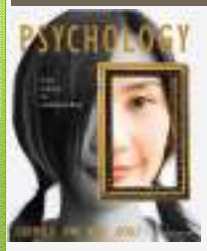
Psychology:
From Inquiry to Understanding



Chapter One

Psychology & Scientific Thinking: A Framework for Everyday Life

Lecture Preview

- What is psychology?
- Psychological pseudoscience
- Scientific thinking
- Psychology's past and present
  - Let's see what do you know about psychology a little bit ☺
  - Then watch a video ☺

True or False?

Most people use only about 10% of their brain capacity.

Hypnosis enhances the accuracy of our memories.

People tend to be romantically attracted to individuals who are opposite to them in personality and attitudes.

The lie detector is test is 90 to 95 percent accurate.

The more people present at an emergency, the more likely it is that at least one of them will help.

People with schizophrenia have more than one personalities.

All effective psychotherapies require clients to get to the roots of their problems in childhood.

- Explain why psychology is more than just common sense...
- Explain the importance of science as a set of safeguards against biases.
  - Let's see what Lilienfeld thinks about it ☺

What is psychology?

- First off, it's not very easy to define.
- Our definition will be that psychology is **the scientific study of the mind, brain, and behavior.**
- As a discipline, psychology spans many **levels of analysis**
  - Runs from biological to social influences

What is psychology?

- **Levels of analysis**
  - Rungs on a ladder of analysis, with lower levels tied most closely to biological influences and higher levels tied most closely to social influences.
  - Why are you enrolled to the department of psychology?
    - Answers to questions like why you become angry or you fall in love?

We can't understand psychology by focusing on only one level of analysis – but instead by examining *all* of them

Each of these panels from everyday life poses a different psychological question: (1) Why do we fall in love? (2) Why do some of us become depressed for no apparent reason? (3) What makes us angry? Although the science of psychology doesn't provide easy answers to any of these questions, it does offer valuable insights into them.

Figure 1.1 Levels of Analysis in Depression. We can view psychological phenomena, in this case the disorder of depression, at multiple levels of analysis, with lower levels being more biological and higher levels being more social. Each level provides us with unique information and offers us a distinctive view of the phenomenon at hand. (*Source: Adapted from Ilardi, Rand, & Karwoski, 2007*)

I say....
Studying Psychology is Challenging and Fascinating

Why do you think it is so?

Psychology may not be one of the traditional "hard sciences," like chemistry, but many of its fundamental questions are even harder to answer.

In the museum of everyday life, causation isn't a one-way street. In conversations, one person influences a second person, who in turn influences the first person, who in turn influences the second person, and so on. This principle, called *reciprocal determinism*, makes it challenging to pinpoint the causes of behavior.

Challenging and Fascinating

- Five factors make the study of psychology very difficult, but very rewarding.

1. Human behavior is difficult to predict.
   - Actions are multiply determined. (But popular psychology usually offer single factor explanations).
2. Psychological influences are rarely independent of each other.
3. Individual differences among people

Challenging and Fascinating

Psychological influences are rarely independent of each other.

- Reasons of developing anorexia nervosa
  - Perfectionism
  - Anxiety proneness
  - Excessive concern with the body image
  - Exposure to tv programs that feature thin models
  - Excessive exercise

Challenging and Fascinating

Individual differences among people

- Why two different people react to the same behavior in totally different manner?
- Can you come up with examples from your own life?

Difficult to come up with explanations of behavior that apply to everyone.

Challenging and Fascinating

4. People influence one another
   - Reciprocal determinism

5. Behavior is shaped by culture

   Give me examples of differences in people's behaviors that you think they depend on cultural differences.
   - Emic vs. etic approaches

In a study by Chua, Boland, and Nisbett (2005), European Americans tend to focus more on the central details of photographs, like the tiger itself (top), whereas Asian Americans tend to focus more on the peripheral details, like the rocks and leaves surrounding the tiger (bottom).

Challenging and Fascinating

- Emic vs. etic approaches
- Emic: study the behavior of a culture from the perspective of a native or insider.
  - May better understand the unique characteristics of that culture but may overlook similarities between cultures.
- Etic: study the behavior of a culture from the perspective of an outsider.
  - Unintentionally impose perspective from one culture onto others.
  - An example?

