Alternative metrics, traditional problems? Assessing gender bias in the altmetrics of political science

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Abstract: To what extent are altmetrics in the field of political science gender-biased? An emerging form of bibliometric measurement, altmetrics capture the online dimension of scholarly exchange and knowledge dissemination. In a higher education landscape increasingly focused on quantifying research productivity, quality, and impact, altmetrics reflect how social media shapes knowledge circulation. Against this backdrop, we consider whether and to what extent altmetrics (re)produce gender-bias in terms of high-impact scholarship in political science. Using a novel dataset on the Altmetric Attention Scores (AAS) of political science research, we investigate two empirical questions: Do AAS vary by gender? And how do AAS relate to gendered social media dynamics? We find that AAS reflect similar gendered dynamics found in disciplinary publication and citation practices. For example, journal articles authored exclusively by women scholars score 27% lower on average than exclusively male-authored outputs. However, men are also more likely to write articles with an AAS of zero. These patterns are shaped by the presence of high-scoring male disciplinary "superstars" whose research attracts "viral" online attention. Specifically, complementing earlier scholarship, we show that the AAS closely overlaps with virality dynamics on Twitter. On this basis, we suggest that altmetrics reproduce gender bias. These effects may be hidden behind the seemingly neutral, technical character of altmetrics indicators, which is worrisome where they are increasingly used to evaluate scholarship.

Keywords: altmetrics, gender bias, bibliometrics, Twitter, political science

In this article, we introduce the study of altmetrics to political science, placing it in conversation with existing debates on gender bias in the discipline. Following Brouns (2007, 25), we understand gender bias as "the often unintentional and implicit differentiation between men and women that situates one gender in a hierarchical position above the other as a result of stereotypical images of masculinity and femininity, thus steering the assessment

and selection process or the gendered structure of the scientific system". Using an original dataset, we analyze the extent to which altmetrics, as an emerging indicator of research impact and attention, reflect the organization of the discipline in terms of the institutional and structural factors that limit women's representation and advancement (Lundine et al. 2018, 1755). We build on political science scholarship that has investigated how gendered hierarchies emerge in the discipline, in particular relating to publication and citation practices (Breuning, Bredehoft, and Walton 2005; Evans and Moulder 2011; Maliniak, Powers, and Walter 2013; Teele and Thelen 2017) and practices in pedagogy and teaching (Colgan 2017; Phull, Ciflikli, and Meibauer 2019). We extend this literature through a focus on altmetrics.

Altmetrics ("alternative metrics") are indicators of research impact that aim to acknowledge the increasingly digital diffusion of research activities via social media. They allow scholars to "see ripples generated by their research that might otherwise go unnoticed" (Kwok 2013, 492). For example, the Altmetric Attention Score (hereafter: AAS) commonly features on most publisher homepages. The AAS tracks the online attention an individual research item receives, visualized as a colorful wheel containing a dynamic numeric score. Despite having become a ubiquitous part of the digital academic experience (and potentially emerging as a tool of academic governance), such altmetrics are rarely discussed outside specialized literature (Bar-Ilan and Weijden 2015; González-Valiente, Pacheco-Mendoza, and Arencibia-Jorge 2016; Konkiel, Sugimoto, and Williams 2016; Thelwall et al. 2013; Thelwall and Nevill 2018). This literature has argued that, if simply taken for granted, altmetrics may contribute to the reification of socio-political inequities ranging from the naturalization of bias to the legitimation of discrimination, for example in hiring, promotion, or grant awards. It strikes us as particularly appropriate to begin interrogating the politics of altmetrics where they concern political science. In this exploratory piece, we therefore investigate what altmetrics do *to* and *for* the discipline of political science when it comes to gender bias. To assess how altmetrics reproduce or overcome patterns of gender bias (as previously documented in political science for publication and citation practices), we ask: do altmetrics vary by gender? And how do altmetrics relate to gendered social media dynamics?

To answer these questions, we introduce a novel dataset that combines information on author-gender and AAS for all articles published in 65 top peer-reviewed political science journals between 2013-2019. Analyzing this dataset, we find that the AAS reflects the same

gendered inequities found in broader publication and citation practices. For example, journal articles authored exclusively by women scholars score 27% lower on average than exclusively male-authored outputs, yet men are also more likely to write articles with an AAS of zero. Patterns such as these are shaped by the presence of high-scoring male disciplinary "superstars" whose research attracts online attention and viral sharing. We find gendered interactions pervade the online scholarly ecosystem, especially where sharing and dissemination are concerned. Specifically, we show that the AAS closely overlaps with sharing and virality dynamics on Twitter, complementing earlier scholarship on the indicator. These insights are useful for understanding what the AAS actually measures, and how this measurement is influenced by pre-existing gendered dynamics online and offline.

Based on these findings, we suggest that the AAS may in turn contribute to the gendering of knowledge production and the reproduction of disciplinary inequalities. Gendering refers to the process by which indicators (re)produce patterns of gendered social organization. This is based on the notion that bibliometric indicators are not neutral tools, but capable of influencing and producing norms, behaviors, and practices (Schroeder 2021, 376). A better understanding of altmetrics as non-neutral indicators that may increasingly govern the evaluation of research impact helps avoid naturalizing structural inequalities in the discipline.

