

**PSY 617-READING AND  
UNDERSTANDING STATISTICS IN  
PSYCHOLOGY  
Summer 2020**

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**CLASS MEETING:**

Section M01: MTWRF 8:00-11:15am, Zoom

**COURSE DESCRIPTION:** *PSY 617 Reading and Understanding Statistics in Psychology. 3 Hours*

Examination of critical consumer statistics reported in psychology journals. Coverage ranges from basic descriptive statistics to advanced inferential statistics. The focus of the course is on reading, interpreting, and critiquing results sections of journals.

**PSY617 & School Psychologists**

*-A child's experiences in the K-12 setting can alter their life for better or worse. As a future school psychologist you play a role in shaping these experiences.*

*- I am passionate about teaching others to be critical consumers of research. The content covered in this course is essential for understanding how to read research and in turn make evidenced-based decisions for diagnosing and intervening with your clients.*

*-I will research, plan, deliver, evaluate, give feedback, and seek feedback in order to optimize your learning.*

*-You will need to identify and use efficient learning strategies, put forth necessary effort, and engage in adaptive help-seeking.*

**COURSE RATIONALE:** The purpose of this course is to teach students to critically read results sections of journal articles:

- a) to determine the appropriateness of the statistic utilized, understand the reported statistical vernacular, and to determine the practical significance of the results (**NASP 2.9**).
- b) to think critically about the soundness of the research methodology, especially selection of potential moderator and mediator variables (**NASP 2.9**).

**REQUIRED TEXTBOOK:** Huck, S. W. (2012). *Reading and Statistics and Research* (6<sup>th</sup> Ed.). Boston, MA: Pearson.

**COURSE OBJECTIVES (in question format):**

Section I

Preliminaries...

- What is the typical format of a journal article?
- What are some essential questions to ask about every article you read?

Can you accurately evaluate the quality of the research methodology (brief review)?

- What are the strengths and weaknesses of descriptive, correlational, and experimental research?
- What are the most common threats to the external and internal validity of research?
- What are some common means for controlling threats to validity of research?

Do the variables assessed in the study reflect adequate psychometric properties?

- Reliability: sub types and acceptable levels.

- Validity: sub types and acceptable levels.

What do you know about moderating and mediating variables (round 1)?

- What is the difference between a moderating vs. mediating variable?
- Can you provide examples of each?
- Why should they be included in a study (reasons from MacKinnon)?

## Section II

Can you accurately interpret common descriptive statistics?

- What are the different scales of measurement and how do they impact selection of stats?
- What are the different measures of central tendency, variability, and distributional shape? When do you use each one and how do you interpret them?

Can you accurately interpret common graphical means of reporting data?

- How do you interpret frequency distributions?
- How do you interpret a histogram?
- How do you interpret box plots?

Null hypothesis significance testing

- What is the purpose of null hypothesis significance testing?
- How do you interpret NHST results?
- What are alpha, beta, type I errors (round I), and type II errors?
- What are outliers? How do you detect them? What do you do with them?
- What are common assumptions for parametric statistics?
- Explain the concept of robustness and how it relates to the Central Limit Theorem.

Confidence intervals

- What is sampling error?
- What is standard error?
- How do create a confidence interval?
- How do you interpret a CI?

Effect sizes

- What is the difference between statistical vs. practical significance?
- Why are effect sizes important?
- What are the different “families” of effect sizes?
- How do you interpret different types of effect sizes (i.e. criteria for magnitude labels)?
- How do you calculate effect sizes if the article does not provide them?

Power

- What is statistical power?
- Why is statistical power important?
- How do you calculate statistical power?
- Relate statistical power to type I and type II error rates.

Type I error rates (round 2)

- What is meant by “inflated type I error risk?”
- How do you control for inflated type I error risk?

## Sections III-V

Inferential statistics

- determine the appropriateness of each statistic utilized given the research design and variables.
- determine if the assumptions for the statistic utilized were met.
- accurately interpret the statistical significance.
- accurately interpret and if necessary compute the practical significance (i.e., effect size).
- translate statistical results into applied implications.

## Section III

## Parametric stats

- z-test
- t-test for one sample
- t-test for two independent samples
- t-test for related scores
- 1 factor ANOVA
  - Post hoc & planned comparisons
- 2 factor between groups ANOVA
  - Moderation (round 2)
- 1 factor within groups ANOVA
- Mixed factorial ANOVA
- ANCOVA
- MANOVA

## Section IV

- Correlation
  - Simple
  - Comparison of two
  - Partial
    - Mediation (round 2)
- Regression
- Multiple regression
  - Simultaneous
  - Stepwise
  - Hierarchical
    - Moderation & Mediation (round 3)
- Curvilinear regression
- Logistic regression
- Path analyses
- Structural equation modeling
- Canonical correlation
- Discriminant analyses

## Section V

## Nonparametric stats

- Chi-square
- Student-selected nonparametric stats...

