The Gender Citation Gap in International Relations[1]

Daniel Maliniak, Ryan M. Powers, and Barbara F. Walter

December 2012

Abstract

We investigate the extent to which citation and publication patterns differ between men and women in the international relations literature. Using data from the Teaching, Research, and International Policy project on peer-reviewed publications between 1980 and 2006, we show that women are systematically cited less than men after controlling for a large number of variables including year of publication, quality of publication, substantive focus, theoretical perspective, methodology, tenure status, and institutional affiliation. These results are robust to a variety of modeling choices. We then turn to network analysis to investigate the extent to which the gender of a given article's author affects that article's relative centrality in the network of citations between papers in our sample. We show that articles authored by women are systematically less central than articles authored by men, all else equal. We argue and then show that this is likely due to two factors: (1) women tend to cite themselves less than men, and (2) men (who make up a disproportionate share of IR scholars) tend to cite men more than women. This is the first study in political science to reveal significant gender differences in citation patterns. This finding is especially significant since citation counts have historically been viewed as a relatively objective and important measure of the quality and impact of research.

1 We thank Peter Gourevitch, Zoltan Hajnal, Kelly Kadera, Lisa Martin, Sara Mitchell, Maya Oren, Maggie Peters, and Jaime Settle, for invaluable comments. We also thank the Institute for the Theory and Practice of International Relations at the College of William and Mary for providing research assistance.

Introduction

To what extent – if any – are articles in international relations cited differently depending on the gender of the publication's author?[2] We address this question by analyzing citation patterns in the international relations literature. Our analysis uses data from the Teaching, Research, and International Policy (TRIP) project.[3] We use the TRIP project's journal article database, which catalogues articles published in the top 12 peer-reviewed international relations journals over the period 1980-2006.[4] The TRIP project has coded 3,087 articles on 26 different substantive and demographic variables. Using these data, we demonstrate the existence of a persistent gender gap in citation counts: articles written by women are consistently cited less than articles written by men. We then show that observable differences between male and female IR scholars - including productivity, institutional affiliation, publication venue, or epistemology - cannot account for this gap. We explore the gender citation gap further through an analysis of men and women in the network formed by citations between the articles in our sample. Using a dyadic citation dataset built from the TRIP data and the Thomson Reuters Web of Knowledge

---

2 In this article we use the term "gender" rather than "sex" to refer to our male/female variable. We realize that the two terms are not synonymous, nor is gender dichotomous. We prefer to use the term gender because the coding of the author is based heavily on the pronouns an author uses to identify him or herself. The result, however, is that we are unable to include a category for transgender scholars. We regret this. Still, due to the fact that transgendered individuals make up such a small proportion of the total population of IR scholars, any analysis of citation patterns of articles authored by transgendered individuals would be unreliable at best.

3 The TRIP Project is run by the Institute for the Theory and Practice of International Relations at the College of William and Mary. The TRIP project gathers data to enable scholars to better understand the development and current state of the discipline of IR and to what extent IR research informs or is informed by the international politics policymaking process. For more information, see http://irtheoryandpractice.wm.edu/projects/trip/.

4 The TRIP project identified the "top" journals on the basis of their impact rating. The database itself contains bibliographic data on all articles up to 2010, but articles have only been systematically coded and arbitrated through 2006.

database (WOK), we show that women are also more concentrated on the periphery of the IR network, where their work is cited less often by authors of the most heavily cited work.

Taken together, these findings offer robust evidence for a gender gap in citation counts in IR. This is a cause for concern. If women in IR are systematically cited less often than men in ways that do not appear to be associated with observable differences between the scholarship of men and women, and if citation counts continue to be used as a key measure of research impact, then women will be disadvantaged in tenure and promotion decisions. This article seeks to reveal the differential pattern of citation counts for articles published by men and women in international relations and then offer two potential explanations for it. Our hope is by identifying the gender gap in citations and then identifying potential reasons for it, we can begin to address and rectify this disparity.

What follows is divided into four sections. In Section 1, we review recent work on the topic of gender in academia, political science, and international relations. We use this research to develop expectations about what observable characteristics might help explain why citation counts for articles authored by women in IR garner fewer citations than those written by men. In Section 2, we test these hypotheses. While some of them help explain overall citation counts, none of them can account for the underlying gender gap in these counts. Section 3 addresses the gender gap question using a different metric – the network centrality of articles authored by men and women – to see if the gap persists in more nuanced measures of article influence. Again, we are unable to account for the gender gap using observable characteristics of the author(s) and the article. In Section 4, we propose two possible explanations for this persistent gap. We show that lower rates of self-citation partly explain the discrepancy. We also show that informal networks appear to be at play. In a field numerically dominated by men, men tend to cite men, and women

tend to cite women, resulting in disproportionately fewer citations for women. We conclude with a discussion of the implications these findings have for the field of IR and provide specific recommendations on ways to address the gap.

Gender and the IR Literature

The status of women in academia and political science has long been a topic of discussion and concern.[5] Women have been and continue to be underrepresented on political science faculty, as students in graduate programs, at conferences, and in peer-reviewed publications.[6] Today, women are earning Ph.D.'s in political science in record numbers, but are then failing to earn tenure in proportion to these numbers.[7] Colleges and universities are still dominated by male faculty, despite the fact that their student bodies are now nearly all majority female.

The number of women in academia, as well as their influence, will depend in part on how often their research gets published and whether other scholars then cite their work. Decisions about tenure and promotion, especially at research universities, take into account not just publications but impact, and impact tends to be partly measured by citation counts. If departments are determined to increase the number of women in their ranks, then uncovering the existence of systematic bias and then correcting for it will become a necessary step in reaching this goal.

---

5 Schuck, 1969; Finifter, 1973; Gruberg and Sapiro, 1979; Charles and Grusky, 2005.

6 Committee on the Status of Women, 1992; Gruberg and Sapiro, 1979.

7 Ginther, 2004; Sedowski and Brintnall, 2007; APSA Report 2004.

Work in a number of other scholarly fields shows a consistent trend in gender-citation patterns between men and women. In biology,[8] biochemistry,[9] ecology,[10] library and information science[11] and in general studies of the natural sciences, men tend to be more productive in terms of quantity, while women produce higher quality work, as measured by citations.[12]

Do these trends hold in international relations or political science more broadly? Do articles authored by women receive more citations, as is the case in science, or do they receive less or equal numbers? Copenheaver et al. argue, "[g]ender differences in citation rates appear to be discipline specific, so identifying whether a difference exists within a discipline is an important factor for making fair and equitable decisions regarding the evaluation and promotion of female and male researchers."[13] Mitchell et al. provide some limited evidence of a gender citation gap in IR in their bibliographic analysis of articles published in *International Studies Quarterly* and *International Studies Perspectives* in 2005.[14] They find that articles published by

---

8 Sonnert, 1995.

9 Long, 2002.

10 Symonds et al., 2006.

11 Peñas and Willett, 2006.

12 Sonnert and Holton 1995. However, Slyder et al. (2011) show no difference for articles in the field of Forestry and Geography for scholars from ten universities. They argue that this may be the result of frequent coauthorship among men and women, a result our analysis supports. In the field of dendrochronology, Copenheaver et al. (2010) find no difference between the men and women as first authors, but also point to the role of coauthorship.

13 Copenheaver et al. 2010.

14 Mitchel et al. 2012.

men are less likely to cite work by women than are articles published by women. On the other hand, Østby et al. find gender is not a significant determinant of publication in their analysis of submission and publication rates at the *Journal of Peace Research* between 1983-2010. [15] Given the conflicting findings of some of these more limited datasets, more systematic tests are needed to come to a general understanding of how author gender affects the eventual influence of a given article.

To test if a citation gap exists in international relations, we look at over 3,000 articles published between 1980 and 2007 in 12 influential peer-reviewed IR journals. Our findings suggest that articles authored by women are cited less on average than those authored by men. We begin our investigation with a very basic analysis of the TRIP dataset. We coded all articles in the TRIP database for the gender of the author(s), grouping them into three categories: those written by one or more male authors, those written by one or more female authors, and those written by at least one author of each gender.[16] A simple cross-tabulation suggests that author gender plays a significant role in determining the number of citations a given article garners after publication. Table 1 displays the average number of citations a given article received based on the gender of the author(s). As Table 1 shows, articles authored by men garnered an average of 4.8 more citations than those authored by women over the period 1980-2006. Given that the average number of citations per article during this time was 12, this is quite a significant difference.

---

15 Østby et al 2012.