Altmetrics as an indicator of research impact

Altmetrics are meta-analytical tools used for monitoring scientific research with the aim to measure research impact and influence. A direct response to the rise of the digital and social web, altmetrics are motivated by a desire to capture the reach, relevance, and impact of academic research in the digital ecosystem (Priem et al. 2010). The growing prevalence of altmetrics has started to attract considerable scholarly interest (Bar-Ilan and Weijden 2015; González-Valiente, Pacheco-Mendoza, and Arencibia-Jorge 2016; Konkiel, Sugimoto, and Williams 2016; Thelwall et al. 2013; Thelwall and Nevill 2018). Unlike traditional citation metrics codified at the journal or author level, altmetrics have no fixed or canonical definition but adapt to follow the online life of research (Lin 2020, 214). Altmetrics can be thought of as a composite of diverse criteria of engagement with scholarship, including interactions (e.g., clicks, views, and downloads), capture (e.g., bookmarks, saves, and favorites), mentions (e.g.,

posts, comments, reviews, and attributions), and social media reactions (e.g., likes, shares, and tweets), in addition to citations and rankings (Roemer and Borchardt 2015).

Concurrently, altmetrics reflect our digital social behavior (Lin 2020, 215). As a result, they have garnered attention as a means of understanding how gender bias operates in the digital academic sphere (Bar-Ilan and Weijden 2015; Fortin et al. 2021; Sud and Thelwall 2014). Academic knowledge production, exchange, and dissemination take place through ever-diversifying digital channels via ubiquitous online platforms like Twitter, YouTube, Reddit, blogging, and collaborative wikis. This coincides with a shift toward open access research, "nano-publications", and self-publishing online (Davis and Fromerth 2007; Groth, Gibson, and Velterop 2010). This development is generally considered a net benefit for academia because it works to democratize scholarship and its evaluation (Daraio 2021). Digital sharing increases the likelihood for research to be cited and circulated, which stands to equalize knowledge dissemination. These practices have transformed the environment within which disciplinary debates emerge and circulate (Esarey and Wood 2018; Greenhow, Gleason, and Staudt Willet 2019). Social networking sites, news media, academic and popular blogs, and podcasts open channels of access and communication between academics and public audiences. They create possibilities for evaluating and interrogating research, enabling real-time, crowdsourced peer review (Greenhow, Gleason, and Staudt Willet 2019, 992), encouraging transparency, eliciting policy advice, and engaging in open debate. Importantly, these evolving knowledge platforms work in parallel with traditional "offline" forms of academic exchange, including citation and academic networking through conferences.

Research indicators, e.g., citation counts, journal impact factors, and institutional rankings, are not socially-neutral tools, however. They structure the discipline and shape the academic profession in different and unequal ways (Crane and Glozer 2022; Nygaard and Bellanova 2017; Ringel 2021; Thelwall and Nevill 2018). Indeed, the higher education landscape has seen a proliferation of instruments intended to measure research productivity and quality, ultimately shaping funding, career advancement and educational policies through calculative rationalities. Formal and informal practices of academic hiring, tenure, promotion, and evaluation can often be tied to publication status, citation statistics, and research popularity (Alter et al. 2020; Giles and Garand 2007), while publisher and university rankings are determinants of funding and social capital (Hix 2004). The use of performance metrics in

research and higher education management highlights how measurement can both reproduce and generate disciplinary inequalities (Lenine and Mörschbächer 2020). Such metrics then operate as "engines of anxiety" that promote particular notions of excellence and accountability (Espeland and Sauder 2016).

Altmetrics are emerging as tools of academic governance. While not (yet) formally anchored in excellence or evaluation frameworks, institutions can use altmetrics to assess impact (e.g., the UK's Research Excellence Framework), which influences funding allocation (Konkiel, Sugimoto, and Williams 2016; Kwok 2013, 493). Private research funders and charities are increasingly paying attention to altmetrics (Dinsmore, Allen, and Dolby 2014), though current uses of altmetrics remain limited to informal channels (e.g. as shorthand for exemplary scholarship).

The use of altmetrics has been met with considerable criticism along three main axes. Firstly, it remains unclear what altmetrics are meant to measure, not least because their calculative inner workings are often black-boxed (e.g., proprietary measurements, (Lin 2020, 214). Secondly, it remains unclear whether altmetrics actually depart from rather than duplicate traditional measurements (Fortin et al. 2021; Haustein et al. 2016; Roemer and Borchardt 2015). Thirdly, scholars have raised criticisms against institutional moves to use altmetrics in promotion and tenure decisions, the allocation of funding, or professional awards (Nygaard and Bellanova 2017). Building upon literature that anticipates and critically interrogates the risks of institutionalizing altmetrics as tools of academic governance (Crane and Glozer 2022, 807; Kaufman-Osborn 2017; Lenine and Mörschbächer 2020; Nygaard and Bellanova 2017, 25), we analyze the most prevalent altmetrics indicator–the AAS–to empirically investigate the extent to which gender bias is reproduced in the field of political science.