Common Sense

Most of us trust our gut intuitions about how the world works.

Birds of a feather flock together. ⟷	Opposites attract.
Absence makes the heart grow fonder. ⟷	Out of sight, out of mind.
Better safe than sorry. ⟷	Nothing ventured, nothing gained.
Two heads are better than one. ⟷	Too many cooks spoil the broth.
Actions speak louder than words. ⟷	The pen is mightier than the sword.

Even though each of these ring true, they are in fact opposites!

Why are marriages like that of Mary Matalin, a prominent conservative political strategist, and James Carville, a prominent liberal political strategist, rare?

Intuition vs. Science

- Common sense can be very useful for some purposes, but it's sometimes completely wrong
- Our intuitive understanding of the world and ourselves is sometimes wrong
- We can't always trust our own judgment, or the judgment of others

Naïve Realism

- The belief that we see the world precisely as it actually is in truth – "seeing is believing"
- Works well in ordinary life, but consider:
  - The earth *seems* flat
  - We *seem* to be standing still, yet the earth is moving around the sun 18.5 miles/sec
- Our beliefs shape our perceptions

Which table is longer?

These two tabletops are identical in length.

When Common Sense is Right.

- Not all common sense is wrong.
- Common sense should serve as a generator for *hypotheses,* which can then be tested.
- But learning to think like a scientist means learning when—and when not—to trust our common sense.

Psychology as a Science

- Science is *not* a body of knowledge (e.g. chemistry or physics).
- Science is an *approach* to evidence, one designed to keep us from fooling ourselves.
- Science begins with *empiricism*, the premise that knowledge should initially be acquired through observation, but then tests those observations using rigorous methods.

Psychology as a Science

- In psychology (and all science) we must abandon relying on opinions.
- Instead we find out which explanations best fit the evidence or data.

Theories and Hypotheses

- A scientific theory is an explanation for a large number of findings in the natural world.
  - Offers an account that ties multiple findings together into one pretty package.
  - Does not account only for existing data, but also generate predictions regarding new data we haven't yet observed. Must generate novel predictions that researchers can test.
  - Do you know a theory that is mostly criticized as not being a theory in fact? ☺
- A hypothesis is a specific prediction based on a theory, which can then be tested.
- Theories are general explanations, hypotheses are specific predictions derived from them.

Theory Misconceptions

"A theory explains one specific event"

"A theory is just an educated guess"

Why are these both **wrong**?

Some creationists have argued that evolution is "just a theory." Cobb County, Georgia, briefly required high school biology textbooks to carry this sticker (Pinker, 2002).

This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered.

Approved by
Cobb County Board of Education
Thursday, March 28, 2002

Arthur Darbishire (1879–1915), a British geneticist and mathematician. Darbishire's favorite saying was that the attitude of the scientist should be "one of continual, unceasing, and active distrust of oneself."

Figure 1.3 Diagram of Wason Selection Task. In the Wason selection task, you must pick two cards to test the hypothesis that all cards that have a vowel on one side have an odd number on the other. Which two will you select?

Here are four cards. Each of them has a letter on one side and a number on the other side. Two of these cards are shown with the letter side up, and two with the number side up.

E C 5 4

Indicate which of these cards you have to turn over in order to determine whether the following claim is true:

If a card has a vowel on one side, then it has an odd number on the other side.

Science as a Safeguard against Bias

- **Confirmation bias** - tendency to seek out evidence that supports our hypothesis and neglect or distort contradicting evidence
- Scientists need to design studies that may *disprove* their theories

Here are four cards. Each of them has a letter on one side and a number on the other side. Two of these cards are shown with the letter side up, and two with the number side up.

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Science as a Safeguard against Bias

- **Confirmation bias** - tendency to seek out evidence that supports our hypothesis and neglect or distort contradicting evidence
- Mother of all biases.
- Psychological scientists vs. Nonscientists.