16 This coding is based first on the pronouns that the individual authors use to refer to themselves in articles or on their department website. If no pronoun is used by the individual, we looked for photographs of the individual on their department or personal website. Finally, if no pronoun usage or photo was available, we coded individual his coding is based first names based on the most common gender associated with the individual. In cases where a name was not overwhelmingly associated with one gender or another, we left the gender of the article as missing data.

[Table 1 here]

There are a number of possible explanations for why this gap may exist. First, men and women tend to work at different institutions. According to the 2006 TRIP survey of IR scholars, men are more likely than women to be employed by Ph.D. granting institutions, while women are more likely than men to be employed by liberal arts schools.[17] The focus on teaching at liberal arts colleges may lead faculty to produce less research or have fewer opportunities to publicize their work at conferences and/or at seminars at other colleges or universities. Likewise, tenure requirements and a focus on research may generate different incentives to engage in academic debates and produce research. Because of the gender disparity in placement at liberal arts colleges, we might expect institutional affiliation to partially account for the gender divide in citation counts.

Second, women may publish less in the early years of their careers as a result of their need to take parental leave. This may not affect productivity over the long-term, but if citations depend in part on building name recognition, then fewer publications early in one's career could translate into fewer citations over time. Symonds et al. find that discrepancies between men and women early in their careers can lead to differences in citation rates throughout their time as scholars.[18] Taking a temporary leave from research in the first part of one's career, therefore, may have lasting effects.

---

17 The TRIP project has conducted more recent surveys, but we use the 2006 numbers here because that survey is coincident with the last year of publications included in our sample.

18 Symonds et al. 2006.

Third, the norms of coauthorship have changed over time and differentially across genders. Fisher et al. show in their analysis of coauthorship at the APSR, AJPS, and JOP, that while coauthorship across these journals has increased, it has increased more quickly for women.[19] Further, in cross-sex collaborations, Fisher et al. find that women are nearly four times more likely to collaborate with men than men are to collaborate with women. It is possible that women receive fewer citations because coauthors are cited less frequently or acknowledged less often than single authors or authors whose names appear first. To account for these differential coauthorship patterns, we control for coauthorship in general and whether a given instance of coauthorship is mixed gender.

Fourth, men and women tend to study different substantive issues. As Table 2 shows, men are more likely to write articles on security, U.S. foreign policy, and methods. Women are more likely to write articles on human rights, comparative foreign policy, health, international law, and the environment.[20] If these topics are less popular and less well cited, then this could also help account for the gender gap in total citation counts.

[Table 2 here]

Fifth, men and women report using different theoretical paradigms to analyze international politics. In the 2006 TRIP survey, women reported that they are more likely to employ constructivism and feminism than their male counterparts. Meanwhile, men are more

19 Fisher et al. 1998.

20 These trends are reflected in APSA membership records as well. As of 2008, "APSA divisions with the lowest female representation included international security and arms control, international collaboration, foreign policy, conflict processes, and international history and politics" (TRIPS).

likely than women to report employing realism or liberalism.[21] Similar differences are also apparent in our data from the coded articles. Table 3 shows this breakdown. Women are more likely than men to publish articles that are constructivist or non-paradigmatic, while men are more likely to publish articles that are atheoretic, realist, or Marxist. There is little difference in the use of liberal theory across genders. Again, if women tend to gravitate toward theoretical approaches that are less widely used and appreciated, then this could account for the lower citation rate.

[Table 3 here]

Sixth, as the 2006 TRIP survey and Breuning et al. show, men and women tend to situate their work in different epistemological schools.[22] Men are slightly more likely to report that their work is positivist. Women are nearly twice as likely as men to report their work being post-positivist. We find these trends in our data as well. We know from other recent work that articles not employing a positivist epistemology tend to be cited less, especially in the sampling of journals we include in our analysis.[23]

---

21 In the 2006 TRIP survey, 29.8 percent of women reported employing feminism compared to just 16.5 percent of men. 7 percent of women reported being primarily committed to feminism compared to just .15 percent of men. By contrast, 27 percent of men reported being primarily committed to realism, compared to just 13 percent of women. Similarly 31 percent of men reported being primarily committed to liberalism compared to just 26 percent of women. The survey asked respondents, "What paradigm within international relations are you primarily committed to in your research? If you do not think of yourself as 'committed,' please pick the paradigm in which most other scholars would place your work." Respondents could choose from "Realism," "Liberalism," "Marxism," "Constructivism," "Feminism," or "Other." The 2006 TRIP survey was sent to 2,383 individuals identified as IR scholars in the U.S. and 275 individuals identified as IR scholars in Canada. The U.S. and Canada samples both had a response rate of approximately 40 percent. For more details on the 2006 TRIP survey methodology see Maliniak et al. (2007).

22 Breuning et al. 2005.

23 AUTHOR.

Seventh, the TRIP surveys show that women are just slightly more likely to report employing qualitative methods than are men. Conversely, men are only slightly more likely to report employing quantitative methods than women. Men are also much more likely than women to report using formal methods.[24] As Maliniak et al. (2011) show, quantitative and formal work are cited more frequently than qualitative work in recent years, potentially explaining the discrepancy in citations.

Finally, it could be that the gap in citations is due to the venue in which men and women publish. Women may tend to publish in certain journals and it is these journals that tend to draw fewer citations than others. Copenheaver et al. (2010), for example, find that when they control for journal-specific effects in their analysis of citations, no gender gap remains. It is possible that controlling for the venue in which articles are published will capture some of the variance between male and female citations.

The explanations discussed above represent a range of plausible and compelling reasons for the citation gap in IR. Our hope is that by controlling for these factors, we will find that the gender gap disappears. If not, a new set of variables will need to be considered, and new data collected.

Why Citations?

This article focuses on individual citations for two reasons. First, the discipline tends to use citations as an important measure of the quality of scholarly contributions, whether at the level of individual scholars, journals, or even entire institutions. Citations are one of the chief

24 According to AUTHOR, "Of the 122 people in the sample who indicated that formal modeling was either their primary or secondary methodology, only 12 were women."

metrics used in academia to evaluate a scholar's performance and influence, and to distribute resources.[25] They are also used to rate the quality of the faculty and departments across different universities. Finally, citation-related metrics are often part of efforts to evaluate institutional excellence at a global level.[26] When articles are highly cited we assume they have had a significant impact on the field and that the researcher or researchers are influential. Second, the importance of citation counts is likely to increase as they become easier to compile using Google Scholar, ISI, or Scopus. If a persistent gender gap exists in citations, department and universities should be aware of this.

It is important to emphasize that our analysis looks only at article citations and not the full range of venues through which scholars communicate their work. Other outlets include single and co-authored books, chapters in edited volumes, op-eds in newspapers, and (increasingly) blog posts. Given this variety, is it possible that the source of the gender citation gap is the result of self-selection into different types of publications? The evidence suggests not. Indeed, in the 2011 TRIP survey, respondents were asked to rank the "three kinds of research outputs that are most important for you to publish in order to advance your academic career."

[Table 4 here]

Table 4 shows responses to this question broken down by gender. A plurality of women (45.9) and a large percentage of men (40) listed a single-authored journal article in a peer-reviewed journal as the most important research output to produce in order to advance their career. Co-authored articles in peer-reviewed journals are also ranked in the top three, higher

25 Fowler and Aksnes 2006, Dries et al. 2008.

26 Hix 2004.

than any other outlet, save single-authored books for a university press and single-authored journal article in a peer-reviewed journal. Male and female scholars seem to agree that peer-reviewed journal articles are the main currency for stature in the realm in academia. That said, important insights could be gained from the analysis of citation patterns of other types of research output and we hope to do so in future research.

Data

Our universe of cases comes from the journals tracked by the TRIP project. These include *American Journal of Political Science (AJPS)*, *American Political Science Review (APSR)*, *British Journal of Political Science (BJPS)*, *European Journal of International Relations (EJIR)*, *Journal of Conflict Resolution (JCR)*, *Journal of Peace Research (JPR)*, *Journal of Politics (JOP)*, *International Organization* (IO), *International Security* (IS), *International Studies Quarterly* (ISQ*), Security Studies* (SS), *World Politics* (WP). For those journals that publish both IR and non-IR research, we limit our sample to those articles coded as being related to IR by TRIP.

As a dependent variable, we use the count of citations provided by the Thomson Reuters Web of Knowledge. These values were gathered by an automated script, and linked to the articles in the TRIP database by the unique combination of values formed by the title, journal of publication, issue number, and volume number. The number of citations for each article reflects citations from all articles catalogued in the Web of Knowledge, not just those journals from which we draw our sample.[27]

27[↑] While Thomson Reuters does not provide an exact number of journals in their Web of Knowledge database, they write on their website that the database contains "over 12,000 top tier international and regional journals in every area of the natural sciences, social sciences, and arts and humanities."

