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Science of Psychology

PSY W1001 Section 2
MW 8:40-9:55 Fall 2012

Wednesday, September 5

Course Introduction

Methods in Psychology

Are you ALREADY a psychologist?

- Test your knowledge of psychology with the following true/false questions.

- ***Don't worry – it's not graded!!***

True or False?

To change people's behavior toward members of ethnic minority groups, we must first change their attitudes.

True or False?

By feeling people's faces, blind people can mentally visualize how a person looks.

True or False?

Children memorize much more easily than adults.

True or False?

Unlike humans, the lower animals are motivated only by their bodily needs—hunger, thirst, sex, etc.

True or False?

"The study of the mind" is the best brief definition of psychology today.

True or False?

The more you memorize by rote (e.g., poems), the better you will become at memorizing.

True or False?

The best way to ensure that a desired behavior will persist after training is completed is to reward the behavior every single time it occurs throughout training (rather than intermittently).

True or False?

Fortunately for babies, human females have a strong maternal instinct.

True or False?

By giving a young baby lots of extra stimulation (e.g., mobiles and musical toys), we can markedly increase its intelligence.

True or False?

Psychiatrists are medical people who use psychoanalysis.

True or False?

The high correlation between cigarette smoking and lung cancer proves that smoking causes lung cancer.

True or False?

Genius is akin to insanity.

True or False?

In love and friendship, more often than not, opposites attract one another.

Truth or Consequences…..

- *So, let's grade that quiz…..*

Test your Knowledge of Psychology

- To change people's behavior toward members of ethnic minority groups, we must first change their attitudes.

- False
  - Behavior, and interaction with others changes attitudes. We will learn about attitude change, stereotyping and prejudice when we discuss social psychology

Test your Knowledge of Psychology

- Unlike humans, the lower animals are motivated only by their bodily needs—hunger, thirst, sex, etc.

- False
  - We will explore some interesting studies on non-human cognition as we discuss various cognitive processes like motivation, judgment, decision making and language.

Test your Knowledge of Psychology

- "The study of the mind" is the best brief definition of psychology today.

- False
  - Psychologists study
    - Mind: The private, inner experience
    - Behavior: Outward, observable actions
    - Brain: How does the action of the brain drive behavior
    - Do these always match? Not always…..

Test your Knowledge of Psychology

- The best way to ensure that a desired behavior will persist after training is completed is to reward the behavior every single time it occurs throughout training (rather than intermittently).

- False
  - Behavior is more persistent if it is rewarded only intermittently. We will discuss basic mechanisms of learning and behavior modification

Test your Knowledge of Psychology

- By giving a young baby lots of extra stimulation (e.g., mobiles and musical toys), we can markedly increase its intelligence.

- False
  - Although the marketing companies would like you to believe this, in fact a minimal amount of stimulation is sufficient for normal development. We will discuss what does, and what doesn't, influence intelligence.

Test your Knowledge of Psychology

- Psychiatrists are defined as medical people who use psychoanalysis.

- False
  - Psychiatrists are physicians (medical doctors) who specialize in mental disorders. Not all psychiatrists are trained in psychoanalysis. Not all psychoanalysts are physicians. We will discuss psychoanalysis, and other types of therapy, towards the end of the semester.

Test your Knowledge of Psychology

- The high correlation between cigarette smoking and lung cancer proves that smoking causes lung cancer.

- False
  - Correlation cannot prove causation!
    - More on this in a few minutes

Test your Knowledge of Psychology

- Genius is akin to insanity.
  - (in other words, the smarter you are the more likely you are to develop a mental illness.)

- False
  - Sensational examples do not indicate true prevalence rates.
    - This can be tested empirically…more on this in a minute.

In fact…..

- All of the statements are false.

- Psychology as a Science
  - What you believe to be true versus what you can empirically demonstrate
  - Applying objective criteria to understand, explain and predict behavior.

What is behavior?