Methodology

To investigate gender bias in political science altmetrics, we develop an original dataset containing data from Altmetric Explorer (access granted by Altmetric) from Altmetric.com in May 2020. Altmetric.com, founded in 2011, is a private, for-profit UK-based company and the foremost aggregator of altmetrics in the natural and social sciences (competitors include Plum Analytics and OurResearch). For each item in an expanding global database of over 35 million research outputs (i.e., journal articles, whitepapers, reports, datasets, and more;

(Altmetric.com 2011), Altmetric.com produces a numerical Altmetric Attention Score (AAS), visualized as a distinct, colorful "donut" or summary badge shared across publishing and journal web pages. While Altmetric.com cautions against using AAS as a proxy for research excellence (Konkiel 2016), the AAS ranks and hierarchizes research based on popularity, with high-scoring articles often featured on journal webpages.

The AAS is an algorithmically-derived measure of the attention that a research item garners as it is shared across online communication channels. The AAS approximates the magnitude and types of mentions or references for an item, assigning unique colors to each source captured (e.g., blue for Twitter mentions, red for news outlets, etc.). It considers volume (number of times mentioned), sources (where mentions derive from), and authors (who mentions). Sources of attention include reference tools (e.g., Web of Science, Scopus, Google Scholar), news media, blogging platforms and wikis (e.g., Wikipedia), policy documents, and the public pages of social media platforms (e.g., Facebook, Twitter).

Despite criticism concerning the nature and composition of the AAS, the algorithm remains proprietary and non-replicable (Altmetric.com 2020). It amalgamates online reactions to research that might be qualitatively different. For instance, it does not distinguish between positive and negative attention, challenging the assumption that high AAS reflect better-quality research. A telling example is Bruce Gilley's controversial and later redacted *Third World Quarterly* article, published in 2017. The article, which makes a case for colonialism, garnered a score of 1653 in our dataset, among the highest recorded in the field of political science and derived primarily from negative attention via Twitter (see Table 1). Altmetrics therefore reflect the virality and rapid circulation of attention surrounding a research output. While the visual simplicity of the AAS gives a semblance of precision, neutrality, and utility (Nygaard and Bellanova 2017, 33), this can result in an oversimplification of information and context (Gumpenberger, Glänzel, and Gorraiz 2016, 980).

Operationalizing Gender and the AAS in Political Science

Our unit of analysis is the research item (i.e., publication). Our full database contains close to thirty million research items published since 2011, identified via digital object identifiers (DOIs). Relying on DOIs, the database includes primarily journal articles, in addition to some books, chapters, reports, and other sources. Each research item has an associated AAS, as well as information such as title, journal or source, publication date and venue, author names

and affiliations at the time of writing, funding bodies, subject field, and collected mentions across social media platforms and dimensions.

Within this dataset, we narrow our focus to items belonging to the subject field "Political Science" (as opposed to other disciplines). Of these, we focus solely on journal articles to preserve comparative consistency (we exclude books, chapters, and other outputs). We then focus on items published between 2013 and 2019 for the following reasons: first, pre-2013 data is less reliable and comparable on the whole due to changes in social media measurement; second, post-2019 data may experience skews due to recency bias. AAS accumulate over time, meaning that very recent scores may not be directly comparable to older ones. Furthermore, the Covid-19 pandemic may have incentivized different patterns of knowledge dissemination. This precludes us from generalizing the dynamics that have driven online research dissemination since 2020, including those that interrelate with existing inequalities, e.g., unequal burden-sharing between female and male colleagues.

In addition to publication time frame, we further ensure the comparability of data by excluding non-peer-reviewed publications. We limit our dataset to items published in one of 67 top peer-reviewed political science journals, selected based on SCImago journal ranking scores in 2020. This excludes items published through preprint servers such as the Social Sciences Research Network or ResearchGate. This is not to suggest these publication types are not of sufficient quality or are insignificant in online knowledge ecosystems (in some cases such publications have very high AAS).

We supplement information on author gender for each included research item. First, we coded the data with the help of the genderize.io package, an open-access API that predicts gender based on name (Wais 2018). Second, we manually validated genderize.io results, correcting where necessary. We preserve the sequence in which authors appear, coding for gender by designating authors as "male" or "female" based on full names as well as (where available) institutional/online profiles at the time of publication. These parameters produced a final dataset consisting of 6,856 coded research items.

Importantly, we use the term "gender" rather than "sex" in this analysis to denote categorizations of male/female authorship, allowing for an understanding of the relationship between gender roles and norms in academia. We recognize that our adherence to disaggregating by male/female can be problematic because it denies the inclusion of non-

binary identities and can result in assigning gender/sex erroneously (Brooke 2021, 2096). While this approach enables us to offer a viable "first cut" into the dataset, it is limited where it overlooks important dimensions and intersections of variation, including more nuanced understandings of gender in academia, which may perpetuate social inequality (Westbrook and Saperstein 2015).