Data for our independent variables come from the TRIP project article-coding database Peterson and Tierney (2009). The TRIP project has coded 26 variables for each article in issues one and three of each journal from 1980-2006. We believe the coded data are a representative sample of the IR literature over the last 25 years. The TRIP coding scheme records variables for important article attributes including methodology, epistemology, paradigm, time period, geographic area of study, issue area, and many others. For a more detailed description of the TRIP coding methodology see the TRIP codebook.

Gender, our independent variable of interest, is taken from the TRIP gender variable which codes gender on the basis of pronouns used by the author in the publication or on their website. If no gendered pronouns are used, we rely on any available photographs on the author's personal or departmental website. As a last resort, we rely on gender-specific first names. If no information about the author's gender is available the variable is left as missing. We capture the gender makeup of a given article's authorship in three mutually exclusive dichotomous variables: all male, all female, or mixed gender.

To operationalize the potential confounding factors contributing to the gender-gap in citation counts that we discussed in section two, we use a number of specific variables from the TRIP data. These include:

Theoretical Paradigm. This is a nominal variable that is coded as one of the following: realist, liberal, Marxist, constructivist, non-pardigmatic, or atheorhetic/none. As the TRIP codebook explains, "paradigms are defined primarily by their core assumptions and secondarily by the independent variables they emphasize." See the TRIP codebook for a longer description of the paradigm coding rules.

Age of publication. This is measured in years since publication. We add a square term to account for the possibility that the effect of age increases with time.

Author tenured. This is a dichotomous variable. An author is considered tenured if his or her rank is given as associate professor, professor, or full professor (or their equivalent for scholars at non-U.S. institutions).

R1. This is a dichotomous variable. It is coded as '1' if the author is at a "National Research University" as defined by U.S. News and World Report's college and university rankings.

Coauthored. This is a dichotomous variable. It is coded as '1' if the publication has more than one author.

Epistemology. This is a dichotomous variable. As the TRIP codebook explains, "This variable seeks to answer the question, by what criteria does the author establish knowledge claims." An article is coded as positivist "if [the author(s)] implicitly or explicitly assume that theoretical or empirical propositions are testable, make causal claims, seek to explain and predict phenomena, assume that research is supported by empirical means, and aspire to the use of a scientific method" {trip_codebook}.

Ideational. This is a dichotomous variable that captures the use of ideational factors. The TRIP codebook explains, "Any article where ideas, beliefs, perceptions, learning, norms, identity, knowledge, or personality traits play a central role in the argument, whether as independent or dependent variable, is coded as ideational."

Material. This is a dichotomous variable. It is coded as 1 if the article employs "material variables" which are defined by the TRIP codebook as "non-ideational and

refer to ascriptive characteristics of actors or the structures in which actors are embedded."

Issue Area. This is a nominal variable that captures the particular sub-field into which an article falls. It can take a value of any one of the following: International Security, International Political Economy, Human Rights, Environment, Health, IR theory, US Foreign Policy, Comparative Foreign Policy, History of the IR Discipline, Philosophy of Science, International Law, Other, General (or non-specific), International Organization, Methodology, Comparative Politics, American Politics, Political Theory. The TRIP codebook explains, "we have values for [non-IR] sub-fields of political science so that we can track non-IR articles in IR journals."

Methodology. This is a set of dichotomous variables. The TRIP codebook explains that this variable is a "measure of whether the study uses quantitative (statistics), qualitative (case studies), formal modeling (calculus, game theory, spatial modeling), or some other methodological approach. Many articles utilize more than one methodology." An article can employ one or more of the following types of methods: quantitative, qualitative, formal modeling, counterfactual, analytics/non-formal conceptual, descriptive, policy analysis, and experimental.

Journal of Publication. This is a nominal variable that takes on the value of one of the 12 journals tracked by the TRIP database.

Table 5 provides descriptive statistics on each of these variables.

Analysis

Using the data described above, we test the extent to which each of the variables discussed above affects citation counts. Our estimates are based on a negative-binomial model

because of clear over-dispersion in the citation count variable.[28] In all cases, we include our main independent variables of interest, an *All Female* and a *Mixed Gender* variable, with *All Male* as the reference category.[29] To account for potential idiosyncrasies across publication years in the data, we include year fixed-effects.[30] Moreover, we exclude articles published later than 2006 so that each article has at least five years of exposure to possible citations by the time we gathered the counts. We also include the age of the article (in years) and a quadratic of age to help control both for exposure but also the changing nature of citation patterns over time.

In our baseline model in Table 6, we see that the *All Female* variable is negative and statistically significant. Given that the coefficient represents the natural log of the expected count of citations, we can interpret this as female-authored articles receiving roughly 73% of the citations that a similar male-authored article would receive. Articles having at least one male and one female author show no statistically significant difference in citations from male-only authored articles. Adding controls for time, in Column 2, we see unsurprisingly that older articles receive more citations than younger articles, but that this effect declines over time. The effect of article age slightly reduces the magnitude of our gender effect, but it does not affect its direction or significance.

[Table 6 here]

---

28 However, the results are robust to a number of alternative modeling choices, including a poisson and linear regression model.

29 The results are qualitatively similar when we include only an *All Female* dummy variable or a measure of the percent of authors who are female.

30 The inclusion of age, age squared, and year fixed effects may induce multicolinariety in the data, but our results are similar without the inclusion of year fixed effects.

In the column 3, we explore the extent to which accounting career-related factors helps explain the gender gap in citation counts. As noted above, women in the field of IR are less likely to be employed by R1 institutions. We account for institutional affiliation by including a variable that captures whether any of the authors are employed at an R1 institution.[31] In this model we see that R1 affiliation has a positive and significant effect on citation counts. We also noted above how coauthorship differs across gender and so we add a variable to account for whether a given article is coauthored. Coauthorship also has a positive and significant effect on citation counts.[32] We also add two variables to account for the effect of tenure across genders. The first is a simple dichotomous variable called *Tenure* that takes on a value of one if any of the authors on the article are tenured and zero otherwise. The second is a variable called *Tenure*Female* that takes on a value of one if the article is written solely by women and at least one of these authors is tenured. The variable takes a value of zero otherwise. This term is, in effect, an interaction between *Tenure* and *All Female* variable and allows us to interpret the differential effects of tenure across the gender-composition of the article authors. To more easily interpret the interaction, Figure 1 shows the predicted count of citations and 95 percent confidence interval for all four categories of interest. Tenure is associated with more citations for both point estimates of male and female, but is only statistically significant for male. Moreover, men with tenure are cited more than women with tenure.[33]

[Figure 1 here]

31 Our results are similar if we control for being a member of a top 20 institution as defined by the most recent U.S. News and World Report rankings of IR graduate programs.

32 Note too that coauthored articles are cited more than single-authored articles. If past findings are correct, and women coauthor articles more often than do men, the positive effect of co-authoring on citation counts may mask some of the citation gender gap.

33 This effect is consistent for the later models as well.

We now turn to arguments about differences in the content of articles between male and female authors. As we discuss above, the articles in our sample authored by women are more likely to employ a non-positivist or post-positivist epistemology than those authored by men. When we include a dummy variable for whether the article is post-positivist or non-positivist, as seen in the Epistemology model, positivist articles receive relatively more cites than similar non- or post-positivist articles. The coefficient on *All Female*, however, remains negative and significant. The Ideational model shows that neither accounting for the ideational variables nor a lack of material variables has a significant effect or changes the signs and significance of our coefficients of interest *All Female* and *Tenure.*

When we control for the particular issue area that a given paper addresses, we find that articles in comparative foreign policy, U.S. foreign policy and IPE are cited less than the reference category of American politics.[34] Articles in IR theory and human rights are cited more than the reference category. While inclusion of these factors does decrease the magnitude of the coefficient on *All Female*, it remains significant at conventional levels. Further, the coefficient on our other variable of interest *Tenure,* increases in size and is highly significant.

Including the paradigm of the article does not substantially affect the citation gender gap. Using realism as a base category, our Paradigm model shows that atheoretic and Marxist articles tend to be cited relatively less, while constructivist articles have more citations.[35] As Column 7 illustrates, again, our coefficients of interest again remain relatively stable after accounting for

34 The category of "American politics" includes those articles in general journals that are coded by TRIP due to the use of an international dependent or independent variable, but are actually in the subfield of American politics.

