Research Designs

Instructor Manual

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This unit helps students understand the way psychologists think about and answer questions. Instead of using intuition or instinct, we test research questions using a variety of empirical methods.

In this module, "Research Designs", students are exposed to the two most common research designs psychologists use: correlations and experiments. This module also introduces students to quasi-experimental designs, surveys, and longitudinal studies. Finally, the Research Designs module concludes with a discussion of the trade-offs between the different approaches to research design.

Learning Objectives

- Relevant APA Learning Objectives (Version 2.0)
    - Describe key concepts, principles, and overarching themes in psychology (1.1)
    - Describe applications of psychology (1.3)
    - Use scientific reasoning to interpret psychological phenomena (2.1)
    - Demonstrate psychology information literacy (2.2)
    - Engage in innovative and integrative thinking and problem solving (2.3)
    - Interpret, design, and conduct basic psychological research (2.4)
    - Apply ethical standards to evaluate psychological science and practice (3.1)
    - Apply psychological content and skills to career goals (5.1)

- Content Specific Learning Objectives: Research Designs
    - Understand the difference between correlational and experimental designs.
    - Understand how to interpret correlations.
    - Understand how experiments help us to infer causality.
    - Understand how surveys relate to correlational and experimental research.
    - Understand what a longitudinal study is.
    - Understand the strengths and weaknesses of different research designs.

Abstract

Psychologists test research questions using a variety of methods. Most research relies on either correlations or experiments. With correlations, researchers measure variables as they naturally occur in people and compute the degree to which two variables go together. With experiments, researchers actively make changes in one variable and watch for changes in another variable. Experiments allow researchers to make causal inferences. Other types of methods include longitudinal and quasi-experimental designs. Many factors, including practical constraints, determine the type of methods researchers use. Often researchers survey people even though it would be better, but more expensive and time consuming, to track them longitudinally.

Class Design Recommendations

The *Research Methods* unit is optimally taught over two class periods. This section of the course not only represents a fundamental aspect of the field of psychology, it also includes some of the terms and concepts with the highest levels of difficulty (Gurung & Landrum, 2014). Please also refer to the Noba PowerPoint slides that compliment this outline.

1st class period (50 min – 75 min):

- Overview
    - Why do we need research? Why is intuition insufficient?

- Correlations
    - Description of Basic Procedures: strength and direction
    - Limitations: Correlation is not causation

2nd class period (50 min – 75 min):

- Experimental Method
    - Concept definitions: operational definitions, independent variable, dependent variable
    - Description of Basic Procedures: control group, random assignment, experimental group
    - Considerations: placebo, confounding variable, participant demands, experimenter expectations
    - Application of Experiments
- Research Methods Considerations
    - Surveys: correlation or experiment
    - Quasi-Experimental designs
    - Longitudinal Studies
    - Understanding trade-offs (Under what circumstances might a correlation or survey be appropriate? An experiment?)

Module Outline

Research Designs

- One of the important steps in scientific inquiry is to test our research questions. However, there are many ways to test hypotheses in psychological research. Which of these methods you choose to use will depend on the type of questions being asked and the availability of

resources. Most psychological research can be divided into two types: experimental and correlational research. All methods have their strengths and limitations.

- The goal of this chapter is to introduce students to the different ways that psychological researchers answer questions. The bulk of the chapter is dedicated to explaining experiments and correlations, while other types of design, such as quasi-experiments, longitudinal studies, and surveys are briefly introduced.
- The chapter ends with an explanation of the trade-offs associated with the varying research designs as well as a discussion of why empirical research is important to the field.

Experimental Research

- Experiments are the first research design students are introduced to via a description of a happiness study (participants were given $20 and then told they had to spend the money by the end of the day. Some participants were told they must spend the money on themselves and some were told they must spend the money on others). The author then uses that experiment to introduce concepts such as operational definitions (i.e., how do we define happiness?), independent variables (i.e., spending choices), and dependent variables (i.e., happiness).
- The happiness experiment is also used to demonstrate the importance of random assignment in experiments – what if someone dropped their toast that morning and it ruined their whole day? The author uses that example to explain how random assignment makes it so that the groups *on average* are similar on all characteristics except what the experimenter manipulates. In closing, the author explains that random assignment is critical to experimentation because if the only way in which the two groups differ is on the independent variable, then we can make the inference that the independent variable is what causes any observable differences between the two groups.
- In the last part of this section, the author very briefly describes other considerations researchers must think through before running an experiment, such as, confounds (things that could undermine your ability to draw causal inferences), the placebo effect (knowing that one is getting special treatment or something new is sometimes enough to actually cause changes in human behavior), participant demand (participants try to behave in way that they think the experimenter wants), and experimenter expectations (experimenter inadvertently influences the outcome of the outcome of the study).

