1 **Myers' Psychology for AP***

2 **Unit 2:**
Research Methods: Thinking Critically with Psychological Science

3 **Unit Overview**

- The Need for Psychological Science
- How Do Psychologists Ask and Answer Questions?
- Statistical Reasoning in Everyday Life
- Frequently Asked Questions about Psychology

4 **The Need for Psychology Science**

5 **Did We Know It All Along?**
Hindsight Bias

- Hindsight Bias
  - "I knew it all along"
  - "Out of sight, out of mind"
  - "Absence makes the heart grow fonder"

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18 **Overconfidence**

- Overconfidence
  - Together with hindsight bias, can lead to overestimate our intuition

19 **The Scientific Attitude**

- Three main components
  - Curious eagerness
  - Skeptically scrutinize competing ideas
  - Open-minded humility before nature

20 **Critical Thinking**

- Critical Thinking
  - "Smart thinking"
  - Four elements
    - Examines assumptions
    - Discerns hidden values
    - Evaluates evidence
    - Assesses conclusions

21 **How Do Psychologists Ask and Answer Questions?**

22 **The Scientific Method**

- Theory
  - "mere hunch"
- Hypothesis
  - Can be confirmed or refuted
- Operational Definition
- Replication (repeat)

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27 **The Scientific Method**

- A good theory is useful if it:
  - Effectively organizes a range of self-reports and observations
  - Implies clear predictions that anyone can use to check the theory

28 **Description**
The Case Study

- Case Study
  - Suggest further study
  - Cannot discern general truths

29 **Description**
The Survey

- Survey
  - Looks at many cases at once
- Word effects
- Random sampling
  - Representative sample

30 **Description**
The Survey

- Sampling
  - Population
  - Random Sample

31 **Description**
Naturalistic Observation

- Naturalistic Observation
  - Describes behavior
  - Does not explain behavior

32 **Correlation**

- Correlation (correlation coefficient)
  - How well does A predict B
  - Positive versus negative correlation
  - Strength of the correlation
    - -1.0 to +1.0
  - Scatterplot

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42 **Correlation**

Correlation and Causation

- Correlation helps predict
  - Does not imply cause and effect

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47 **Correlation**
Illusory Correlations

- Illusory Correlation
  - Perceived non-existent correlation
  - A random coincidence

48 **Correlation**
Perceiving Order in Random Events

- Comes from our need to make sense out of the world
  - Coin flip
  - Poker hand

49 **Experimentation**

- Experiment
  - Can isolate cause and effect
  - Control of factors
    - Manipulation of the factor(s) of interest
    - Hold constant (“controlling”) factors

50 **Experimentation**
Random Assignment

- Random assignment
  - Eliminates alternative explanations
  - Different from random sample

51 **Experimentation**
Random Assignment

- Blind (uninformed)
  - Single-Blind Procedure
  - Double-Blind Procedure
- Placebo Effect

52 **Experimentation**

Random Assignment

- Groups
  - Experimental Group
    - Receives the treatment (independent variable)
  - Control Group
    - Does not receive the treatment

53 **Experimentation**

Independent and Dependent Variables

- Independent Variable
  - Confounding variable
    - Effect of random assignment on confounding variables
- Dependent Variable
  - What is being measured

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62 **Statistical Reasoning in Everyday Life**

63 **Describing Data**

Measures of Central Tendency

- Mode (occurs the most)
- Mean (arithmetic average)
- Median (middle score)

64 **Describing Data**
Measures of Variability
- Range
- Standard Deviation

65 **Describing Data**
Measures of Variability
- Normal Curve (bell shaped)

66 **Making Inferences**
When Is an Observed Difference Reliable?
- Representative samples are better than biased samples
- Less-variable observations are more reliable than those that are more variable
- More cases are better than fewer

67 **Making Inferences**
When Is a Difference Significant?
- Statistical significance
  - The averages are reliable
  - The differences between averages is relatively large
  - Does imply the importance of the results

68 **Frequently Asked Questions about Psychology**

69 **Psychology Applied**

- Can laboratory experiments illuminate everyday life?
  - The principles, not the research findings, help explain behavior

70 **Psychology Applied**

- Does behavior depend on one's culture and gender?
  - Culture
    - Influence of culture on behavior
  - Gender

- More similarities than differences

71 **Ethics in Research**

- Ethics in animal research
  - Reasons for using animals in research
  - Safeguards for animal use

72 **Ethics in Research**

- Ethics in human research
  - Informed consent
  - Protect from harm and discomfort
  - Maintain confidentiality
  - Debriefing

73 **THE END**

74 **Teacher Information**

- Types of Files
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- Animation
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- Adding slides to this presentation
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75 **Teacher Information**

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  - Unit subsections hyperlinks: Immediately after the unit title slide, a page (slide #3) can be found listing all of the unit's subsections. While in slide show mode, clicking on any of these hyperlinks will take the user directly to the beginning of that subsection. This allows teachers quick access to each subsection.
  - Bold print term hyperlinks: Every bold print term from the unit is included in this presentation as a hyperlink. While in slide show mode, clicking on any of the hyperlinks will take the user to a slide containing the formal definition of the term. Clicking on the "arrow" in the bottom left corner of the definition slide will take the user back to the original point in the presentation.