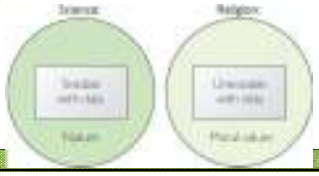
HOW DOES CONFIRMATION BIAS EFFECT OUR DAILY LIVES? WHAT DO YOU THINK ABOUT SCIENTIFIC FINDINGS REGARDING THIS ISSUE?

Science as a Safeguard against Bias

- **Belief perseverance** - tendency to stick to our initial beliefs even when evidence contradicts them
- The "don't confuse me with the facts" bias
- Why?
- Ross et al.'s suicide notes study.

Metaphysical Claims

- Non-testable assertions fall outside the realm of science
  - The existence of God, the soul, or the afterlife
- Does not mean that those questions are unimportant or do not deserve respect but...



We Might Be Wrong

- Good scientists are aware they might be wrong.
- Scientific knowledge is always tentative and open to revision.
- Science forces us to question our findings and conclusions.
- Bits of information, we acquire knowledge through science very slowly.
- Science as a prescription for humility.
- Good scientists never claim to «PROVE» their theories.
- In writings → Supports, suggests, appears that, ...


Seattle Post-Intelligencer

Breast self-exams questioned

Frequently, newspapers present headlines of medical and psychological findings, only to retract them weeks or months later. How can we know how much trust to place in them?

Popular Psychology

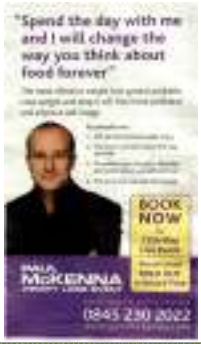
- Misinformation explosion.
- About 3,500 **self-help** books are published each year – only 5% are tested!
- The quality of the information can be good, misleading, or even dangerous
- The Internet offers easy, quick information, but quality is often questionable

What is Pseudoscience?

- A set of claims that seem scientific, but aren't.
- Pseudoscience lacks the safeguards against confirmation bias and belief perseverance that characterize science.
- Testable beliefs that are *not* supported by the evidence.
- 41% - extrasensory perception, over 30% - hounted houses, 25% - astrology.

Pseudoscientific and otherwise questionable claims have increasingly altered the landscape of modern life.

Which of these claims is metaphysical and which is probably pseudoscientific?



Warning Signs of Pseudoscience

- Ad hoc immunizing hypothesis
  - Escape hatch to protect against falsification, usually a loophole or exception for negative findings.
  - **Let's see a video ☺**
- Lack of self-correction
  - E.g. Dooms day believers.
- Overreliance on anecdotes
  - Anecdotes are often not representative, can't tell us about cause and effect and are often difficult to verifty.

Why pseudoscience?

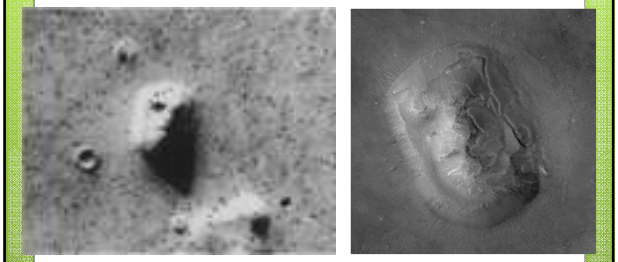
- Our brains are predisposed to make order out of disorder and make sense out of nonsense.

The search for Meaningful connections:

- Apophenia is when we find connections among unrelated or random phenomenon.
- Pareidolia is seeing meaningful images in meaningless visual stimuli.

Conspiracy theories are manifestations of apophenia. Believers in conspiracies often claim to detect hidden interconnections among powerful people and institutions.

The "Face" on Mars



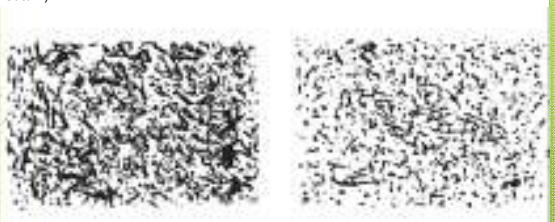
Original photo

Higher resolution photo

Why pseudosciene?