Results

Do AAS vary by gender?

In the following, we provide descriptive statistical features of the dataset to understand altmetrics variations by gender. Fig. 1 depicts AAS by author gender, disaggregated by female-authored, male-authored, and mixed-gender-authored publications. In absolute terms, there are three times more exclusively male-authored (62.7%) than exclusively female-authored (20%) research items (17.2% mixed-gender teams; Fig. 2).

Fig. 1: Altmetric Attention Score disaggregated by gender

Mean AAS are highest on average for mixed-gender authored items (Figure 2). Female-only authored research generates, on average, the lowest AAS (19.23) as compared to male-only authored (24.49) and mixed-gender-authored research (30.54). Publications authored exclusively by women thus have, on average, a 27% lower AAS than those authored by men. Yet median AAS reveal that while mixed-gender authored items generate the most attention, female-authored publications surpass male-authored ones. This indicates that while male authors appear to garner higher average AAS, the trend is driven by a small number of prolific outliers. If we exclude such outliers, female authors garner higher AAS than their male counterparts.[1]

Fig. 2: Distribution of Altmetric Attention Score

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[1] Note that the number of authors in mixed-gender publications might introduce a slight bias to the comparison with single-authored articles. We aim to explore this relationship in future analysis.

Figure 3 demonstrates the effect of such outliers by applying a log-transformation, which condenses the distribution of data by treating multiplicative trends as additive, allowing for a closer observation of trends.

Fig. 3: Effects of male-author outliers (axis log-transformed to condense scale)

We find that the "viral hits" of research in political science and international studies are dominated by male authors: of the top 100 highest-scoring publications, 67 are authored by men. In comparison, only 7 are exclusively female-authored while 26 are authored by mixed-gender teams. Figure 4 shows similar patterns among the top 50 highest-scoring publications, where "virality" skews toward a male bias.

Fig. 4: Top 50 high-scoring publications, color-weighted by gender (male authorship shown in green)

The gendered patterns visible among top scores are also present for publications that have an AAS of 0 or garner no online attention. Just as with top scores, zero scores are also dominated by male-authored publications (Figure 5). More precisely, the share of male-authored publications with AAS of 0 (67%) mirrors the top 100 (68%: compared to 62.7% overall). Given that female-authored publications make up 15% and mixed-gender authorship 16% of zero-score items (20% and 17.2% respectively in the overall dataset), this implies that male-authored items are more widely distributed, while female-authored items are more closely centered around the mean.

Fig. 5: Distribution of Altmetric Attention Score '0'

Finally, we observe temporal patterns to understand whether these trends are reproduced over time. Figure 6 shows year-on-year AAS by author gender. Over time, mixed-gender teams tend to capture the highest scores on average, reproducing the above findings. Consistently across all years, exclusively female-authored items tend to have the lowest AAS. We find overall AAS across all categories increase over time. While two items may have the

same AAS, the relative weight or importance of that score vis-à-vis others is meaningful in relation to publication year. Older items tend to have lower average AAS. This could be reflective of increased levels of online attention and dissemination, e.g., the growing usage of academic social media over the period under investigation. For instance, though Twitter emerged in 2006, "academic Twitter" as a tool for scholarly networking, dissemination and outreach really began to gain traction around 2013 (Lupton 2014; Mohammadi et al. 2018; Thelwall et al. 2013). In sum, our dataset reveals a relationship between AAS and gender, whereby male-authored scholarship dominates the highest scores and the lowest scores while female-authored scholarship performs better overall outside of these extremities.

Fig. 6: Gendered distribution of Altmetric Attention Scores over time

To sum up the initial findings related to our first question, AAS seem to reflect the gendered practices and norms that also organize academic research and scholarship in political science more broadly. These dynamics represent existing disciplinary patterns that reproduce online, as well as dynamics unique to online spaces (e.g., social media sharing, exposure, and reactions). Consider the finding above that male-authored publications dominate the highest and lowest scores while female authors do better along the median, outside of extremes. This gendered dynamic aligns with literature showing that the gender citation gap is driven by male-dominated publications at the top of the distribution (Zigerell 2015).

High AAS for male-authored research may reproduce the outsized influence that seniority could have in disciplinary and wider political networks: perceived "superstars" in the discipline are quite often male, as the profession, especially in its higher rungs, remains relatively homogenous and slow to change. In addition to having larger audiences and therefore garnering more attention through social and other online channels, research authored by senior scholars attracts "mentioning up" dynamics (Bisbee, Larson, and Munger 2020). In turn, measurement techniques that reflect male academic "superstardom" or success through "virality" can work to reinforce a research environment (whether through funding, opportunities, career progression, etc.) that privileges (the visibility of) male scholarship. Where it should otherwise act as a neutral, technical tool for understanding impact, altmetrics risk depoliticizing knowledge production by rendering invisible differences

in publishing and social networking practices. The AAS risks attaching new meaning to research impact by prioritizing "virality", and has the potential to further institutionalize unequal gender dynamics.