Correlational Designs

- Once students have read about and understand what an experiment is, the author explains that correlations are a way for scientists to passively observe and measure their phenomena (as opposed to manipulating variables, like in experiments). Further (and importantly!), when we use this method, we are able to see patterns that go together, but we usually cannot infer what causes what.
- After the basic overview described above, the chapter goes into more details about correlations. First, the author introduces students to scatterplots, a graphical representation of the relation between the scores on two variables. This helps students visualize the relationship between variables, which makes the strength and direction of correlations easier to understand (discussed next). In terms of direction, the author describes what positive and negative correlations are and how the variables relate to each other (e.g., as one increases, the other decreases). In terms of strength, the author talks about the absolute value of the correlation: the larger the absolute value, the stronger the correlation; the closer the absolute value is to zero, the weaker the correlation.
- Finally, the author wraps up the correlation section with the drawback of using correlations, such as the lack of causality (e.g., the relationship could be due to a third variable or the relationship could be opposite of what was proposed)

Quasi-Experimental Design

- What if we want to study an independent variable that cannot ethically or practically be manipulated (e.g., marriage status, gender, race, etc.)? In a Quasi-Experimental Design, we rely on existing group memberships (e.g., married vs. single), and we treat these as independent variables even though we did not assign people to those conditions and we did not manipulate those variables. The drawback is that causal inference is more difficult with quasi-experimental designs that with purely experimental designs.

Longitudinal Designs

- In Longitudinal Designs, we follow the same people over a longer period of time and measure them several times. This design approach provides valuable evidence for testing many theories in psychology, but they can be quite costly to conduct, especially if they follow many people for many years.

Surveys

- Surveys gather information by the use of questionnaires. Their main strength is that they can reach a larger audience and tend to be cheaper. Although surveys are typically used for correlational research, this is not always the case (surveys can be used in experiments)

Trade-offs in Research

- Every method has a set of trade-offs. Factors in selecting research method include whether or not the method appropriate to answer the research question and what resources (time and money) you have available for completing the study.

Research Methods: Why You Need Them

- The strength of a scientific finding lies in the strength of its methodology. Therefore, in order to be a savvy consumer of research, students need to understand the pros and cons of different methods and the distinctions among them.

Difficult Terms

Confounds
Correlation
Correlation Coefficient
Dependent Variable
Direction
Experimenter Expectations
Independent variable
Longitudinal Design
Operational Definitions
Participant Demand
Placebo Effect
Quasi-Experimental Design
Random Assignment
Scatterplot
Strength

Lecture Frameworks

Overview

What are your goals for teaching this class? One of the most important goals for Introductory Psychology is to help students become better consumers of research. We not only want to teach students the information, but we want to do so in a way that is useful for them. In many ways, research methods are a fundamental part of psychology. The more time we take to ensure students 'get it,' the better. Plus, since some students tend to have a bias about this unit (they tend to assume methods are boring) the more you can apply the material, the better!

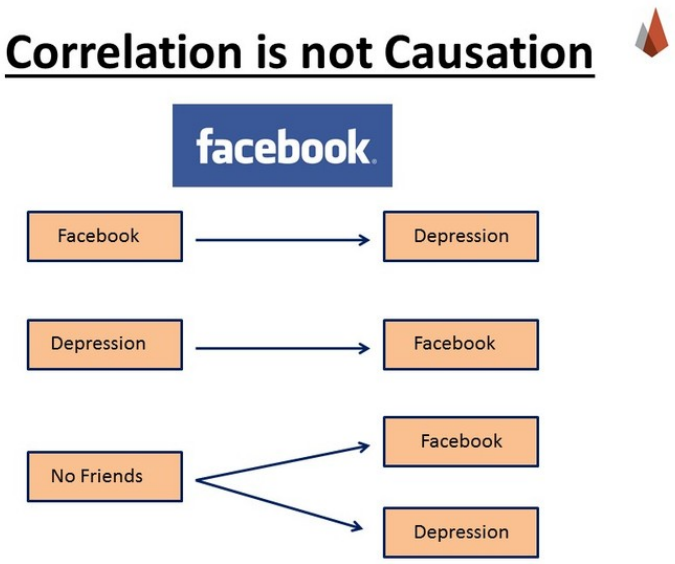
First Class Period:

Correlations

- Discussion/Warm-Up
    - Consider starting class off with examples of correlations that students might find stimulating or that captures their interest (e.g. the more educated a female is, the fewer children she is likely to have; The less time students spend on Facebook, the higher their grades tend to be; The more attractive you are, the more phone numbers you get).
- Lecture
    - Discuss relationships between variables. After giving them two variables and discussing how they are related (as in the examples above), you can explain that the relationships you were just talking about can actually be represented with a single number (the correlation coefficient). We like this order (examples before terms) because it helps students understand the concept behind correlations before you scare them with numbers (of course, not all students are scared of numbers, but many are!).
    - So the first piece of the number you can talk about is direction – that correlations can be positive or negative. Explain what this means and give them three examples of each. Next, talk about strength, making sure to emphasize that a negative number does not mean a weak correlation! Here, try to give them examples of strong correlations (e.g., as temperature drops, the number of clothes worn increases) and weak correlations (e. g., agreeableness and education). This can be tough for students, so try to give them lots of practice questions and examples!

- Activity – Practice Makes perfect
    - Allow students to take a turn practicing
- Additional Information
    - Once they get the hang of identifying the strength and direction of correlations, you can start on the *Correlation is NOT Causation* mantra. To begin, you can use the silly example of the relationship between ice cream sales and shark attacks (let them know that yes, this is a true correlation!). We then ask them if eating ice cream will make them more likely to be bitten by a shark. The students can correctly guess that no, eating ice cream will not make you more likely to be bitten by a shark; it is easy for them to figure out that both variables are being caused by warm summer temperatures. This example is a good way to start because the presence of a 3rd variable is so obvious, students can easily wrap their heads around it.
    - You can then use other, more difficult examples - examples where it's not necessarily intuitive if A causes B or if B causes A (or if there is a 3rd variable). To demonstrate how people get tricked by correlations, you can use an example found in a news article a few years ago, which claimed that Facebook caused depression in teenagers. The article cautions parents about the use of Facebook and other social media, even suggesting that parents have their kids suspend their accounts. We like using this article because it delivers two points – the first is that we have to be careful about the causal inferences we make, and the second is to be wary of how the popular press can twist research. You can start this discussion off by telling them a little about the research – researchers emailed teenagers with Facebook accounts and asked them two questions: How often do you feel depressed? How often do you use Facebook? After giving students this basic background, give them a few minutes to think about other possible explanations that could explain the relationship between Facebook use and depression. Inevitably, students always come up with alternative hypotheses (it might be that teenagers who experience depression try to fill the void with Facebook). You can also use this to more formally introduce the concept of third variables – an alternative hypothesis is that having no friends at school leads teenagers to feeling depressed and also to spend more time on Facebook (since they aren't spending time with friends). An example of the slide you can show in class is below.

Second Class Period



- Discussion/warm-up
    - You can start off experimental research by asking students a few questions: Can pills make you smarter? Is the newest trend in exercise (right now it's Cross Fit) more effective than other types of exercise? Is therapy effective in treating patients? Ask students these questions and then ask them *how* they know – are they guessing? Have they read research? This kicks off the discussion of experiments; we want know without a doubt that A causes B.
- Lecture
    - After your informal introduction, you can introduce students to independent and dependent variables. After explaining/defining what they are, go back and identify the IVs and DVs in all the questions you just asked them (e.g., in the first question, Pills are the IV and intelligence is the DV; in the second question, Cross Fit is the IV and health/weight/BMI is the DV; in the third question, therapy is the IV and patient success is the DV). This gets them starting to apply their newly learned definitions of the IV and DV. After they get the hang of identifying the IV and DV, make it a little more complicated – they have to brainstorm how they would manipulate the IV in each of the scenarios (e.g., we could test Cross Fit against weight lifting classes, cardio classes, water aerobics classes, etc.). This leads to the natural progression of talking about experimental groups vs. control groups. Because this begins to get confusing for students, we try to offer as

many examples as possible.

- Once they've mastered identifying IVs and DVs, start to explain how experiments provide us with causal inferences. Because they have already talked about independent variables, it's easy to talk about the importance of manipulating the independent variable. After that, you can follow up with random selection and assignment.

- Activity – Real World Data Collection
- Special Topic: Evaluating Research Methods in Popular Media

  - For many students, the topic of research methods can be quite dry – we can't think of any students that take Intro to Psychology because they want to learn about research methods (we are sure there are some students out there – we just haven't met them yet!). This can provide a challenge to instructors, especially new instructors. Therefore, to help make research methods more interesting, you should continually show the application of research methods. From a students' perspective, why should they care? Very few are going to go into research, so why is it important for them to learn about experiments, correlations, random assignment, etc.? This is where you come in! You can show them how research methods infiltrate everything we do – from the stories we see on the news to the best parenting practices.
  - SO….how do you get them interested? One way to help them understand how important the inferences we make from research are, we always incorporate current events and popular culture into class discussion and activities. For example, popular media is always making some sort of claim – Having friends makes you fat! Being single linked to obesity! People who chew gum more likely to want revenge! You get the idea…
  - As an instructor, you can use these [sometimes ridiculous] claims to your advantage. What better way to help students be better consumers of research than to talk about and let them practice evaluating popular press articles? Find a few articles that make claims based on research and have the class use what they have learned (causation, operationalization, random assignment, random selection generalizability, etc.) as criteria for evaluation. When evaluated, can we trust the claims the articles are making? What research methods did they use? Were those appropriate to answer their research question? What could the authors have done differently/better?