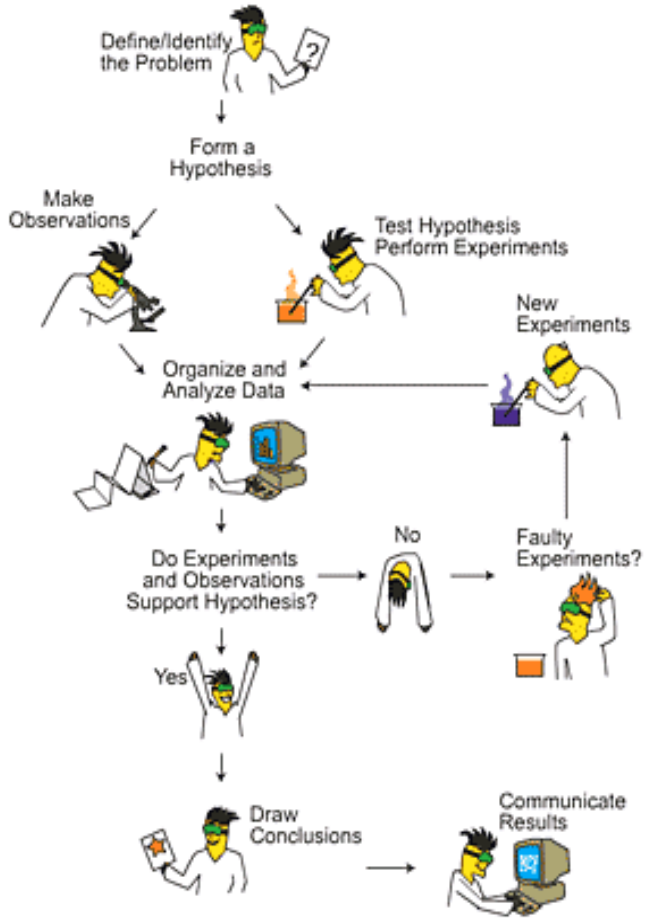
- Everything you do, choose, and think counts as behavior
  - What drives the choices you make and behaviors you perform?
  - Why are you here right now?
- Different perspectives within the discipline of psychology
  - From cells to cultural influences.

The Science of Psychology

- How can we become scientific about something we do every day?
  - Using the scientific method to study behavior.

Science is simply common sense at its best that is, rigidly accurate in observation, and merciless to fallacy in logic. Thomas Henry Huxley (1825-95)

Steps of The Scientific Method



- #1 - Observation
- #2 - Define Problem/Question
- #3 - Develop Hypothesis
- #4 - Gather Evidence to Test Hypothesis
- #5 – Retain or Reject Hypothesis
- #6 - Develop Theory

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Conducting research in psychology

- Asking questions about human behavior
  - Observation and questions
  - If you know the answer to the question I'm about to ask, please don't shout it out…..
- Observation:
  - A man walks into a bar and asks the bartender for a glass of water. The bartender smiles at the man, reaches under the bar, and pulls out a pistol. He aims the gun at the man. The man smiles, says thank you, and walks out of the bar.
- Question:
  - Why did the man thank the bartender?

Become a Scientist

- Observation:
  - A man walks into a bar and asks the bartender for a glass of water. The bartender smiles at the man, reaches under the bar, and pulls out a pistol. He aims the gun at the man. The man smiles, says thank you, and walks out of the bar.
- Question:
  - Why did the man thank the bartender?
- Develop your Hypothesis and Gather Evidence
  - Perform an experiment
    - Ask me a question I can answer with "Yes" or "No".
- Test the hypothesis based on the answer (results).
- Develop a theory

If you know this riddle please wait a few minutes before participating.

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What does good science require?

