History of Statistics Paper VI
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July 27th 2025

Week 11

Gender, Recognition, and Structural Inequality in the History of Statistics

I. Introduction

The history of statistics has often been told through the achievements of a few prominent male figures, focusing on the development of theoretical methods and overlooking the contributions of those who worked in applied, administrative, or computational roles. This narrow focus has excluded many women and marginalized contributors whose work was central to the expansion of statistical practice. From census work to groundbreaking algorithms, women played key roles in shaping the field but were frequently left out of its canonical history (Anderson, 1992).

Recent efforts to revisit this history reveal how structural inequalities and professional cultures have limited recognition and opportunity within the statistical community. These patterns are not simply accidents of omission; they reflect deeper assumptions about who counts as a contributor and what types of work are considered intellectually valuable. For example, Arianna Rosenbluth's pioneering role in the development of the Metropolis algorithm was long underappreciated, while Evelyn Kitagawa's decomposition method became folded into a literature that often overlooked her foundational insight.

II. Statistical Labor and Gendered Histories

The development of statistics as a field has depended not only on abstract theory but also on labor-intensive data collection, processing, and applied work. Much of this labor was historically performed by women, especially in government agencies and administrative offices. Yet these contributions have been largely excluded from traditional histories of statistics, which tend to focus on male theorists working in academic settings. Margo Anderson (1992) highlights this discrepancy, noting that women were essential to the expansion of statistical infrastructure in the United States but were often described as assistants or clerks rather than as statistical workers.

This exclusion reflects a deeper hierarchy within the discipline. Tasks such as coding data, managing surveys, or performing repetitive calculations were considered less intellectual than developing models or proving theorems. As a result, the kinds of contributions women were allowed to make—often in applied or support roles—were systematically devalued. Anderson argues that this division between "thinking" and "doing" has shaped how contributions are recognized and remembered, with prestige concentrated around theoretical advances and institutional leadership, areas from which women were long excluded.

Importantly, this is not just a problem of historical omission. The division of labor within statistics has reinforced broader societal beliefs about gender and intellectual authority. By marginalizing applied and administrative work, the field both reflected and contributed to a culture in which women's contributions were seen as secondary. Anderson calls for a rethinking of what counts as statistical work and a broader appreciation of the institutional, collaborative, and technical efforts that made statistical practice possible.

Recognizing this history does not simply fill in gaps; it challenges the assumptions underlying the traditional narrative. It asks us to consider how knowledge is produced and attributed, and whose labor is valued. Reclaiming these histories is not only a matter of justice but also a step toward a more complete and honest account of how statistics developed as a discipline.

III. Case Study: Arianna Rosenbluth and the Metropolis Algorithm

Arianna Rosenbluth played a central role in developing one of the most important computational tools in modern statistics, yet her name remains unfamiliar to many working in the field today. In the early 1950s, Rosenbluth collaborated with physicists at Los Alamos to design and implement what would become known as the Metropolis algorithm, a foundational method for Markov Chain Monte Carlo (MCMC). Her coding expertise and algorithmic design laid the groundwork for an entire family of simulation-based methods that now form the backbone of Bayesian statistics and high-dimensional modeling.

Despite her central role, Rosenbluth's contributions were long overshadowed by her male collaborators, including Nicholas Metropolis, after whom the algorithm was named. As Katie

Hafner (2021) notes, Rosenbluth wrote the code for the algorithm, designed its structure, and helped carry out the simulations using one of the earliest digital computers. Yet when the algorithm entered the literature and statistical training, her name was rarely mentioned. The Metropolis algorithm became a canonical concept in statistical computing, but its co-creator was largely erased from the narrative.

Rosenbluth's story also illustrates how gendered expectations shaped scientific careers. After her early achievements, she left physics to focus on raising a family, a decision influenced by the social norms of the time. Hafner emphasizes that such departures were not unusual for women in science, who often faced trade-offs between professional continuity and family life in ways their male colleagues did not.

What stands out is not just the lack of recognition, but the broader structure that made such erasure possible. Contributions to applied computation, especially by women, were seen as technical rather than intellectual, and thus excluded from authorship credit, citation, and institutional memory. Rosenbluth's case reveals how the boundaries of credit and recognition were shaped not only by disciplinary standards but also by gendered assumptions about labor and authorship.

