

Take-home Final Exam

Rules of Engagement

You may use any material you have available to answer the questions (including books, notes, web pages), but you **must not quote or copy**; you have to write your answers in your own words. Most important, you **must not collaborate** with any other person, inside or outside this class.

If you have questions of clarification, please address them to Bertram.

Each of your answers must be on 1 page or less (measured at 1.5 line spacing, 1" margins, 12-pt Times New Roman font). Exceeding the length restriction leads to point deductions.

Number the subparts of your answers (and their parts a, b, etc.) clearly, but do not include the question text.

The completed exam is due on Wednesday, May 15, 2019, at 5:00 p.m. Please submit it through the assignment module in canvas as a .docx file.

Before you turn in the exam, **sign or type** your name on the line below, which indicates that you have read the rules of engagement and have abided by them throughout your work on this exam. Then add this page to your submitted document.

Signature:

1. Of the numerous themes discussed in Rosnow and Rosenthal's (1989) article, *Statistical procedures and the justification of knowledge*, which two are the most significant points ($p < .05$), in your assessment? (a) **Argue** for their importance and (b) develop some implications they have for one of **your own** (past, current, or future) research projects.
2. Orthogonality between two vectors is an essential concept in statistics. (a) Explain what orthogonality means and how one can assess it. (b) Discuss the importance and specific role of this property for **3 distinct topics** we covered in this class.
3. Describe (a) the **similarities and differences** between *logistic regression*, *loglinear analysis*, and *logit analysis* and (b) briefly describe, for each technique, one example (fictitious or real) for which the particular technique is **clearly** the best choice.
4. In factorial (multi-way) designs you have a choice between running either traditional main effects + interactions or simple effects instead. (a) **Define** interactions and simple effects and (b) **provide explicit arguments** for the strategy best suited for each of the following designs:
 - (I) Testing the effectiveness of an anti-depressant drug vs. a placebo for treating anxiety in depressed patients, obese patients, and anorexia nervosa patients (2×3 design).
 - (II) Examining the incidence of intentional childlessness among hetero vs. gay/lesbian couples who are either married or unmarried (2×2 design).
5. Researchers investigated the effects of wine drinking on depression and academic productivity, and you are hired as a consultant to analyze the data. The documentary material you look at reveals that the researchers tested 300 participants. Each participant received two cases of wine (= 24 bottles of 750 ml each) and was asked to have one 150 ml drink (about 5 fl. oz.) each day for four months. Participants were randomly assigned to receive either high-alcohol wine, low-alcohol wine, or nonalcoholic wine. Depression was measured by a person's score on the CES-D (a depression scale for the general population); productivity was measured by a person's overall score on a multi-item work activities survey. These two measures were administered on Day 0 (the day the study began), on Day 60, and on Day 120.

Your task is this:

- (a) Sketch the structure of the **data file** so you clearly see all the relevant variables.
- (b) Precisely describe the **design** of the study.
- (c) Devise the best possible **analysis technique** for these data that makes use of all collected information.
- (d) Write appropriate SPSS **syntax** for this analysis.
- (e) From the potentially long and complex output, identify those results that **best answer** the wine researchers' question: *whether wine intake showed any benefits*.

(It is helpful to create a small simulated data set and actually run the analysis to have the output in front of you; but you are not obligated to do so.)

Question 5 has a 2-page length limit, but you don't have to use the full 2 pages.