- Finding comfort in Our Beliefs: We believe what we want to believe.
- Many pseudoscientific beliefs offer control over an uncontrollable world.
  - Whitson and Galinsky's (2008) deprivation of control study ☺
- Terror management theory and manipulating mortality salience.

Figure 1.6 Regaining Control. Do you see an image in either of these pictures? Participants in Whitson and Galinsky's (2008) study who were deprived of a sense of control were more likely than other participants to see images in both pictures, even though only the picture on the right contains an image (a faint drawing of the planet Saturn).



Thinking Clearly

- Learning to think scientifically can help us avoid falling prey to pseudoscience.
- **Emotional reasoning fallacy (affect heuristic)** —using emotions rather than evidence as the guide.
- **Bandwagon fallacy**—lots of people believe it so it must be true.
- **Not Me fallacy**—other people may have those biases, but not me.
  - Bias blind spot: most people are unaware of their biases but keenly aware of them in others ☺

Table 1.5 Logical Fallacies to Avoid When Evaluating Psychological Claims.

LOGICAL FALLACY	EXAMPLE OF THE FALLACY
Error of using our emotions as guides for evaluating the validity of a claim (emotional reasoning fallacy)	"The idea that day care might have negative emotional effects on children gets me really upset, so I refuse to believe it."
Error of assuming that a claim is correct just because many people believe it (bandwagon fallacy)	"Lots of people I know believe in astrology, so there's got to be something to it."
Error of framing a question as though we can only answer it in one of two extreme ways (either-or fallacy)	"I just read in my psychology textbook that some people with schizophrenia were treated extremely well by their parents when they were growing up. This means that schizophrenia can't be due to environmental factors and therefore must be completely genetic."
Error of believing we're immune from errors in thinking that affect other people (not me fallacy)	"My psychology professor keeps talking about how the scientific method is important for overcoming biases. But these biases don't apply to me, because I'm objective."

LOGICAL FALLACY	EXAMPLE OF THE FALLACY
Error of accepting a claim merely because an authority figure endorses it (appeal to authority fallacy)	"My professor says that psychotherapy is worthless because I trust my professor, she must be right."
Error of confusing the correctness of a belief with its origins or genesis (genetic fallacy)	"Freud's views about personality development can't be right because Freud's thinking was shaped by sexist views popular at the time."
Error of assuming that a belief must be valid (or because it's been around for a long time (argument from antiquity fallacy)	"There must be something to the Rorschach Inkblot Test, because psychologists have been using it for decades."
Error of confusing the validity of an idea with its potential real-world consequences (argument from adverse consequences fallacy)	"IQ can't be influenced by genetic factors, because if that were true it would give the government an excuse to prevent low-IQ individuals from reproducing."

LOGICAL FALLACY	EXAMPLE OF THE FALLACY
Error of assuming that a claim must be true because no one has shown it to be false (appeal to ignorance fallacy)	"No scientist has been able to explain away every reported case of ESP, so ESP probably exists."
Error of inferring a moral judgment from a scientific fact (naturalistic fallacy)	"Evolutionary psychologists say that sexual infidelity is a product of natural selection. Therefore, sexual infidelity is ethically justifiable."
Error of drawing a conclusion on the basis of insufficient evidence (hasty generalization fallacy)	"All three people I know who are severely depressed had strict fathers, so severe depression is clearly associated with having a strict father."
Error of basing a claim on the same claim reworded in slightly different terms (circular reasoning fallacy)	"Dr. Smith's theory of personality is the best, because it seems to have the most evidence supporting it."

Why should we care?

- Because pseudoscience can be very dangerous.
- Three major reasons to be concerned.
  - Opportunity cost: What we give up.
  - Direct harm
  - Inability to think scientifically
- Although not foolproof, scientific thinking is our best safeguard against human error.

Candace Newmaker was a tragic victim of a pseudoscientific treatment called rebirthing therapy. She died of suffocation at age 10 after her therapists wrapped her in a flannel blanket and squeezed her to simulate birth contractions.

