

Second Term, Academic Year 2025-2026

Seminar: Bayesian Inference for Qualitative Evidence

Time and Place: **Monday 15:00-17:00, Seminar Room 2**

First Session: 05.01; Last Session: 09.03

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Seminar Description and Objectives

Qualitative evidence can make vital contributions to social science research that strives for explanation. Diverse kinds of qualitative information, including but hardly limited to interviews, ethnographic observations, news reports, meeting notes, and archival records, provide “clues” that help us adjudicate between alternative explanations, in the same way that a detective goes about figuring out who among a list of plausible suspects committed the crime, how, and why. Yet qualitative studies do not always draw clearly reasoned and well justified conclusions from the evidence presented. Authors often overstate their claims, and as we know from cognitive psychology, multiple biases can lead to faulty reasoning.

Bayesianism is enjoying a revival across many fields, and it offers a powerful framework for improving inference and analytic transparency in qualitative research. Bayesian updating is an intuitive process that begins by assessing prior odds that express our initial view about the relative plausibility of two or more rival hypotheses, drawing on any relevant background knowledge we have. We gather evidence and evaluate its inferential weight by asking which hypothesis makes the evidence more expected. We then update to obtain posterior odds on our hypotheses—following Bayes’ rule, we gain more confidence in whichever hypothesis makes the evidence more expected.

This course will provide concrete guidance on how to carry out each step of the Bayesian reasoning process, with applications to single case studies (within-case analysis / process tracing), comparative case studies (cross-case analysis), and multi-method research that draws on both qualitative evidence and quantitative data. You will learn how to construct well-articulated rival hypotheses, systematically assess the inferential weight of evidentiary observations, and evaluate which hypothesis provides the best explanation through Bayesian updating. The course will also address key aspects of research design, including case selection. Throughout, we will work with examples and exercises drawn from a wide range of published social science research to give you hands-on practice applying Bayesian techniques.

Learning Outcomes

- Analytical skills for reading qualitative research more critically;
- Tools for evaluating whether and to what extent the evidence presented supports the authors’ conclusions;
- Ability to apply Bayesian principles in your own research;
- Appreciation of the contributions qualitative information can make to social science, whether in the context of purely qualitative research designs or mixed-method research.

Prerequisites

This course does NOT require any familiarity with Bayesianism or probability theory. The only technical skills that will be assumed are basic arithmetic (addition and multiplication).

Requirements

This course requires regular attendance (80% minimum), active participation in discussions and group exercises, and completion of a final project. Researchers are expected to do the required readings and homework assignments and arrive prepared to discuss the material.

Attendance: Officially, the EUI allows you to miss two class meetings and still receive credit for the course, but I urge you to attend all sessions except in cases of illness. If you have caught something contagious but do not want to miss a session, contact me about participating via zoom.

Final Project: You may choose from the two options below:

- (a) Conduct a Bayesian scrutiny of a published article or book chapter. Identify concrete empirical evidence that the author presents and provide quantified assessments of how strongly that evidence weighs in favor of the author's argument relative to rival explanations. If the author does not consider rival hypotheses, you will need to devise one yourself.
- (b) Apply Bayesian reasoning to your own dissertation research in progress. Devise at least two rival hypotheses to compare and analyze the weight of available evidence from your own research and/or existing literature. Provide quantified assessments of how strongly each piece of evidence weighs in favor of one hypothesis relative to the rival(s).

The project is due by 4pm on Friday March 20 (end of Week 11). The length should not exceed 3600 words.

Auditors: All of the above requirements also apply for auditors who do not wish to receive credit, with the exception of the final project and homework exercises marked with an asterisk (*).

AI policy: No use of AI / large language models is permitted for assignments in this course.

Cell phone policy: Cell phones are to be stored out of sight during seminar sessions.

Schedule

Note: This schedule is tentative and subject to change based on our weekly progress.