35 While the TRIP categorization of articles in the feminist tradition would be under non-paradigmatic, we do not think they make up a large enough portion of those articles to account for the positive coefficient. Moreover while female respondents to the 2011 TRIP survey are also slightly more likely to be constructivists than male respondents, we do not find that accounts for the gap.

the research methods employed in each article. Formal or quantitative methods have a positive effect on citation counts, while descriptive methods are associated with fewer article citations. Despite our discussion above, we cannot account for the gender citation gap by controlling for the fact that women are more likely to employ qualitative methods.

Finally, we estimate a Kitchen Sink model in which we include all article characteristics in one model and control for potential venue-specific citation effects. When we include a variable for each of the 12 journals (*World Politics* serves as the reference category), the net effect of is to decrease the magnitude of coefficient on *All Female*, but to substantially increase the magnitude of the *Tenure* coefficient. Despite accounting for a wide variety of factors that might effect the number citations that a publication might receive over time, we are unable to account for the gender-specific effects. Articles authored by all women, regardless of tenure status, are cited systematically less than similar articles written by either all men or by men and women together.

To illustrate the gender gap in a slightly different way, we create a model of citation counts built only from the all-male authored articles. If citations occur regardless of the gender of the authors, a model that explains variance in citation counts should be equally predictive regardless of the gender makeup of the authors. Using the kitchen-sink model from our analysis above, we calculate the predicted number of citations for each article in our dataset authored by only women or having at least one author from both sexes.

A quick comparison between the average number of predicted citations for male-authored articles and the actual number of citations shows that the model seems to be accurate, if not precise. Next, we can use the *Mixed Gender* articles to see if the coefficients from the model based on all-male authors do well to predict citations in this excluded group. In this case, a

simple t-test shows that a 0.36 difference in the number of citations between the actual and predicted counts is not statistically significant. How well does this model predict actual citations for female-authored articles? Table 6 offers the aggregate results and Figure 2 illustrates a plot of these values. The steeper slope for articles authored by women shows that for each citation predicted by the model, women are receiving a smaller fraction compared to all-male authored articles and mixed gendered articles.

[Table 7 here] [Figure 2 here]

The out of sample analysis presented above illustrates our key counterfactual: would the number of citations a given article received change if it were written by a man (or men) instead of a woman (or women)? In this case we have constructed a model that accounts for the combined positive and negative citation effects associated with choices of method, issue area, paradigm, rank, etc. To the best that the observable characteristics of each article allow, we have limited the variance to only that of the gender of the author(s). Our all-male model predicts articles authored by only women should have 4.7 more citations than they actually received. Of course, as is the same with our previous results, we cannot be sure we have controlled for all the important confounding variables. Still, we find this result striking. Even controlling for a wide variety of confounds from attributes of the author, to attributes of the article, articles written by women are cited less often at a statistically significant rate.

Is There Also an "Influence" Gap?

Thus far, we have shown a robust relationship between the gender of authors and the total number of times their papers are cited. Putting aside this result, we wonder if the ideas and influence of articles authored by women in the field of IR are also being undervalued? To

address this, we propose the use of network analysis as a better measure of the impact of female authors on the field. The reason this additional analysis is important is that it measures impact much better than a simple citation count. Network analysis not only incorporates how many citations an article gets, but whether an article is cited by more influential articles. It is far more important to be cited in a seminal article than it is to be cited in an obscure one.

To measure the relative influence of a given article we employ the widely used HITS algorithm developed by Kleinberg.[36] HITS calculates a hub score and authority score for each node in the network. Kleinberg's method was developed to measure the relative importance of nodes in the world's largest "citation" network: the Internet.[37] A given node garners authority by being linked to by other nodes. More weight is placed on a link from a node that itself is linked to by many other nodes. To put it in the parlance of citation analysis, an article that is cited by many widely cited articles will have a higher authority score than an article cited by many articles that themselves are only rarely cited.

Using the network of citations produced by the 12 journals in the TRIP article-coding database, we calculate the "authority" score for all articles cited by at least one other article in the largest cluster of articles.[38] These values range from 0 to 1, with one being the most highly

---

36 Kleinberg 1999. The HITS algorithm is perhaps better than at least two other widely used alternatives – degree centrality and eigenvector centrality – because it makes use of both inward and outward links in the network (See Fowler et al. (2007); Fowler and Aksnes (2007)).

37 In 1998, several researchers at Stanford developed an algorithm similar to Keleinberg's for use in ranking search engine results. Their method would eventually be known as Google PageRank.

38 The largest cluster is that group of articles within which one could get from any one article to any other via citations, and has the largest number of articles total. We use the largest cluster because our measure only take into account articles that have at least one tie to another, connected article. We cannot calculate a centrality value for those single articles or groups of articles that are unconnected to this largest cluster. By definition, the articles we lose are the most peripheral, since they are not cited by any articles in the largest cluster, and do not cite any of those within the largest cluster.

authoritative article, and zero having no authority. We take the largest value an article achieves in any year of its publication. In this sense, we are looking to see if an article ever becomes highly influential over the entire time period of our sample.

Our results largely mimic those of the citation count models presented above. Articles written by female authors are not only being cited less, but authors of the most influential articles are citing them less often. Table 8 presents the results of similar models to those used in the citation analysis using OLS models.[39] In this sense, we should expect that the position of articles written by women is more to the periphery of the IR citation network.

[Table 8 here]

This finding can be seen in Figure 3 which highlights authorship by gender across the network plotted in space. Each circle represents an article. The size of the circle is proportional to its authority score. Articles written by female author(s) are colored green. Articles written by all men are blue. Articles written by some combination of men and women are colored red. As you can see from Figure 3, the all-female nodes (green) are much smaller on average than the male (blue) and mixed gender nodes (red). The green nodes also tend to be smaller than their blue counterparts.

[Figure 3here]

Other Explanations for the Citation Gap

The data reveal that articles published by women in the top journals of international relations are cited less often than those written by men even after controlling for the age of publication, whether the author came from an R1 school, the topic under study, the quality of the

39 The results are robust to a number of other modeling choices, including the use of a tobit model.

publishing venue, the methodological and theoretical approach, and the tenure status of the author. Articles written by women are also cited less often than articles co-authored with at least one man. They are also cited less often in seminal articles in the field. This is a striking and disturbing pattern given the weight the profession assigns citation counts in evaluating scholars and their institutions.

In order to correct this gap, we need to understand why it is occurring. Does the citation gap exist because of overt discrimination, performance issues related to gender not addressed above, or something entirely different? In what follows, we offer and then test two additional explanations for why articles written by women might be cited less than those written by men.

Women Cite Themselves Less Than Men

It is possible that the gap in citation counts is the result of women failing to cite their own work as frequently as men do. Self-citation is the easiest way to increase one's citation count because the total number of citations any one article in IR receives over the course of its lifetime is small. In fact, the average number of citations an article in the social sciences and humanities receives in a year is less than one. (Anne-Wil Harzing 2010) The average number of total citations received by articles in the TRIP dataset was 12. Adding even one additional citation every year, therefore, quickly adds up.

Self-citation also appears to have a compounding effect. Fowler and Aksnes (2006) find that self-citation increases future citations from others, at least among the Norwegian scientists they studied. In their study, each self citation generated an additional 3.65 citations from others after ten years. Thus, even if promotion and review committees were to subtract self-citations from overall citation counts, there would still be a substantial benefit from citing oneself.

A look at our data reveals that women in IR do, in fact, cite their work at significantly lower rates than men.[40] We begin by defining a self-cite as any citation which has a common author with the author of the published article.[41] As seen in Table 9, among those single-authored articles, male-authored articles have 0.4 self-cites on average, while articles authored by one woman self-cite 0.25 articles. Looking only at co-authored articles reveals a similar pattern, where those written by two or more men cite themselves more than women. There is no significant difference between articles written by two or more men, and those written by at least one man and one woman. Again, we see that the introduction of one male author to the mix causes articles to "look" more like male-authored articles.[42] In both cases, the difference is substantively large, being just under 40 percent more in single-authored work, and over double in coauthored work.

[Table 9 here]

Does controlling for self-citation have a major effect on the gap? Here, we take the number of citations within our 12-journal network and subtract all self-citations. Using this new citation count as the dependent variable, we find that the gender gap still exists. Articles written

---

40 Here we must rely citation counts from within the network of top 12 journals tracked by the TRIP project. Recall that the dependent variable used above is the total number of times an article is cited in all of the journals tracked by the WoK. We are unable to collect information about the identity of each of these citations. We are, however, able to identify cases in which a given scholar in the TRIP database cites their own work elsewhere in the TRIP database. As such, our dependent variable here is the total number of times a scholar is cited by articles in the TRIP database minus the number of times a given author cites his or her self in the TRIP database. The correlation between the number of citation counts from WoK and citation counts just from articles within the TRIP database is over 80 percent.

