



Survival of the Notable: Gender Asymmetry in Wikipedia Collective Deliberations

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Communities on the web rely on open conversation forums for a number of tasks, including governance, information sharing, and decision making. However these forms of collective deliberation can often result in biased outcomes. A prime example are Articles for Deletion (AfD) discussions on Wikipedia, which allow editors to gauge the notability of existing articles, and that, as prior work has suggested, may play a role in perpetuating the notorious gender gap of Wikipedia. Prior attempts to address this question have been hampered by access to narrow observation windows, reliance on limited subsets of both biographies and editorial outcomes, and by potential confounding factors. To address these limitations, here we adopt a competing risk survival framework to fully situate biographical AfD discussions within the full editorial cycle of Wikipedia content. We find that biographies of women are nominated for deletion faster than those of men, despite editors taking longer to reach a consensus for deletion of women, even after controlling for the size of the discussion. Furthermore, we find that AfDs about historical figures show a strong tendency to result into the redirecting or merging of the biography under discussion into other encyclopedic entries, and that there is a striking gender asymmetry: biographies of women are redirected or merged into biographies of men more often than the other way round. Our study provides a more complete picture of the role of AfD in the gender gap of Wikipedia, with implications for the governance of the open knowledge infrastructure of the web.

CCS Concepts: • **Human-centered computing** → **Empirical studies in collaborative and social computing**; • **Social and professional topics** → *Gender*; • **Mathematics of computing** → Survival analysis.

Additional Key Words and Phrases: Wikipedia, Gender Gap, Collective Deliberation, Article for Deletion, Competing Risks Analysis

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1 Introduction

In 2018, the physicists Donna Strickland, Gérard Mourou, and Arthur Ashkin received the Nobel Prize for “groundbreaking inventions in the field of laser physics”¹. The Nobel prize in Physics recognizes a lifetime of accomplishments of a scientific nature, but this award carried additional significance since it was the first to go to a woman in 55 years. Nonetheless, in the immediate aftermath of the announcement, internet users looking to know more about Donna Strickland could not find a Wikipedia entry about her — as one would normally expect when looking up an accomplished scientist — even though her two co-awardees had been listed in the encyclopedia

¹Morou and Strickland shared half of the price for their work on chirped pulse amplification; the other half went to Ashkin for separate work.

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since 2005. Later, it was discovered that there had indeed been an attempt to create an entry for her in Wikipedia. Some editors had drafted her biography, but this draft had never been published, and thus had never been indexed by search engines, since — unlike her scientific work — she had not been considered to be ‘notable’ enough to warrant the creation of a separate, individual entry about her [7].

On February 11, 2019, the biography of nuclear scientist Clarice Phelps, who is the first African American woman to help discover a new chemical element, was deleted from Wikipedia [37]. The debate over whether Phelps met the internal notability standards of Wikipedia was contentious. Editors initially deleted her entry, then reinstated it, only to delete it again later. In total, her entry was deleted (and later reinstated) three times — each deletion sparking increasingly heated discussions. Last but not least, in 2017 a Wikipedia editor raised concerns about the notability of Margaret D. Foster (1895–1970), an American chemist known for being the first female chemist at the United States Geological Survey and for her involvement on the Manhattan Project [34]. Despite this record, her Wikipedia page was flagged for potential deletion due to concerns about her notability.

These three scenarios — which are drawn from STEM areas but are not necessarily limited to those fields — exemplify how barrier-breaking women get undermined and undervalued and face challenges to be fully included in Wikipedia — the largest and most influential online encyclopedia. Though this issue reflects broader challenges women encounter across the web, the central role of Wikipedia in shaping public knowledge makes it a critical site where women struggle for the recognition they deserve.

As a free encyclopedia, Wikipedia aspires to encapsulate the entirety of human knowledge. It stands as a significant source of encyclopedic information encompassing notable individuals from diverse countries, historical periods, and fields of knowledge on a global scale. Within its extensive body of knowledge, about 1.9 million entries cover the biographies of notable individuals like scientists, artists, politicians, etc., yet very few of these biographies are about women (approximately 19% in the English version, the largest of all Wikipedia versions [46]), highlighting a substantial gender gap in encyclopedic coverage between men and women. This is concerning, since the recognition of the merits of an individual, particularly in a societal context, requires fair representation, but also because the presence of this kind of gap in one of the pillars of the digital knowledge infrastructure poses the risk of propagating preexisting social biases in other digital platforms, and thus of further strengthening the underlying gender inequality in society [13]. For example, Wikipedia is often used to train Machine Learning models for a variety of tasks, representing one of the highest quality corpora openly available. As a result, several AI models are at risk of being biased against women in various applications [27, 47, 67].

Prior work on the gender gap in Wikipedia has found that articles about women are brought up for deletion more frequently than those about men [54, 56, 72], yet it is not clear how and when this takes place. Like many other editorial actions, the deletion of an article is subject to the regular collaborative norms of Wikipedia [64], and thus articles are susceptible of being flagged for deletion at any point during their editorial cycle. Our objective is thus to investigate the following question: how quickly do Wikipedia biographies interact with the Articles for Deletion (AfD) process? Specifically, we aim to determine if there is any gender-based discrepancy in the various stages of the process, from the initial nomination for deletion to the consensus outcome taken by the discussants (if any). Our analysis covers the full history of the AfD process, from January 15, 2001 to November 3, 2023.

Definition of gender. For our analysis, we rely on human annotations provided by the Wikidata project to identify the gender of biographical subjects. Even though the vital records information

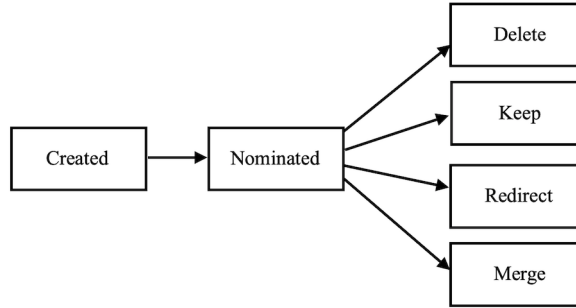


Fig. 1. Multi-state model depicting competing risks of nomination and each outcome of the deliberation

from Wikidata provided us with rich gender information about the subjects of biographies, in this study, we chose to restrict ourselves to a gender binary (i.e., man and woman). This choice was dictated by the limited frequency of other, non-binary gender labels in the dataset (0.09%), which would have severely limited our ability to draw reliable statistical inferences about them. Thus, it is important to acknowledge that our analysis is restricted in its scope, as it does not encompass all existing notions of gender.

The rest of the article proceeds as follows. First, to define the scope of the problem, we review how prior work has documented the gender gap on Wikipedia and its community. We then provide a brief description of how the Wikipedia deletion process works and discuss prior literature on gender and deletion discussions. From this discussion we derive the hypotheses that guide our main research question, and highlight how a host of contingent factors, like the historical evolution of Wikipedia as a mass collaboration project, are relevant when measuring the gender disparity in deletion discussions. Since Wikipedia is a repository of both historical and contemporary knowledge, we also considered two more factors: the additional considerations that Wikipedians typically take into account when debating about the merits of living people to be featured on Wikipedia, and the challenges in finding information about historical figures. In the Discussion section, we go back to the motivating research question, consider the main limitations of our analyses, and point to ways in which future work can build on our approach.

2 Background

While traditional encyclopedias are typically curated by experts and editorial teams who determine content based on their expertise, Wikipedia relies on contributions from volunteers, enabling anyone to edit through open collaboration, thus making it accessible to everyone. To maintain content reliability and quality within its open platform, the Wikipedia community has set up rules and guidelines that mobilize the collaborative efforts of contributors in creating, deleting, or improving articles. In the following sections, we begin by highlighting power dynamics and governance in online communities, including Wikipedia, drawing on prior CSCW and HCI scholarship. We then turn to the gender gap in content and the community, highlighting how the Wikipedia community applies standards for the subjects of biographies. We then discuss attempts made to bridge this gender gap in content and the challenges encountered. Additionally, we explore how the standards for subjects are applied in the deletion process and develop hypotheses to test if there is a gender disparity in the application of these standards in deletion consideration.

2.1 Power Dynamics in Online Communities

The CSCW literature has a long-standing tradition of examining how contributions are created, negotiated, and valued within online communities, including peer production systems [25, 89], social media platforms [4], and citizen science projects [53], among others. While many of these systems are celebrated for enabling open participation, research shows they are never truly neutral [11, 31]. As Kraut and Resnick [49] argue, the success of peer production systems depends not only on participation by users but also on how underlying social and technical factors shape collaboration, norm enforcement, and inclusion, of both users and content. These factors embed specific values – whether through how authority is delegated, behavior is rewarded, or norms are enforced. Star and Ruhleder [68] conceptualize these forms of “infrastructure” as a site of power, shaping who can participate and how, while Gillespie [26] observes that social media platforms curate public discourse not just through visible moderation but also through invisible algorithmic choices. These insights underscore that online collaborative platforms function not merely as neutral spaces but as socio-technical systems that actively structure participation, authority, and legitimacy – often in ways that reflect and reinforce existing power dynamics.

This framing is especially important when considering persistent gender imbalances in open collaboration systems. Prior CSCW work has shown that women face systemic barriers to meaningful participation in platforms such as Wikipedia and open-source communities. Subtle gendered interaction patterns [22, 62], coupled with design practices historically led by men, can produce environments where male contributors dominate participation. Also, women often face lower confidence, receive more critical or dismissive feedback, and are less likely to influence content or governance decisions [12, 48]. These structural issues, combined with this particular social dynamics, have positioned male contributors as the dominant group from the outset. Consequently, their perspectives are embedded in editorial norms, policies, and governance practices – shaping the platform’s assumptions about what constitutes legitimate knowledge and participation.

This dynamic reflects what Bourdieu [9] describes as symbolic power – the ability of dominant groups to impose and naturalize their worldview as common sense. Symbolic power does not function necessarily through overt exclusion but through subtle mechanisms that shape which contributions are seen as credible, and which norms are accepted as neutral. In the context of Wikipedia, policies and guidelines may seem objective, but are often interpreted and enforced through the lens of dominant contributor groups [59]. This creates a self-reinforcing cycle: contributions by or about marginalized people are more frequently questioned, scrutinized, or removed, while systemic exclusion – when happening – is framed in terms of procedural fairness.

Feminist HCI scholars have long warned that platform design and policy frequently reflect the values of dominant social groups – typically male, Western, and institutionally resourced. In response, they have advocated for more inclusive, reflexive, and justice-oriented approaches to technology design and evaluation [6, 14, 33]. In the context of peer production community like Wikipedia, these critiques prompt renewed attention to how content standards are defined, how editorial authority is exercised, and how community policies are experienced differently by marginalized contributors.

Expanding on this, recent CSCW researchers have increasingly turned to the concept of epistemic injustice to analyze how systems for knowledge creation and curation – such as Wikipedia, citizen science forums, online health forums, open-source community platforms, and content moderation systems on social media – may marginalize certain users or contributions and delegitimize alternative standpoints [2, 3, 17]. Building on Fricker’s framework [51], epistemic injustice refers to the ways individuals are wronged in their capacity as knowers – either by being treated as less credible (testimonial injustice) or by lacking the shared interpretive frameworks needed for their

knowledge to be fully understood (hermeneutical injustice). In the context of Wikipedia, this lens highlights how seemingly neutral editorial standards may disproportionately devalue knowledge about certain individuals. Rather than focusing solely on who contributes, our work centers on whose lives and contributions are considered worthy of being written about and preserved – and how quickly those representations become vulnerable to deletion. These dynamics raise broader concerns about how platform governance may reproduce structural inequities in the recognition, preservation, and erasure of knowledge.