Activities & Demonstrations

Real World Data Collection: In or Out of Class Activity

This activity can be done during class or assigned as an out of class project/homework. In this activity, students answer one research question using different research methods.

Time60 minutes

MaterialsThorough directions, public location, paper, pen

DirectionsFirst, a research question must be selected by the students or assigned by you. The important feature of the research question is that it can be answered on campus with the student body available.

Some examples you might consider: Where do students prefer to buy their lunch on campus (campus dining, McDonalds, Panda Express, campus convenience store, etc.)? Do psychology students prefer to study alone or in groups? Are more students late to Psychology classes or Chemistry classes?

- Once the research question is selected/assigned, students (either alone or in groups) set out to answer that question using different research designs (e.g., create an experiment, use naturalistic observation, create a survey, etc.).
    - For the experiment, the students can just write it up (they don't need to execute it). They should identify the procedures (random selection and assignment, experimental and control groups, levels of the independent variable, etc.)
    - For the survey, they could give a 5-item survey to 10 people and collect the results (great way to practice mean, median, mode, etc. if you have included that)
    - For the naturalistic observation, have them spend 20 minutes observing behavior in the appropriate location (student center, library, etc.)
- Once they have completed the assignment individually or in groups, come back together as a class for discussion. Different groups will have differing operational definitions, proposed different experiments, asked different questions on the surveys, and possibly had different results.

Practice Makes Perfect: In-Class Activity

For this in-class activity, students are given practice scenarios and they apply what they have learned by identifying components of experiments, the strength and direction of correlations, and creating their own experiments.

Time10-15 minutes

MaterialsHandout

DirectionsStudents can work on this individually or in groups (your discretion). Handout the worksheet and give students sufficient time to complete the worksheet. Once students are done, you can go over the answers to make sure they understand the content.

Build a Study: In-Class Activity

For many students, this is their first exposure to correlation coefficients, independent variables, and other advanced terminology. Therefore, it's important that you give students a chance to practice what they have learned. For this in-class activity, students are divided into groups, given a research questions prompt (in this example: Does exercise improve mood?), and asked to design several different types of studies using the concepts learned in class and from the book.

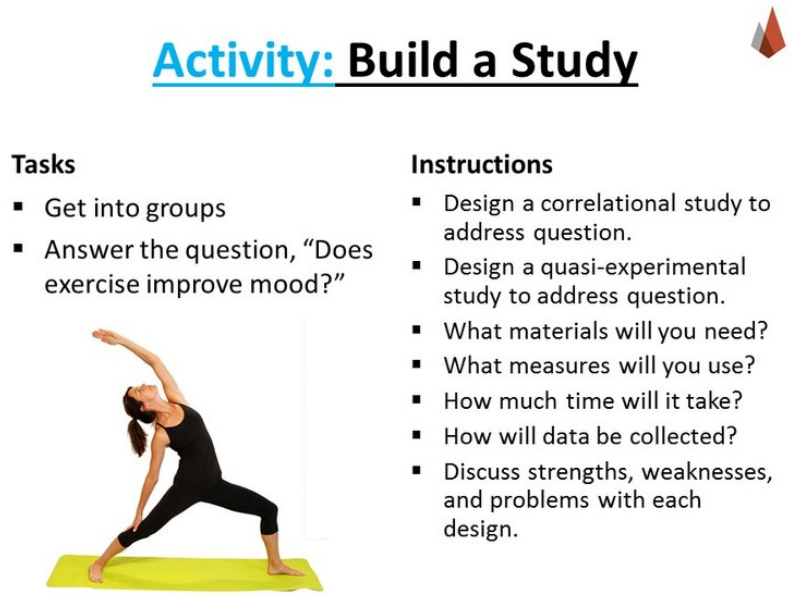
Time10-15 minutes

MaterialsResearch Designs class slides (pictured below)

DirectionsStudents can work on this individually or in groups (your discretion). Project the slide with directions on the overhead and give students sufficient time to complete the activity.

- Design a correlational study to address question
- Design a quasi-experimental study to address question
- What materials will you need?
- What measures will you use?
- How much time will it take?
- How will data be collected?
- Discuss strengths, weaknesses, and problems with each design.