How do AAS relate to gendered social media dynamics?

To further interrogate gendered dynamics in the AAS, we investigate the individual components that constitute it. More specifically, we first unpack the individual components that comprise the score; second, we focus on Twitter trends and other social media dimensions that amplify scores; third, we map changes in AAS against Twitter trends to understand the importance of Twitter in online research dissemination. Figures 7 and 8 deconstruct the AAS into its component parts. Note that while Mendeley and Dimensions (traditional citations, e.g. those found in Web of Science) garner high mentions, they do not contribute to the calculation of the AAS.

Fig. 7: Sources of online attention, ordered by mean; (*) denotes social media sources

With respect to the composition of the AAS, two characteristics are notable: first, the overall score relies mainly on mentions from Twitter, and second, other sources of mentions that the AAS tracks frequently have very low mentions or no data. The absence of mentions from these sources is not necessarily evidence of a lack of online engagement—for example, Altmetric.com can only track public Facebook pages, excluding those (like most user-level pages) that are set to be visible only to private audiences. Indeed, focusing on social media only (Facebook, Google, Reddit, and Twitter) demonstrates that Twitter is not only the most relevant online platform for altmetrics measurement, but that it disproportionately determines digital research impact.

Fig. 8: Altmetric Attention Score and mentions across sources mapped

We examine temporal patterns to investigate whether AAS and Twitter scores perform similarly year-on-year. Figure 9 suggests that both the average AAS and average Twitter mentions have steadily increased over time (based on date of publication). We find that AAS

moderates the effect of Twitter mentions. Relatively low average Twitter input between 2013 and 2016 results in slightly higher AAS, comparatively speaking: Twitter had slightly less influence on the overall AAS. This relationship is reversed from 2017, where higher average Twitter input results in continuously increasing, but comparatively lower average AAS.

Fig. 9: Average Attention Scores compared to average Twitter mentions over time

Finally, we compare the gendered nature of overall AAS and Twitter mentions. Figure 10 suggests that the AAS indeed closely matches the distribution of mentions on Twitter for female-authored, male-authored, and mixed-author teams.

Fig. 10: Altmetric Attention Scores compared to average Twitter mentions, disaggregated by gender

In sum, our findings support existing research on altmetrics indicators that find Twitter currently the foremost measure of online research impact, attention, and dissemination of research. The results raise broader questions as to the value of the indicator for researchers. for instance, its capacity to capture wider online dynamics of knowledge exchange rather than simply reflecting social media popularity and follower base.

It also introduces several dynamics: first, research dissemination online has a recency bias— emerging research is more likely to be tweeted simply because Twitter was not available as a platform before 2007, and because Twitter's academic user base has grown substantially since. While more dated research can still be shared and thus accrue high AAS (e.g., Alexander Wendt's 1992 article "Anarchy is what states make of it: The social construction of power politics" was republished online by *International Organization* in 2009, drawing an AAS of 76), newer work is more likely to garner social media attention, generating higher scores. In turn, we know that the more recent the research output, the more likely it is to be attributed to female authors or co-authored teams (due to trends toward co-increased authorship; (Teele and Thelen 2017, 437–39). In combination with the predominance of Twitter in the AAS, this may explain a relative increase in scores for female-authored pieces over time. Whereas in the professional discipline, a higher ratio of male scholars combined with practices of self-citation and citing other men produces significant gender bias (Kristensen 2018), this may be

mediated among more diverse online audiences. For example, female political scientists (and those tenure-track) are more likely to use Twitter (Bisbee, Larson, and Munger 2020). There may also be generational dynamics at play, with a younger user population on Twitter compared to the offline professional discipline decreasing gender bias in overall AAS (Bisbee, Larson, and Munger 2020; Wojcik and Hughes 2019). This would be good news if this online community maintains its higher willingness to engage female-authored research and translate it into its offline citation practices.

Conclusion

This article introduced the study of altmetrics to political science with a focus on gender bias. We make three contributions: first, this original gender-coded dataset allows us to augment and refine existing research on the internal workings of altmetrics, and offers multiple avenues for further research. Second, our analysis meaningfully complements scholarship on gender bias in political science. The results generated by approaching the dataset from multiple angles offers a comparative baseline for scholars working on structural inequalities. Concurrently, our analysis remains preliminary. The dataset and coding process could be expanded to include article abstracts or full texts to complement title length, keywords, and author information. This would provide greater insight into the nature of virality, as well as how online attention, status, subject matter, and gender interrelate (Alter et al. 2020). The analysis could also extend to online mentions themselves; for example, the content and sentiment expressed in tweets about research, which we cannot currently capture. We do not currently control for factors such as the size of the respective author's network (e.g., number of Twitter followers). Here again, we may see gendered patterns at work (Flaherty 2019). Similarly, controlling for institutional affiliation, rank, seniority, and language—which may well affect virality, but are difficult to reproduce in a dataset—could strengthen results.