Recognizing her role requires reexamining how history is written and who gets included. It also invites reflection on whether similar patterns continue in modern collaborations, especially in large interdisciplinary projects where attribution can be diffuse and unequal.

IV. Kitagawa's Decomposition and the KOB Misattribution
In 1955, sociologist Evelyn Kitagawa introduced a method for decomposing group differences in an outcome variable into components attributed to differences in group characteristics and differences in coefficients. Her technique was motivated by demographic questions, such as differences in mortality rates between populations, but it laid the groundwork for later developments in labor economics. Despite her early contribution, Kitagawa's name is often mentioned only as a footnote in what is now called the Oaxaca–Blinder decomposition, developed in the early 1970s (Fortin et al., 2023).

The Oaxaca–Blinder method formalized decomposition in the context of wage differentials, especially between men and women or among racial groups. Although the algebraic structure of Kitagawa's approach and the Oaxaca–Blinder method are closely related, the latter has become more widely recognized, particularly in economics. Many papers casually refer to the combined framework as KOB (Kitagawa–Oaxaca–Blinder), yet Kitagawa's name is often added retrospectively, and sometimes omitted entirely. This naming pattern reflects not only historical sequencing but also broader patterns of attribution within academic disciplines.

Kitagawa's method was elegant and intuitive. She emphasized that outcome gaps could be explained either by differences in group composition or by differences in the effects of those characteristics. Her framing aligned well with the concerns of later economists studying labor

markets and discrimination. Yet her work was published in a sociological journal and came from outside the economics discipline, factors that likely contributed to its limited recognition at the time.

The misattribution is not just about a name. It signals how institutional prestige, disciplinary boundaries, and gender shaped the visibility of contributions. As Fortin et al. (2023) point out, the later economists' work reinterpreted and extended Kitagawa's approach but did not substantially alter its logic. Her ideas became foundational, but the credit was absorbed by a different academic community, under different norms of recognition.

Revisiting Kitagawa's work challenges us to consider whose contributions are counted as original and whose are treated as derivative. It also prompts reflection on how disciplinary silos and gendered dynamics affect the transmission and ownership of intellectual ideas in statistics and its neighboring fields.

V. Institutional Cultures and the Statistical Profession
While individual cases like Rosenbluth and Kitagawa highlight overlooked contributions, broader reflections from within the profession reveal how structural and cultural norms have shaped who participates in statistics and how their work is valued. Women in statistics have often faced implicit and explicit barriers in hiring, promotion, funding, and recognition. These obstacles are not simply historical. They continue to shape the experiences of women and underrepresented groups in both academic and applied statistical settings.

Mary Thompson reflects on her career in Canada and points to the slow pace of change, especially in achieving leadership roles and equal representation in prestigious institutions. She highlights the importance of mentorship, peer support, and visibility in helping women statisticians advance professionally (Thompson, 2014). Despite progress in recruitment and participation, she argues that professional structures remain uneven in terms of access to resources and recognition.

Nancy Reid calls attention to the discomfort many in the field express when discussing gender. She critiques the idea that statistics is a purely objective or merit-based discipline, arguing that such beliefs can obscure structural inequality and discourage necessary institutional change (Reid, 2014). Her reflection suggests that statistical culture often resists engagement with questions of equity, in part because of its strong identification with neutrality and abstraction.

Louise Ryan emphasizes the need for inclusive practices in training, hiring, and professional development. She describes how flexible work environments, supportive mentorship, and a commitment to diversity at the institutional level can help create space for those who have been historically excluded (Ryan, 2014). She also notes that encouraging diversity strengthens the field intellectually by broadening perspectives and expanding the range of questions considered.

Together, these reflections make it clear that exclusion in statistics is not only a matter of past omissions but an ongoing challenge. Cultural norms that prioritize theoretical innovation over

applied practice, or that reward individual achievement over collaboration, can marginalize forms of work where women and minority statisticians have been most active. Changing this requires not only policy but also shifts in values, recognizing that intellectual merit and equity are not opposed but interdependent.

VI. What I've Learned
Reading these papers shaped my understanding of how statistical knowledge is built, shared, and remembered. I had previously imagined the history of statistics as a steady progression of theoretical breakthroughs, driven by a few prominent figures. This week challenged that view by revealing how much of the field's development depended on contributions that were collaborative, applied, and often overlooked.