- Once students are done, you can go over the answers to make sure they understand the content.



Additional Activities

Arnold, J. (1987). A consumer approach to teaching research methods in introductory psychology. In V. Makosky, L. Whittemore, A. M. Rogers (Eds.), *Activities handbook for the teaching of psychology,* Vol. 2 (pp. 20-22). Washington, DC, US: American Psychological Association.

- This author presents an approach to teaching research methodology that emphasizes critical thinking and the ability to evaluate research evidence. The emphasis is on the introductory psychology student, but the specific activities mentioned could also be used in conjunction with a research methods course. You must present statistical concepts before or in conjunction with this activity, and you will need to provide handouts that structure the critical analysis of the research. The appropriate class size is limited only by the number of two- or three-page papers you want to read. Students read the articles and write the papers outside class, with in-class discussion.

Boyce, T. E., & Geller, E. S. (2002). Using the Barnum effect to teach psychological research methods. *Teaching of Psychology*, 29, 316-318.

- The authors describe a class exercise based on the Barnum effect, to effectively demonstrate the importance of the scientific method. Although demonstrations of the

Barnum effect are popular, this article specifically illustrates how students' attitudes about pseudoscience change after receiving one-size-fits-all personality ratings, and then again after debriefing.

Burkley, E., & Burkley, M. (2009). Mythbusters: a tool for teaching research methods in psychology. *Teaching of Psychology*, 36, 179-184.

- This article describes how to use clips from the popular TV show, Mythbusters, to demonstrate the use of research methods in answering empirical questions. The authors discuss efficacy of the exercise as well as student enjoyment.

Carducci, B. J. (1990). Will class participation 'kill' you? Refuting a common irrational belief by teaching research methods. In V. Makosky, C. Sileo, L. Whittemore, C. P. Landry, M. Skutley (Eds.), *Activities handbook for the teaching of psychology,* Vol 3 (pp. 203-205). Washington, DC, US: American Psychological Association.

- This activity is an icebreaker that can be used with classes of any size at any level. It is a good activity to use on the first day of class. No prior knowledge is required of students and no advance preparation by the instructor is needed. The activity familiarizes students with several terms relevant throughout the course. This activity can also be used to introduce methodology. One of the biggest frustrations faced by those teaching large sections of psychology courses (e.g., introductory psychology) is getting students to overcome their apprehension about speaking up in class. The purpose of this activity is to present a demonstration designed to establish a norm of class participation during the first class meeting while introducing some basic principles of research methodology. On the basis of the irrational belief held by many students that speaking up in class will "kill" them, this demonstration uses a very simple pretest-posttest design to test in a rational manner this irrational belief right before the students' eyes.

Hall, S. S., & Seery, B. L. (2006). Behind the Facts: Helping Students Evaluate Media Reports of Psychological Research. *Teaching Of Psychology*, 33(2), 101-104. doi:10.1207/s15328023top3302_4

- This article describes an activity that can help students (a) understand how the research process influences the outcomes of that research and (b) appreciate the media's limitations of reporting research findings. Students read about research reported in an online newspaper and in a scholarly journal and responded to questions that guided their critique of the research methods and their comparison of the 2 sources. Quantitative and qualitative evaluations suggested that this activity can help students understand the impact of research procedures on a study's findings and to appreciate the limitations in the reporting

of such findings from mainstream media sources.

Hughes, A. (2008). The use of urban legends to improve critical thinking. In L. r. Benjamin (Ed.), *Favorite activities for the teaching of psychology* (pp. 139-140). Washington, DC, US: American Psychological Association.

- Critical thinking involves an assessment of how we determine the truthfulness of information we encounter. As they evaluate urban legends, this activity encourages students to think critically about the way they make decisions about truth. The activity can also be used to launch a discussion of the value various cultures place on ways of knowing. This is an out-of-class activity that involves all students and can be used with any size class.

Johnson, D. E. (1996). A 'handy' way to introduce research methods. *Teaching of Psychology*, 23, 168-170.

- This article describes a classroom activity that encourages students to think about the difference between correlation and causation, third variable issues, and interpretation of line graphs.

Leal, L. (2008). Experimental versus correlational research. In L. r. Benjamin (Ed.), *Favorite activities for the teaching of psychology* (pp. 20-21). Washington, DC, US: American Psychological Association.

- This activity is a vehicle for discussing the relations among experimental research, correlational research, and causal inferences at an introductory level. Students need a basic understanding of experimental and nonexperimental research methods, as well as positive and negative correlation coefficients. No advance preparation is needed, unless you wish to present the instructions for the research proposals as a handout or PowerPoint presentation. This is appropriate for any size of class and can be completed by students either in or outside of class.