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    - By presenting information in small chunks, students will

find it easier to process and remember the concepts.
- By continually changing slides, students will stay interested in the presentation.
- To facilitate class discussion and critical thinking. Students should be encouraged to think about "what might come next" in the series of slides.

- Please feel free to contact me at kkorek@germantown.k12.wi.us with any questions, concerns, suggestions, etc. regarding these presentations.

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77 **Division title (green print)**
subdivision title (*blue print)*
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79 **Definition Slide**

= add definition here

80 **DEFINITION SLIDES**

81 **Hindsight Bias**

= the tendency to believe, after learning an outcome, that one would have foreseen it.
- Also known as the "I knew it all along" phenomenon.

82 **Critical Thinking**

= thinking that does not blindly accept arguments and conclusions. Rather, it examines assumptions, discerns hidden values, evaluates evidence, and assesses

conclusions.

83 **Theory**

= an explanation using an integrated set of principles that organizes observations and predicts behaviors or events.

84 **Hypothesis**

= a testable prediction, often implied by a theory.

85 **Operational Definition**

= a statement of the procedures (operations) used to define research variables.

- i.e. Human intelligence may be operationally defined as what an intelligence test measures.

86 **Replication**

= repeating the essence of a research study, usually with different participants in different situations, to see whether the basic finding extends to other participants and circumstances.

87 **Case Study**

= an observation technique in which one person is studied in depth in the hope of revealing universal principles.

88 **Survey**

= a technique for ascertaining the self-reported attitudes or behaviors of a particular group, usually by questioning a representative, random sample of the group.

89 **Population**

= all the cases in a group being studied, from which samples may be drawn.

- Note: Except for national studies, this does NOT refer to a country's whole population.

90 **Random Sample**

= a sample that fairly represents a population because each member has an equal chance of inclusion.

91 **Naturalistic Observation**

= observing and recording behavior in naturally occurring situations without trying to manipulate and control the situation.

92 **Correlation**

= a measure of the extent to which two factors vary together, and thus of how well either factor predicts the other.

93 **Correlation Coefficient**

= a statistical index of the relationship between two things (from -1 to +1).

94 **Scatterplot**

= a graphed cluster of dots, each of which represents the values of two variables. The slope of the points suggests the direction of the relationship between the two variables. The amount of scatter suggests the strength of the correlation (little scatter indicates high correlation).

95 **Illusory Correlation**

= the perception of a relationship where none exists.

96 **Experiment**

= a research method in which an investigator manipulates one or more factors (independent variables) to observe the effect on some behavior or mental process (the dependent variable). By random assignment of participants, the experimenter aims to control other relevant factors.

97 **Random Assigment**

= assigning participants to experimental and control groups by chance, thus minimizing preexisting differences between those assigned to the different groups.

98 **Double-Blind Procedure**

= an experimental procedure in which both the research participants and the research staff are ignorant (blind) about

whether the research participants have received the treatment or the placebo. Commonly used in drug-evaluation studies.

99 **Placebo Effect**

= experimental results caused by expectation alone; any effect on behavior caused by the administration of an inert substance or condition, which the recipient assumes is an active agent.

100 **Experimental Group**

= in an experiment, the group that is exposed to the treatment, that is, to one version of the independent variable.

101 **Control Group**

= in an experiment, the group that is NOT exposed to the treatment; contrasts with the experimental group and serves as a comparison for evaluating the effect of treatment.

102 **Independent Variable**

= the experimental factor that is manipulated; the variable whose effect is being studied.

103 **Confounding Variable**

= a factor other than the independent variable that might produce an effect in an experiment.

104 **Dependent Variable**

= the outcome factor; the variable that may change in response to manipulations of the independent variable.

105 **Mode**

= the most frequently occurring score(s) in a distribution.

106 **Mean**

= the arithmetic average of a distribution, obtained by adding the scores and then dividing by the number of scores.

107 **Median**

= the middle score in a distribution, half the scores are above it and half are below it.

108 **Range**

= the difference between the highest and lowest score in a distribution.

109 **Standard Deviation**

= a computed measure of how much scores vary around the mean score.

110 **Normal Curve**

= a symmetrical, bell-shaped curve that describes the distribution of many types of data; most scored fall near the mean (68 percent fall within one standard deviation of it) and fewer and fewer near the extremes.

111 **Statistical Significance**

= a statistical statement of how likely it is that an obtained result occurred by chance.

112 **Culture**

= the enduring behavior, ideas, attitudes, and traditions shared by a group of people and transmitted from one generation to the next.

113 **Informed Consent**

= an ethical principle that research participants be told enough to enable them to choose whether they wish to participate.

114 **Debriefing**

= the postexperimental explanation of a study, including its purpose and any deceptions, to its participants.