The story of Arianna Rosenbluth helped me recognize how gendered assumptions influence who is remembered in science. Her work on the Metropolis algorithm was foundational, yet for many years she remained unseen in standard statistical narratives. Similarly, Evelyn Kitagawa's 1955 decomposition method was elegant and influential, but it took decades for her name to be linked with the better-known Oaxaca–Blinder framework. These cases made me reconsider what it means for a contribution to be deemed "foundational," and how disciplinary boundaries affect visibility.

The broader reflections by Anderson, Thompson, Reid, and Ryan reminded me that there are so many more similar examples. They are part of larger institutional and cultural dynamics that continue to affect statistical practice today. It was particularly surprising to see how frequently women's work was described as clerical or technical, even when it involved deep analytic insight. Reid's critique of the idea that statistics is purely meritocratic was also insightful to me. Her argument that neutrality can sometimes cover up exclusion made me more aware of the values that lay in how we evaluate and teach statistics.

This week helped me think more carefully about whose work is recognized, how credit is distributed, and what values we should prioritize in our discipline. It encouraged me to see the history of statistics not as a fixed record of achievements but as a living conversation that must be revisited, expanded, and corrected. Going forward, I hope to be more attentive to whose work is cited, whose contributions are made visible, and how equity and rigor can be pursued together in statistical practice.

Week 12

Reflections on the Social Role of Statistical Practice

I. Introduction
Statistics is often presented as an objective and technical field, focused on methods of inference and efficient data analysis. Yet the history and present practice of statistics reveal a discipline that is deeply embedded in political and social processes. From the construction of census

categories to the design of algorithms that influence public policy, statistical work does not merely describe the world but helps shape it.

Alain Desrosières (2002) argues that modern statistics emerged alongside the rise of the administrative state, not simply to measure pre-existing realities, but to produce categories that could be governed. Through instruments like censuses, tax records, and economic indicators, states developed standardized representations of society that were both tools for intervention and symbols of legitimacy. These statistical systems relied on negotiated decisions about classification, definition, and aggregation, making them inherently political. At the same time, contemporary statisticians are increasingly reflecting on their role in a rapidly changing world.

In Past, Present, and Future of Statistical Science, Xihong Lin and her colleagues (2014) compile perspectives from leading statisticians who emphasize the evolving responsibility of the field. As statistics becomes more central to areas like public health, artificial intelligence, and policy evaluation, the profession must deal with issues of fairness, transparency, inclusion, and ethical practice.

II. Statistics as a Mode of Governance
The expansion of national statistical systems in the nineteenth and twentieth centuries was not only an exercise in technical refinement. It was a political and institutional project that served the interests of emerging modern states. As Desrosières (2002) shows, statistics became a way for governments to make populations distinguishable and clear: to count, classify, and compare people across time and territory.

Censuses, registers, and occupational surveys did not just describe society; they organized it into categories that could be taxed, regulated, or targeted by policy. The creation of statistical indicators involved decisions about what to include, how to define terms, and which differences to preserve or suppress. For example, the categorization of employment, ethnicity, or household structure reflected administrative needs and normative assumptions about social order. Once established, these categories gained durability. They were accepted by policymakers, researchers, and the public, acquiring a sense of naturalness that masked their constructed origins (Desrosières, 2002).

This dynamic gave statistics its dual character: it was both a tool of abstraction and a mechanism of control. Statistical categories became part of the infrastructure of governance, shaping how people were seen by institutions and how they saw themselves. As Desrosières explains, this made statistical reasoning "performative" rather than purely descriptive. It created standardized frameworks within which decisions about education, welfare, or law enforcement could be made with an appearance of objectivity.

The power of these systems lay in their capacity to simplify complexity while appearing neutral. By quantifying human behavior, statistics enabled governments to act at scale. Yet this abstraction also risked excluding context and reinforcing dominant perspectives. Understanding this historical role challenges the idea that statistics is politically neutral. Instead, it highlights the

importance of critically assessing how statistical systems are built and whose interests they serve.

III. Statistical Categories and Social Consequences

Statistical categories are not passive descriptors. They influence how institutions operate, how social programs are designed, and how individuals are grouped and governed. Once a statistical category becomes standardized, it enters the fabric of administrative and scientific life. Decisions about who qualifies for public housing, how funding is distributed, or what disparities are measured all depend on how variables like race, gender, income, or disability are defined and reported.