- Session 1 (5 January) Course Overview; Introduction to Bayesian Reasoning
- Session 2 (12 January) Rival Hypotheses and Prior Odds
- Session 3 (19 January) Assessing the Inferential Import of Evidence: Likelihood Ratios
- Session 4 (26 January) Likelihood Ratios Continued
- Session 5 (2 February) Analyzing Testimonial Evidence
- Session 6 (9 February) Log-Odds Updating and Weight of Evidence
- Session 7 (16 February) Comparative Case Studies and Case Selection
- Session 8 (23 February) Iterative Research
- Session 9 (2 March) Scrutinizing Qualitative Research
- Session 10 (9 March) Methodological Perspective and Review of Fundamentals

Supplemental: BIQE Working Group

The [Bayesian Inference for Qualitative Evidence](#) Working Group will meet regularly during the term, tentatively scheduled for alternating Thursdays, 5-6:30pm (avoiding conflicts with CPSS). You are strongly encouraged (but not required) to attend—especially if you are interested in using the method in your research. Some of our sessions will be exclusively for members of the EUI community, others will be held in hybrid format with the online [Qualitative Bayesian Reasoning \(QBR\) Network](#). We provide feedback on work at all stages of the research process, with an emphasis on helping participants refine hypotheses and systematically evaluate how strongly empirical evidence supports an explanation relative to rivals.

Seminar Sessions and Readings

***Note:** I will provide updates regarding schedule adjustments to give us flexibility for spending more time or less time on specific topics as fits your needs.*

Week 1. Course Overview and Introduction to Bayesian Reasoning

Please come prepared to briefly introduce yourself, including your field of study and research interests, your methods background, and something unique or unusual about yourself to share.

After the overview and introductions, I will introduce the fundamentals of Bayesian probability and Bayesian reasoning. We will go over the notation of conditional probability and contrast the Bayesian notion of probability—our rational degree of belief given the information we possess—with the frequentist view of probability—relative frequency in an infinite series of repeated trials. As time allows, we will proceed to discuss rival hypotheses, what mutual exclusivity does and does not mean, and the importance of comparing alternative explanations, picking up where we leave off next week.

Required Reading

- Fairfield & Charman. 2022. *Social Inquiry and Bayesian Inference*, “Introduction: Bayesian Reasoning for Qualitative Research.” pp. 1-23, 29-30.
- Fairfield & Charman. 2022. “Chapter 3: Heuristic Bayesian Reasoning,” pp.71-77.

Week 2. Rival Hypotheses and Prior Odds

Bayesian analysis—and essentially all inference—involves working with mutually exclusive (i.e., rival) hypotheses. Contrary to common perceptions, this requirement does not restrict the level of complexity or the number of variables that we can include in our explanations. Working in groups, you will practice constructing a set of well-specified mutually exclusive hypotheses from two or three causal factors that might contribute to the outcome of interest. As time allows, we will continue on to the next steps in Bayesian reasoning.

Required Readings

- Fairfield & Charman, 2022, “Chapter 3: Heuristic Bayesian Reasoning,” pp.78-101.

Recommended Readings

- “Meteorite or Volcano? New Clues to the Dinosaurs’ Demise,” *New York Times* Jan 16, 2020.

Week 3. Assessing the Inferential Import of Evidence: Likelihood Ratios

One of the most important things that Bayesian reasoning can do for qualitative research is to help us make better judgments about how strongly our evidence favors one hypothesis relative to rivals. In this session, we will practice evaluating *likelihood ratios*, which determine the inferential import of the evidence. Here we need to “mentally inhabit the world” of each hypothesis and ask which one makes the evidence more expected. This is the key analytical step that tells us how to update our prior views about the relative plausibility of our hypotheses—we gain more confidence in whichever hypothesis makes the evidence more expected.

Required Readings

- Fairfield & Charman, 2022, “Chapter 3: Heuristic Bayesian Reasoning,” pp.101-119.
- Sir Arthur Conan Doyle, *The Adventure of Silver Blaze*
- Read through the *Sliver Blaze* worksheet before seminar. We will analyze the clues together during class.