2.2 Gender Gap in Content and Community

The lack of representation of women in the biographies on Wikipedia has garnered extensive attention and analysis in various studies. For instance, Reagle and Rhue compared English Wikipedia with the Encyclopedia Britannica, finding a significant lack of biographies of women on Wikipedia, despite its otherwise broad coverage [63]. The aforementioned work of Konieczny and Klein [46] on the Wikidata Human Gender Indicator further confirmed this disparity, showing that only 18.51% of biographies on English Wikipedia are about women. Similar results hold across various popular language editions of Wikipedia, including French, Arabic, Polish, Italian, Russian, German, and Spanish, with the percentage of biographies of women ranging between 17% and 23% [45]. Even though it is challenging to place these numbers within perspective, lacking a ground truth about the completeness of these classes within society [61], within specific fields of knowledge, Adams *et al.* [1] reported the limited representation of female sociologists on Wikipedia, while Schellekens *et al.* [65] observed similar trends in the fields of Physics, Economics, and Philosophy, suggesting the presence of ongoing disparities across different fields.

This gender disparity in biographical coverage is not limited to contemporary or modern periods but extends into the historical record. A systematic analysis by Laouenan *et al.* [52] found that the gender gap is particularly pronounced for individuals born between the 17th and 18th centuries, with women representing only 5% to 10% of available biographies from that period.

These findings collectively highlight the ongoing challenges faced by women for representation on Wikipedia, and have spurred an ongoing debate and self-reflection within the Wikipedia community. Due to its open nature, the content we see on Wikipedia necessarily reflects the interests and preferences of its community, but the existing gender gap in biographies may also indicate the possibility of different editorial standards being applied to women. Indeed, Ford and Wajcman [21] argued that while Wikipedia aims to encompass all knowledge, it has not adequately represented the knowledge of everyone due to the lack of diversity in its community. In 2019, Katherine Maher, then CEO of the Wikimedia Foundation, reported that women make up only 15–20% of total contributors [42]. This lack of diversity in the editor base may also influence which articles are prioritized for development. The study by Houtti *et al.* [36] examines how Wikipedia's *Vital Articles* (VA) list, curated by volunteer editors to prioritize the development of specific topics or articles, represents gender. It compares the VA list with other ranking methods, such as PageRank, Pageviews, and past Edit Count. Among the 794 editors identified as having participated in VA talk page discussions, only 7.1% (56) of those listing their gender identify as women, compared to 12.9% on English Wikipedia overall. The study found that the VA list under-represents women, making up 8.9% of the top 1000 articles and 10.8% of the top 10,000 articles. This underscores the need for a greater understanding of how the Wikipedia community applies standards for the subjects of biographies.

On Wikipedia, notability is regarded by editors as the golden standard to determine if a particular subject deserves its own entry [82]. In particular, the notability guidelines of biographies specify that individuals are deemed notable if they have received substantial coverage in multiple reliable,

published, secondary sources independent of the subject [83]. The content we see on Wikipedia results from the notability tests conducted during collective editing and deliberation processes.

Several studies have tried to observe how the standard of notability is applied to the subjects of Wikipedia biographies, though there is not an accepted operational definition of it nor it is clear whether it is being applied consistently. For instance, as proxies for the notability of a given individual, Wagner *et al.* [73] used the number of distinct language editions having a Wikipedia entry about that person, as well as the number of results returned by the Google search engine when searching the person by name. They found that, on average, women on Wikipedia possess higher notability than men, suggesting the presence of a “Glass Ceiling” effect: an invisible yet significant barrier that prevents women from attaining significant levels of visibility, recognition, or representation within the platform. This effect implies that Wikipedia editors may inadvertently establish a more stringent notability threshold for women, affecting their representation and acknowledgment on Wikipedia. This effect holds for historical figures too, as women face a higher threshold for recognition due to historically inadequate documentation of their merits and limited coverage across languages [76].

In another study focusing on academics, Lemieux *et al.* [54] took an intersectional approach to determine whether the notability guidelines of Wikipedia are applied consistently across genders and different racial backgrounds, and in particular when the label “too soon” is applied in the deletion process. This term is invoked within an AfD deliberation to signal that an individual does not yet possess adequate coverage in independent, reputable sources, and thus it is ‘too soon’ to grant them a Wikipedia entry [84]. Using again the coverage of individuals in search engines as a proxy for their notability, the authors found that biographies of female scholars with high media coverage were more likely to be deleted with a “too soon” rationale, regardless of their racial backgrounds. This was not the case for male scholars, suggesting inconsistent enforcement of the “too soon” policy.

Taken together, these studies indicate that there may be systemic biases present in the notability assessment process of Wikipedia, particularly affecting women and individuals from marginalized groups. However, the measures used to quantify notability in these studies may not fully capture the way that Wikipedia editors assess notability. This limitation arises for two primary reasons: first, each measure, such as the number of language editions or search engine results, has its own constraints and may only capture certain aspects of notability. For instance, a higher volume of search engine results does not guarantee reliable sources that accurately reflect the notability of a person. Second, even if we could precisely quantify notability based on Wikipedia guidelines (i.e., coverage in multiple, independent, and reliable sources), this might still not align with how editors actually assess notability in practice. Schneider *et al.* [65] found that notability is frequently invoked in collaborative decisions concerning the deletion of biographies during the Articles for Deletion (AfD) process. Since notability assessments are an integral part of the editorial process, articles may face nomination for deletion at any stage of development over their lifecycle. Therefore, examining when the deletion deliberations occur and whether the deletion outcomes vary based on the gender of the subjects in these biographies can reveal if the notability standards are applied consistently.

2.3 Feminist Interventions

To counter these trends, a number of feminist interventions have been proposed over the years. Wikimedia Foundation board member Rosie Stephenson-Goodknight has emphasized that, along with increasing the number of women within the community of editors, it is especially crucial to improve the coverage of content about women [42]. In line with this idea, and as a precursor to it, the “Women in Red” (WiR) [86] WikiProject was established in 2015, with the goal to highlight

women who had previously not been prominently featured or acknowledged on the platform, by creating new biographical entries about them. The project owes its name from a feature of the wiki software. In Wikipedia and other wikis, red links in the text of articles indicate that they are linked to pages that either do not exist or previously existed but have been deleted. Adding red links to text during the editing of the articles essentially encourages other editors to create new pages and turn the red links into blue. Since its inception, the Women in Red community sought to turn red links pointing to the missing biographies of women into blue, successfully increasing the percentage of biographies of women from 15% to 19% [87]. Aside from Women in Red, several other feminist movements like “Art + Feminism” and “500 Women Scientists” paved the way to bridging the gender gap [50].

However, despite all these attempts, biographies of women still continue to face deletion challenges. Tripodi [72] studied the Women in Red project and identified several instances in which notable women had been nominated for deletion shortly after their creation. She also noted that content about notable women, even when added and protected by community efforts like Women in Red, can still face prompt deletion. Aside from coordinating and participating in events aimed at enhancing the representation of women on Wikipedia, editors also have to allocate significant time to ensure their articles remain intact and survive deletion attempts [72], which adds more burden and emotional labor to the fight for bridging the gender gap.

2.4 Deletion Process

Schneider *et al.* [65] identified four different deletion processes in Wikipedia: Speedy Deletion (CSD), Proposed Deletion (PROD), Proposed Deletion for Biography of Living People (BLPPROD), and Articles for Deletion (AfD). *Speedy Deletion* covers all situations where deletion is clearly the most appropriate, and least contentious, action, such as vandalism, hate content, duplicates of existing pages, etc.; *Proposed Deletion* applies to situations that do not fall under the CSD guidelines but for which no opposition to the deletion is expected, like articles about promotional products; *Proposed Deletion for Biography of Living People* applies to biographies of living individuals that lack referenced merits; and finally, *Articles for Deletion* applies to all those remaining case where editors are called to evaluate subjects where there is uncertainty or a lack of consensus regarding their notability.

What distinguishes AfD from other processes is its focus on notability assessment, achieved through extensive discussion and deliberation. Editors can nominate articles for potential deletion based on a number of notability concerns. Once nominated, an entry is listed on a web board where self-selected editors are invited to provide comment about any of the nominated entries. Discussants typically suggest a range of actions, the most common of which can result in either the deletion of the article (*Delete*), the replacement of the entire entry with a pointer to an existing entry (*Redirect*), and the merging of the entry with an existing entry (*Merge*). If no consensus is reached, or notability is affirmed, the page is left as is (*Keep*). After a period of about one week an administrator editor reviews the discussion, implements the decision, and closes the discussion.

Due to the self-selected nature of AfD discussion bodies, several prior studies have focused on how the group composition of these deliberation affects their outcomes [40, 58, 69, 70, 74]. Taraborelli and Ciampaglia [69] were among the firsts to show that the editors who take part to deletion discussions tend to fall under two different camps, known as the *inclusionists* and *deletionists*, based on their tendency to deliberate in favor of either Keep or Delete outcomes. Later, Tasnim Huq and Ciampaglia [70] used Gaussian mixture models to categorize editors based on their past record of deliberation. They found evidence for a more fine-grained taxonomy with a distinction between strong and weak Inclusionist / Deletionists, and showed that the composition of the group of discussants in terms of this group membership is a strong predictor of the outcome

of an AfD. This suggests that AfD deliberations may have a hard time to reach a consensus when editors from these polarized groups are part of the discussion, thus likely leading to longer, and more debated deliberations.

2.5 Gender Disparity in Deletion Process

A number of studies have focused on the role of deletion deliberations in the gender gap on Wikipedia. Worku *et al.* [88] examined whether content preferences of editors for gendered content influence the outcomes of deletion deliberations. The study found no evidence of systematic biases in deletion decisions of articles that are of interest to men and women. However, the authors did not consider factors influencing the selection of articles for deliberation, like at what stage in the editorial cycle of an article the nomination for deletion tends to occur. This is a crucial question, since deletions are part of the regular collaboration process of editorial development of the encyclopedia. Wikipedia editors choose a topic, start writing articles, and gradually develop the articles by adding content and references. Meanwhile, the other editors use the information they have access to (either present in the the entry itself or in external sources) to assess the notability of the entry subject, and based on this information argue for its inclusion or deletion in case of an AfD. Articles nominated prematurely in this editorial cycle may not have enough time to develop and thus to aggregate enough notability information.

Relating notability discussions in AfD to the gender gap, in addition to the aforementioned analysis of WiR, Tripodi [72] also conducted a comparative analysis of discussions regarding the deletion of biographies of women and men. She analyzed the AfD discussions of 22,174 biographies nominated for deletion between 2017 and 2020. She found that biographies of women were more likely to be nominated for deletion than those of men, even though they were also more likely to be kept (i.e., to be found to be notable) as a result of the subsequent AfD deliberation. This is evidence that women are being ‘miscategorized’ as less notable than men. However, in this study, there is no way to determine at which stage articles were nominated after their creation. This means that the study did not account for the varying survival rates of articles before their nomination.

Consistent with these findings, Martini [56] showed that the women who are the subject of nominated biographies are more often called into question and discussed more controversially in AfD, suggesting that the notability of women is closely monitored and more vigorously challenged due to biased views. These studies suggest that editors in AfD might promptly question the notability of women in biographies, highlighting the importance of understanding what factors may affect the chance of nomination for deletion over the lifespan of the articles.

3 Hypothesis Development

There are multiple reasons why it is important to estimate the chances of an article being nominated for deletion over its lifespan. First, several studies have shown that the biographies that have been on Wikipedia for a long time tend to undergo multiple edits, revisions, and reviews by editors, leading to an incremental improvement in quality with collaboration over time [20, 75, 90]. Consequently, this suggests that biographies take time to develop fully, with a richer set of references and content. Second, the efforts of the Women in Red community and several feminist interventions have led to a significant increase in biographies about women in recent years. Compared to entries that have existed for many years, newly created articles tend to be shorter and less developed, and thus face greater challenges and undergo more scrutiny for quality, often being considered for deletion. Thus, there may be a possibility that the notability of women is questioned when their newly created biographies are still in the development process. Therefore, inspired by Tripodi [72], we aim to test the following hypothesis:

H1: *The biographies of women have a higher likelihood of being quickly considered for deletion compared to those of men in AfD.*

In particular, we aim to address this question while accounting for additional factors that could influence considerations for deletion, which we detail in the next set of hypotheses.

Wikipedia has undergone significant changes and developments since its inception, including shifts in structure, norms, policies, topical trends, and editorial community engagement [35, 60]. Over the years, Wikipedia has expanded its coverage from central encyclopedic topics to encompass a wide range of general and specialized subjects. As the reach and popularity of Wikipedia have grown over time, the Wikipedia community has gradually established stringent rules for entry to maintain the quality of content and to prevent scams and vandalism [44].