Mitchell, M. L., & Jolley, J. M. (1999). The correlator: A self-guided tutorial. *Teaching Of Psychology*, 26(4), 298-299. doi:10.1207/S15328023TOP260410

- The authors describe a free Macintosh® program suitable for use in introductory psychology as well as more advanced classes such as statistics or research methods. The program, called the Correlator, helps students to distinguish between positive and negative correlation coefficients and to understand the differences between correlation coefficients of different sizes. The authors performed several small studies to assess whether the

Correlator aided student learning. In the first, 9 class members completed a voluntary, anonymous survey. Another study found that 28 students who completed the Correlator for extra credit scored higher on the subsequent exam. In another, 36 students who used the Correlator scored higher on the correlation questions than the no-Correlator class. It was concluded that students completing the Correlator better understand correlation coefficients.

Ward, R. A., & Grasha, A. F. (2002). Using astrology to teach research methods to introductory psychology students. In R. A. Griggs (Ed.), *Handbook for teaching introductory psychology*: Vol. 3: With an emphasis on assessment (pp. 197-199). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

- Describes a classroom activity designed to test an astrological hypothesis that can help teach introductory psychology students about research design and data interpretation. The activity illustrates differences between science and nonscience, the role of theory in developing and testing hypotheses, making comparisons among groups, probability and statistical significance, and the complications involved in interpreting research data.

Outside Resources

Article: Harker and Keltner study of yearbook photographs and marriage
http://psycnet.apa.org/journals/psp/80/1/112/

Article: Spending money on others promotes happiness. Elizabeth Dunn's research
https://www.sciencemag.org/content/319/5870/1687.abstract

Article: What makes a life good?
http://psycnet.apa.org/journals/psp/75/1/156/

Artilce: Rich Lucas's longitudinal study on the effects of marriage on happiness
http://psycnet.apa.org/journals/psp/84/3/527/

Evidence-Based Teaching

Bensley, D., Crowe, D. S., Bernhardt, P., Buckner, C., & Allman, A. L. (2010). Teaching and

assessing critical thinking skills for argument analysis in psychology. *Teaching Of Psychology*, 37(2), 91-96. doi:10.1080/00986281003626656

- Critical thinking is a valued educational outcome; however, little is known about whether psychology courses, especially ones such as research methods courses that might be expected to promote critical thinking skills, actually improve them. The resaerchers compared the acquisition of critical thinking skills for analyzing psychological arguments in 3 groups of research methods students, 1 getting critical thinking skills infused directly into their course and 2 other groups getting no explicit critical thinking skills instruction. They found that the group receiving explicit critical thinking skills instruction showed significantly greater gains in their argument analysis skills than the groups receiving no explicit critical thinking instruction. These results support the effectiveness of explicitly teaching critical thinking skills infused directly into regular course instruction.

Borshuk, C. (2006). Introducing Diverse Perspectives into Research Methods Classes. *Teaching Of Psychology*, 33(4), 256-258.

- Instructors of undergraduate research methods can introduce diverse perspectives into their courses through expanding learning units on research ethics to include extensive discussions on the responsibilities of the researcher. The author provides suggestions for teaching strategies that promote multiculturalism while avoiding a deficit research perspective.

Ciarocco, N. J., Lewandowski, G. R., & Van Volkom, M. (2013). The impact of a multifaceted approach to teaching research methods on students' attitudes. *Teaching Of Psychology*, 40(1), 20-25. doi:10.1177/0098628312465859

- A multifaceted approach to teaching five experimental designs in a research methodology course was tested. Participants included 70 students enrolled in an experimental research methods course in the semester both before and after the implementation of instructional change. When using a multifaceted approach to teaching research methods that included both active learning and a form of scaffolding, students reported a greater efficacy in APA style writing, a higher perceived utility of research and statistics, better attitudes toward statistics, and higher perceived skills/abilities in statistics. This approach benefitted students' perception of an often disliked subject area in psychology.

Manning, K., Zachar, P., Ray, G. E., & LoBello, S. (2006). Research methods courses and the scientist and practitioner interests of psychology majors. Teaching Of Psychology, 33(3),

194-196.

- This study examined the effects that exposure to research methodology coursework has on students' interests in scientist and practitioner activities. Consistent with previous research, there was a positive correlation between scientific and practitioner interests. Exposure to instruction in research methods was associated with a loss of interest in scientific activities even for students who had strong interests in scientific occupations.

