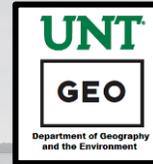




GEOG 4185/5185 **STATISTICAL RESEARCH** **METHODS IN GEOGRAPHY**



Weekly Discussion Questions

The following is a cumulative summary of our module-by-module Discussion Questions posted for your weekly engagement in Canvas. The expectation with each of these discussion opportunities is that each student will provide their own well-considered contribution and at least one thoughtful response to another student's contribution to the online discussion. Cumulatively, your participation in the group discussion on all DQs counts for a portion of your final course grade (see syllabus for the actual breakdown).

Weeks with discussion questions due: weeks 1, 3, 5, 6, 7, 11, and 13

In addition to the specific questions provided below for each week, standard questions that can be addressed in any week's online discussion include:

- What parts of the past week's discussion (or lab) were most difficult to follow?
- Which parts made the most sense?
- What questions do you have about this week's topic?

Week 1: Motivation & Fundamentals*

Posted DQ

- What do you see as the basic need that is met by the field of statistics? In other words, why do statistics exist?
- Are there problems or issues that can get in the way of statistics filling this need? Discuss.

* "Posted DQ" = DQ set that is due for submission this week in Canvas.

Week 2: Probability, Distributions, Z-Scores**

- How would you explain the two key kinds of probabilities in your own words?
- What are some good examples of a distribution that follow the Normal distribution?
- What are some good examples of a distribution that follow the Poisson distribution?

Non-Posted DQ

** "Non-Posted DQ" = not for submission. No DQ due this week.

Posted DQ

Week 3: Normal and Poisson Probabilities, Statistical Testing Basics

- How would you explain the rationale for knowing how to fit a Normal curve to an empirical dataset?
- What's a null hypothesis all about? Why do we need an alternative hypothesis?

Week 4: Tails in Testing and Sampling Issues

- What is the one- and two-tail test idea about? Why do we need both options?
- Do we actually need all the sampling options we discussed?

Non-Posted DQ

Posted DQ

Week 5: Data Description and Transforming Data Distributions

- What reasons can you see for studying the simple descriptive measures we cover this week, especially when we have much more complex and informative inferential methods?

Posted DQ

Week 6: Estimates from Samples, Sample Size, and a Start on Comparative Methods

- What cases can you think of where you might need to provide an estimate from a sample in the classes you have already taken?
- Thinking of the video supplement discussion provided for this week, what parts of the "Six Steps" concept were most difficult to follow?

Posted DQ

Week 7: Comparative Statistical Methods, Part I – Mann-Whitney U Test, Student's t Test

- In your own words, why do we need the Mann-Whitney U Test? What about Student's t Test?

Week 8: Comparative Statistical Methods – Part II, Chi Square Test*

- What niche in our testing needs does the Chi Square test fill?
- Which test(s) that we are studying in this course are closest to Chi Square in terms of function? Are there any that could be substituted for Chi Square (or vice versa)? Explain.

Non-Posted DQ

Week 9: Comparative Statistical Methods – Part III, ANOVA, Kruskal-Wallis H Test

- What's the point of this week's two methods, ANOVA and Kruskal-Wallis H Test? What situation(s) do these two methods cover that we have not yet encountered?
- Do a search of the geography literature and briefly explain one case where each was used, and define the benefit of using each method in those cases.

Non-Posted DQ

Week 10: Relationships – Correlation

- Define in your own words what the term "relationship" means

Non-Posted DQ

Week 11: Trends – Simple Linear Regression

- In your own words, explain the contribution to society to be able to predict something based on what is happening with something else?

Posted DQ

Week 12: Multiple Regression Modeling*

- Geographers and environmental scientists understand that the complexity of the world makes it often (even usually) necessary for research to incorporate many variables. For this reason, a simple “ $y=b+cx$ ” model has limited use in the research we do. This being said, can you think of a research topic in geography that could be adequately addressed with a single independent variable driving a single dependent variable?

Non-Posted DQ

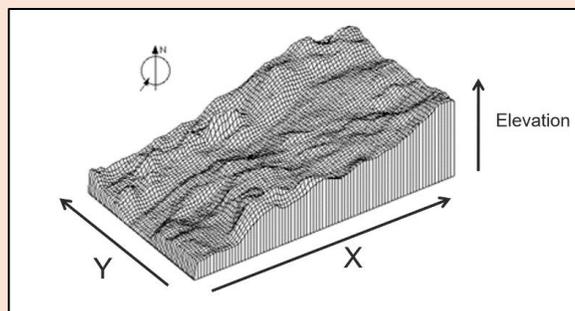
Week 13: Spatial Statistics – Point and Areal Patterns

Posted DQ

- Name and describe a phenomenon or dataset related to your area of study where measurement of the existence of spatial pattern in the dataset might be possible. Go on to define the specific element (or elements) of the dataset that you believe pattern measurement might be possible, specify whether this is a point or areal pattern, and discuss what applied purpose might be served by completing such a pattern measurement and assessment.

Week 14: Spatial Statistics – Smoothing and Trend Surface Analysis*

- Trend surface analysis is basically an application of multiple regression in three-dimensional space which generates a mathematical model that specifies the orientation of the surface that best fits a dataset. The basic idea is shown below:



- The question: what value can you see in being able to generate such a model? What kind of application can you envision for such a methodology?

Non-Posted DQ

Week 15: Summary and Synthesis*

- What's the single most valuable method that we covered this semester, considering your research interests? Explain what makes this method so useful for you.

Non-Posted DQ