Week 4. Likelihood Ratios Continued

The principle is simple—mentally inhabit the world of each hypothesis and ask which one makes the evidence more expected—but execution takes practice! We will do more exercises to that end. In addition, we will discuss how to incorporate multiple pieces of evidence into our analysis, taking possible logical dependence into account.

Homework

- Write up and **email me** your likelihood ratio reasoning for one of the clues on last week’s *Silver Blaze* worksheet.*

Required Readings

- Review Fairfield & Charman, 2022, “Chapter 3: Heuristic Bayesian Reasoning,” pp. 111-116.
- Read the Social Policy worksheet and spend some time thinking about how you would analyze the inferential import of the evidence.

Week 5. Analyzing Testimonial Evidence

More practice with reasoning about likelihood ratios this week, along with a discussion of how to analyze testimonial evidence—information we learn from human sources who may have imperfect knowledge and incentives to conceal or distort the truth.

Required Readings & Exercises

- Review Fairfield & Charman, 2022, Chapter 3: “3.5 Evidence,” bottom of p.103-105, and “3.6.2. Testimonial Evidence,” pp. 109-111.
- Alexander Gazmararian, 2025. “Sources of Partisan Change: Evidence from the Shale Gas Shock in American Coal Country,” *Journal of Politics*. Read pp. 601-606 (stop at Research Design).
- Testimonial Evidence worksheet: Read the interview evidence and decide whether you want to reorder anything, or aggregate anything, in order to facilitate a Bayesian analysis. Then write up your likelihood ratio reasoning for the first piece of evidence on your (possibly reordered) list **and send it to me via email**. We will discuss in class and analyze more of the evidence on the worksheet in groups.

Recommended Readings

- Fairfield & Charman, 2022, “Chapter 4: Explicit Bayesian Analysis,” Section 4.5. Application: Tax Reform in Chile, pp. 143-159. *Note: This case includes lots of interview evidence.*

Week 6. Log-Odds Updating

This session will introduce a simple linear version of Bayes’ rule that is easier to remember and easier to use, along with the *weight of evidence*, an intuitive concept promoted by Jack Good and Alan Turing that is closely related to the likelihood ratio. We will draw on real-world social science examples to practice evaluating the weight of evidence and quantifying probabilities in order to better communicate our views and aggregate the probative value of multiple pieces of evidence more systematically.

Homework

- Explain the basic ideas behind Bayesian reasoning (prior odds, likelihood ratios, and updating) to someone who is not in the course. You will report back on how it went during seminar. This assignment will help you figure out what aspects of Bayesian reasoning you understand well, and what aspects need more work.
- Write up your likelihood ratio reasoning for a couple pieces of evidence—further details to be distributed.*

Required Readings

- Fairfield & Charman, 2022, “Chapter 4: Explicit Bayesian Analysis,” pp. 124-143, 159-167.

Online Resources

- For getting used to the decibel scale: <https://tashafairfield.wixsite.com/home/bayes-resources>

Week 7. Comparative Case Studies and Case Selection

Methodological literature often treats cross-case (e.g., comparative) analysis and within-case analysis (e.g., process tracing) as distinct analytical endeavors that draw on different logics of inference. Within a Bayesian framework, however, there are no fundamental distinctions; all evidence contributes to inference in the same manner, whether we are studying a single case or multiple cases. In essence, each piece of evidence we obtain weighs in favor of one explanation over a rival to some degree, which we assess by asking which explanation makes that evidence more expected. Evidentiary weight then aggregates both within any given case, and across different cases that fall within the scope of the theories we are testing.

We turn next to case selection, a topic of tremendous debate in the literature with much conflicting advice. Logical Bayesianism applies an information-theoretic approach, where the goal is to choose cases that will be highly informative for developing theory and/or for comparing rival hypotheses. We will discuss a number of practical guidelines for case selection that emerge from this information-theoretic approach.