Sizemore, O. J., & Lewandowski, G. r. (2009). Learning might not equal liking: Research methods course changes knowledge but not attitudes. *Teaching Of Psychology,* 36(2), 90-95. doi:10.1080/00986280902739727

- Students completed surveys at the beginning and end of a sophomore-level course on research and statistics. Researchers hypothesized that the course would produce advances in knowledge of research and statistics and that those changes would be accompanied by more favorable attitudes toward the subject matter. Results showed that knowledge did increase significantly, but 4 of 6 attitude measures showed no change. Two attitude measures (perceived utility of research and statistics) showed significant declines. These results demonstrate the independence of knowledge and attitudes and show that attitudinal change is not monolithic. Thus, students' misconceptions about research might underlie the declines in perceived utility of research and statistics.

Suggestions from the Society for Teaching's Introductory Psychology Primer

Good, J. J. (2013). Research Methods. In S.E. Afful, J. J. Good, J. Keeley, S. Leder, & J. J. Stiegler-Balfour (Eds.). Introductory Psychology teaching primer: A guide for new teachers of Psych 101. Retrieved from the Society for the Teaching of Psychology web site: http://teachpsych.org/ebooks/intro2013/index.php

POSSIBLE ASSESSMENTS (Out of Class)

Popular News Assignment:

- Students are tasked with finding a popular news report (print, radio, TV) of an empirical psychology study. Students must identify the research design (experimental or correlational), the hypothesis, operational definitions, and main conclusions. Finally, students are asked to think critically about possible third variables or biases that could limit the conclusions of the researchers. Sometimes students report difficulty in finding popular press reports of psychological studies, so be prepared to suggest possible sources (LO 2.2).

Mini-Research Project:

- For this assignment, instructors should compile a list of easily assessed quantitative variables (height, weight, GPA, number of Facebook friends, time spent studying, number of alcoholic drinks per week, etc.). Ask students to sample 10 people, collecting data on 2 variables of their choice. Students then must plot their data on a scatterplot and visually assess whether a correlation is present. In a brief paper, students must estimate the strength and valence of the correlation, as well as identify possible third variables that could be influencing the relationship (or lack thereof). Students could also discuss sampling issues, non-representativeness, etc. Students should then design an experimental study to test whether there is a causal relationship between the two variables assessed. The data collection part of this assignment is engaging for students, but the more difficult critique and research design portions may be frustrating for beginning psychology students. As an instructor, be sure to scaffold the assignment as needed (LO 1.1a, 1.3a, 2.2).

Belief in Popular Myths:

- For this short paper, students should pick a pseudo-scientific myth, perhaps from Lilienfield et al. (2009) or another similar source. Students should survey 10 people to assess their belief in the myth. In a short paper, students should present their results, use their critical thinking skills to dispel the myth, and discuss why scientific research is necessary. Students often come into class believing various pseudo-scientific myths, and this can be a good way to introduce the course and underscore the importance of scientific psychological research (LO 1.1a, 1.3a).

ACTIVITIES & TECHNIQUES (In Class)

Dueling Proverbs:

- This activity is based on an excerpt from David Myers' Social Psychology, 9th edition (2008)

in which Myers presents proverbs or common sayings that directly contradict each other. For example, he lists "birds of a feather flock together" and "opposites attract." Ask half of the class to close their eyes and show the remaining half one of the proverbs/sayings (this could be done using powerpoint or written lists could be passed out). Ask them to think about whether they agree with the saying. Next, switch and show the other half of the class the opposite proverb and again ask them to think about whether or not they agree. Finally ask the entire class to raise their hands if they agreed with the proverb they were shown. Generally the majority of the class raises their hands. After showing the entire class both proverbs, the instructor can begin a discussion about common sense vs. scientific findings, the importance of scientific research, etc. (LO 1.1a, 2.1).

- Myers, D. G. (2008). Social psychology (9th ed.). New York: McGraw Hill.

Guessing Correlations:

- Provide students with pairs of variables and ask them to guess the strength and valence of the relationships. For example, ask them to guess the correlation between age and height, weight and reading ability, temperature and thickness of jacket worn, number of churches and number of liquor stores in a town, etc. Instructors should provide a range of possible correlations, indicating positive, negative, and no relationship, as well as weak and strong relationships. If students indicate no relationship between 2 variables, ask them to imagine that there is a strong correlation and guess what third variable could be driving that correlation. For example, can you think of a third variable that could affecting both weight and reading ability? Depending on the tine allotted, instructors could also bring up linear versus curvilinear relationships, and the inability to determine direction with correlational research. This is a quick and easy activity to put together and can occupy as much or as little class time as you would like. The more creative the relationships between variables, the more fun students will have determining the nature of those relationships (LO 2.2).