Third, our results indicate how metrics are not detached from, and may indeed reify, existing structural inequalities. The AAS potentially broadens the scope for research impact to include the digital social landscape. Yet there are severe pitfalls to the expanding range of performance indicators that increasingly come to reflect research quality, productivity, and popularity. As Grimson (2014, 34) writes, "not everything that can be counted counts, and not everything that counts can be counted". That altmetrics quantify attention and popularity

but do not reflect ideas and intellectual work stands to distort and "metrify" the system of scholarly exchange, which is itself already deeply gendered and non-neutral.

This distortion and metrification is more likely to produce inequality if indicators are treated and employed as strictly technical and supposedly gender-neutral. Our preliminary analysis of altmetrics and political science has shown that altmetrics scores are gendered. In line with literature that suggests the need to reflexively account for everyday academic choices (Alejandro 2021; Phull, Ciflikli, and Meibauer 2019), we wish to highlight how this may be productive of effects independent of intended objectives. The very dissimulation of these indicators through discourses of neutrality contributes to their depoliticization.

Our results question the neutrality of altmetrics in a way that necessitates further sociological analysis of their use and reception beyond this preliminary analysis. This becomes especially urgent in the context of the neo-liberal academy, which incentivizes the use of indicators in the governance of scholarly activity. As academic careers and funding become tied to metrics of productivity and impact, such tools introduce a perverse logic of knowledge production aimed at attention-generation. Notably, AAS say little about either the quality of the research or the type of engagement it generates (positive or negative). As Gumpenberger et al. (2016, 980) suggest, it is here that the multi-dimensional landscape of digital scholarship crashes into linearity, resulting in a loss of information and missing context. Seeking to capture research excellence or impact by focusing on individual AAS, independent of how the indicator hierarchizes scholarship, risks conflating impact with gendered structural inequality in political science.

Bibliography

Alejandro, Audrey. 2021. "Reflexive Discourse Analysis: A Methodology for the Practice of Reflexivity." *European Journal of International Relations* 27(1): 150–74. https://doi.org/10.1177/1354066120969789.

Alter, Karen J., Jean Clipperton, Emily Schraudenbach, and Laura Rozier. 2020. "Gender and Status in American Political Science: Who Determines Whether a Scholar Is Noteworthy?" 18(4): 1048–67. https://doi.org/10.1017/S1537592719004985.

Altmetric.com. 2011. "How It Works." November 2, 2011. https://www.altmetric.com/about-our-data/how-it-works-2/.

———. 2020. "Numbers behind Numbers: The Altmetric Attention Score and Sources Explained." 2020. https://www.altmetric.com/blog/scoreanddonut/.

Bar-Ilan, Judit, and Inge van der Weijden. 2015. "Altmetric Gender Bias? An Exploratory Study." *International Journal of Computer Science: Theory and Application* 41(1): 16–22.

Bisbee, James, Jennifer Larson, and Kevin Munger. 2020. "#polisci Twitter: A Descriptive Analysis of How Political Scientists Use Twitter in 2019." *Perspectives on Politics*, 1–22. https://doi.org/10.1017/S1537592720003643.

Breuning, Marijke, Joseph Bredehoft, and Eugene Walton. 2005. "Promise and Performance: An Evaluation of Journals in International Relations." *International Studies Perspectives* 6(4): 447–61. https://doi.org/10.1111/j.1528-3577.2005.00220.x.

Brooke, S. J. 2021. "Trouble in Programmer's Paradise: Gender-Biases in Sharing and Recognising Technical Knowledge on Stack Overflow." *Information, Communication & Society* 24(14): 2091–2112. https://doi.org/10.1080/1369118X.2021.1962943.

Brouns, Margo. 2007. "The Making of Excellence: Gender Bias in Academia." In *Exzellenz in Wissenschaft Und Forschung - Neue Wege in Der Gleichstellungspolitik*, edited by Wissenschaftsrat, 23–42. Cologne: Wissenschaftsrat.

Colgan, Jeff. 2017. "Gender Bias in International Relations Graduate Education? New Evidence from Syllabi." *PS: Political Science & Politics* 50(2): 456–60. https://doi.org/10.1017/S1049096516002997.

Crane, Andrew, and Sarah Glozer. 2022. "What's Next for the Quantified Scholar? Impact, Metrics, and (Social) Media." *Business & Society* 61(4): 807–12. https://doi.org/10.1177/00076503211016778.

Daraio, Cinzia. 2021. "Altmetrics as an Answer to the Need for Democratization of Research and Its Evaluation" 4(1): 2-13. https://doi.org/10.29024/joa.43.

Davis, Philip M., and Michael J. Fromerth. 2007. "Does the ArXiv Lead to Higher Citations and Reduced Publisher Downloads for Mathematics Articles?" *Scientometrics* 71(2): 203–15. https://doi.org/10.1007/s11192-007-1661-8.