41 Although it is possible that a larger portion of women's research is published outside these 12 journals where women might be citing themselves at the same rate as men, we assume that the citations within this network closely mirror those overall. Because we cannot test this proposition, one should consider these results with this proviso in mind.

42 This gender gap persists when we conduct additional analysis that controls for the number of authors.

by women still receive fewer citations than those written by men. Moreover, as we suspected, coed-authored articles do not differ statistically from male-authored articles. The coefficients from models that do and do not account for self-citation do not differ statistically from each other.

The fact that the gender gap in citations continues even when we remove self-citations from the analysis is not surprising. If one self-citation translates into almost 4 additional citations, as Fowler and Aksnes (2006) found, then removing the self-citations will not correct for this additional benefit. To address this, we not only subtract all self-citations from the total number of citations an article receives, but we also subtract an additional 3.65 citations for each self-cite.[43] When we control for "bonus" citations, the results still hold. Articles written solely by women are still cited significantly less than men. Thus, although self-citation may explain some of the discrepancy between men and women, it does not explain all.

The Existence of Citation Groups

The second possible explanation has to do with informal agreements made amongst a group of scholars to cite each other. Clusters of individuals could inflate their citation counts by agreeing to cite each other in every article they write even if their research is only tangentially related. One type of citation game is already known to exist – the citation cartel. Here, groups of editors at academic journals have been known to collude to publish review articles that heavily cite articles published in each others' journals as a way to improve their impact factor.[44] This type

---

43 One challenge, however, exists. For those articles that have three or less citations, and where one or more is a self-cite, the value turns negative when we subtract 3.65. Since we cannot have negative citations, we code these cases as having zero citations.

44 Franck 1999.

of behavior is not only an easy way to increase citations, but one that is more difficult to trace than self-citations. If men were more apt to form such alliances than women, or had more opportunity to do so given their larger numbers or more extensive social networks, then this informal collaboration could account for the higher rate of citations for men.

We have no definitive evidence that such informal arrangements exist or that they are more prevalent among men than women. Stories abound in the halls of academia, however, of such groups forming between graduate student friends, or sub-field cohorts. The evidence we do have, however, reveals that citations appear to split along gender lines. Men tend to cite male-authored articles more than female-authored articles and women tend to cite female-authored articles more than male-authored articles. This difference alone could account for the gender gap in citations since the number of men in IR is significantly higher than women. Tables 10 and 11 illustrate this trend. We see that there does seem to be a gendered pattern to citations.

[Tables 10 and 11 here]

Implications

The findings presented above are powerful. They show that articles written by women in IR are cited less than men even after controlling for a host of factors. Lower citation counts do not exist because women are less likely to work at R1 universities, less likely to have tenure, publish less in their early career, choose topics, theories and methods that are less popular, or because they pick venues that are less influential. Even when one controls for all of these factors, women are still cited less frequently than men in IR. A clear gender gap exists.

Studies that point out gender bias, or any type of bias, tend to make people uncomfortable. Those who benefit from the current system may feel that they are somehow responsible for the differential treatment, or are being blamed for it, even if they are beyond

reproach. Those who suffer from it may feel victimized, duped, or somehow complicit in their own troubles. The result is that both sides often prefer not to discuss the problem, hoping it will correct itself over time.

We do not believe the citation gap will go away on its own. The gap is real. In fact, at least three lessons should be drawn from this study. First, citation counts used as a measure of a scholar's quality are biased against women. We now know that women will have lower citation counts all else equal. Moreover, the bias stems not from a difference in quality or choice of research strategy, but from underlying behaviors (fewer self-citations by women, and more within-gender citations). Citation counts, therefore, are not a fair and objective measure of the quality and impact of a scholar. Second, self-promotion strongly affects citation counts and women are less likely to promote themselves. Not only does self-citation increase one's overall citation score, but it also exposes one's work to a larger number of scholars, exponentially increasing citations. The more references other scholars see to one's work, the more likely it is to get cited. Third, citations tend to fall along gender lines (for reasons we do not yet understand). This means that any field dominated by men will likely have a gender gap in citation counts, and the gap will not disappear until a more equal number of male and female researchers exists.

What's the solution? One could argue that citations should no longer be used as a measure of scholarly impact or weighted as heavily as it has been. Any measure that has been shown to include significant bias and is easy to manipulate should be discarded in favor of other, better measures. We disagree. Citation counts are a biased measure of quality and impact, but – as we demonstrated above – this bias is quantifiable to a significant degree. Moreover, this bias is systematic. Replacing a measure that has a known and quantifiable bias with a measure whose bias is unknown is not a solution. We believe it is better to work with an existing indicator whose

bias is known, than one that is assumed to be unbiased but is not.[45] Departments should carefully keep this bias in mind when evaluating female scholars for promotion and review.

We believe a better solution is to view these findings as a call to action to scholars in the field. Women in particular can help reduce the gap in at least two ways. First, if self-citation is a common and conventional practice, and we know it is, then women need to overcome their hesitancy and advocate for themselves and their work. As Fowler and Aksnes found in their 2006 study, there are no penalties even for the most egregious self-citation. In a world where the absolute number of citations an article receives is low, and where citations can mean the difference between promotion or no promotion, funding or no funding, the failure to cite oneself can be professionally harmful. Second, women should consider the benefits of co-authorship across gender lines since collaboration may be one way to increase the visibility of one's scholarly work. We do not think this should be a call for researchers to choose their coauthors based on anything but research abilities and collaborative qualities. Still, the benefits of co-authoring with at least one male colleague should be known.

What about men? One of the interesting findings to emerge from this study is the tendency for men and women to more heavily cite authors from their own gender. A large portion of the gender citation gap, therefore, could be narrowed if men and women were made aware of this pattern and encouraged to be more gender neutral in who they choose to cite.

Some of the factors discussed above will be easy to fix – such as the tendency for women in IR to cite themselves less. Some will be more difficult to fix – such as the tendency of the large cohort of men in the field of IR to cite other men. All require additional research to

45 This reveals the importance on additional research looking into the presence or absence of bias in all aspects of the publishing process from the review process, to the final decision by editors and publishers to accept a manuscript.

understand why these patterns exist. Still, simply knowing that this gap exists and that it exists in part because of how individuals are citing themselves and others can go a long way to closing it. If colleges and universities really care about promoting women and increasing their representation in academia, then closing the citation gap, or at least acknowledging that it exists, is one step toward increasing their numbers on campus.

Table 1: Citations by Gender.

Year Range	Gender of Authors	Mean citations	Median citations	Std. Dev.	N Obs.
1980-2006	Men	18.47	7	37.31	4592
	Women	13.65	6	21.62	626
	Mixed	18.60	9	28.80	564
1980-1989	Men	16.84	6	38.82	1424
	Women	9.73	4.5	13.28	126
	Mixed	17.51	9	33.68	82
2000-2006	Men	12.17	6	23.21	1705
	Women	9.47	5	12.76	312
	Mixed	13.83	6	23.94	305

Table 2: Gender of Authors by Issue Area

	Gender of Authors			
Issue Area	Male (%)	Female (%)	Mixed (%)	Total
American Politics	0.32	0.00	0.33	0.29
Comparative Foreign Policy	6.58	10.44	7.67	7.07
Comparative Politics	0.95	1.10	2.00	1.05
Environment	0.88	1.37	1.33	0.97
Health	0.21	0.55	0.67	0.29
History of Discipline	0.91	0.27	0.00	0.77
Human Rights	1.76	4.67	4.00	2.25
International Law	0.95	2.20	3.67	1.31
International Organization	5.98	7.14	7.33	6.21
IPE	13.26	14.84	16.67	13.71
International Security	34.81	26.65	26.33	33.24
IR Theory	9.11	8.24	2.67	8.47
Methodology	2.99	1.65	5.33	3.05
Other	9.49	13.74	10.00	9.98
Philosophy of Science	0.95	0.55	2.00	1.00
Political Theory	0.25	0.00	0.00	0.20
U.S. Foreign Policy	7.81	5.22	4.67	7.27
General	2.81	1.37	5.33	2.88
Total	100.00	100.00	100.00	100.00

Table 3: Gender of Authors by Theoretical Paradigm Employed in Publication

	Gender of Authors			
Paradigm	Male (%)	Female (%)	Mixed (%)	Total
Atheoretic	17.58	10.44	10.33	16.22
Constructivist	6.72	14.56	5.67	7.44
Liberal	20.78	19.78	26.00	21.12
Marxist	1.86	0.82	2.33	1.80
Non-Paradigmatic	43.64	49.45	51.00	44.87
Realist	9.42	4.95	4.67	8.55
Total	100.00	100.00	100.00	100.00

Table 4: Rank the three kinds of research outputs that it is most important for you to publish in order to advance your academic career.