You'll probably forget many of the things you'll learn in college. But you'll be able to use the approach of scientific skepticism throughout your life to evaluate claims. (© Science CartoonsPlus.com)

Scientific Skepticism

- Being scientifically skeptical does not mean being close-minded.
- Evaluate claims with an open mind, but insist on persuasive evidence before accepting them.
- Skeptics are willing to change their minds, but must have good evidence before doing so.

The license plate of the state of Missouri captures the central motto of scientific skepticism.

Scientific thinking involves ruling out rival hypotheses. In this case, do we know that this woman's weight loss was due to a specific diet plan? **What might be some alternative explanations for her weight loss?**

Answer: During this time, she might have exercised or used another diet plan. Or perhaps, the larger pants she's holding up were never hers to begin with.

Critical Thinking

- A set of skills for evaluating all claims in a open-minded and careful fashion.
- This allows us to overcome our own biases (especially the confirmation bias).
- Six critical thinking principles will be emphasized in this course.

Critical Thinking Principles

- Ruling out rival hypotheses
  - Have important alternate explanations for the finding been considered?
- Correlation vs. causation
  - Can we be sure A causes B?
  - Sexual lyrics, sexual intercourse behavior (or a C variable).
- Falsifiability
  - Can the claim be disproven?
  - A theory that can explain everything indeed explains nothing. (A psychic's explanation about your child's sex).

Critical Thinking Principles

- Replicability
  - Can the results be duplicated in other studies?
- Extraordinary Claims
  - Is the evidence as convincing as the claims?
- Occam's razor
  - Does a simpler explanation fit the data just as well?
  - The principle of parsimony – logical simplicity
  - If two explanations account equally well for explaining a phenomenon, choose the simpler one! (shave off the needlessly complicated explanations).
  - KISS – Keep it simple, stupid ☺

Figure 1.7 The Six Principles of Scientific Thinking That Are Used Throughout This Textbook.

Correlation isn't always causation. (Family Circus © Bil Keane, Inc. King Features Syndicate)

Psychology's Early History

- For many centuries, psychology was indistinguishable from philosophy (even the METU example ☺).
- No research, talking from the armchair.
- In 1879, William Wundt developed the first psychology laboratory in Leipzig, Germany.
  - How different must two colors be for us to tell them apart? How long does it take to react to a sound?
  - Method of introspection – requires trained observers to carefully reflect and report on mental experiences (reaction time procedures).
- But psychology had to break away from another influence as well—spiritualism.

Psychology's Early History

- But psychology had to break away from another influence as well—spiritualism.
- Psychology means the study of psyche – spirit or soul.
- Search for paranormal capacities of mediums.
- Separated itself by creating a new field: the psychology of human error and self-deception: how people can fool themselves into believing things that are not supported by evidence ☺

From Séance to Science

- In the 1800's, Americans were obsessed with spiritualism and mediums
- The public saw psychology and spiritualism as inextricably linked
- Psychologists investigated spirit mediums and psychics, finding only fakery and fraud

Great Theoretical Frameworks

- What unifying theoretical perspective best explains behavior?
- Five primary schools of thought have shaped modern psychological responses to this question.

Great Theoretical Frameworks

Structuralism

- Major figures were **Wundt** and E.B. Titchner
- Aimed to identify the most basic elements or structures of psychological experience
- «what?» question

Great Theoretical Frameworks

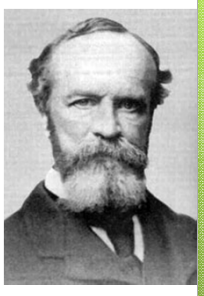
Structuralism

- Two major problems killed structuralism:
  - Even highly trained introspectionists often disagreed on their subjective reports
  - Oswald Kulpe: Imageless thought (thinking accompanied by unconscious experience).

Great Theoretical Frameworks

Functionalism: Psychology meets Darwin

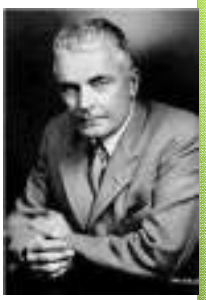
- Major figure was **William James**, heavily influenced by Charles Darwin
- Principles of Psychology (1890)
- Hoped to understand the adaptive purposes of psych characteristics
- «why?» question



Great Theoretical Frameworks

Behaviorism

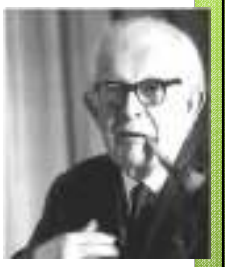
- Major figures were **Watson** and Skinner
- Focuses on uncovering the general laws of learning by looking outside the organism
- Mind is a black box
- Psychology should deal only with observable behavior, inputs and outputs, not the process in the black box.



