem and positive outcomes, before we try to manipulate these variables in an experiment. Study 1's hypothesis: "*There is a positive relationship between self-esteem and academic performance.*" Method is to ask 100 participants using the following operational definitions: self-reported self-esteem scores on the Rosenberg Self-Esteem Scale (a very common measure), and self-reported academic average. Study 1's prediction: "*As self-esteem scores increase, grades will increase.*" These two variables are positively correlated (.76), therefore high self-esteem causes high academic performance.

At this point, I ask students using a clicker question to report whether they would recommend this study for publication, a light revise and resubmit, a heavy revise and resubmit, or rejection. I always have a high number of students vote to accept or lightly revise this study… until the discussion!

Students bring their sticky notes up to the board, where I sort them. In a very large class (>100), you may wish to invite students in a section of the room, or just those who are particularly keen. Typically, the two major flaws are identified by many students: inappropriate causal conclusion from correlational data, and reliance on self-report for academic average. Other flaws are also brought up and can be useful points of discussion (e.g., some note that 100 people form a tiny sample, which prompts a discussion of typical sample sizes in psychology). After this discussion, I have a re-vote using clickers, and almost everyone now chooses rejection, or at least heavy revise and resubmit.

I then describe a follow-up study that uses academic average as obtained (with permission) by the registrar's office. Now the correlation drops to zero. Students then work in groups to come up with a revision to the original theory (i.e., high self-esteem leads to positive outcomes) that accounts for both results. Without fail, at least one group revises the theory in a way consistent with research findings on self-esteem (i.e., high self-esteem leads to positive memory bias). Although I make up the data and the design specifics, the substantive message is based on findings from Baumeister, Campbell, Krueger, & Vohs (2003) in *Psychological Science in the Public Interest* (a thorough literature review on self-esteem).

Demonstration: Searching for Articles as Novices and Experts

Relevant Learning Objectives: 4, perhaps 3 depending on how you use it
Roughly Estimated In-Class Time: 10 minutes or more, depending on discussion
Class Size: any

While connected to the projection screen, open your institution's library catalogue and invite students to generate terms to search. Use common psychological terms like "attachment" or "cheating" to generate thousands of hits. Help students narrow results by refining the search terms. Use the same search terms in Scholar.google.ca to prompt awareness of the differences in the type of results.

It is useful to keep in mind the difference between what the expert sees and what the novice sees in the results. It's been my experience that acknowledging this gap can be helpful for students. For example, when I use this demonstration to search for peer reviewed articles about "eHarmony" online dating service (a topic we've previously explored using the Online Dating activity from Chapter 1), I first show the results from Google Scholar. I ask "what do you notice?" and students often start reading the titles. Then I note aloud that the first place I look is the source. The first entry is from "Journal of personality and …" which I know probably means the

top-tier journal “Journal of Personality and Social Psychology” so that entry catches my attention. The second two are Patents, so I’m not interested in them—I know that they’re not peer reviewed research. Then we switch over to PsycINFO and it becomes clear quickly the benefit to selecting “peer reviewed scholarly articles only” especially for novice learners. I try to remember to mention that I don’t expect them to see what I see right away, but these are the kinds of details that will be helpful to learn to detect. Until then, it’s going to be harder for them to find relevant sources than it is for experts.

Variations: inviting individual students or small groups of students to use their devices to conduct their own searches and report what they find; use as the opening demonstration to introduce the next Beyond the Classroom Activity or assignment; ask students to report at the end of the demo what they learned (one of the most common responses I get is an appreciation for PsycINFO’s search limiting ability); open the pdf of an article and show an example of each of the sections in the article and what information they can expect to find (or invite students to make predictions based on their readings about what they should be able to find in the different sections).

Beyond the Classroom Activity: Finding Journal Articles

Relevant Learning Objectives: 1, 3, 4
Estimated In-Class Time: none to 20 minutes or more, depending on how you use it
Class Size: any

Ask students to choose a topic and then search for past literature using *PsycINFO* or *Web of Science*. They should write down or print information on the author, title, date of publication, and so forth on each article. Finally, they should try to track down one of the articles. This is a good time to point out how important it is to follow your library's procedures for accessing articles using these databases; otherwise, it can be frustrating to search for articles that are accessible only for a price.

You may wish to choose the topic students are seeking. For example, you could build off of the Online Dating activity from Chapter 1, and direct students to find empirical articles testing the efficacy of such sites. Compare what articles they find using scholar.google.ca versus *PsycINFO* versus *Web of Science.*

This activity could be used as a graded, take-home assignment, an in-class activity, and/or a discussion starter. A possible handout with guiding questions for this exercise is included as Handout 1 in Part III of the instructor's manual.