	Top venue			In the top Three		
	Men	Women	diff	Men	Women	diff
Books (single-authored, published by a commercial press)	7	5.3	1.6	29	23.9	5.2
Co-authored books (published by a university press)	1.3	0.5	0.8	17.6	16.9	0.6
Books (single-authored, published by a university press)	49	44.7	4.1	83	81.2	1.9
Edited books (with you as editor or co-editor, published by a commercial press)	0.4	0.5	-0	3.7	3.1	0.5
Chapter in an edited book (in a university press)	0.4	0.24	0.1	11.7	13.8	-2
Co-authored books (published by a commercial press)	0.2	0	0.2	2.4	2.4	-0
Edited Books (with you as editor or co-editor, published by a university press)	0.2	1.5	-1	11.3	11.8	-1
Chapter in an edited book (in a commercial press)	0.1	0	0.1	2.8	2.9	-0
Journal article (single authored, in a peer-reviewed and/or Social Science Citation Index journal)	40	45.9	-6	87.4	90.6	-3
Journal article (single authored, in a non-peer reviewed journal)	0.2	0	0.2	3.9	1.2	2.7
Journal article (co-authored, in a peer-reviewed and/or Social Science Citation Index journal)	0.7	1.5	-1	37	37.9	-1
Journal article (co-authored, in a non-peer reviewed journal)	0.1	0	0.1	0.5	2.4	-2
Conference papers / presentations	0.4	0	0.4	3.8	6.0	-2

Figure 1: Estimated citation count for single-authored articles by authors at R1 institutions. Estimates from Career model.

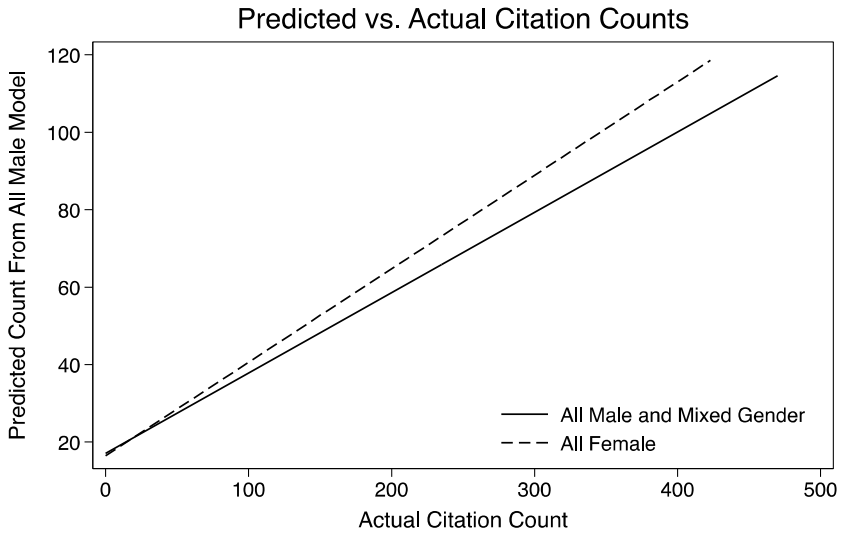

Figure 2: Out of Sample Test: Predicted number of citations for females based on a model of citations for male-only articles

Table 5: Descriptive Statistics

Category	Variable	N. Obs.	Mean	Std. Dev.	Min	Max
	Citation Count	3087	21.158	40.451	0	869
	Maximum Authority Score	2590	0.036	0.104	1.95×10^{-19}	1
	Age of Publication	3334	17.258	8.076	5	32
	Author Tenured	3334	0.399	0.489	0	1
	Author at R1	3334	0.530	0.500	0	1
	Coauthored	3334	0.302	0.459	0	1
Gender	All Male Author(s)	3334	0.818	0.386	0	1
	All Female Author(s)	3334	0.101	0.301	0	1
	Mixed Gender Authors	3334	0.081	0.273	0	1
Ontology	Non- or Post-Positivist	3334	0.192	0.394	0	1
	Ideational	3334	0.416	0.493	0	1
	Material	3334	0.928	0.259	0	1
Issue Area	Comparative Foreign Policy	3334	0.073	0.259	0	1
	Environment	3334	0.000	0.098	0	1
	Health	3334	0.003	0.052	0	1
	History of the Discipline	3334	0.008	0.090	0	1
	Human Rights	3334	0.021	0.143	0	1
	International Law	3334	0.013	0.113	0	1
	International Organization	3334	0.061	0.240	0	1
	International Political Economy	3334	0.138	0.345	0	1
	International Security	3334	0.330	0.470	0	1
	IR Theory	3334	0.087	0.282	0	1
	Methodology	3334	0.029	0.168	0	1
	Philosophy of Science	3334	0.010	0.110	0	1
	U.S. Foreign Policy	3334	0.073	0.259	0	1
Methodology	Analytic non-formal	3334	0.159	0.365	0	1
	Counterfactual	3334	0.005	0.073	0	1
	Descriptive	3334	0.103	0.305	0	1
	Experimental	3334	0.035	0.184	0	1
	Formal Modeling	3334	0.135	0.342	0	1
	Policy Analysis	3334	0.050	0.219	0	1
	Qualitative	3334	0.353	0.480	0	1
	Quantitative	3334	0.329	0.470	0	1
Paradigm	Atheoretic/Non-formal	3334	0.166	0.372	0	1
	Constructivist	3334	0.073	0.260	0	1
	Liberal	3334	0.209	0.407	0	1
	Marxist	3334	0.019	0.135	0	1
	Non-paradigmatic	3334	0.445	0.497	0	1
	Realist	3334	0.088	0.284	0	1