Required Readings

- Fairfield & Charman 2022, “Chapter 5: Bayesian Analysis with Multiple Cases,” pp. 171-186.
- Fairfield & Charman 2022, “Chapter 12: Case Selection,” pp. 551-556, 567-581.
- Boas, Taylor. 2016. *Presidential Campaigns in Latin America: Electoral Strategies and Success Contagion*. Cambridge University Press. Read pp. 1-3, 28-34, 204-207.

Recommended Readings

- Fairfield & Charman 2022, “Chapter 5: Bayesian Analysis with Multiple Cases,” pp. 204-220.

- Fairfield & Charman 2022, “Chapter 12: Case Selection.”
- Dan Slater, 2009. “Revolutions, Crackdowns, and Quiescence: Communal Elites and Democratic Mobilization in Southeast Asia.” *American Journal of Sociology* 115(1):203-254.
- Marcus Kurtz, 2009. “The Social Foundations of Institutional Order: Reconsidering War and the ‘Resource Curse’ in Third World State Building.” *Politics & Society* 37 (4): 479-520.

Week 8. Iterative Research

Qualitative research almost always proceeds through an iterative process where we go back and forth between theory revision, data collection, and data analysis. We draw new insights through a continuous process of analyzing evidence, refining theory and asking new questions, revisiting the data and analyzing it differently or in more detail, and deciding what kinds of additional evidence to collect. This style of research contrasts with the linear-deductive model that is the norm in many social science fields. We will examine the Bayesian foundations that justify iterative research, and discuss Bayesian safeguards against two common problems that may arise in iterative research: confirmation bias, and ad-hoc hypothesizing, where explanations become too tightly fit to the data.

Homework Exercise

- Evaluate two weights of evidence, quantifying in decibels—further details to be distributed.*

Required Readings

- Fairfield & Charman 2019, “A Dialogue with the Data: The Bayesian Foundations of Iterative Research in Qualitative Social Science,” *Perspectives on Politics* 17(1):154–167.

Recommended Readings

- Fairfield & Charman 2022, “Chapter 10: Iterative Research.”

Week 9. Scrutinizing Qualitative Research

This week’s theme is using the Bayesian framework to critique published case studies and scrutinize the conclusions they draw. To what extent do authors implicitly follow Bayesian reasoning when they write case narratives? Where does their thinking deviate from Bayesian principles? How strongly does the evidence support their argument over rivals? The research process involves a not just a dialog with the evidence, but also a dialog with a community of scholars. Bayesian reasoning is both a tool for making better inferences, and a framework for pinpointing disagreements and trying to build consensus.

Homework

- Land Reform worksheet: You will evaluate two weights of evidence, quantifying in decibels. Write up and **email me your analysis**.

Required Readings

- Fairfield and Charman, 2025. “Bayesian Reasoning for Qualitative Replication Analysis: Examples from Climate Politics,” *Political Science Research and Methods*.

Recommended Readings

- Fairfield & Charman, 2020. "Reliability of Inference," pp. 201-33 in C. Elman, J. Gerring, and J. Mahoney, Eds., *The Production of Knowledge*, New York: CUP.

- Fairfield & Charman 2022: “Chapter 7: Scrutinizing Qualitative Research,” pp.267-276.

Week 10. Methodological Perspective and Review

We will wrap up the course by highlighting the relative advantages of Bayesianism and how it differs from other methodological approaches. The session will include a group exercise designed to elucidate key matters of Bayesian principle and practice, with an emphasis on addressing some common misunderstandings in the literature.

Homework

- Land Reform exercise continued: You will evaluate one more weight of evidence, quantifying in decibels. Write up and **email me your analysis**.*

Recommended Readings

- Fairfield & Charman 2022, “Chapter 9: A Unified Framework for Inference.”
- Fairfield & Charman 2022, “Chapter 11: Test Strength”
- Fairfield & Charman 2022, “Chapter 8: Contrasting Logical Bayesianism and Frequentism”