As a result of the growing awareness toward the gender gap in coverage, the number of biographies about women has increased in recent years. On one side, there are efforts to include a broader range of women in the encyclopedia but, on the flip side, debates are emerging in AfD about whether allowing them compromises the standards of Wikipedia [56]. Thus, there is a possibility that entries about women created in recent years may have been increasingly targeted for deletion. Furthermore, the trend in editor retention has shifted since 2006, with a noticeable drop in participation from newcomer editors [30]. This change has significantly impacted the level of engagement in deletion discussions within AfD over time, such as a reduced participation in deletion discussions by newcomer editors [23]. One study, for example, has found that a vast majority of newcomer article creators do not participate in Articles for Deletion discussions regarding articles they have started [24].

To examine whether there is a gender disparity in how quickly biographies are flagged for deletion on Wikipedia, we test the following hypotheses:

H2(a): *Biographies created in recent years are nominated for deletion in AfD faster than in earlier years.*

H2(b): *Biographies of women created in recent years are nominated for deletion in AfD faster than in earlier years.*

When analyzing the timing of nomination for deletion of a biography, it is also crucial to take another dimension into account, which is the *living status* of its subject, i.e. whether the subject of the biography being discussed is alive or deceased. Establishing the notability of living people (BLP) is especially challenging, since subjects may be experiencing brief bursts of notoriety, and the quality and availability of external sources may be lacking or in flux. Being featured on Wikipedia also symbolizes status, and individuals often strive to be listed on Wikipedia and invest significant time and effort toward that goal, even though the standards of Wikipedia discourage self-promotion and try to maintain objectivity by preventing conflicts of interest [81]. Finally, there are additional limits imposed on what can be covered about living subjects, the presence of unflattering information about themselves on Wikipedia could lead some subject to consider taking legal action. Indeed, Joyce *et al.* [41] have shown that the AfD process can be a mechanism to handle the biographies of living people when they are deemed to be controversial.

When it comes to gender, it is important to account for the living status of the subjects for two reasons: first, among biographies of living people, roughly 25% of them are women [28], and this figure rises to 50% when focusing on professions other than athletes; second, over the past century, awareness toward gender equality has become generally more common in society, leading to a reasonable expectation of a higher representation of women among notable figures worthy of inclusion in the encyclopedia [46]. Therefore, there is the possibility that the proportion of women

featured in articles about living people is significantly higher compared to the overall ratio of women across all biographies. To confirm whether being alive influences the likelihood of being nominated for deletion more than gender, we test the following hypotheses:

H3(a): *The biographies of living people are nominated for deletion sooner than those of deceased people in AfD.*

H3(b): *The biographies of living women are nominated for deletion sooner than those of living men in AfD.*

Prior studies about gender and AfD have not provided insights into the persistence of the gender gap in biographies of historical figures. Several studies found that Wikipedia is heavily biased toward contemporary knowledge, which means the number of historical figures is lower than the number of contemporary figures in Wikipedia [38, 52]. Also, Wikipedia contributors have less tendency to create content related to the past since collective or social memory decreases over time [5]. However, Jatowt *et al.* [39] discovered that articles about historical figures tend to be more comprehensive than those about contemporary individuals. Particularly, they observed a decline in the length of articles for individuals born after the 17th century. This raises questions about the risk of nominations for deletion of historical figures in AfD, especially considering the lack of female historical figures on Wikipedia [52, 74]. This motivates us to test the following hypotheses:

H4(a): *The biographies of historical people are nominated for deletion sooner than those of contemporary people in AfD.*

H4(b): *The biographies of historical women are nominated for deletion sooner than those of historical men in AfD.*

It is crucial to understand what happens to biographies after being nominated for deletion in AfD discussions. Prior studies by Tripodi [72] and Martini [56] have focused primarily on the binary outcomes of deletion and inclusion in AfD debates. However, other outcomes, such as the merging with existing articles or redirecting to different entries, are also common in AfD processes. These alternatives, while not resulting in deletion, do not necessarily mean that the affected biographies are preserved as independent entries. Merging often results in an entire biography being absorbed into another entry, and redirection in a biography becoming a subtopic within a broader topic. This is especially important when considering the visibility and recognition of biographies of women on Wikipedia, as many redirected or merged articles may still reflect reduced prominence and independence. Additionally, Martini [56], which focused on the German Wikipedia, showed that debates concerning biographies of women tend to be longer and more extensive. This highlights the need to examine the duration and likelihood of all outcomes — not just deletion — to better understand how these dynamics unfold in the AfD in English Wikipedia. That motivates us to test the following hypotheses:

H5: *AfD deliberations to delete entries about women are faster than those of men.*

3.1 Our Contribution

In this study, we make three contributions:

- (i) We employ survival analysis to explore potential gender disparities in the timing of nomination for deletion, covering the entire history of the AfD process from January 15, 2001, to November

3, 2023. This allows us, among other things, estimate the likelihood of survival from nomination for deletion over the entire history of Wikipedia.

- (ii) We contribute empirically to a better understanding of nomination for deletion patterns by examining various factors, including the characteristics of biography subjects such as gender, living status, and historical status, as well as the chronological ages of the Wikipedia project itself. These analyses provide insights into the dynamics of deletion nominations and their associations with different factors.
- (iii) Beyond the decision to nominate an article, we examine the aforementioned factors and their impact on the outcomes of AfD discussions. To achieve this, we employ a multi-state survival model, which captures both the risk of nomination as well as that of different competing events (i.e., the different outcomes of an AfD) following the nomination stage.

4 Methodology

Our analysis required us to collect data about the following pieces of information: (i) the list of all existing biographical entries in Wikipedia; (ii) the list of all biographical entries nominated for AfD; (iii) the date of nomination for deletion of the biographies in AfD; (iv) the creation dates of both nominated and non-nominated biographies. (v) the list of biographies about living people and deaths by decade; (vi) the gender, date of birth, and date of death of the subjects of all the biographies mentioned above; and finally (vii) the logs of conversations, recommendations and outcomes of AfD discussions. We describe data collection for each of these in the following section. We then briefly describe the main statistical framework (survival analysis) we employ for our study, and how it can be extended to account for the presence of multiple states and multiple competing risks (i.e. different deliberation outcomes).²

4.1 Data Collection

4.1.1 Biographies selection and entry life cycle metadata. Unfortunately, Wikipedia lacks a single source of truth to reliably identify its biographical entries. Instead, the biographical status of an encyclopedic entry must be inferred either from available metadata or via manual coding. For example, Tripodi [72] relied on a mix of metadata (deletion sorting lists maintained by AfD participants, plus entries about women tagged by the Women in Red project) and manual coding to identify biographical content and its associated gender. However, this approach is not scalable beyond a certain size. Because our goal is to study the deletion process in its entirety, the dataset we employ for our analysis, which comprises of a total of 1,975,779 biographies with complete information on their entry life cycle (i.e., time of creation, nomination, and deletion), is a sample of the full set of Wikipedia biographies, compiled starting from two main sources of metadata.

First, we used Quarry [80] to query the Wikipedia database for all entries marked, by means of a category link, as within the scope of WikiProject Biography [85], the main community effort devoted to maintaining biographical content on the English Wikipedia. This query yielded 2,017,869 biographical entries (henceforth referred as the ‘WP-Bio’ set). Second, we queried Wikidata for all the records with the Q5 property, which is used to identify instances of the ‘Human’ class within the Wikidata ontology [77]. This yielded a separate set of 2,050,178 records (the ‘Q5’ set). Note that these two sets differ in their composition. The former includes only *extant* Wikipedia biographical entries i.e., either because (i) never nominated, or (ii) nominated and kept or (iii) nominated, deleted, and finally recreated at a later time; the latter includes, besides extant biographies, also subjects for which either an entry in Wikipedia has never been created, or for which, at a certain point, a

²The data and code to replicate all analyses is provided at: <https://github.com/CSDL-UMD/Survival-of-the-Notable-in-Wikipedia>.

Wikipedia entry had been created but had been later deleted, either because nominated for AfD or other deletion process (see Sec. 2.4).

Another challenge in defining our sample of biographies has to do with the fact that the relevant metadata needed to describe the life cycle of an entry (creation, nomination, deletion, etc.) is not recorded in any single location. Rather, it needs to be reconstructed from a snapshot of the Wikipedia database. This process is necessarily incomplete and required us to make certain simplifications.

If an entry has never been nominated for deletion, then the only relevant piece of information regarding its life cycle is the timestamp of creation. This information is stored in the ‘page’ table of the Wikipedia database, and we collected it using the Wikipedia REST API. If an entry has been nominated, the way to determine information about its AfD depends on the outcome of the AfD itself: for nominated entries that have been kept or redirected, we apply the same method used for those never nominated (i.e., we queried the ‘page’ table through the Wikipedia API); instead, for those that have been deleted or merged, we need to reconstruct this information from the ‘archive’ table of the Wikipedia database, which is the staging area where content is stored after deletion in Wikipedia.

For this latter step, to identify all biographies nominated (and later deleted) in the AfD process, we again used Quarry to extract 513,712 AfD deliberations that took place between January 15, 2001 and November 3, 2023. Note this is the *complete* set of all AfDs (i.e., not just those of biographies). To filter out AfDs of non-biographical content, we parsed the entry title from the title of the AfD discussion page, and matched it against the aforementioned set of Wikidata ‘Human’ records, which yielded a total of 87,873 biographies nominated for AfD deliberation. We then joined this list of AfDs against the ‘archive’ table to find all biographies deleted due to AfDs (i.e., either as result of a ‘Delete’ or ‘Merge’ deliberation), and extracted the timestamp of their creation.

Next, to estimate when the AfD nomination occurred (regardless of its outcome), we also extracted the timestamp of creation of the AfD discussion page itself, again querying the ‘page’ table in the Wikipedia database.

Finally, during this process, we came across a considerable number of entries (28,244) that had been recreated after having previously been deleted in an earlier AfD (i.e., whose creation timestamp from the ‘page’ table was *after* their timestamp of nomination). To resolve this discrepancy, and keep our multi-state modeling framework simpler, we queried the ‘archive’ table to find the original creation date and discarded the re-creation date. This approach ensured that each nominated entry appeared only once in the dataset (i.e., for their first nomination). This procedure reduced the number of AfDs to 84,366.

4.1.2 Deletion Discussions Metadata. We then parsed the contents of each AfD discussion to extract the title of the discussed entry, the rationale provided for nominating the entry, the final outcome of the deliberation, and the timestamp of the closing of the discussion. In addition to these, we also collected variables describing the size of the deliberation, such as the number of participants, the number of messages posted, and the average number of words per message. Because the language used to describe the possible outcomes of an AfD varies greatly, we consolidated the labels based on the classification of editorial outcomes described in Table 1.

4.1.3 Vital Records and Historical Classification. Similarly to the entry life cycle information, we were confronted with several challenges when collecting vital records information about the subjects of the biographies. Even though many biographical entries in Wikipedia include some vital record information (like date of birth or and death), we decided to rely exclusively on Wikidata, which provides this information in a more structured format.

Therefore, we accessed Wikidata, both via its SPARQL endpoint and its REST API, to collect gender, date of birth, and date of death of the members of the Q5 set. We then matched individuals

Table 1. Classification of editorial outcomes of AfD

Outcome	Parsed Outcome
Delete	Delete, Deletion, Deleted, Speedy Delete, Snowball Delete, Strong Delete, Weak Delete, Soft Delete, Speedied, Remove, Erase, Not Include, Not Keep, Copyvio, A7, Delete G7
Keep	Keep, Kept, Inclusion, Include, Speedy Keep, Snowball Keep, Strong Keep, Weak Keep, Soft Keep, Userfy, Userfied, No-consensus, No Delete, Moot, Move, Procedural closure, Close, Withdraw
Redirect	Redirect to, Redirect into, Redirect with, Redirected
Merge	Merge, Merged, Merge all, Merge to, Merge into, Merge with

in Q5 to their respective Wikipedia entry (if any) using its Wikidata item identifier ('wikibase_item') recorded in the Wikipedia database. This join resulted in a subset of 1,965,822 extant biographical entries (from the 'WPBio' set) matched to their Wikidata records ('Q5' set) with complete vital records information. In matching these two sets, we found that only 52,047 biographies could not be matched to a Wikidata entry. For deleted entries, since they are not included in the WPBio set, we instead matched members of the Q5 based on the title extracted from the 'archive' table.