- Define your variables
  - Theoretical vs. operational definitions
- Validate your measure
- Internal and external validity
  - Are you really measuring your construct?
  - Is there any relationship to the "real world"?
- Don't bias your data
  - Observer biases
    - Pygmalion effect, Hawthorne effect
  - Selection biases

Developing a good hypothesis

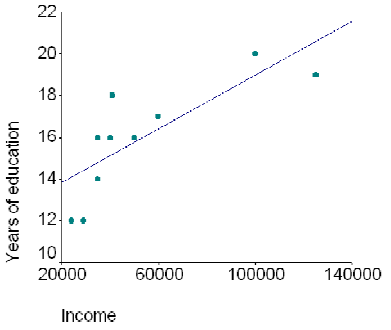
- Testable and Rejectable
  - "Druggies are bad people" is not a testable hypothesis
    - What defines "bad"? What defines "druggie"?
- Gathering data to test hypothesis
  - Objectivity is critically important
    - Methods of data collection affect interpretations
      - Experiments, correlation, case study, etc.

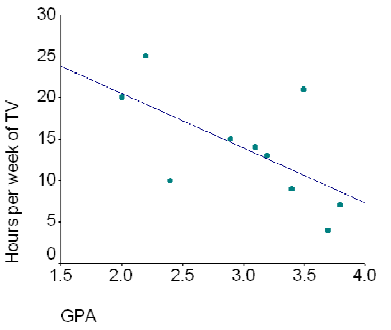
How to test your observations

- Correlations
  - Do two events change in a way that is **predicted** by one another?
    - There is a significant correlation between the amount of time you attend lectures and your grade.
  - Perfect correlation = 1.00 or -1.00
  - No correlation = 0

Positive vs. Negative correlations

- Positive (value between 0 and 1.00)
  - As one variable increases, so does the other
  - Example: years of education and income
- Negative (value between 0 and -1.00)
  - As one variable increases, the other decreases
  - Example: GPA and hours spent watching TV
- BUT….these aren't necessarily cause-and-effect.





Is Genius akin to insanity?

- How can you test this empirically?
  - Determine if mental illness and IQ are correlated
  - Measure the incidence rates of mental illness in people with a genius IQ and compare it to the incidence of mental illness in the general (non-genius) population.
    - Side note: there is no difference in incidence rates.
- Why do we think geniuses are "mad"?
  - Sensational cases
  - Human "errors" in decision making

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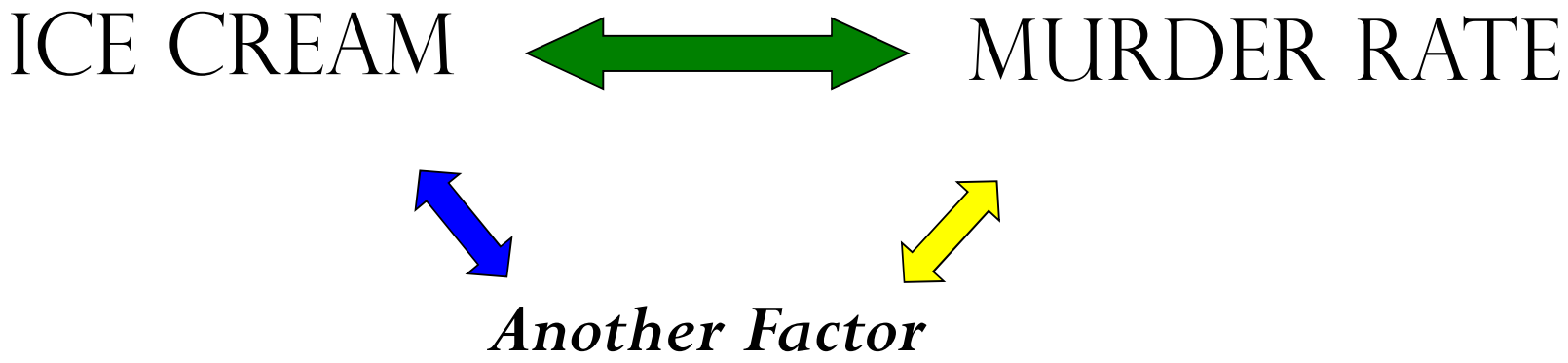
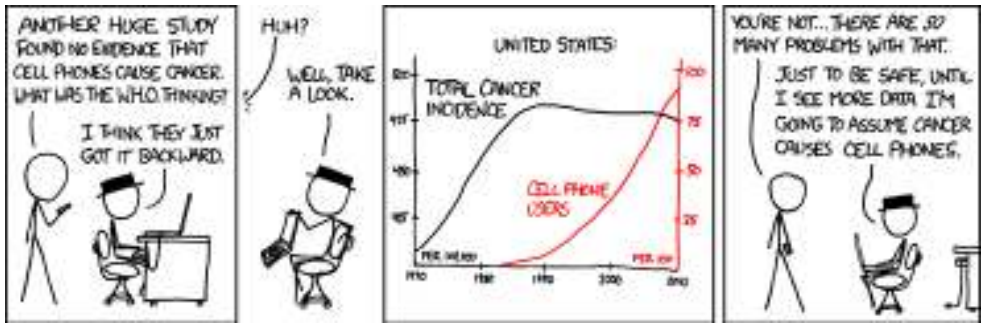
Correlations and Causation