In-Class Activity: Using a Reference Manager

Relevant Learning Objectives: 4

Roughly Estimated In-Class Time: 15 minutes or more, depending on choices
Class Size: any

Check with your institution's library system to find out about what online reference manager options are available for your students to use. Some examples of reference managers include Zotero, RefWorks, Mendeley, and EndNote. These services allow users to record and organize the reference and link to an article, some can generate APA style references for them, and some can allow sharing of folders to facilitate group work. These handy tools will help students learn to keep track of articles they find relevant to their search and also allow them to generate a reference page that follows APA style.

In class, there are many ways to share this type of resource. One might be to conduct a live demonstration of how a system like this works, perhaps in conjunction with earlier activities such as "Searching for Articles as Novices and Experts". This activity is also a great opportunity for a guest speaker. Your subject librarian might be delighted by the invitation to share strategies for finding articles and using reference managers with your class. An added bonus: the students get to meet an important person who can help them learn skills that now seem so straightforward and obvious to us academics!

Resources:
Koerner Library, University of British Columbia. Citation Management Support. http://koerner.library.ubc.ca/services/research-commons/citation-management/
PennState University Libraries. (October 2014). Choosing a citation manager. Retrieved from https://www.libraries.psu.edu/psul/lls/choose_citation_mgr.html
Comparison of reference management software. *Wikipedia*. https://en.wikipedia.org/wiki/Comparison_of_reference_management_software

In-Class or Beyond the Classroom Activity: Navigating a Database

Relevant Learning Objectives: 4
Roughly Estimated In-Class Time: none to 20 minutes or more, depending on how you use it
Class Size: any

Modify the following handout to fit your specific institutional library system, and perhaps topic area. You might also add questions that facilitate comparisons between academic databases and Google Scholar.

Library Activity

To complete this assignment, you must use the [ERIC, PsycINFO, LUIS, PubMed, etc] database

through our institution's library system. You might need to sign in, especially if you are accessing it from off campus. A link is available here: _____.

1. How many database entries are there with the keyword (key concept) *attachment*?
2. How many peer-reviewed journal articles have been published by someone with exactly the same last name as yours?
3. How many journal articles by *Philip Zimbardo* appear in the database?
4. How many journal articles by *David Buss* appear in the database?
5. How many database entries have the word *persuasion* in the title?
6. How many database entries are there with the subject *schizophrenia* that were published in 2004?
7. Since March, 2009, how many journal articles are there with the keyword *depression*?
8. How many database entries have both *schizophrenia* and *depression* as keywords?
9. How many database entries have *depression* as a keyword but not *schizophrenia* as a keyword?
10. How many database entries have *discrimination* as a keyword and the word *social* in the journal title?

Adapted from A. Janowsky, University of Central Florida (2009).

Reference Articles

Ault, R. (1999). What goes where? An activity to teach the organization of journal articles. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching statistics and research methods* (2nd ed.; pp. 230). New Jersey: Erlbaum.

Cameron, L. & Hart, J. (1999). Assessment of PsycLit competence, attitudes, and instructional methods. Pp. 157-161. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching statistics and research methods* (2nd ed.; pp. 230). New Jersey: Erlbaum.

Connor-Greene, P. A. & Greene, D. J. (2002). Science or snake oil? Teaching critical evaluation of "research" reports on the internet. *Teaching of Psychology, 29,* 321–324.

Joswick, K. (1999). Getting the most from PsycLit: Recommendations for searching. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching statistics and research methods* (2nd ed.; pp. 162-166). New Jersey: Erlbaum.

Marmie, W. R. (1999). Using an everyday memory task to introduce the method and results sections of a scientific paper. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching statistics and research methods* (2nd ed.; pp. 196-198). New Jersey: Erlbaum.

Merriam, J., LaBaugh, R. T., & Butterfield, N. E. (1999). Library instruction for psychology majors: Minimum training guidelines. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching*

statistics and research methods (2nd ed.; pp. 154-156). New Jersey: Erlbaum.

Poe, R. E. (1999). A strategy for improving literature reviews in psychology courses. In M. E. Ware & C. L. Brewer (Eds.), *Handbook for teaching statistics and research methods* (2nd ed.; pp. 167-168). New Jersey: Erlbaum.

Powner, L. C. (2006). Teaching the scientific method in the active learning classroom. *PS: Political Science and Politics, 39*, 521-524.

Sample Answers for Questions in the Text

Deepen Your Understanding Question

1. Think of at least five "commonsense" sayings about behaviour (e.g., "Spare the rod, spoil the child"; "Like father, like son"; "Absence makes the heart grow fonder"). For each, develop a hypothesis that is suggested by the saying and a prediction that follows from the hypothesis (based on Gardener, 1988.)