After removing entries with other genders, in this final dataset ($N = 1,975,779$), we found 1,584,817 (80.21%) men and 390,962 (19.78%) women (see Table 2 for a full breakdown). Among them, we have the dates of birth for 90.6% of the subjects, dates of death for 40.5% of the subjects, and both pieces of information for 39.4% of the subjects.

To determine whether an individual is a contemporary or historical figure, we compare their date of birth against a conventional cutoff: if the subject was born before 1907 (the year of birth of the known oldest living person at the time of our study [78]), we categorize the biography a 'historical', based on the idea that nobody categorized as such should still be alive. Else, if the date of birth is after 1907, we categorize the subject as either 'contemporary alive' or 'contemporary dead' based on whether a date of death is recorded in our data. For subjects who lacked a date of birth but had a date of death, we estimated their date of birth by subtracting the average life expectancy of the remaining subjects (70 years) from their date of death. Since the choice of this cutoff is somewhat arbitrary, as a robustness test we also tested alternative cutoff dates and repeated our main survival analysis with those, finding results that are qualitatively similar to the one presented later in the main text, see Appendix A.

Finally, a small fraction of the subjects (8%) lacked both the date of birth and death information in Wikidata. To find whether they belonged to the set of historical or contemporary figures, we used PetScan [79] to match the titles of those entries against the lists provided by the Wikipedia categories on 'Living People' and 'Deaths by decade'. This process left 25,894 biographies (1% of the Q5 set) for which we could not find either a birth or death information. We manually checked a random sample of 100 of them, and found they were all alive at the time of study, hence we include all of them in the final dataset as 'Alive'.

To assess the accuracy of this heuristic classification, we manually reviewed a random sample of 500 biographies, verifying whether the subjects were historical, contemporary dead, or alive. We found that the accuracy of the information extracted from Wikidata and Petscan was 98% overall (100% for gender, 98% for living subjects, 96% for contemporary deceased, and 99% for historical figures).

4.2 Survival Analysis

Survival analysis is a statistical framework designed to estimate the duration until a particular event, such as a machine failure or the death of a patient under treatment, and for identifying potential factors influencing this likelihood. In this study, we apply this framework within the context of Wikipedia biography deliberations for deletion to gain insight into various aspect of the process, such as the time to nomination and the duration of the ensuing deliberation. Fig. 1 provides a schematic description of the events that characterize this process, and of whose duration we are interested in. After its creation, any entry remains the *created* state until it is *nominated* for deletion. A deliberation then determines which of four possible editorial outcomes (*Delete*, *Keep*, *Redirect*, or *Merge*) may happen. For each of the state transitions in Fig. 1, we record the duration (in days) before the transition happens. Because not all pages do get nominated by the end of our observation window, it means that our observations about the duration of stay in the ‘Created’ state are affected by (right) censoring. That is, a biography is considered censored if it was not nominated by the time of data collection (November 3, 2023). Note that, in our dataset, all entries that have been nominated also have a final deliberation outcome. In other words, none of the deliberation duration observations are affected by censoring.

In the following, we give a brief overview of the main elements of survival analysis for multi-state models with competing risks. We begin by describing the basic form of survival analysis for events of a single type (e.g. nomination), and then generalize to the case of multiple event types, which is suited to describe deliberations, with their multiple outcomes. All the analyses were carried out using the ‘lifelines’ Python package for survival analysis [16] and the ‘survival’ R package for the multi-state analysis with competing risks [71].

4.2.1 Survival Function $S(t)$. The probability of survival from, e.g., getting nominated for deletion after time t . In our study, we use the Kaplan–Meier estimator [43] to infer this probability, which is given by the following equation:

$$S(t) = \prod_{i: t \leq t_i} \left(1 - \frac{d_i}{n_i}\right) \quad (1)$$

where t is the time when at least one event (e.g. nomination) happened, d_i is the number of nominated entries at time t_i , n_i is the number of entries that have not been nominated yet at time t_i or are censored.

4.2.2 Hazard Function. We applied the Cox proportional hazards model [15] to estimate the risk occurrence of an event of interest (e.g. nomination) in terms of a set of variables denoted by vector $\mathbf{X} = (X_1, X_2, \dots, X_n)$ that increase or reduce the risk $\lambda(t|\mathbf{X})$ at time t as given by the following model:

$$\lambda(t|\mathbf{X}) = \lambda_0(t) \exp(X_1\beta_1 + X_2\beta_2 + \dots + X_n\beta_n) = \lambda_0(t) \exp(\mathbf{X}\boldsymbol{\beta}) \quad (2)$$

where $\boldsymbol{\beta} = (\beta_1, \beta_2, \dots, \beta_n)$ is the vector of coefficients that measures the impact of the variables in vector $\mathbf{X}$. The term $\lambda_0(t)$ is the baseline hazard when $\mathbf{X} = \mathbf{0}$, i.e. all the variables are equal to zero. Let $\mathbf{X}^{(i)}$ and $\mathbf{X}^{(j)}$ denote the vectors describing the variables for the i -th and j -th biography, then the hazard ratio HR between the two is

$$\text{HR} = \frac{\lambda(t|\mathbf{X}^{(i)})}{\lambda(t|\mathbf{X}^{(j)})} = \frac{\lambda_0(t) \exp(\mathbf{X}^{(i)}\boldsymbol{\beta})}{\lambda_0(t) \exp(\mathbf{X}^{(j)}\boldsymbol{\beta})} = \exp\left((\mathbf{X}^{(i)} - \mathbf{X}^{(j)})\boldsymbol{\beta}\right) \quad (3)$$

We fit the regression model of Eq. 2 to estimate the coefficients in vector $\boldsymbol{\beta}$. We report these estimates as the associated log (HR) associated to each β_i , relative to $\mathbf{X}^{(j)} = \mathbf{0}$. Negative values of β_i correspond to a reduction in the risk of occurrence for a unit change of variable X_i (all else equal), while positive values to an increase in risk.

4.2.3 Multi-state and competing risks model. Since AfD deliberation can lead to multiple competing outcomes (Delete, Keep, Redirect, and Merge), we use the Cumulative Incidence Function (CIF) [29] to estimate the marginal probability for each competing event, and thus to measure the impact of the above variables (e.g. gender or status) on the overall deliberation, as given by the following equation:

$$\text{CIF}_c(t_i) = \sum_{k=1}^i S(t_{k-1}) \cdot h_c(t_k) \quad (4)$$

where c denotes the event type, $S(t_{k-1})$ is the Kaplan-Meier estimator of survival up to time t_i , and $h_c(t_k)$ is the hazard function for event type c at any prior time t_k .

4.2.4 Regression variables. In all regression analyses, we encode ‘gender’ as a categorical value, with two levels – man (0) and woman (1) – we always report the coefficient associated to being a woman. Likewise, we use the vital records information defined above (see Sec. 4.1.3) to define a categorical variable ‘Status’ representing the vital status of a subject. This variable captures mutually exclusive levels: Alive, Contemporary Dead, and Historical. These levels combine two dimensions – living status (Alive/Deceased) and historical status (Historical/Contemporary) – and are used to support Hypotheses 3 and 4. Though conceptually close, H3 compares living and deceased subjects, while H4 compares historical and contemporary ones. As contemporary subjects may be either living or recently deceased, we test the hypotheses separately and also explore their interaction. Finally, to test Hypotheses H2(a) and H2(b), we include an interval variable representing Wikipedia’s age (in years) at the time of article creation.

Finally, for the competing risks analysis, since we consider only entries nominated for deletion, we also include in the regression additional variables to describe the deliberation itself. These variables include the number of participants, the number of messages posted, and the average message size (in words).

5 Results

Table 2 shows a breakdown of the number of entries by gender, nomination status, and living status of the subject. The date of birth of subjects ranges from 7999 BCE to 2022 CE. In our dataset, the proportion of women among nominated article (25%) is greater than among all articles ever published (20%), which is consistent with prior work [72].

Table 2. Data summary.

Gender	All	Nominated	History	Alive	Contemp. Dead
Women	390,962 334 (19.8%)	21,473 (25.5%)	64,369 (11.9%)	276,975 (24.9%)	49,603 (15.3%)
Men	1,584,817 (80.2%)	62,893 (74.5%)	472,436 (88.1%)	836,696 (75.1%)	275,637 (84.7%)
Total	1,975,779	84,366	536,805	1,113,671	325,240

5.1 Nomination for Deletion

In Figure 2, the Kaplan-Meier curves for men and women in biographies show early drops in survival, suggesting an “infant mortality” pattern. However, after this initial drop, the two lines exhibit different slopes. Notably, the curve for women drops further down than that of men, suggesting that biographies of women receive nominations for deletion more rapidly than their male counterparts. However, these patterns could be explained by various confounding factors described above (see

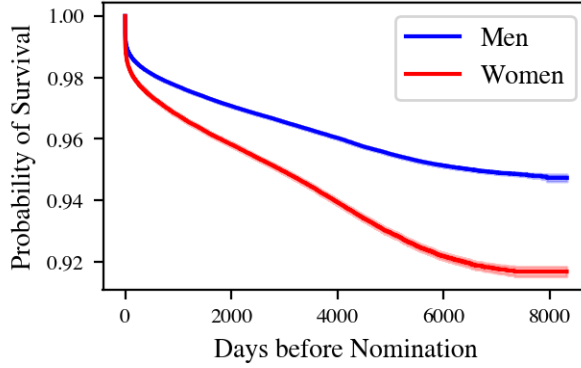


Fig. 2. Probability of survival from nomination for deletion. The shaded area corresponds to the 95% c.i.

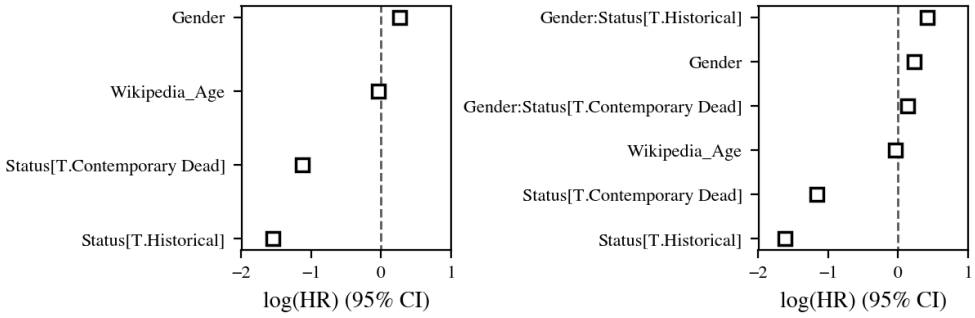


Fig. 3. Cox regression analysis. Left: Baseline model; Right: the model with interaction terms between gender and status. Error bars represent robust standard errors and are all smaller than the data points.

Sec. 3), and to account for these we employ the Cox proportional hazards model to assess the risk of nomination controlling for a number of variables (see Sec. 4.2.4).

Figure 3 (Left) shows that only gender is positively associated with nomination ($\beta = 0.23$, 95% CI [0.21, 0.25], $p < 0.005$), supporting H1: biographies about women are nominated 26% faster than those about men. Wikipedia age has a small but statistically significant negative association with nomination ($\beta = -0.02$, 95% CI [-0.02, -0.02], $p < 0.005$), suggesting that newer entries are nominated more slowly. This finding does not support H2(a). Also, the model supports H3(a): compared to living individuals, biographies of contemporary deceased ($\beta = -1.13$, 95% CI [-1.16, -1.11], $p < 0.005$) and historical figures ($\beta = -1.55$, 95% CI [-1.57, -1.52], $p < 0.005$) are nominated at a significantly slower pace. Specifically, contemporary deceased figures are nominated at a rate approximately 68% slower, and historical figures about 80% slower, than living individuals. Moreover, historical figures exhibit the lowest overall nomination risk – contradicting H4(a).