Great Theoretical Frameworks

Cognitivism

- Major figures were **Piaget** and Neisser
- Focuses on the mental processes involved in different aspects of thinking
- Interpretation of rewards and punishments is the determinant of our behavior.
- We learn not only by rewards and punishments but also by insight: grasping the underlying nature of the problems.
- Cognitive and affective neuroscience

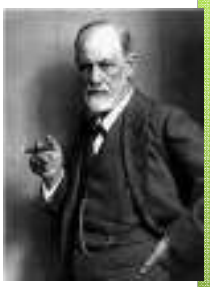


Two students may react to the same grade on a test—say a B+—in markedly different ways. One may be pleased, the other disappointed. Cognitive psychologists would say that these differing reactions stem from the students' differing interpretations of what these grades mean to them.

Great Theoretical Frameworks

Psychoanalysis

- Major figures were Freud and Jung
- Focused on internal psychological processes of which we're unaware
- Two drives: sexuality and aggression
- Decoding symbols
- Slip of the tongue – Freudian slip
- Infant and childhood experience



The couch that Sigmund Freud used to psychoanalyze his patients, now located in the Freud museum in London, England. Contrary to popular conception, most psychologists aren't psychotherapists, and most psychotherapists aren't even psychoanalysts. Nor do most modern therapists ask patients to recline on couches.

Figure 1.8 Timeline of Major Events in Scientific Psychology.

Contributions to Scientific Psychology

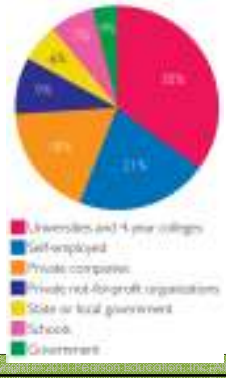
- Structuralism – insistence on systematic data collection and empiricism
- Functionalism –influence of evolutionary theory on modern psych
- Behaviorism – helped to understand how we learn and the importance of scientific rigor

Contributions to Scientific Psychology

- Cognitivism – focus on not only rewards or punishers, but on our interpretation of events
- Psychoanalysis – may have actually retarded scientific advance of clinical psych, but theories of mental processing outside of conscious awareness are holding up

Psychology Today

- Very diverse, as reflected in the 500,000 psychologists worldwide
- There are many types of psychologists who work in many settings



Psychologists Elizabeth Loftus (1) and Paul Meehl (2) are far less well known to the general public than psychologists Dr. Phil (3) and John Gray (4), but they've had a much greater impact on how we think about ourselves and the world.

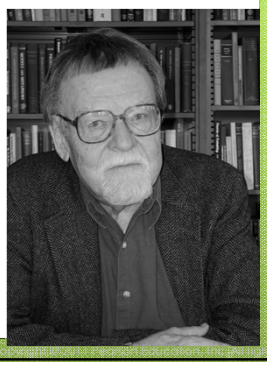


TABLE 1.7 Types of Psychologists, What They Do, and What They Don't Do.