Design Two Studies:

- To illustrate the difference between correlational and experimental research, yet demonstrate that most research questions are amenable to both types of design, break students up into small groups and give them a research question. Instructors can choose the practicality versus creativity of the prompts (e.g., "does caffeine improve studying?" versus "does moving in a zig-zag pattern increase your likelihood of outrunning a rhino?"). Students must come up with both an experimental and a correlational study to address the assigned research question. Depending on the scope of the lesson and time allotted,

instructors could also students to develop specific hypotheses, operational definitions of the relevant variables, etc.). If desired, students could discuss their ideas with the entire class or even engage in "pop presentations," in which students are given 5 to 10 minutes (and appropriate blackboard/easel space to draw) to create a brief presentation of their ideas. At first, students can be stumped if they have not yet 16 been exposed to much psychological research; circulate through the room and help student groups come up with initial ideas (LO 1.3a, 2.2).

Class IRB:

- Many instructors teach ethics in research methods by showing students classic studies in psychology that contain ethical questions (e.g., Milgram's studies, Stanford Prison Study, etc.). While these studies are exciting and can certainly foster good discussion, Intro Psych students may not yet have the background (in Week 2 of the course) to understand that those studies are not representative of typical current research methods. As an alternative, the instructor can create brief one-paragraph descriptions of research that have been "submitted" to an IRB. In groups, students can act as an IRB and evaluate each proposal, discuss the ethical considerations, and decide whether or not to approve the research. Depending on what issues the instructor would like to emphasize, the "proposals" could highlight issues of deception, un-informed consent, experimenter bias, undue stress to the participant, confidentiality of data, and even standards of care for lab animals. After students have discussed in groups, bring the entire class together as one large IRB and discuss whether to approve each proposal. This activity is more successful when the ethical issues in the scenarios are subtle enough to spark debate rather than clear ethical violations that leave little room for student discussion (LO 1.2e).

Links to ToPIX Materials

Activities, demonstrations, handouts, etc.:
http://topix.teachpsych.org/w/page/19981034/Research%20Methods%20in%20the%20Classroom

Current events/ news:
http://topix.teachpsych.org/w/page/23075273/Research%20Methods%20in%20the%20News

Video/audio:

http://topix.teachpsych.org/w/page/19981033/Research%20Methods%20Video

Teaching Topics

Teaching The Most Important Course
http://nobaproject.com/documents/1_Teaching_The_Most_Important_Course.pdf

Content Coverage
http://nobaproject.com/documents/2_Content_Coverage.pdf

Motivating Students
http://nobaproject.com/documents/3_Motivating_Students_Tips.pdf

Engaging Large Classes
http://nobaproject.com/documents/4_Engaging_Large_Classes.pdf

Assessment Learning
http://nobaproject.com/documents/5_Assessment_Learning.pdf

Teaching Biological Psychology
http://nobaproject.com/documents/6_Teaching_Bio_Psych.pdf

PowerPoint Presentation

This module has an associated PowerPoint presentation. Download it at http://nobaproject.com//images/shared/supplement_editions/000/000/109/Research%20Designs.ppt?1416603054.

About Noba

The Diener Education Fund (DEF) is a non-profit organization founded with the mission of re-inventing higher education to serve the changing needs of students and professors. The initial focus of the DEF is on making information, especially of the type found in textbooks, widely available to people of all backgrounds. This mission is embodied in the Noba project.

Noba is an open and free online platform that provides high-quality, flexibly structured textbooks and educational materials. The goals of Noba are three-fold:

- To reduce financial burden on students by providing access to free educational content
- To provide instructors with a platform to customize educational content to better suit their curriculum
- To present material written by a collection of experts and authorities in the field

The Diener Education Fund is co-founded by Drs. Ed and Carol Diener. Ed is the Joseph Smiley Distinguished Professor of Psychology (Emeritus) at the University of Illinois. Carol Diener is the former director of the Mental Health Worker and the Juvenile Justice Programs at the University of Illinois. Both Ed and Carol are award- winning university teachers.

Acknowledgements

The Diener Education Fund would like to acknowledge the following individuals and companies for their contribution to the Noba Project: The staff of Positive Acorn, including Robert Biswas-Diener as managing editor and Peter Lindberg as Project Manager; The Other Firm for user experience design and web development; Sockeye Creative for their work on brand and identity development; Arthur Mount for illustrations; Chad Hurst for photography; EEI Communications for manuscript proofreading; Marissa Diener, Shigehiro Oishi, Daniel Simons, Robert Levine, Lorin Lachs and Thomas Sander for their feedback and suggestions in the early stages of the project.

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R. Biswas-Diener & E. Diener (Eds), Noba Textbook Series: Psychology. Champaign, IL: DEF Publishers. DOI: nobaproject.com

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