Figure 3 (Right) shows the results of the model with interaction terms between gender and status. A log-likelihood ratio test indicates that this model fits the data significantly better than the baseline model ($p < 0.005$). It reconfirms that both contemporary deceased and historical figures are nominated at a slower pace than living individuals. Specifically, the nomination risk is significantly lower for both contemporary deceased ($\beta = -1.16$, 95% CI [-1.19, -1.13], $p < 0.005$) and historical figures ($\beta = -1.62$, 95% CI [-1.64, -1.59], $p < 0.005$), again supporting H3(a) and further contradicting H4(a). However, the interaction terms reveal that the effect of gender differs

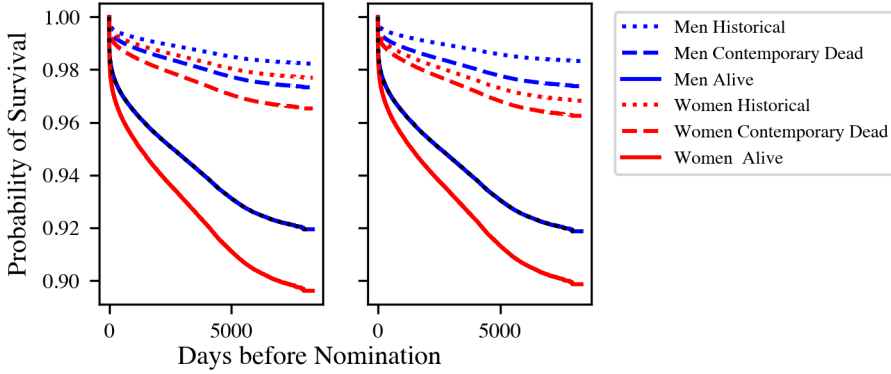


Fig. 4. Marginal effects of gender and status. Left: Baseline model; Right: the model with interaction terms between gender and living status.

across status groups. The interaction between gender and contemporary deceased status is positively associated with nomination ($\beta = 0.13$, 95% CI [0.07, 0.19], $p < 0.005$), and the interaction between gender and historical status is also positive and significant ($\beta = 0.42$, 95% CI [0.36, 0.48], $p < 0.005$).

To get a better sense of the effect of the interaction term, in the two panels of Fig. 4, we plot the partial effects of gender and status on the risk of nomination before and after incorporating the interaction terms. In particular, Fig. 4 (Right) shows that entries about deceased women – both historical and contemporary – are nominated earlier than their male counterparts, as reflected by their lower survival probabilities. To clarify these patterns, we compared the predicted partial hazards across gender and status groups. Among living subjects, women have a higher predicted risk (2.14) than men (1.78), a 20% increase. For contemporary deceased, women’s risk (0.76) exceeds men’s (0.58) by 31%. The largest disparity appears among historical figures, where women’s risk (0.66) is 78% higher than men’s (0.37). Notably, historical women (0.66) also face greater risk than contemporary deceased men (0.58), highlighting how gendered disadvantage can outweigh the temporal protection of historical status. These disparities align with the statistically significant gender–status interaction terms presented in Fig. 3 (Right), reinforcing the conclusion that women benefit less than men across different status. Together, these findings support H3(b): the biographies of living women are nominated for deletion sooner than those of living men and, in fact, face the highest nomination risk across all groups. These results also support H4(b): although historical figures are generally less likely to be nominated earlier, historical women are more likely to be nominated sooner than historical men, indicating that the temporal protective effect of historical status is weaker for women.

5.2 Deliberation Duration

What are the chances of receiving a particular deliberation outcome, and are deliberations about biographies of women different than those of men in terms of their duration? To answer these questions, we start by focusing on the biographies that reached the AfD deliberation stage. Table 3 provides a breakdown of these deliberations by the gender of the subject and their outcome.

By far, the two most common outcomes for AfDs are deletion (49.7%) and keeps (42.4%) – either due to consensus or lack thereof. Across all outcomes, there are more deliberations about entries of men than of women, owing to their higher prevalence in the encyclopedia. Furthermore, conditional on nomination, men are deleted at slightly higher rates (52.4%) than women (45.9%).

Table 3. Number of nominated biographies by gender and deliberation outcome.

Gender	Delete (D)	Keep (K)	Redirect (R)	Merge (M)	Total
Women	9,432 (23.1%)	9,786 (28.1%)	1,078 (27.9%)	269 (27%)	20,565 (25.6%)
Men	31,388 (76.9%)	25,010 (71.9%)	2,792 (72.1%)	725 (73%)	59,915 (74.4%)
Total	40,820	34,796	3,870	994	80,480

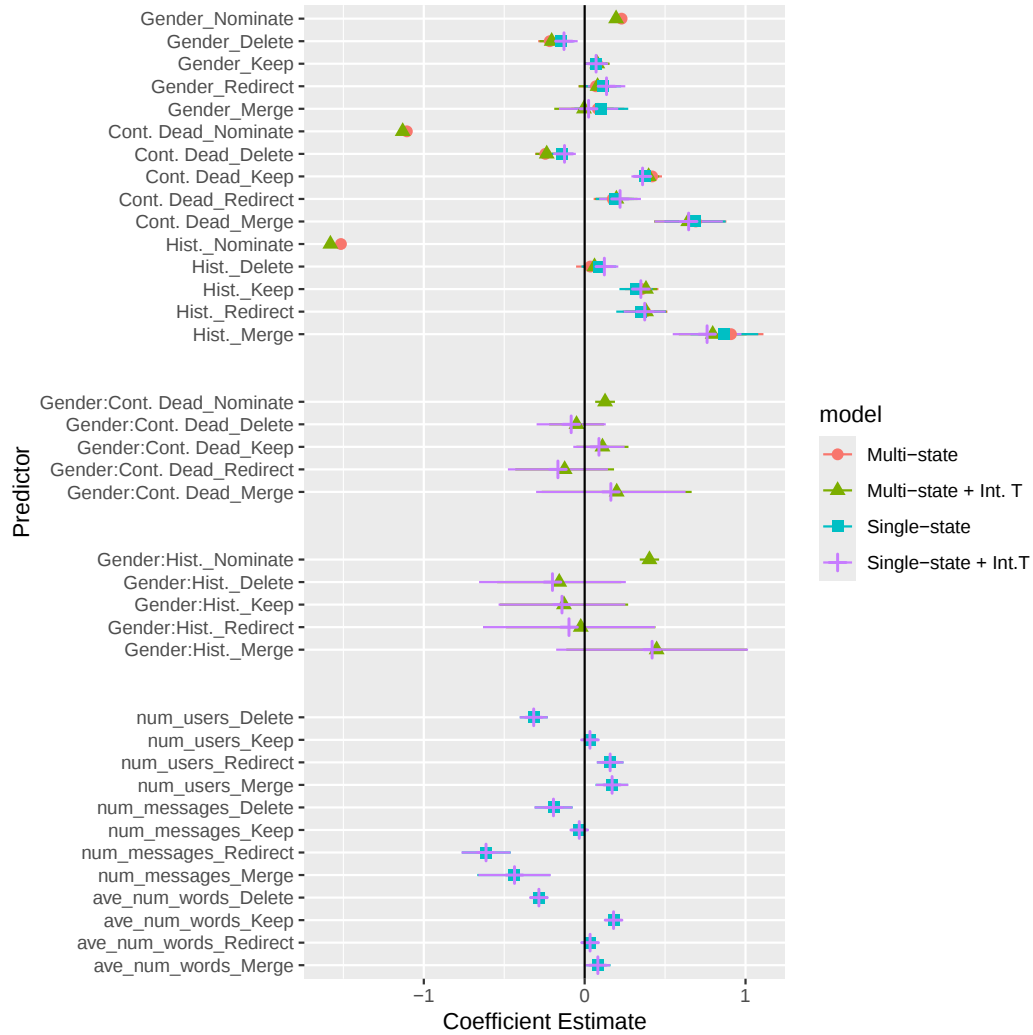


Fig. 5. Survival analysis with competing risks. The ‘multi-state’ models correspond to the full diagram in Fig. 1, while the ‘single-state’ models correspond only to the final transition in the diagram (i.e. without the ‘Created’ state). The error bars show the 95% confidence intervals.

To better understand the duration of deliberation for different groups of entries, we fit the full multi-state model with competing risks shown in Figure 1 to the full dataset of entries (i.e.

nominated and not nominated). Because this model includes both type of events (i.e. nominations and deliberation outcomes), we can compare its results with those of the vanilla survival model (i.e. without competing risks) used for the dataset with nomination events only.

Fig. 5 summarizes the results, which for nomination events closely mirror those obtained from the vanilla model in Fig. 3. Consistent with it, the risk of being nominated for deletion is significantly lower for contemporary dead (H3(a)) and historical (H4(a)) biographies compared to those of living individuals ($p < 0.001$), and significantly higher for biographies of women compared to those of men ($p < .001$; H1).

Moving to the effect of gender on the duration of deliberations for different outcomes, we find that deliberations to delete entries about women are significantly longer in duration than those of men ($p < .001$; H5), possibly suggesting a more disputed, and harder to reach consensus in those cases. For biographies of deceased individuals (both historical and contemporary), which generally face a lower risk of nomination, deliberations are significantly shorter overall compared to those of living individuals ($p < .001$), suggesting these cases are less controversial once nominated. An exception is observed for contemporary dead individuals, whose deletion discussions are significantly longer than those for living subjects ($p < .001$).

Adding interaction terms between gender and status to this full model confirms the results of Fig. 3 (Right) about the risk of nomination — historical and contemporary dead women face a significantly higher risk of early nomination compared to their male counterparts ($p < .001$), suggesting an additional disadvantage in the speed at which their biographies are subjected to deletion. For the duration deliberation, we mostly find non-significant results.

Finally, in Fig. 5 we also fit a separate competing-risk model only to the sub-dataset of nominated entries (Tab. 3). This allows us to control for additional variables describing the size of the deliberation (see Sec. 4.1.2). This model still entails competing risks, but is not a multi-state model anymore as it covers only the final transition in Fig. 1 — hence it is a single-state model with competing risks. We find that certain indicators of deliberation size are significantly associated with slower speed of consensus, regardless of the outcome. Specifically, a higher number of messages is linked to significantly longer durations to consensus across all outcomes ($p < .001$). Similarly, a greater number of users and longer messages are associated with slower consensus in deletion outcomes ($p < .001$), but with slightly faster consensus for other outcomes ($p < .001$). That said, controlling for deliberation size does not substantially alter the results of the full multi-state model, either with or without interaction terms between gender and status.

The competing risks analysis shows that decisions to merge and redirect are deliberated quickly, possibly suggesting these decisions are less contentious and easier to reach, especially for deceased individuals. In both of these outcomes, the nominated subject loses its status as an independent entry in the encyclopedia, and is instead tied to the entry of an alter — either a biography or a non-biographical entry. This raises the question of what type of alters these nominated entries are merged or redirect into.

Figure 6 shows the fraction of merges and redirects by gender of biography and type of alter. For both biographies of men and women, incorporation into a non-biographical alter is the most common forms of merge or redirection, followed by same-gender alter. We find, however, a strong asymmetry for merges and redirections into opposite-gender alters: the fraction of men merging or redirecting into women alter is very low ($< 2\%$), while the reciprocal (i.e. women being merged into men) is nearly an order of magnitude larger (20%). These observed patterns cannot be explained simply by the presence of more biographies of men, as the frequencies obtained by random reshuffling ($N = 10^3$) of the three possible alter labels (man, woman, non-biographical) significantly differ from the observed frequencies.