**INSTRUCTIONAL METHODS AND**

**ACTIVITIES:** Lecture, discussion, group activities, application exercises, readings, and presentations.

**SPECIAL INSTRUCTIONAL**

**MATERIALS/BEHAVIOR :** Each student is expected to use effective learning strategies (i.e., study skills), put forth necessary effort needed to master the materials being taught, and to engage in adaptive help-seeking when needed.

**GRADING/EVALUATION:**

20 Outside of class readings (10) (**NASP 2.9**)

50 Quests (5) (**NASP 2.9**)

10 Non-parametric presentation (**NASP 2.9**)

20 Final exam (**NASP 2.9**)

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100

**Grading Scale:** **A** = 90-100, **B** = 80-89,  
**C** = 70-79, **D** = 60-69, **F** = 00-59

**COURSE POLICIES:****1. Ideal Student Behavior**

The following is provided in an effort to create a professional environment more conducive to learning for all students.

**Professional behaviors**

- Promptness: arrive to class 2-3 minutes early
- Civility and Respect:
  - Wait to talk until others are finished
  - Use professional language (no profanity)
  - Refrain from exiting and re-entering during class or leaving early (if you must leave early, let me know why a priori)
  - Avoid “packing-up” while the professor is still talking during scheduled class time

-Let me know in advance if you must miss class and provide an explanation for why

### **Behaviors that facilitate encoding**

Before class

- Read suggested readings (cognitive load)
- Optimize your attention (get adequate sleep & nutrition, preview learning objectives, select optimal seating, minimize potential distractions)

During class

- Use optimal note-taking strategies
- Participate in class activities and small group discussions
- Monitor your comprehension and ask questions if something is not clear

After class

- Link your notes to the learning objectives
- Relate what we are learning to your life/intended career
- Space out your studying (e.g., same day, weekly reviews, reviews prior to exams)
- Explain it to others; this is one of the best ways to see if you understand the material (*Docendo discimus*)

### **Behaviors that reduce extraneous cognitive load (i.e., minimize distractions)**

- **Turn off** electronic devices and **put** them **away**: 1<sup>st</sup> = warning, 2<sup>nd</sup> = remedial assignment OR 5-point deduction from course average
  - If you are expecting an emergency phone call, inform me prior to class, place your phone on vibrate in your lap or pocket, and leave the room discreetly to take the call.
- Clear non-essential items (e.g., backpacks, purses, etc.) from tabletops prior to the start of class (potential invasion of other students' personal space)
- Eat outside of class

- Refrain from extraneous conversation or activities (e.g., grooming, home work from another class)

### **Caveat on electronic devices**

Research shows that using electronic devices during class interferes with learning, i.e., results in lower grades. Research also shows that students learn more by taking longhand notes as opposed to electronic notes.

*It is easier to avoid temptation than to resist it. Therefore, the best strategy is to determine a way to prevent exposure to tempting [distracting] stimuli.*

### **2. Tardiness**

-I request that students make every effort to be in class at least 2-3 minutes prior to the official starting time.

-Students entering class after the official starting time are tardy.

-Each student will be allowed two “grace” tardies. After the second tardy, the student will be prompted to identify a plan for preventing future tardies.

-If a student is tardy, the student should enter very discreetly. Please do not walk across the front of the classroom if you are tardy.

### **3. Attendance**

-I hope that you will attend every class. This course is very note-dependent and students who miss more than a couple of classes tend to fall at the lower end of the grade distribution (D's & F's).

-As a professional courtesy, I appreciate it when students inform me about their reasons for missing.

-Please do not bring guests to class with you (for example, friends, relatives, or children). If there are extenuating circumstances and you

need to bring guests, communicate with the professor prior to class.

#### 4. Personal breaks

-Unless you have a medical condition that necessitates frequent visits to the restroom, you should not take personal breaks during class (i.e. exiting & re-entering).

-Those with medical conditions should be registered with Student Disability Services and should present the appropriate paperwork to me within the first two weeks of school.

#### 5. Asking questions

-I encourage you to ask questions. If you don't understand something, please ask a question. Most of the time if you have a question, someone else has the same question.

#### 6. Questions you do not need to ask

*Do we have to know this?*

*Will this be on the test?*

-If there is something that I am presenting in class that you will not be tested over, I will tell you. I will place "FYI" on the slide for that material.

*Can we leave early today?*

-I will usually use most of the class period as it will be needed to cover the amount of material I have planned for this course.

*Did I miss anything?*

*Did we do anything important?*

-If you miss class, then you missed ~160 minutes' worth of important content.

#### 7. Students with disabilities

-In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, 1074. SARC can be reached by phone number

at 270-745-5004 [270-745-3030 TTY] or via email at [sarc.connect@wku.edu](mailto:sarc.connect@wku.edu).

-Please do not request accommodations directly from the professor or instructor without a Faculty Notification Letter (FNL) from The Student Accessibility Resource Center.

#### 8. Class participation/readings

Be prepared to critically discuss each reading. Articles marked with an \* require students to turn in typed responses to three questions: a) *what is the "take home message," i.e., summary of 1-2 sentences*, b) *what was the most interesting thing you learned*, and c) *what are two questions you have based on the reading*. These should be handed in at the beginning of each class period. Late summaries/questions will not be accepted.