Desrosières (2002) emphasizes that these categories are the result of negotiation among technical experts, political actors, and administrative constraints. For example, the development of occupational classifications involved reconciling economic theory with labor market realities and bureaucratic feasibility. The end result was a simplified but powerful coding system that shaped employment statistics, educational planning, and wage analysis.

These classifications did not merely reflect labor markets; they helped define what counted as skilled or unskilled work. Over time, categories become taken for granted. They are built into forms, databases, and laws, and they structure the questions researchers ask. But the choice to measure one attribute and not another can shape public understanding and policy agendas. Statistical visibility confers legitimacy. What is counted becomes governable and what is left out becomes invisible. This has real consequences, especially for marginalized populations. The problem is not with measurement itself, but with the illusion that statistical categories are self-evident or value free. Desrosières warns that treating them as natural masks the social and political decisions behind them.

Lin et al. (2014) emphasized this concern in their reflections on modern statistical practice. They note that categories embedded in machine learning models or large-scale data pipelines continue to shape life chances, sometimes without transparency or accountability. Recognizing the social power of statistical categories does not require rejecting quantification. Instead, it calls for thoughtful reflection on how those categories are constructed, who participates in their design, and how they are used. Statisticians must be attentive not only to technical validity but also to ethical and civic consequences.

V. Equity, Inclusion, and Professional Reflection

Beyond technical challenges, the statistical profession must also address issues of equity and representation within its own institutions. Several chapters in Lin et al. (2014) reflect on the need to diversify who becomes a statistician, whose work is recognized, and how statistical communities support underrepresented members.

These reflections underscore that the culture of statistics is shaped not just by intellectual priorities but also by organizational practices, mentorship structures, and norms of recognition. Gender and racial disparities remain persistent in both academic and applied statistical careers.

The pathways to leadership, editorial influence, and research funding often remain opaque or unevenly distributed.

Contributors to Lin et al. (2014) argue that these disparities are not inevitable. They stem from institutional choices and cultural attitudes that can be challenged and changed. Encouraging broader participation means rethinking recruitment, evaluation, and collaboration, especially in academic departments and professional societies.

One recurring theme is the importance of mentorship. Supporting students and early-career researchers from underrepresented backgrounds requires more than formal programs. It involves active engagement, access to networks, and recognition of different ways of contributing to the field. Lin et al. (2014) emphasize that statistical training should include awareness of the social dynamics of research environments—not just technical instruction.

Another area of reflection is the recognition of different forms of expertise. Applied work, interdisciplinary projects, and teaching are sometimes undervalued relative to theoretical innovation. This can marginalize those whose careers are centered in public service, community collaboration, or education. Building a more inclusive discipline requires expanding the criteria for professional excellence.

Ultimately, equity and inclusion are not separate from the core goals of statistics. They affect what questions are asked, what data are collected, and how results are interpreted. A more diverse and self-aware statistical community will be better equipped to serve a society that increasingly relies on data-informed decisions.

VI. What I've Learned
After this week's readings, I changed the way I think about statistics. I had previously viewed statistical work as a mostly technical practice: choosing the right model, checking assumptions, interpreting results. But after reading Desrosières (2002) and the reflections in Lin et al. (2014), I began to see statistics as a deeply social activity—one that not only measures but also constructs the world it describes.

I especially liked Desrosières' argument that statistical categories are not natural objects but the outcome of political and institutional processes. The idea that classifications used in censuses, economic surveys, or administrative databases are shaped by negotiation and carry lasting consequences helped me realize that even small decisions in data coding or variable definition can influence how people are treated by institutions.

The reflections in Lin et al. (2014) also made me think more about my role as a future statistician. It is not enough to build technically sound models. I need to understand how those models are used, who is affected, and what values are embedded in the process. The call for equity, transparency, and inclusion within the field connected with me, particularly the idea that mentorship, interdisciplinary collaboration, and ethical awareness are important to good statistical practice.

This week helped me see statistics not only as a method but also as a civic responsibility. I appreciated the institutional history of the field more and become more mindful of the social power of statistical work. Going forward, I hope to be more intentional about the categories I use, the assumptions I make, and the ways I contribute to a profession that should be both rigorous and just.

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