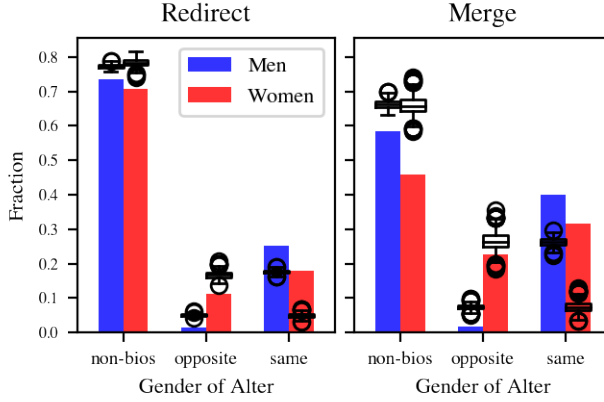


Fig. 6. Fraction of merge / redirect outcomes by type of gender of alter for deliberations of both men and women. The black box and whisker plots refer to the same fraction under random reshuffling of the alter labels.

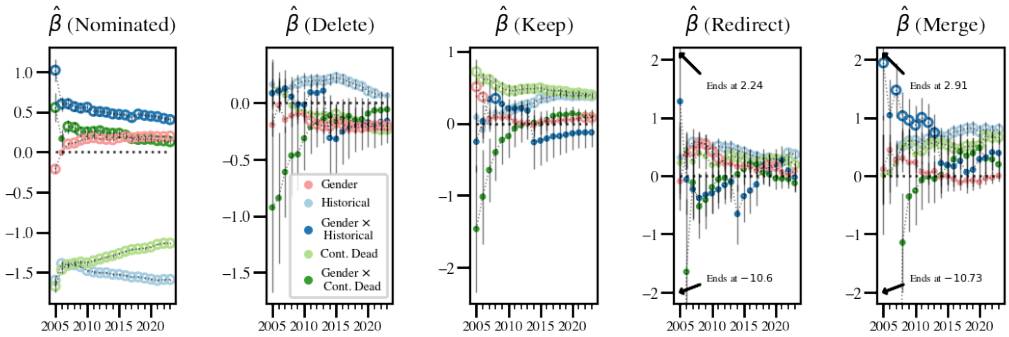


Fig. 7. Retrospective analysis of multi-state model with competing events. Each figure shows the trend of the coefficient of each outcome over time. In all the figures, each data point corresponds to the coefficients of the Cumulative Incidence Function, fitted only on the data of articles created up to that year. Larger circles indicate statistically significant coefficients ($p < 0.001$); smaller circles indicate non-significant results. The error bars represent robust standard errors. The black dash-dotted line corresponds to a coefficient value of zero.

Finally, in a retrospective analysis of the multi-state survival model shown in Figure 7, we observe how the coefficients of variables such as gender and status change, as we consider observations windows of different sizes. This allows to assess how the risks for nomination and for the duration of deliberations evolved over the history of Wikipedia. Early on, the effect of gender on nomination risk was negative (Figure 7(a)), but it increased steadily until 2006 and remained consistently and significantly positive relative to men thereafter ($p < 0.001$). Furthermore, both historical and contemporary deceased women have been at a statistically significant disadvantage relative to living men from the earliest periods onward, with elevated nomination risks persisting throughout the observed window ($p < .001$).

Since 2010, deletion deliberations for biographies of women have been significantly longer than those for men ($p < 0.001$), indicating greater contention in reaching consensus. In contrast, deliberations for historical figures were significantly shorter relative to those for living individuals – reaching a minimum around 2015 – and have subsequently slowed down ($p < 0.001$).

Deliberations to keep biographies of women have only very recently become significantly faster than those for men ($p < 0.001$). In contrast, deliberations for retaining contemporary deceased and historical subjects have consistently been significantly faster than those for living individuals ($p < 0.001$), suggesting that these cases are less contentious.

Decisions to redirect women were taken significantly more rapidly than those for men ($p < 0.001$) until around 2010, but have since slowed down. In contrast, decisions to redirect and merge historical and contemporary deceased individuals consistently yield small, yet significantly positive coefficients relative to those for living individuals ($p < 0.001$). Similarly, for merges, deliberations involving historical women were significantly faster than those for living men ($p < 0.001$) until the early 2010s, but have also slowed thereafter.

Finally, despite being not statistically significant, we also find a slow down in duration for deliberations regarding historical women happening around 2014. Since the ‘Women in Red’ initiative was established around that time (2015), it is possible that this intervention may have influenced the overall trends in AfD outcomes around that time.

6 Threats to Validity

Even though our analysis is based on the largest dataset of biographies nominated in the AfD process collected so far, our coverage is still limited, since the vast majority (68%) of the entries nominated for deletion in the AfD process are not present in our data. Thus, there might be a significant number of biographies still missing in our analysis. Furthermore, as we focus only on the AfD process, our analysis may miss entries deleted through other processes as PROD or CSD. Furthermore, our gender labels come from Wikidata, but since Wikipedia and Wikidata operate independently, its coverage of Wikipedia biographies is far from complete. Our study thus inherits any potential bias that may be present in the way gender information is annotated in Wikidata.

7 Discussion

Our study aims to provide an empirical foundation for the ongoing discussions surrounding the gender gap in Wikipedia, particularly investigating whether women in biographies are prone to nomination for deletion in AfD sooner than men and how gender influences the deliberations of those AfD discussions. Table 4 summarizes the results of our hypotheses.

Our research reveals a tendency to prematurely scrutinize the notability of women in the AfD at a higher rate than men. Since articles are continually being developed, the earlier they are nominated for deletion, the shorter the window for further development becomes. Thus, entries about women have lower chances to develop and improve on Wikipedia. Our findings are also consistent with the ‘miscategorization’ hypothesis [72]. Specifically, while articles about women are more likely to be nominated for deletion at an earlier stage compared to those about men, women are deleted at lower rate than men, and those deliberation that decide on delete, take longer, presumably because more disputed by editors.

This suggests that editors may prematurely nominate articles about women based on perceived lower notability, rather than thoroughly assessing the overall importance of the subject, even when they meet the notability criteria of Wikipedia with substantial media coverage [54, 56]. However, the decisions to keep, redirect, or merge these biographies point to a corrective mechanism within the AfD process, where deliberation shifts towards properly evaluating notability. Moreover, while it takes only one editor to nominate an article for deletion, saving it typically requires collective

Table 4. Findings (✓ = supported; × = not supported).

Hypotheses	Conclusion
H1: The biographies of women have a higher likelihood of being quickly considered for deletion compared to those of men in AfD.	✓
H2(a): Biographies created in recent years are nominated for deletion in AfD faster than in earlier years.	×
H2(b): Biographies of women created in recent years are nominated for deletion in AfD faster than in earlier years.	×
H3(a): The biographies of living people are nominated for deletion sooner than those of deceased people in AfD.	✓
H3(b): The biographies of living women are nominated for deletion sooner than those of living men in AfD.	✓
H4(a): The biographies of historical people are nominated for deletion sooner than those of contemporary people in AfD.	×
H4(b): The biographies of historical women are nominated for deletion sooner than those of historical men in AfD.	✓
H5: AfD deliberations to delete entries about women are faster than those of men.	×

deliberation. This highlights the vulnerability of the biographies of notable women to premature deletion due to insufficient assessment prior to nomination. It also indicates that the editors who nominate these articles and those who argue for keeping them might interpret the deletion policy differently.

Furthermore, our retrospective analysis shows that gender has long been a significant factor in deletion nomination risk, even after the deployment of feminist interventions like the “Women in Red” project. Moreover, we find that historical women pay a double price when it comes to nominations as they are disadvantaged (i.e., have a higher risk) for being both women and historical. Although contemporary living individuals have a higher chance of being nominated for deletion, living women face a greater risk of nomination than living men. Taken together, these findings suggest that the notability of women is quickly undermined, giving them fewer opportunities to enhance their Wikipedia presence. This phenomenon could be attributed to the societal perception that men hold greater value and worth than women [8, 18].

Another explanation of why women are quickly nominated for deletion stems from how they are described in Wikipedia. The entries of women are more likely to contain language indicating their gender [72]. The excessive use of gendered terms such as “female singer”, “wife of” or “daughter of” reinforces traditional gender roles and norms. This not only influences existing notions of masculinity and femininity but also molds the identity of the individuals being referenced [10]. This practice of labeling content about women with gendered language establishes a heteronormative structure, where a notable individual is automatically assumed to be male unless specified otherwise.

Using gendered terms in some specific cases, such as “female president” or “female astronaut” highlights the unique and pioneering aspect of the accomplishments of women, which indeed aligns with the criteria for notability of Wikipedia. However, contributors in AfD often argue that gender should not determine notability, leading to a quick dismissal of women [56].

Moreover, while this study lends support to the original ‘miscategorization’ theory, we provide a more complete picture of the full range of editorial practices associated with it. In particular, we find an asymmetry in the choice of alters into which merges and redirects occur, with opposite-gender alters being much less common for men compared to women. This could be because women are often portrayed as companions, partners, offspring, or relatives of notable men, rather than being

recognized as notable individuals in their own right. As a result, women who are redirected or merged into articles about men or non-biographical topics may continue to face reduced visibility as independent subjects on Wikipedia.

Conversely, the reverse pattern – merging or redirecting men into entries about women – is rare, indicating that men are less likely to be positioned as secondary figures or subtopics in biographies of women. This also suggests that men are not typically viewed as mere helpers or subordinates in relation to women.

Traditional historical narratives have long obscured, neglected, and distorted the rich and diverse experiences of women throughout history [55]. These narratives often focused primarily on the achievements, perspectives, and roles of men, leaving women and their experiences in the shadows. As a result, the voices and stories of women were marginalized or omitted in both offline and digital media, including Wikipedia, leading to an incomplete and biased understanding of historical events and societal developments [19, 32, 57]. The under-representation of women in historical and contemporary records and sources contributes to a perception of lower notability. This may prompt AfD contributors to undervalue women and take premature actions based on that perception.

The gender disparity observed in this and other studies is challenging to rectify and reflects a larger structural issue. However, Women in Red and other feminist interventions exemplify collaborative efforts to address the gender gap problem. From the retrospective analysis of the multi-state model, there is some limited evidence of reversals in some of the trends around 2015, suggesting that this and other feminist interventions may play a role in preserving biographies of women.

Our findings suggest that providing suitable time between creating and considering deletion allows biographies of notable people to be well developed, which is particularly beneficial for individuals for whom secondary sources might be challenging to find. One possible way to do this could be to design a recommendation interface for the AfD nominators that can help them assess the notability of the subject before flagging for deletion. In the long term, revising the Notability guidelines could also be a key step in addressing the gender gap on Wikipedia [59]. This revision should aim to promote inclusivity and facilitate the representation of a wider range of topics, including those related to women.

Future work should explore how editors seek information about the subjects of biographies on Wikipedia to assess notability, particularly focusing on gender differences and the types of reliable sources used as evidence. Adopting a mixed-method approach that combines quantitative analysis with qualitative examination of AfD discussions could reveal how notability assessments are evoked, interpreted, and debated in practice. Such efforts would deepen our understanding of the notability assessment process and help improve the reliability and inclusivity of content on Wikipedia.

Building on prior CSCW work [36], future research could also examine how ranking mechanisms of article prioritization impact deletion discussions. For example, ranking proxies like Pageviews and Edit Count have been shown to offer a more balanced representation of gender compared to community-curated lists. Incorporating such prioritization strategies into AfD workflows could support contributors in evaluating the inclusion or exclusion of biographies, potentially helping to mitigate gender disparities in notability assessments.

Our work also extends the engagement of the CSCW literature with epistemic injustice [2, 3, 17, 51]. Compared with prior work, we do not focus on whose knowledge is excluded, but on how inclusion standards are unevenly enforced. We interpret this as a form of testimonial injustice, where credibility is undermined based on gendered assumptions rather than content.

Aligned with Feminist HCI [6, 14, 33], our findings also emphasize how platform design and community norms often reflect dominant group values. By revealing how deletion practices can

disadvantage women, our study urges more reflective governance practices to support epistemic inclusion and equitable participation in collaborative knowledge systems.

Our retrospective analysis of the Articles for Deletion (AfD) process contributes to ongoing CSCW conversations about the value of historicist perspectives in understanding sociotechnical systems [66]. The patterns we identify show that gender disparities in content retention are not incidental, but shaped by the evolution of longstanding norms, editorial structures, and content policies. By tracing how knowledge design, governance, and policy have developed over time, this historical lens reveals how such systems influence whose contributions are preserved or removed. These findings highlight the importance of longitudinal analysis in uncovering structural bias and provide a basis for rethinking content governance toward greater equity. support more equitable and inclusive knowledge production in collaborative platforms.