#### 9. Late assignments

Points will be deducted from assignments that are handed in late and without documentation of a valid excuse (for example, a deduction of one point per day for the meta-analysis).

#### 10. Quests & final exam

-The format of the quests and final exam will consists of matching, true/false, multiple-choice items, short answer, and essays.

-Students are expected to bring pencils and Scantrons to quests and the final exam.

-I will do my best to get your grades back to you by the next class period for quests.

-Students who believe they deserve more points for any item will need to provide their rationale in writing. This method is much more productive than attempting to engage in oral debate about an item.

-*Missing a quest*: I strongly encourage you not to miss a quest. If you do miss a quest, you will need to provide documentation that establishes your reason for missing.

-Make-up quests for those with documented excuses (for example: illnesses, accidents, tragedies, etc.) should be scheduled with the professor ASAP.

- I will work with you on an alternate test time if you have a legitimate preplanned absence (for example, a sport competition or professional meeting).

### **11. Final exam**

-The final exam is comprehensive.  
617-001, 6/5, 8:00am (Friday)

### **12. Grades**

-Individual grades will not be disclosed over the phone or via email (FERPA). I will post grades electronically for persons who have handed in the signed permission slip.

-Most of you are capable of mastering all of the material taught in this course. Consequently, most of you are capable of earning an “A” in this course.

-Please be aware that you are the determining factor with regards to how much you learn in this course.

-If you desire to truly master the material taught in this class, a significant portion of the learning will take place outside of class.

-I will share with you my knowledge of empirically supported methods for facilitating learning (for example, note-taking skills & study skills). It is up to you to choose among these methods and to use these or other methods in order to achieve a mastery of the course material.

-There may be opportunities to earn extra credit throughout the course of the semester. There will be no additional extra credit opportunities available after grades have been reported.

### **13. Academic integrity**

-I hope your focus is on learning and that you will have no desire to engage in cheating or plagiarism.

-Anyone caught cheating or plagiarizing will receive a zero for that assignment. If the same student is caught again, the student will receive an “F” for the course.

-To discourage cheating, during exams no one will be allowed to wear hats, sunglasses, or use any electronic devices. For more information on this issue see the “Academic Requirements and Regulations” section of the WKU undergraduate catalog.

### **14. Title IX/Discrimination & Harassment**

-Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU’s Title IX Sexual Misconduct/Assault Policy (#0.2070) at <https://wku.edu/eoo/documents/titleix/wkutitleixpolicyandgrievanceprocedure.pdf> and Discrimination and Harassment Policy (#0.2040) at [https://wku.edu/policies/hr\\_policies/2040\\_discrimination\\_harassment\\_policy.pdf](https://wku.edu/policies/hr_policies/2040_discrimination_harassment_policy.pdf).

Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121.

Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are “Responsible Employees” of the University and

MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator.

If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's [Counseling and Testing Center](#) at 270-745-3159.

### 15. Socratic Method (my main teaching strategy)

I will regularly ask students questions. My goal will be to ask at least every student one question during each class period.

How

1. I will usually pose a question to the entire class.
2. Allow for wait time for students to think.
3. Call on one student to answer (no need to volunteer, I will try to distribute the opportunity to answer questions equally across all students).
4. Allow for a 2<sup>nd</sup> wait time for everyone to process that student's answer.
5. Clarify, comment on, ask another student to respond, or move on to next topic.

Why

- a) Bring students' attention to important content/learning objectives.
- b) Promote deeper thinking.
- c) Gauge student understanding.
- d) Improve both selective and sustained attention for all students.
- e) Provide an opportunity for the professor to learn from the students.

### 16. Your Syllabus

-I recommend that you bring your syllabus to every class.

### BIBLIOGRAPHY/ REFERENCE/

WEBSITES: None.

\*The professor reserves the right to make changes, additions, or deletions to any part of this syllabus. Any changes will be noted in class. Each student is responsible for taking note of any announced changes regardless of whether he/she is in attendance while the announcement is made.

### RECORD KEEPING

Please keep a record of your grades so you can calculate your standing grade as the course progresses.

Points Possible	(%)	Points Earned	Due Date
20	Readings	_____	N/A
10	Presentation	_____	6/4-5
(50)	Quests*		
10	#1 ( )	_____	5/20
10	#2 ( )	_____	5/22
10	#3 ( )	_____	5/27
10	#4 ( )	_____	5/29-6/1
10	#5 ( )	_____	6/3
20	Final Exam	_____	6/5
<b>100</b>			

\* Quest dates are tentative and may be changed if needed.

### Example of calculating "Points Earned"

- Quest I is worth 10 points, your grade for Quest I was 80%;  $10 \times .80 = 8.0$  points out of the possible 10.

**Permission to Disclose Grades**

I, \_\_\_\_\_, give  
(print your full name)

Dr. Wininger permission to post my  
grades using the five-digit number I  
provided to him.

X \_\_\_\_\_  
(sign your full name)

Five-digit number: \_ \_ \_ \_ \_