Dinsmore, Adam, Liz Allen, and Kevin Dolby. 2014. "Alternative Perspectives on Impact: The Potential of ALMs and Altmetrics to Inform Funders about Research Impact." *PLOS Biology* 12(11): e1002003. https://doi.org/10.1371/journal.pbio.1002003.

Esarey, Justin, and Andrew R. Wood. 2018. "Blogs, Online Seminars, and Social Media as Tools of Scholarship in Political Science." *PS: Political Science & Politics* 51(4): 811–19. https://doi.org/10.1017/S1049096518000070.

Espeland, Wendy Nelson, and Michael Sauder. 2016. *Engines of Anxiety: Academic Rankings, Reputation, and Accountability*. New York, New York: Russell Sage Foundation.

Evans, Heather K., and A. Moulder. 2011. "Reflecting on a Decade of Women's Publications in Four Top Political Science Journals." *PS: Political Science & Politics* 44(4): 793–98. https://doi.org/10.1017/S1049096511001296.

Flaherty, Colleen. 2019. "Women Have about Half the Followers of Men on Twitter and Otherwise Diminished Influence." *Inside Higher Education* (blog). October 2019. https://www.insidehighered.com/news/2019/10/15/women-have-about-half-followers-men-twitter-and-otherwise-diminished-influence.

Fortin, Julie, Bjarne Bartlett, Michael Kantar, Michelle Tseng, and Zia Mehrabi. 2021. "Digital Technology Helps Remove Gender Bias in Academia." *Scientometrics* 126(5): 4073–81. https://doi.org/10.1007/s11192-021-03911-4.

Giles, Micheal W., and James C. Garand. 2007. "Ranking Political Science Journals: Reputational and Citational Approaches." *PS: Political Science & Politics* 40(4): 741–51. https://doi.org/10.1017/S1049096507071181.

González-Valiente, Carlos Luis, Josmel Pacheco-Mendoza, and Ricardo Arencibia-Jorge. 2016. "A Review of Altmetrics as an Emerging Discipline for Research Evaluation." *Learned Publishing* 29(4): 229–38. https://doi.org/10.1002/leap.1043.

Greenhow, Christine, Benjamin Gleason, and K. Bret Staudt Willet. 2019. "Social Scholarship Revisited: Changing Scholarly Practices in the Age of Social Media." *British Journal of Educational Technology* 50 (3): 987–1004. https://doi.org/10.1111/bjet.12772.

Grimson, Jane. 2014. "Measuring Research Impact: Not Everything That Can Be Counted Counts, and Not Everything That Counts Can Be Counted." In *Bibliometrics: Use and Abuse in the Review of Research Performance*, edited by Wim Blockmans, Lars Engwall, and Denis Weaire, 29–41. Stockholm: Wenner Gren/Portland Press.

Groth, Paul, Andrew Gibson, and Jan Velterop. 2010. "The Anatomy of a Nanopublication." *Information Services & Use* 30(1–2): 51–56. https://doi.org/10.3233/ISU-2010-0613.

Gumpenberger, Christian, Wolfgang Glänzel, and Juan Gorraiz. 2016. "The Ecstasy and the Agony of the Altmetric Score." *Scientometrics* 108(2): 977–82. https://doi.org/10.1007/s11192-016-1991-5.

Haustein, Stefanie, Timothy D. Bowman, Kim Holmberg, Andrew Tsou, Cassidy R. Sugimoto, and Vincent Larivière. 2016. "Tweets as Impact Indicators: Examining the Implications of Automated 'Bot' Accounts on Twitter." *Journal of the Association for Information Science and Technology* 67(1): 232–38. https://doi.org/10.1002/asi.23456.

Hix, Simon. 2004. "A Global Ranking of Political Science Departments." *Political Studies Review* 2(3): 293–313. https://doi.org/10.1111/j.1478-9299.2004.00011.x.

Kaufman-Osborn, Timothy. 2017. "Disenchanted Professionals: The Politics of Faculty Governance in the Neoliberal Academy." *Perspectives on Politics* 15(1): 100–115. https://doi.org/10.1017/S1537592716004163.

Konkiel, Stacy. 2016. "Altmetrics: Diversifying the Understanding of Influential Scholarship." *Palgrave Communications* 2(1): 1–7. https://doi.org/10.1057/palcomms.2016.57.

Konkiel, Stacy, Cassidy R. Sugimoto, and Sierra Williams. 2016. "What Constitutes Valuable Scholarship? The Use of Altmetrics in Promotion and Tenure." *Impact of Social Sciences* (blog). March 24, 2016. https://blogs.lse.ac.uk/impactofsocialsciences/2016/03/24/the-use-of-altmetrics-in-promotion-and-tenure/.

Kristensen, Peter Marcus. 2018. "International Relations at the End: A Sociological Autopsy." *International Studies Quarterly* 62(2): 245–59. https://doi.org/10.1093/isq/sqy002.

Kwok, Roberta. 2013. "Research Impact: Altmetrics Make Their Mark." *Nature* 500(7463): 491–93. https://doi.org/10.1038/nj7463-491a.