In conclusion, our study contributes valuable insights into the ongoing discussions surrounding gender disparities and historical representation on Wikipedia, highlighting the challenges and opportunities for fostering a more inclusive and representative online encyclopedia.

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References

- [1] Julia Adams, Hannah Brückner, and Cambria Naslund. 2019. Who counts as a notable sociologist on wikipedia? gender, race, and the “professor test”. *Socius* 5 (2019), 2378023118823946.
- [2] Leah Ajmani, Mo Houtti, Jasmine C Foriest, Michael Ann Devito, Nicholas Vincent, and Isaac Johnson. 2023. Epistemic Injustice in Online Communities: Unpacking the Values of Knowledge Creation and Curation within CSCW Applications. In *Companion Publication of the 2023 Conference on Computer Supported Cooperative Work and Social Computing* (Minneapolis, MN, USA) (CSCW ’23 Companion). Association for Computing Machinery, New York, NY, USA, 527–531. doi:10.1145/3584931.3611280
- [3] Leah Hope Ajmani, Jasmine C. Foriest, Jordan Taylor, Kyle Pittman, Sarah Gilbert, and Michael Ann DeVito. 2024. Whose Knowledge is Valued? Epistemic Injustice in CSCW Applications. *Proc. ACM Hum.-Comput. Interact.* 8, CSCW2, Article 523 (Nov. 2024), 28 pages. doi:10.1145/3687062
- [4] Adriana Alvarado Garcia, Tianling Yang, and Milagros Miceli. 2025. What Knowledge Do We Produce from Social Media Data and How? *Proc. ACM Hum.-Comput. Interact.* 9, 1, Article GROUP37 (Jan. 2025), 45 pages. doi:10.1145/3701216
- [5] Ching-man Au Yeung and Adam Jatowt. 2011. Studying how the past is remembered: towards computational history through large scale text mining. In *Proceedings of the 20th ACM international conference on Information and knowledge management*. ACM, Glasgow Scotland, UK, 1231–1240.
- [6] Shaowen Bardzell. 2010. Feminist HCI: taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, USA) (CHI ’10). Association for Computing Machinery, New York, NY, USA, 1301–1310. doi:10.1145/1753326.1753521
- [7] Dawn Bazely. 2018. Why Nobel winner Donna Strickland didn’t have a Wikipedia page. <https://www.washingtonpost.com/outlook/2018/10/08/why-nobel-winner-donna-strickland-didnt-have-wikipedia-page/>.
- [8] Joseph Berger, Susan J Rosenholtz, and Morris Zelditch. 1980. Status organizing processes. *Annual review of sociology* 6 (1980), 479–508.
- [9] Pierre Bourdieu. 1991. *Language and symbolic power*. Harvard University Press, Cambridge, MA.
- [10] Judith Butler and Gender Trouble. 1990. Feminism and the Subversion of Identity. *Gender trouble* 3, 1 (1990), 3–17.
- [11] Aarjav Chauhan, Dipto Sarkar, Taneea S. Agrawaal, and Robert Soden. 2024. Value Tensions in OpenStreetMap: Openness, Membership, and Policy in Online Communities. *Proc. ACM Hum.-Comput. Interact.* 8, CSCW2, Article 380 (Nov. 2024), 25 pages. doi:10.1145/3686919
- [12] Benjamin Collier and Julia Bear. 2012. Conflict, confidence, or criticism: An empirical examination of the gender gap in Wikipedia. In *Proceedings of the ACM 2012. Conference on Computer Supported Cooperative Work, New York*. ACM, New York, NY, USA, 383–392.

- [13] L. Conway. 2018. The Disappeared: Beyond Winning and Losing. *Computer* 51, 10 (oct 2018), 66–73. doi:10.1109/MC.2018.3971344
- [14] Sasha Costanza-Chock. 2020. *Design justice: Community-led practices to build the worlds we need*. The MIT Press, Cambridge, MA.
- [15] David R Cox. 1972. Regression models and life-tables. *Journal of the Royal Statistical Society: Series B (Methodological)* 34, 2 (1972), 187–202.
- [16] Cameron Davidson-Pilon. 2019. lifelines: survival analysis in Python. *Journal of Open Source Software* 4, 40 (2019), 1317.
- [17] Michael Ann DeVito, Ashley Marie Walker, and Julia R. Fernandez. 2021. Values (Mis)alignment: Exploring Tensions Between Platform and LGBTQ+ Community Design Values. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW1, Article 88 (April 2021), 27 pages. doi:10.1145/3449162
- [18] Alice H Eagly and Wendy Wood. 1982. Inferred sex differences in status as a determinant of gender stereotypes about social influence. *Journal of personality and social psychology* 43, 5 (1982), 915.
- [19] Jennifer C Edwards. 2015. Wiki women: Bringing women into Wikipedia through activism and pedagogy. *The History Teacher* 48, 3 (2015), 409–436.
- [20] Lucie Flekova, Oliver Fersckhe, and Iryna Gurevych. 2014. What makes a good biography? Multidimensional quality analysis based on Wikipedia article feedback data. In *Proceedings of the 23rd international conference on World wide web*. ACM, New York, NY, 855–866.
- [21] Heather Ford and Judy Wajcman. 2017. ‘Anyone can edit’, not everyone does: Wikipedia’s infrastructure and the gender gap. *Social studies of science* 47, 4 (2017), 511–527.
- [22] Hana Frluckaj, Laura Dabbish, David Gray Widder, Huilian Sophie Qiu, and James D. Herbsleb. 2022. Gender and Participation in Open Source Software Development. *Proc. ACM Hum.-Comput. Interact.* 6, CSCW2, Article 299 (Nov. 2022), 31 pages. doi:10.1145/3555190
- [23] R.Stuart Geiger. 2011. Research:Alternative lifecycles of new users. https://meta.wikimedia.org/wiki/Research:Alternative_lifecycles_of_new_users.
- [24] R.Stuart Geiger. 2011. Research:Projects/2011 Summer of Research/New User Participation in Deletion Processes. https://meta.wikimedia.org/wiki/Research:Projects/2011_Summer_of_Research/New_User_Participation_in_Deletion_Processes.
- [25] Sarah A. Gilbert. 2020. “I run the world’s largest historical outreach project and it’s on a cesspool of a website.” Moderating a Public Scholarship Site on Reddit: A Case Study of r/AskHistorians. *Proc. ACM Hum.-Comput. Interact.* 4, CSCW1, Article 19 (May 2020), 27 pages. doi:10.1145/3392822
- [26] Tarleton Gillespie. 2018. *Custodians of the Internet: Platforms, content moderation, and the hidden decisions that shape social media*. Yale University Press, New Haven, CT.
- [27] Maharshi Gor, Kellie Webster, and Jordan Boyd-Graber. 2021. Toward Deconfounding the Effect of Entity Demographics for Question Answering Accuracy. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing*, Marie-Francine Moens, Xuanjing Huang, Lucia Specia, and Scott Wen-tau Yih (Eds.). Association for Computational Linguistics, Online and Punta Cana, Dominican Republic, 5457–5473. doi:10.18653/v1/2021.emnlp-main.444
- [28] Andrew Gray. 2023. Gender and BLPs on Wikipedia, redux. <https://www.generalist.org.uk/blog/2023/gender-and-blps-on-wikipedia-redux/>.
- [29] Robert J Gray. 1988. A class of K-sample tests for comparing the cumulative incidence of a competing risk. *The Annals of statistics* 16, 3 (1988), 1141–1154.
- [30] Aaron Halfaker, R Stuart Geiger, Jonathan T Morgan, and John Riedl. 2013. The rise and decline of an open collaboration system: How Wikipedia’s reaction to popularity is causing its decline. *American behavioral scientist* 57, 5 (2013), 664–688.
- [31] Blake Hallinan, Rebecca Scharlach, and Limor Shifman. 2022. Beyond neutrality: Conceptualizing platform values. *Communication Theory* 32, 2 (2022), 201–222.
- [32] Paula Hamilton and Mary Sponberg. 2017. Twenty Years On: feminist histories and digital media. *Women’s History Review* 26, 5 (2017), 671–677.
- [33] Karin Hansson, Shaowen Bardzell, Aparajita Bhandari, Marion Boulicault, Dylan Thomas Doyle, Sheena Erete, Teresa Cerratto Pargman, Shaimaa Lazem, Michael Muller, Maria Normark, Adrian Petterson, Anton Poikolainen Rosén, Alex S. Taylor, Jakita O. Thomas, and Julia Watson. 2023. A Toolbox of Feminist Wonder: Theories and methods that can make a difference. In *Companion Publication of the 2023 Conference on Computer Supported Cooperative Work and Social Computing* (Minneapolis, MN, USA) (CSCW ’23 Companion). Association for Computing Machinery, New York, NY, USA, 476–480. doi:10.1145/3584931.3611295
- [34] Stephen Harrison. 2019. The Notability Blues. <https://slate.com/technology/2019/03/wikipedia-women-history-notability-gender-gap.html>.

- [35] Bradi Heaberlin and Simon DeDeo. 2016. The evolution of Wikipedia's norm network. *Future Internet* 8, 2 (2016), 14.
- [36] Mo Houtti, Isaac Johnson, Joel Cepeda, Soumya Khandelwal, Aviral Bhatnagar, and Loren Terveen. 2022. "We Need a Woman in Music": Exploring Wikipedia's Values on Article Priority. *Proc. ACM Hum.-Comput. Interact.* 6, CSCW2, Article 266 (Nov. 2022), 28 pages. doi:10.1145/3555156
- [37] Claire Jarvis. 2019. What a Deleted Profile Says About Wikipedia's Diversity Problem. <https://undark.org/2019/04/25/wikipedia-diversity-problem/>.
- [38] Adam Jatowt, Daisuke Kawai, and Katsumi Tanaka. 2016. Digital history meets Wikipedia: Analyzing historical persons in Wikipedia. In *Proceedings of the 16th ACM/IEEE-CS on Joint Conference on Digital Libraries*. ACM, New York, NY, 17–26.
- [39] Adam Jatowt, Daisuke Kawai, and Katsumi Tanaka. 2019. Time-focused analysis of connectivity and popularity of historical persons in Wikipedia. *International Journal on Digital Libraries* 20 (2019), 287–305.
- [40] Ali Javanmardi and Lu Xiao. 2019. What's in the Content of Wikipedia's Article for Deletion Discussions?. In *Companion Proceedings of The 2019 World Wide Web Conference*. ACM, New York, NY, 1215–1223.
- [41] Elisabeth Joyce, Brian Butler, and Jacqueline Pike. 2011. Handling flammable materials: Wikipedia biographies of living persons as contentious objects. In *Proceedings of the 2011 iConference*. ACM, New York, NY, 25–32.
- [42] Barbara Kandeck. 2023. Closing the gender gap: Women in Red's efforts to add more women to Wikipedia. <https://wikimediafoundation.org/news/2023/03/01/closing-the-gender-gap-women-in-reds-efforts-to-add-more-women-to-wikipedia/>.
- [43] Edward L Kaplan and Paul Meier. 1958. Nonparametric estimation from incomplete observations. *Journal of the American statistical association* 53, 282 (1958), 457–481.
- [44] Brian Keegan and Casey Fiesler. 2017. The evolution and consequences of peer producing Wikipedia's rules. In *Proceedings of the International AAAI Conference on Web and Social Media*, Vol. 11. AAAI, Washington, DC, USA, 112–121.
- [45] Maximillian Klein, Envel Le Hir, Eugenia Kim, and Sejal Khatri. 2024. Humaniki | Wikimedia Diversity Dashboard Tool. <https://humaniki.wmcloud.org/>.
- [46] Piotr Konieczny and Maximilian Klein. 2018. Gender gap through time and space: A journey through Wikipedia biographies via the Wikidata Human Gender Indicator. *New media & society* 20, 12 (2018), 4608–4633.
- [47] Hadas Kotek, Rikker Dockum, and David Sun. 2023. Gender bias and stereotypes in Large Language Models. In *Proceedings of The ACM Collective Intelligence Conference (Delft, Netherlands) (CI '23)*. Association for Computing Machinery, New York, NY, USA, 12–24. doi:10.1145/3582269.3615599
- [48] Theodora Koulouri, Stanislao Lauria, and Robert D Macredie. 2017. The influence of visual feedback and gender dynamics on performance, perception and communication strategies in CSCW. *International Journal of Human-Computer Studies* 97 (2017), 162–181.
- [49] Robert E Kraut and Paul Resnick. 2012. *Building successful online communities: Evidence-based social design*. MIT Press, Cambridge, MA.
- [50] Isabelle Langrock and Sandra González-Bailón. 2022. The gender divide in Wikipedia: Quantifying and assessing the impact of two feminist interventions. *Journal of Communication* 72, 3 (2022), 297–321.
- [51] Rae Langton. 2010. Miranda Fricker Epistemic Injustice: Power and the Ethics of Knowing. Oxford, Oxford University Press, 2007. *Hypatia* 25, 2 (2010), 459–464.
- [52] Morgane Laouenan, Palaash Bhargava, Jean-Benoît Eyméoud, Olivier Gergaud, Guillaume Plique, and Etienne Wasmer. 2022. A cross-verified database of notable people, 3500BC-2018AD. *Scientific Data* 9, 1 (2022), 290.
- [53] Edith Law, Krzysztof Z. Gajos, Andrea Wiggins, Mary L. Gray, and Alex Williams. 2017. Crowdsourcing as a Tool for Research: Implications of Uncertainty. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (Portland, Oregon, USA) (CSCW '17)*. Association for Computing Machinery, New York, NY, USA, 1544–1561. doi:10.1145/2998181.2998197
- [54] Mackenzie Emily Lemieux, Rebecca Zhang, and Francesca Tripodi. 2023. "too soon" to count? How gender and race cloud notability considerations on Wikipedia. *Big Data & Society* 10, 1 (2023), 20539517231165490.
- [55] Gerda Lerner. 1988. Priorities and challenges in women's history research. *Perspectives* 26, 4 (1988), 17.
- [56] Franziska Martini. 2023. Notable enough? The questioning of women's biographies on Wikipedia. *Feminist Media Studies* n.d. (oct 2023), 1–17. doi:10.1080/14680777.2023.2266585
- [57] Elizabeth L. Maurer, Jeanette Patrick, Liesle M. Britto, and Henry Millar. 2024. *Where are the Women? A Report on the Status of Women in the United States Social Studies Standards*. Technical Report. National Women's History Museum.
- [58] Elijah Mayfield and Alan W Black. 2019. Analyzing wikipedia deletion debates with a group decision-making forecast model. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–26.
- [59] Amanda Menking and Jon Rosenberg. 2021. WP: NOT, WP: NPOV, and other stories Wikipedia tells us: A feminist critique of Wikipedia's epistemology. *Science, Technology, & Human Values* 46, 3 (2021), 455–479.