Table 6: Determinants of Citation Count

		Gender	Time	Career	Epistemology	Ideational	Paradigm	Issue Area	Methods	Kitchen Sink
Gender	Female	-.314***	-.278***	-.222**	-.219***	-.233***	-.234***	-.187**	-.174**	-.159**
		(.0858)	(.0744)	(.087)	(.0843)	(.0839)	(.0856)	(.0842)	(.0822)	(.0787)
	Coed		.107	-.0661	-.0872	-.11	-.0973	-.0817	-.0381	.0464
			(.0959)	(.11)	(.108)	(.104)	(.106)	(.102)	(.101)	(.0931)
Time	Article Age		2.88**	2.75**	2.39**	2.19*	2.05	1.66	1.8	-.0549
			(1.18)	(1.19)	(1.18)	(1.18)	(1.34)	(1.31)	(1.33)	(1.39)
	(Article Age)^2		-.211**	-.199**	-.17*	-.152	-.138	-.103	-.115	.0426
			(.0991)	(.1)	(.0989)	(.0992)	(.113)	(.111)	(.112)	(.118)
Field	Tenure			.0985	.127**	.122*	.125**	.119**	.161***	.211***
				(.0641)	(.0646)	(.0639)	(.0616)	(.0586)	(.0583)	(.0588)
	Tenure × Female			.0701	.0919	.126	.154	.143	.0939	-.00652
				(.12)	(.118)	(.118)	(.12)	(.119)	(.118)	(.11)
	R1 Employment			.367***	.3***	.303***	.296***	.313***	.288***	.177***
				(.0569)	(.0571)	(.0562)	(.0556)	(.0547)	(.0532)	(.0501)
	Coauthored			.169**	.0965	.103	.143**	.173***	.0853	-.00693
				(.0699)	(.0699)	(.0685)	(.0681)	(.0661)	(.0642)	(.0566)
Epistemology	Non-Positivist				-.686***	-.786***	-.598***	-.686***	-.478***	-.496***
					(.0917)	(.0922)	(.0939)	(.0954)	(.1)	(.0947)
Ideational	Ideational					.175***	.0465	.0642	.0941	.0855
						(.0627)	(.0641)	(.0655)	(.0654)	(.0552)
Material	Material					-.157	-.154	.00872	.0789	-.0207
						(.138)	(.124)	(.127)	(.12)	(.112)
Paradigm	Atheoretic						-.563***	-.57***	-.479***	-.398***
							(.128)	(.131)	(.138)	(.135)
	Constructivist						.381**	.16	.118	.00396
							(.164)	(.151)	(.145)	(.133)
	Liberal						.141	.141	.0323	-.124
							(.113)	(.111)	(.11)	(.103)
	Marxist						-.444**	-.439**	-.502**	-.371**
							(.201)	(.195)	(.204)	(.185)
	Non-Paradigmatic						-.112	-.142	-.244**	-.24**
							(.102)	(.102)	(.105)	(.0976)
	Realist						—	—	—	—
Issue Area	Comp. Foregn Policy							-.388***	-.393***	-.264**
								(.14)	(.137)	(.128)
	Environment							.203	.324	.486**
								(.196)	(.203)	(.201)
	Health							.196	.138	.0989
								(.405)	(.398)	(.415)
	History of Discipline							.149	.156	.248
								(.238)	(.243)	(.235)
	Human Rights							.305**	.281*	.306**
								(.149)	(.145)	(.136)
	International Law							-.285	-.201	-.378**
								(.212)	(.216)	(.184)
	IO							.131	.178	.0603
								(.116)	(.116)	(.117)
	IPE							-.217**	-.203**	-.222**
								(.0993)	(.0967)	(.0981)
	Security							-.0873	-.0913	.125
								(.0842)	(.0823)	(.0854)
	IR Theory							.524***	.492***	.534***
								(.135)	(.139)	(.134)
	Methodology							.301	.282	.17
								(.227)	(.24)	(.196)
	Phil. of Science							.363	.253	.405
								(.336)	(.315)	(.342)
	U.S. Foreign Policy							-.355***	-.289**	-.0619
								(.116)	(.117)	(.126)
	American Politics							—	—	—
Methodology	Analytic/Non-Formal								-.0475	-.0929
									(.124)	(.113)
	Counterfactual								.331	.173
									(.41)	(.407)
	Descriptive								-.36**	-.393***
									(.148)	(.144)
	Experimental								-.233	-.19
									(.149)	(.143)
	Formal Modeling								.167**	-.0381
									(.0802)	(.0788)
	Policy Analysis								-.642***	-.618***
									(.145)	(.129)
	Qualitative								-.11	-.149*
									(.0861)	(.0771)
	Quantitative								.213**	.196**
									(.0849)	(.0786)
Journal	AJPS									-.257**
										(.112)
	APSR									.348***
										(.13)
	BJPS									-.384*
										(.232)
	EJIR									-.669***
										(.161)
	IO									.0765
										(.098)
	IS									-.543***
										(.122)
	ISQ									-.76***
										(.0988)
	JCR									-.339***
										(.109)
	JOP									-.896***
										(.145)
	JPR									-1.28***
										(.114)
	SS									-1.79***
										(.158)
	WP									—
	Constant	3.08***	-7.08**	-7.06**	-5.81*	-5.15	-4.78	-3.8	-4.27	1.74
		(.0367)	(3.44)	(3.47)	(3.45)	(3.46)	(3.91)	(3.83)	(3.89)	(4.05)
	ln(α)	.489***	.412***	.386***	.354***	.349***	.317***	.282***	.259***	.102***
		(.0306)	(.03)	(.0311)	(.0321)	(.0313)	(.0307)	(.0296)	(.0296)	(.0308)
	N	3087	3087	3087	3087	3087	3087	3087	3087	3087
	AIC	24695.10	24481.38	24402.54	24293.40	24279.63	24183.27	24093.01	24031.66	23549.49
	BIC	24713.20	24662.43	24607.72	24504.62	24502.92	24436.74	24424.93	24411.86	23996.07
	Log Likelihood	-12344.55	-12210.69	-12167.27	-12111.70	-12102.81	-12049.64	-11991.51	-11952.83	-11700.74

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Table 7: Differences between Predicted and Actual citations

Author Gender(s)	Predicted citations	Actual citations	Difference
All Men	20.429	20.882	-0.268
All Women	19.435	14.874	-4.700
Mixed Gender	20.881	21.273	0.361

Table 8: Determinants of Authority Score

		Gender	Time	Career	Epistemology	Ideational	Paradigm	Issue Area	Methods	Kitchen Sink
Gender	Female	-.018***	-.0155***	-.0171***	-.0159***	-.016***	-.0158***	-.0102**	-.00761*	-.00895**
		(.005)	(.00349)	(.00396)	(.0039)	(.00393)	(.00392)	(.004)	(.00404)	(.00413)
	Coed		-.00579	-.011	-.0118*	-.012*	-.0125*	-.00762	-.00723	-.00773
			(.0056)	(.00691)	(.00689)	(.00694)	(.00686)	(.00689)	(.00686)	(.00671)
Time	Article Age		.000936	.00107	.000514	.000588	.00118	.000624	.00115	.000345
			(.00272)	(.00272)	(.00272)	(.00271)	(.00267)	(.00266)	(.00263)	(.00251)
	(Article Age)^2		.000098	.000095	.000109	.000107	.000097	.000116	.000101	.000118
			(.000091)	(.00009)	(.00009)	(.00009)	(.000089)	(.000088)	(.000087)	(.000084)
Career	Tenured			-.00209	-.00115	-.00131	-.000583	-.000321	.00154	.003
				(.00455)	(.00455)	(.00451)	(.00443)	(.00427)	(.00437)	(.00448)
	Tenure × Female			.0107	.012	.0121	.0102	.00816	.00669	.00612
				(.00857)	(.00853)	(.00853)	(.00864)	(.00882)	(.00858)	(.00836)
	R1 Employment			.0129***	.0101***	.0103***	.00848**	.00804**	.00649*	.00397
				(.00376)	(.00383)	(.00385)	(.0038)	(.00375)	(.00376)	(.00389)
	Coauthored			.00434	.00171	.00183	.00382	.00525	.00183	-4.8e-06
				(.00529)	(.0053)	(.0053)	(.00526)	(.00509)	(.00513)	(.00514)
Epistemology	Non-Positivist				-.0284***	-.0305***	-.016***	-.0242***	-.0211***	-.0212***
					(.00456)	(.00559)	(.00532)	(.00578)	(.00634)	(.00637)
Ideational	Ideational					.000544	-.000119	-.000753	.00432	.0044
						(.0039)	(.00444)	(.00464)	(.00483)	(.00476)
Material	Material					-.00906	-.0159*	-.012	-.0125	-.0126
						(.00844)	(.00841)	(.00864)	(.00877)	(.00873)
Paradigm	Atheoretic						-.0449***	-.0355***	-.0374***	-.0347***
							(.00879)	(.00877)	(.00895)	(.00877)
	Constructivist						-.0102	-.00336	-.00289	-.00261
							(.00832)	(.00822)	(.00814)	(.0085)
	Liberal						.014	.0289***	.0255***	.0241**
							(.00905)	(.00972)	(.00968)	(.00978)
	Marxist						-.0196	.000238	.000454	.00602
							(.025)	(.0252)	(.0253)	(.0252)
	Non-Paradigmatic						-.0198**	-.0101	-.0153*	-.0126
							(.00777)	(.00793)	(.00796)	(.0079)
	Realist						—	—	—	—
Issue Area	Comp. Foreign Policy							.00457	.0054	.00981
								(.00844)	(.00833)	(.00841)
	Environment							-.00199	.000246	.00591
								(.00824)	(.0081)	(.00857)
	Health							.0231***	.0177**	.0138
								(.00672)	(.00725)	(.0111)
	History of Discipline							.0514**	.0505**	.0549***
								(.021)	(.0206)	(.0203)
	Human Rights							.00993	.00864	.00903
								(.00649)	(.00661)	(.00733)
	International Law							.000501	.0034	.00262
								(.00678)	(.00686)	(.00747)
	IO							.00364	.00527	.00458
								(.0076)	(.0074)	(.00752)
	IPE							-.00447	-.00307	-.00211
								(.00629)	(.00627)	(.00627)
	Security							.0285***	.0277***	.0323***
								(.0049)	(.00478)	(.0051)
	IR theory							.0515***	.0538***	.0571***
								(.0101)	(.0105)	(.0112)
	Methodology							.0214***	.0208**	.0215**
								(.00824)	(.00854)	(.00841)
	Phil. of Science							.0203**	.0246**	.0272**
								(.00958)	(.0105)	(.0116)
	U.S. Foreign Policy							.00456	.00475	.0102
								(.00687)	(.00701)	(.0073)
Methodology	Analytic/Non-Formal								-.0204**	-.0206**
									(.00894)	(.00875)
	Counterfactual								.0099	.00574
									(.0244)	(.0243)
	Descriptive								-.0143*	-.0126
									(.00807)	(.00797)
	Experimental								-.0258***	-.0243***
									(.00883)	(.00883)
	Formal Modeling								.00817	.00261
									(.00636)	(.0065)
	Policy Analysis								-.0171**	-.0124*
									(.00675)	(.00655)
	Qualitative								-.0238***	-.0217***
									(.00596)	(.00576)
	Quantitative								-.00275	-.000761
									(.00593)	(.00606)
Journal	AJPS									.0222*
										(.0115)
	APSR									.0732***
										(.0168)
	BJPS									—
	EJIR									.0184*
										(.011)
	IO									.0312***
										(.0104)
	IS									.0183
										(.0111)
	ISQ									.0157
										(.0103)
	JCR									.0271**
										(.0117)
	JOP									-.0103
										(.0116)
	JPR									.0103
										(.0103)
	SS									.0128
										(.0107)
	WP									.0393***
										(.0128)
	Constant	.035***	-.00405	-.0124	-.00336	.00457	.016	-.0127	-.00215	-.0225
		(.0015)	(.0115)	(.0118)	(.0121)	(.0152)	(.0168)	(.0179)	(.0184)	(.0208)
	N	2590	2590	2590	2590	2590	2590	2590	2590	2590
	AIC	305.53	-4679.78	-4684.98	-4708.63	-4706.09	-4775.50	-4829.73	-4847.12	-4897.99
	BIC	317.25	-4509.85	-4491.62	-4509.41	-4495.15	-4535.26	-4513.32	-4483.84	-4470.25
	Log Lik.	-150.77	2368.89	2375.49	2388.32	2389.05	2428.75	2468.86	2485.56	2521.99