Lenine, Enzo, and Melina Mörschbächer. 2020. "Pesquisa bibliométrica e hierarquias do conhecimento em Ciência Política." *Revista Brasileira de Ciência Política*, 123–60. https://doi.org/10.1590/0103-335220203104.

Lin, Jennifer. 2020. "Altmetrics Gaming: Beast within or Without?" In *Gaming the Metrics: Misconduct and Manipulation in Academic Research*, edited by Mario Biagioli and Alexandra Lippman, 213–27. Boston: MIT Press.

Lundine, Jamie, Ivy Lynn Bourgeault, Jocalyn Clark, Shirin Heidari, and Dina Balabanova. 2018. "The Gendered System of Academic Publishing." *The Lancet* 391(10132): 1754–56. https://doi.org/10.1016/S0140-6736(18)30950-4.

Lupton, Deborah. 2014. "'Feeling Better Connected': Academics' Use of Social Media." Canberra: News and Media Research Centre, University of Canberra.

https://www.canberra.edu.au/about-uc/faculties/arts-design/attachments2/pdf/n-and-mrc/Feeling-Better-Connected-report-final.pdf.

Maliniak, Daniel, Ryan Powers, and Barbara F. Walter. 2013. "The Gender Citation Gap in International Relations." *International Organization* 67(4): 889–922. https://doi.org/10.1017/S0020818313000209.

Mohammadi, Ehsan, Mike Thelwall, Mary Kwasny, and Kristi L. Holmes. 2018. "Academic Information on Twitter: A User Survey." *PLOS ONE* 13(5): e0197265. https://doi.org/10.1371/journal.pone.0197265.

Nygaard, Lynn P., and Rocco Bellanova. 2017. "Lost in Quantification: Scholars and the Politics of Bibliometrics." In *Global Academic Publishing*, edited by Mary Jane Curry and Theresa Lilly, 23–36. Bristol: Multilingual Matters. https://doi.org/10.21832/9781783099245-007.

Phull, Kiran, Gokhan Ciflikli, and Gustav Meibauer. 2019. "Gender and Bias in the International Relations Curriculum: Insights from Reading Lists." *European Journal of International Relations* 25(2): 383–407. https://doi.org/10.1177/1354066118791690.

Priem, Jason, Dario Taborelli, Paul Groth, and Cameron Neylon. 2010. "Altmetrics: A Manifesto." October 26, 2010. http://altmetrics.org/manifesto.

Ringel, Leopold. 2021. "Challenging Valuations: How Rankings Navigate Contestation." *Zeitschrift Für Soziologie* 50(5): 289–305. https://doi.org/10.1515/zfsoz-2021-0020.

Roemer, Robin Chin, and Rachel Borchardt. 2015. *Meaningful Metrics: A 21st Century Librarian's Guide to Bibliometrics, Altmetrics, and Research Impact*. Chicago: Association of College and Research Libraries. https://www.alastore.ala.org/content/meaningful-metrics-21st-century-librarians-guide-bibliometrics-altmetrics-and-research.

Schroeder, Jonathan E. 2021. "Reinscribing Gender: Social Media, Algorithms, Bias." *Journal of Marketing Management* 37(3–4): 376–78. https://doi.org/10.1080/0267257X.2020.1832378.

Sud, Pardeep, and Mike Thelwall. 2014. "Evaluating Altmetrics." *Scientometrics* 98(2): 1131–43. https://doi.org/10.1007/s11192-013-1117-2.

Teele, Dawn Langan, and Kathleen Thelen. 2017. "Gender in the Journals: Publication Patterns in Political Science." *PS: Political Science & Politics* 50(2): 433–47. https://doi.org/10.1017/S1049096516002985.

Thelwall, Mike, Stefanie Haustein, Vincent Larivière, and Cassidy R. Sugimoto. 2013. "Do Altmetrics Work? Twitter and Ten Other Social Web Services." *PLOS ONE* 8(5): e64841. https://doi.org/10.1371/journal.pone.0064841.

Thelwall, Mike, and Tamara Nevill. 2018. "Could Scientists Use Altmetric.Com Scores to Predict Longer Term Citation Counts?" *Journal of Informetrics* 12(1): 237–48. https://doi.org/10.1016/j.joi.2018.01.008.

Wais, Kamil. 2018. "GenderizeR." R. https://kalimu.github.io/project/genderizer/.

Westbrook, Laurel, and Aliya Saperstein. 2015. "New Categories Are Not Enough: Rethinking the Measurement of Sex and Gender in Social Surveys." *Gender & Society* 29(4): 534–60. https://doi.org/10.1177/0891243215584758.

Wojcik, Stefan, and Adam Hughes. 2019. "How Twitter Users Compare to the General Public." Washington, D.C.: Pew Research Center. https://www.pewresearch.org/internet/2019/04/24/sizing-up-twitter-users/.

Zigerell, LJ. 2015. "Is the Gender Citation Gap in International Relations Driven by Elite Papers?" *Research & Politics* 2(2): 2053168015585192. https://doi.org/10.1177/2053168015585192.