- [60] José Felipe Ortega Soto et al. 2012. *Wikipedia: A quantitative analysis*. Ph.D. Dissertation. Universidad Rey Juan Carlos.
- [61] Hrishikesh Patel, Tianwa Chen, Ivano Bongiovanni, and Gianluca Demartini. 2024. *Estimating Gender Completeness in Wikipedia*. Technical Report. CoRR. arXiv:2401.08993 [cs.CY] <https://arxiv.org/abs/2401.08993>
- [62] Fleur Ruth Prinsen, Monique LL Volman, and Jan Terwel. 2007. Gender-related differences in computer-mediated communication and computer-supported collaborative learning. *Journal of Computer Assisted Learning* 23, 5 (2007), 393–409.
- [63] Joseph Reagle and Lauren Rhue. 2011. Gender bias in Wikipedia and Britannica. *International Journal of Communication* 5 (2011), 21.
- [64] Joseph M. Jr. Reagle. 2007. *Good Faith Collaboration—The Culture of Wikipedia*. The MIT Press, Cambridge, MA. 264 pages.
- [65] Jodi Schneider, Alexandre Passant, and Stefan Decker. 2012. Deletion discussions in Wikipedia: Decision factors and outcomes. In *Proceedings of the Eighth Annual International Symposium on Wikis and Open Collaboration*. ACM, New York, NY, 1–10.
- [66] Robert Soden, David Ribes, Seyram Avle, and Will Sutherland. 2021. Time for Historicism in CSCW: An Invitation. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW2, Article 459 (Oct. 2021), 18 pages. doi:10.1145/3479603
- [67] Gabriel Stanovsky, Noah A. Smith, and Luke Zettlemoyer. 2019. Evaluating Gender Bias in Machine Translation. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, Anna Korhonen, David Traum, and Lluís Màrquez (Eds.). Association for Computational Linguistics, Florence, Italy, 1679–1684. doi:10.18653/v1/P19-1164
- [68] Susan Leigh Star and Karen Ruhleder. 1996. Steps toward an ecology of infrastructure: Design and access for large information spaces. *Information systems research* 7, 1 (1996), 111–134.
- [69] D. Taraborelli and G.L. Ciampaglia. 2010. Beyond Notability. Collective Deliberation on Content Inclusion in Wikipedia. In *Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems Workshop (SASOW)*, Year = 2010, Month = Sep, Pages = 122–125, Doi = 10.1109/SASOW.2010.26. IEEE, Washington, DC 20036-4910 USA, 122–125. doi:10.1109/SASOW.2010.26
- [70] Khandaker Tasnim Huq and Giovanni Luca Ciampaglia. 2021. Characterizing Opinion Dynamics and Group Decision Making in Wikipedia Content Discussions. In *Companion Proceedings of the Web Conference 2021*. ACM, New York, NY, 632–639.
- [71] Terry M. Therneau and Patricia M. Grambsch. 2000. *Modeling Survival Data: Extending the Cox Model*. Springer, New York.
- [72] Francesca Tripodi. 2023. Ms. Categorized: Gender, notability, and inequality on Wikipedia. *New media & society* 25, 7 (2023), 1687–1707.
- [73] Claudia Wagner, Eduardo Graells-Garrido, David Garcia, and Filippo Menczer. 2016. Women through the glass ceiling: gender asymmetries in Wikipedia. *EPJ data science* 5 (2016), 1–24.
- [74] Linda Wang. 2023. Social and Language Influence in Wikipedia Articles for Deletion Debates. https://wikiworkshop.org/2023/papers/WikiWorkshop2023_paper_55.pdf.
- [75] Ping Wang and Xiaodan Li. 2020. Assessing the quality of information on wikipedia: A deep-learning approach. *Journal of the Association for Information Science and Technology* 71, 1 (2020), 16–28.
- [76] Yurong Wang, Claudia Wagner, and Ana LC Bazzan. 2023. Gender Asymmetries in the depiction of Historical Figures: A Comparison of Bede’s *Historia Ecclesiastica* and Wikipedia. https://wikiworkshop.org/2023/papers/WikiWorkshop2023_paper_56.pdf.
- [77] Wikidata. 2024. Q5 (Human) — Wikidata. <https://www.wikidata.org/w/index.php?title=Q5&oldid=2261672924>. [Online; accessed 18-October-2024].
- [78] Wikipedia contributors. 2024. List of the verified oldest people. https://en.wikipedia.org/w/index.php?title=List_of_the_verified_oldest_people&oldid=1214609264. [Online; accessed 11-September-2024].
- [79] Wikipedia contributors. 2024. PetScan - Meta. <https://meta.wikimedia.org/wiki/PetScan/en>. [Online; accessed 11-September-2024].
- [80] Wikipedia contributors. 2024. Research:Quarry - Meta. <https://meta.wikimedia.org/wiki/Research:Quarry>. [Online; accessed 11-September-2024].
- [81] Wikipedia contributors. 2024. Wikipedia:Conflict of interest — Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Wikipedia:Conflict_of_interest&oldid=1214866902. [Online; accessed 11-September-2024].
- [82] Wikipedia contributors. 2024. Wikipedia:Notability — Wikipedia, The Free Encyclopedia. <https://en.wikipedia.org/w/index.php?title=Wikipedia:Notability&oldid=1208711576>. [Online; accessed 11-September-2024].
- [83] Wikipedia contributors. 2024. Wikipedia:Notability (people) — Wikipedia, The Free Encyclopedia. [https://en.wikipedia.org/w/index.php?title=Wikipedia:Notability_\(people\)&oldid=1248827264](https://en.wikipedia.org/w/index.php?title=Wikipedia:Notability_(people)&oldid=1248827264). [Online; accessed 14-October-2024].

- [84] Wikipedia contributors. 2024. Wikipedia:Too soon — Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Wikipedia:Too_soon&oldid=1209155118. [Online; accessed 11-September-2024].
- [85] Wikipedia contributors. 2024. Wikipedia:WikiProject Biography — Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Wikipedia:WikiProject_Biography&oldid=1213762673. [Online; accessed 11-September-2024].
- [86] Wikipedia contributors. 2024. Wikipedia:WikiProject Women in Red — Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Wikipedia:WikiProject_Women_in_Red&oldid=1213710518. [Online; accessed 11-September-2024].
- [87] Wikipedia contributors. 2024. Wikipedia:WikiProject Women in Red/Metrics — Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Wikipedia:WikiProject_Women_in_Red/Metrics&oldid=1213016293. [Online; accessed 11-September-2024].
- [88] Zena Worku, Taryn Bipat, David W McDonald, and Mark Zachry. 2020. Exploring systematic bias through article deletions on Wikipedia from a behavioral perspective. In *Proceedings of the 16th international symposium on open collaboration*. ACM, New York, NY, 1–22.
- [89] Alexey Zagalsky, Joseph Feliciano, Margaret-Anne Storey, Yiyun Zhao, and Weiliang Wang. 2015. The Emergence of GitHub as a Collaborative Platform for Education. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (Vancouver, BC, Canada) (CSCW '15). Association for Computing Machinery, New York, NY, USA, 1906–1917. doi:10.1145/2675133.2675284
- [90] Haifeng Zhang, Yuqin Ren, and Robert E Kraut. 2020. Mining and Predicting Temporal Patterns in the Quality Evolution of Wikipedia Articles.. In *HICSS*. Academy of Management, Valhalla, NY 10595, USA, 1–10.

A Cutoff Date for Historical Figure

As a robustness check, we considered two more alternative cutoff years in the analysis: a) The start of the late modern period (1800), and b) The start of the contemporary period (1945). We found that using these alternative cutoff choices does not alter the conclusion of our hazard model, see Fig. 8:

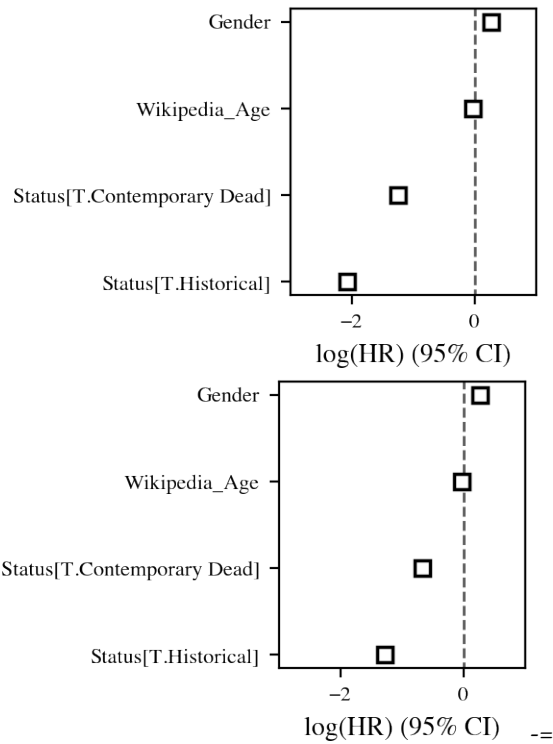


Fig. 8. The results of the Cox proportional Hazards model across cutoff years. First: when cutoff year is 1800; Second: when cutoff year is 1945. In both plots, error bars represent robust standard errors and are all smaller than the data points.

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