   A proverb or commonsense saying is "opposites attract" – the general hypothesis is that people with very different personality traits are more attracted to one another than are people with similar characteristics. A specific prediction might be that dating couples in which one person is highly dominant and the other low on dominance will be more attracted to one another than couples in which both people are similar in dominance. A list of such proverbs may be found at this website: *http://www.corsinet.com/braincandy/proverb.html*

2. Choose one of the hypotheses formulated in Activity Question 1 and develop a strategy for finding research on the topic using the computer database in your library.

   Students' answers will vary based on the selected hypothesis. Some students might create a list of key terms that they would use to find research studies. After that, students could perform a general search in the library's computer database using the proverb alone. Then, students could go through the search results and select articles that they think are related to the topic.

3. Recall that theories serve two purposes: (1) to organize and explain observable events and (2) to generate new knowledge by guiding our way of looking at these events. Identify a consistent behavior pattern in yourself or somebody close to you (e.g., you consistently get into an argument with your sister on Friday nights). Generate two possible theories (explanations) for this occurrence (e.g., because you work long hours on Friday, you're usually stressed and exhausted when you get home; because your sister has a chemistry

quiz every Friday afternoon and she's not doing well in the course, she is very irritable on Fridays). How would you gather evidence to determine which explanation might be correct? How might each explanation lead to different approaches to changing the behavior patterns (e.g., to increase or decrease their occurrence)?

Students' answers will vary, depending on the observable event. One option: students could make a list of observations that would help support or refute a particular explanation (this strategy could also reinforce concepts such as falsifiability, parsimony, and confirmation bias).

CHAPTER 2: WHERE TO START

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LEARNING OBJECTIVES

LO1. Describe the different sources of ideas for research, including questioning common assumptions, observation, practical problems, theories, and past research.

LO2. Identify the two functions of a theory

LEARNING OBJECTIVES

LO3. Summarize the information included in each of the sections of a research article

LO4. Compare and contrast different ways to find past research.

LO5. Discuss how a hypothesis differs from a prediction and a theory.

SOURCES OF IDEAS

- Questioning common assumptions; "common sense"
- Observations of the world around us *(serendipity)*
- Practical problems
- Past research
- Theories

THEORY

- A system of logical ideas proposed to explain a particular phenomenon
- Two functions
  - Organizes and explain observations
  - Generates new knowledge
- Can be modified by new research

ANATOMY OF A RESEARCH ARTICLE

- Abstract
- Introduction
- Method
- Results
- Discussion

ABSTRACT

- A summary of the research report
- 120 words or less
- Includes the hypothesis, procedure, and the broad pattern of results

INTRODUCTION

- Summarizes past research and relevant theories
- Outlines the problems investigated
- Hypotheses are introduced and connected to past research

METHOD

- Made up of subsections
  - Overview of design
  - Characteristics of *participants**
  - Procedure
  - Equipment or testing materials

RESULTS

Findings presented in three ways:

- Description in narrative form
- Description in statistical language
- Material in table or graphs

DISCUSSION

- Review research from various perspectives
- Present methodological weaknesses and/or strengths
- Explain how the results compare with past results

DISCUSSION

- Include suggestions for practical applications
- Include suggestions for future research on the topic

REFERENCES

- Throughout the paper, authors put a brief citation at the end of sentences
  - These give credit for ideas that are not the authors
- At the end, authors include a reference section that gives details of these papers

READING ARTICLES

- You do not always need to read the entire article
- Read the abstract plus whatever else you need to read
- What you need will vary depending on your goals

FINDING EXISTING RESEARCH

- *PsycINFO*
- Electronic index of all abstracts from 1800s
- Updated weekly
- See Appendix D of text for information on how to search *PsycINFO*

FINDING EXISTING RESEARCH

- *Web of Science*
  - Much broader
  - Allows a **cited reference search**

FINDING EXISTING RESEARCH

- Academic Search Complete
- Sociological Abstracts
- MEDLINE
- PubMeD
- ERIC

FINDING EXISTING RESEARCH

- Internet search engines such as *Google*
  - Allow a broader and easier search
  - Be careful that found information is credible

EVALUATING WEB INFORMATION

- Credible references
- Associations with reputable institutions
- Information of authors available
- Current information
- Links lead to legitimate institutions

FINDING EXISTING RESEARCH

- *Google Scholar*
  - Very broad search; difficult to stay specific
- *Wikipedia*
- See Table 2.2 in your textbook for summary of pros and cons of various search techniques

HYPOTHESES AND PREDICTIONS

- **Hypothesis**: a tentative question waiting for evidence to support or refute it
- **Prediction**: a prediction about what will occur in a particular research investigation
  - Supported versus proven
- **Falsifiability** – science only is concerned with hypotheses (and predictions) that can be proven wrong (if they are wrong)