- An increase in ice cream consumption predicts an increase in murder rates.
  - Does eating ice cream cause people to commit murder?
  - Does committing murder cause people to eat more ice cream?
  - Is there a third factor that may cause both?



Correlation vs. Causation

- Correlation does not infer causation
- Two variables/characteristics/behaviors may be correlated but that does not mean one causes the other.



http://xkcd.com/925

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So how do you determine causation?

- Experiments
  - Systematic manipulation of one or more variables
    - Random assignment to groups
    - Independent vs. dependent variables
      - Manipulation vs. measurement
- Can make cause-and-effect statements from the results of well designed experiments.
  - We will see several examples of experiments and correlations studies this semester.

Develop a Theory

- What makes a good theory
  - Predictions that can be tested
    - Especially predictions that may not be obvious
  - Ability to prove or disprove theory

- What happens when you can't disprove a theory?
  - Video Example

It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories instead of theories to suit facts. Sherlock Holmes

Science versus Pseudoscience

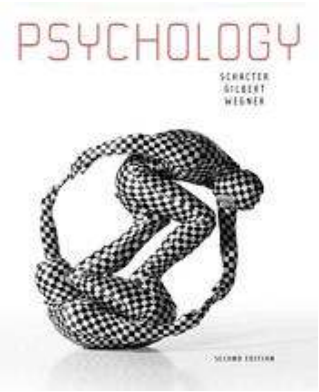
- Skepticism is healthy for scientists. Ask your own questions before accepting any claim.
  - How reliable is the source of a claim, and does that source make this claim often?
    - "The world will end on October 19th!"
  - Has the claim been *independently verified*?
  - Does the claim *fit* with our knowledge of how the world works?
  - What attempts have been made to *disprove* the claim?
    - Confirmation bias
  - *Where* does the evidence point? To the stated conclusion or another conclusion?
- Read more about healthy skepticism in "Baloney Detection" posted in Supplemental Readings folder on Courseworks

"Facts are useless, you can use facts to prove just about anything that is remotely true."

Homer Simpson

Stuff to know about this course

- Professor and TA's
  - Prof. Kathleen Taylor
  - TA's:
    - Matt Bailey, Abbee Cox, Kenzie Snyder, Marek Svoboda, Cait Williamson
  - Contact information is on Courseworks
- Required Materials
  - Schacter, Gilbert, Wegner (2011) *Psychology*
    - Available at the CU Bookstore, etc.
    - Two copies on reserve
    - Also online version is available for less $$
      - www.CourseSmart.com
  - Supplemental Readings on Courseworks



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How many psychologists does it take to change a light bulb?

Can I register for this class?

- If you are registered and want to stay, great – you're in!
  - Please initial attendance sheet so you won't be dropped.
- If you are NOT registered
  - Get on the waiting list
  - Priority for waiting list registration is as follows:
    - Post-bac students
    - Sophomores
    - Seniors needing science requirement
    - Everyone else
- Must attend lectures or you won't be given a spot.
- Overflow permissions will be signed Monday after lecture.
  - Bring the form with you.

