Peer Feedback Sessions: Scheduling Updates

Please see the revised syllabus online at the course website for updated deadlines for our upcoming peer feedback sessions (Sept 26, Oct 10, Nov 14):

- **Today (Sept 19):** form small groups (3-4 persons; we will use the same groups for all upcoming peer feedback sessions)
- **Sept 26 (Literature Review Feedback Session):** e-mail draft document to me and your small group by noon on Sept 23
- **Oct 10 (Research Question Feedback Session):** e-mail draft document to me and your small group by noon on Oct 7
- **Nov 14 (Research Plan Feedback Session):** e-mail draft document to me and your small group by noon on Nov 11

Note on Project Possibilities for this Course

Your syllabus actually gives you **two options** for the project you will complete for this course:

- **A research plan or outline:** this is all that we’ve talked about so far in the course, and this is the project option that I highly recommend
- **A research report:** representing the completed results of a geographic study. This includes all the elements of a research plan (introduction, literature review, case study/research questions), plus results and conclusions. This is an available option.

I provide two options because some students are in a non-thesis option and they do not intend to complete the major research project that the research plan prepares you for. I still believe the research plan helps everyone get the most out of the course possible. However, if you the “report” option interests you most, you must talk with me before proceeding.

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The Nature of Scientific Research in Geography

**Geog 5110**

Science and Geography

- **“Geography is a science”**
  - Some may disagree with this statement, but our reading for this week argues this is true
  - Q: What is a scientist? What are people thinking of when they say geography is not a science? What do you think?

- **“Science … is a fruitful mode of inquiry, not a list of enticing conclusions” (Stephen Jay Gould)**
- **“Geography … is a truth-seeking discipline whose raw material consists of empirical observations” (John U. Marshall)**

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Science and Geography

- **Our focus here is on the process of science followed in geography**
  - Scientific method: “the logical structure of the process by which the search for trustworthy knowledge advances”
  - Not what we find, but how we find it
Science and Geography

- Our reading provides some insight into
  - the "traditional" view of the scientific method
  - some issues with this traditional view and process
  - an alternative approach: Popper’s fallibilism and the use of falsification rather than verification

Q (group discussion):
- In a nutshell, what is the reading’s "traditional view" of the scientific method?
- How would you describe this process of investigation? See my scientific method handout
- What are Marshall’s issues with the traditional view – and how does Marshall think that “fallibilism” provides a fix?

Science and Geography

Speaking practically, there is room for both inductive and deductive reasoning

- Theory-creation is fundamentally a creative process that involves many kinds of thinking
- Some theories come from generalizing based on past observations (induction)
- Some theories come from rigorous application of logic (deduction)

Science and Geography

- See the handout summarizing the scientific method as a series of steps
  - Induction and deduction both play a role throughout

Scientific Method in Geography

- Four different approaches
  - 1. physical geographers who say scientific method is appropriate
  - 2. human geographers who say scientific method is appropriate, but application leads to problems not found in the physical sciences
Scientific Method in Geography

• Four different approaches
  3. human geographers who say scientific method is not appropriate because of the subject matter of human geography
  4. human geographers who apply Marxist methods in geography (such methods are scientific, but in a different way than the natural sciences)

Key Elements of Scientific Thinking

• Next: survey a few concepts that are important to our understanding of scientific method

Key Elements of Scientific Thinking

• Theory
  rival theories can offer competing explanations for the same phenomena
  parallel, unconnected theories may account for different phenomena

Key Elements of Scientific Thinking

• Logic
  In a philosophical sense, explanation based solely on experiment and experience is not ideal – what is the overall rationale that shapes what is observed?
  Good situation: explanation where elements of theory can be shown to be logically derived from a small number of fundamental assumptions and arguments
Key Elements of Scientific Thinking

• Logic
• The language of math and geometry is often used to express this logic
  1. the general form of the relationship is often clarified when represented in such language
  2. the rules of math and geometry lend themselves to more precise definition than everyday language
  3. everyday language often incorporates many shades of meaning that pose difficulty for translation

Key Elements of Scientific Thinking

• Reduction
• The idea that the laws and theories of a discipline can be re-expressed as special cases of the laws of a more fundamental discipline
  - Meteorology as a special case of physics
  - Weathering as an example of applied chemistry
  - Some would say that all social science leads back to psychology

Key Elements of Scientific Thinking

• Scientific practice
• implementing the process that leads to theory
  One fundamental element of scientific practice is the test

Key Elements of Scientific Thinking

• Testing and scientific theory
• Scientific theory needs to be tested for a couple of reasons
  1. for its own internal consistency: does the theory contradict itself? do all elements of the theory truly work together?
  2. for its consistency with the world as observed: does the theory contradict the world as we see it in our research?

Key Elements of Scientific Thinking

• Later in the course we will deal further with how we plan for testing
Scientific Method in Geography

- What about scientific method in geography? Is geography unique?
  - One side: scientific method applies to both human and physical geography
  - Other side: geography is an exceptional discipline and should be excused from strict application of scientific method

Scientific Method in Geography

- If scientific method is to be applied at all in geography, geographers must come to terms with two key issues
  1. Geography as a whole deals with multiple-variable, open systems
  2. Human geography in particular deals with knowing subjects

Scientific Method in Geography

- The first problem (multi-variable, open systems) can be termed uniqueness
  - Geographic phenomena are complex in character and causation
  - Example: soils have 15 characteristics necessary for a full description; study of soils includes physical, chemical, and microbiological processes

Scientific Method in Geography

- The first problem (multi-variable, open systems) can be termed uniqueness
  - Q: how can we as geographers deal with this problem?

Scientific Method in Geography

- The first problem (multi-variable, open systems) can be termed uniqueness
  - One solution: the field experiment, involving data collection outside of the lab
  - Control variables through statistics and analysis, not research design (isolate two variables, all other variables held constant)
  - Issue: unrecognized/unrecorded variables create problems – can't be accounted for
Scientific Method in Geography

- The second problem (knowing subjects) is common to all social sciences
- Issue: interference by the observer with the phenomenon observed
- The character of human behavior and decision-making processes is something that many branches of human geography have debated over the decades
- Q: how might we deal with this?

Term Projects

- Opportunity now to discuss anything related to your ultimate research plans for this course (if you wish)
- Your ideas, your interests, your resources
- My expectations (literature review, paper, presentation)