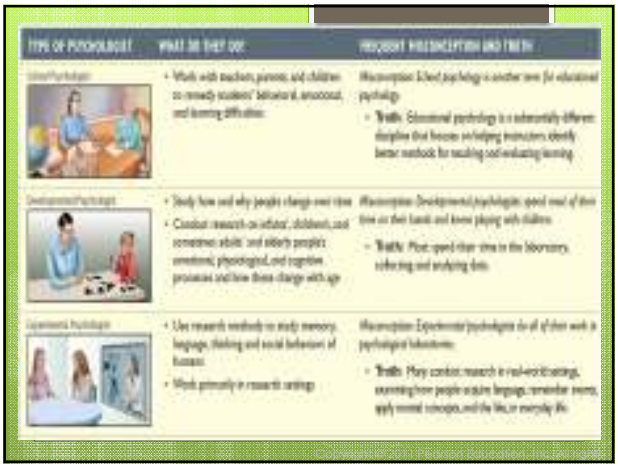
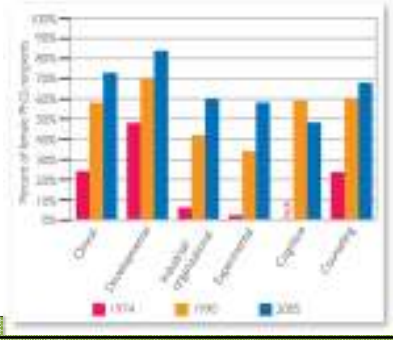


Figure 1.10 The Face of Psychology Has Changed Dramatically over the Past Three Decades. Across most areas, the percentage of women earning doctoral degrees has increased. In clinical and developmental psychology,women comprise three-fourths to four-fifths of those attaining Ph.D.s. *(Source: www.apa.org/monitor/jun07/changing.html)*



Types of Psychologists

- Clinical
  - Except in NM and LA, they cannot prescribe medication (though psychiatrists (M.D.s) can)
  - Therapists may have different degrees (Psy.D., M.S.W., Ph.D., etc.)
- Counseling
  - Work with people experiencing temporary or self-contained problems (e.g., marital or occupational difficulties)

Types of Psychologists

- School
  - Assess and develop intervention programs
  - Differs from educational psychology
- Developmental
  - Study why and how people change over time
  - Most work with infants and children
- Experimental
  - Use sophisticated research methods to study memory, language, and thinking of humans

Types of Psychologists

- Biopsychologists
  - Examine physiological bases of behavior
  - Most work in research settings
- Forensic
  - Assess, diagnose, and assist with rehabilitation and treatment of prison inmates
  - Others conduct research on eyewitnesses or juries

Great Debates in Psychology

- Two great debates have shaped the field of psychology, both currently and in the past.
- Nature-nurture
  - Are our behaviors attributable mostly to our genes or our rearing environments?
  - John Locke – tabula rasa
  - Behavior genetics and twin study designs
  - Evolutionary psychology or sociobiology
    - E.g. Anxiety.

"The title of my science project is 'My Little Brother: Nature or Nurture.'"

Great Debates in Psychology

- Free will - determinism
  - To what extent are our behaviors freely selected rather than caused by factors outside of our control?
  - Environment, automatic behavior

How Psychology Affects Our Lives

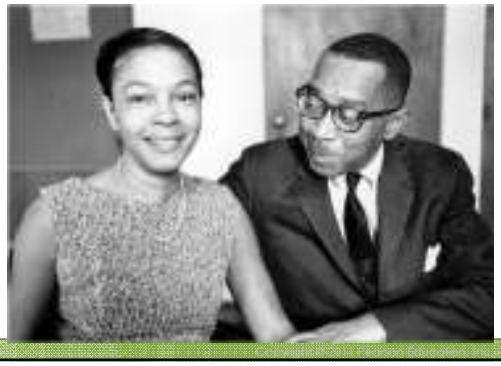
- Two broad categories of research
  - Basic examines how the mind works
  - Applied examines how we use basic research to solve real world problems.
- Yellow fire engine, three brake lights, commercials, and standardized tests are all examples of influence of psychology

Increasingly, today's fire trucks are lime-yellow rather than red. That's because psychological research has demonstrated that lime-yellow objects are easier to spot in the dark than red objects.

Thanks to psychological research, advertisers know that placing a model's face on the left and written text on the right of an advertisement best captures readers' attention.

A classic simultaneous eyewitness lineup. Although police commonly use such lineups, most research suggests that they're more prone to error than sequential lineups.

The classic doll studies of Kenneth and Mamie Clark paved the way for the 1954 Supreme Court decision of *Brown v. Board of Education,* which mandated racial integration of public schools.



Conclusions

- Learning to think scientifically will help you make better decisions not only in this course, but in everyday life
- When confronted with claims from popular psychology and popular culture, remember to "Insist on evidence"