More stuff

- Course Policies
  - 4 exams (90% of grade) 3 midterms + cumulative final
    - Lowest exam grade dropped.
    - YOU MUST take all 3 midterms, cumulative final is optional if you are satisfied with your course grade at the end of the semester.
    - If you have a dire emergency you **might** be excused from an exam. ***Unexcused exam absence has dire consequences!!***
  - Written Assignment (5%)
    - Critique a popular report of a psychological finding
  - Experimental Participation (5%)
    - More information coming soon, and will be posted on Courseworks
  - Important Information Posted on Courseworks
    - PLEASE READ EVERYTHING!!
- Courseworks
  - All information found here
    - Semester will be as paperless as possible

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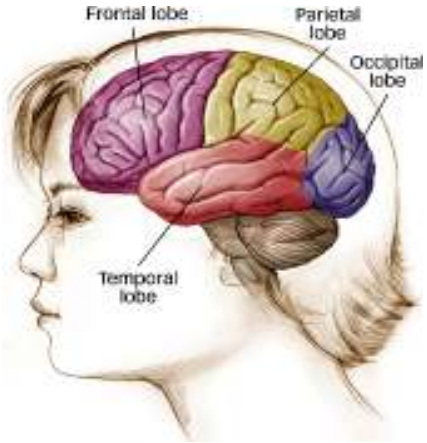
Only one, but the light bulb has to want to change.

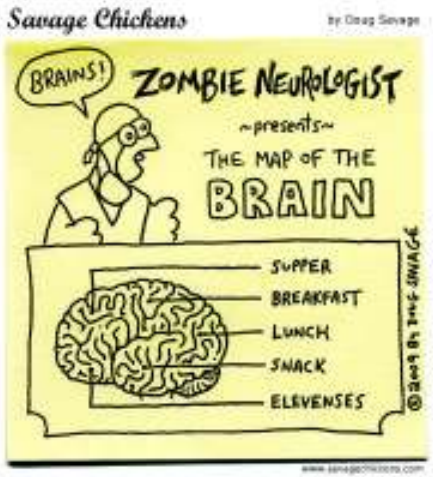
Studying for this course

- Best advice
  - Attend lectures
    - Can't stress this enough. Be here. Or get notes. Better to be here.
  - Use study questions
    - Posted on Courseworks (on chapter material) at the end of the lectures (for lecture material)
  - Keep up with readings, both text and supplements
  - Ask questions
    - In class, after class, during office hours or via e-mail.
  - Get help as soon as you think you need it
- *Text reading covered so far …*
  - Chapters 1 and 2

Next Time

- Neuroscience and Behavior
  - Chapter 3 in text





See you on Wednesday!!

If you have questions for me please email me – I have to dash off to a talk right now……

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Study Questions

- Is genius akin to insanity? Why or why not? Be specific about the methods that can be used to answer this question
- What is behavior?
- Describe the 6 steps of the scientific method discussed in lecture. Use these 6 steps to explain how you would test an observation you have made in your daily life.
- What does good science require?
- Describe some of the common ways research can be biased and how to avoid those biases.
- What makes a good hypothesis?
- What is the main difference between a correlation and an experiment?
- Give some examples (not from the text or lecture) of things that might be positively or negatively correlated.
- Why can't you infer causation from a correlation?
- What I the third variable problem? When is t important to keep this in mind when doing research?
- What are the characteristics of an experiment and how do these differ from a correlation study?
- Why is random assignment to groups important in experiments?
- Describe independent vs. dependent variables. Practice identifying each from examples of experiments.
- What is an operational definition? Give an example of a concept and it's operational definition.
- Compare and contrast internal and external validity. Give examples of each.
- Using the example of therapeutic touch (from the video shown in lecture) describe confirmation bias.
- What makes a good theory? Explain how the confirmation bias can result in bad theories.
- What are the 10 questions that a skeptical scientist should ask before accepting any claim? Why is each important? (Note: You will need to read the supplemental readings to answer this question.)
- See Chapter Study Guides (Chapters 1 and 2) for additional questions.