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < .01$

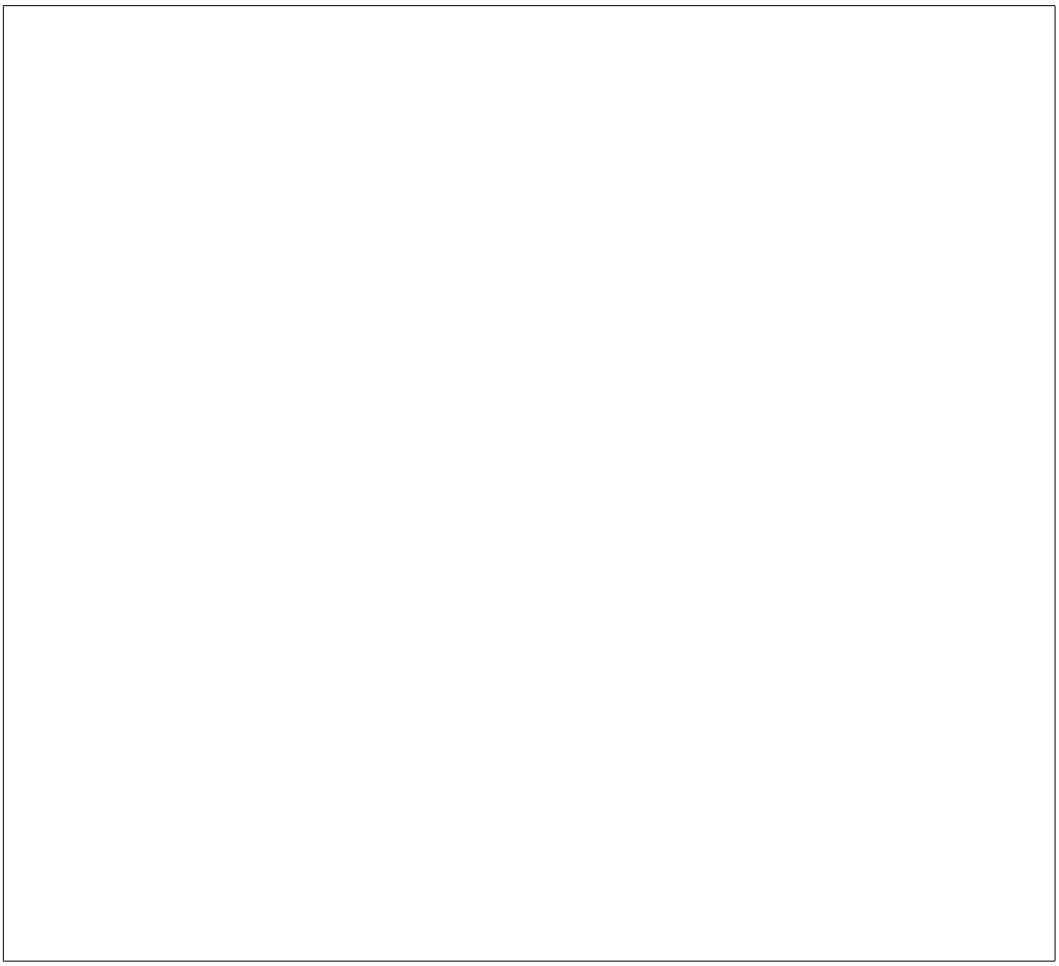

Figure 3: This is a visualization of the central portion of the network formed by citations between articles in the IR literature. Blue nodes are authored by all male authors. Green nodes are authored by all female authors. Red nodes are authored by a mix of male and female authors. The size of the node is proportional to its HITS centrality score.

Table 9: T-Test comparing self-citations among author gender.

	Group	Mean	Std. Dev.	95% CI
Single-Authored	Men	0.40	0.02	0.37–0.43
	Women	0.25	0.03	0.19–0.31
	Diff.	0.15***	0.04	0.07–0.24
Coauthored	Men	0.91	0.04	0.83–1.00
	Women	0.41	0.16	0.08–0.74
	Diff	0.50**	0.24	0.03–0.97
	Men	0.91	0.04	0.83–1.00
	Coed	0.89	0.06	0.77–1.01
	Diff.	-0.02	0.08	−0.17–0.13

Note: *** significant at the 0.001 level, ** significant at the 0.05 level.

Table 10: Dyadic Citations by Gender. Percentages represent the mean for all articles of each type.

Type citing	All Articles	Male-authored	Female-Authored	Coed-Authored
All Male citing	71.07%	75.00%	59.60%	63.17%
All Female citing	9.62%	8.65%	18.56%	10.03%
Coed Citing	10.92%	9.63%	14.96%	18.21%

Table 11: Chi Square Test.

Type citing	All Articles	Male-authored	Female-Authored	Coed-Authored
All Male citing	77.93%	79.73%	66.26%	70.76%
All Female citing	10.48%	9.70%	18.84%	10.91%
Coed Citing	11.59%	10.57%	14.91%	18.34%

Note: Pearson χ^2 = 376.65. Pr = 0.000.

References

Anonymous and Anonymous (1999). "Tenure in a Chilly Climate." *PS: Political Science and Politics*, 32(1):91–99.

Breuning, M., Bredehoft, J., and Walton, E. (2005). "Promise and Performance: An Evaluation of Journals in International Relations." *International Studies Perspectives*, 6(4):447– 461.

Charles, M. and Grusky, D. B. (2005). *Occupational Ghettos: The Worldwide Segregation of Women and Men*. Stanford University Press.

Committee on the Status of Women (1992). "Improving the Status of Women in Political Science: A Report with Recommendations." *PS: Political Science and Politics*, 25(3):547– 554.

Finifter, A. W. (1973). "The professional status of women political scientists: Some current data." *PS: Political Science and Politics*, 6(4):pp. 406–419.

Fisher, B., Cobane, C., Vander Ven, T., and Cullen, F. (1998). "How many authors does it take to publish an article? trends and patterns in political science." *PS: Political Science and Politics*, pages 847–856.

Fowler, J. and Aksnes, D. (2007). "Does self-citation pay?" *Scientometrics*, 72(3):427–437.

Fowler, J., Grofman, B., and Masuoka, N. (2007), "Social Networks in Political Science: Hiring and Placement of Ph. D, 1960–2002." *PS: Political Science and Politics*, 40(04):729–739.

Franck, George. (1999). "Scientific Communication – A Vanity Fair?" *Science*, 286(5437): 53-55.

Ginther, D. K. (2004). "Gender Differences in Salary and Promotion in Political Science."

Gruberg, M. and Sapiro, V. (1979). "Participation by Women in Annual Meetings, 1970-1978." *PS: Political Science and Politics*, 12(3):318–324.

Hix, S. (2004). "A global ranking of political science departments." *Political Studies Review*, 2(3):293–313.

Kleinberg, J. (1999). "Authoritative sources in a hyperlinked environment." *Journal of the ACM*, 46(5):604–632.

Maliniak, Daniel, Amy Oakes, Susan Peterson, and Michael J. Tierney. (2007) "The View from the Ivory Tower: TRIP Survey of IR Faculty in the U.S. and Canada," Institute for the Theory and Practice of International Relations, College of William and Mary.

Maliniak, Daniel, Amy Oakes, Susan Peterson, and Michael J. Tierney. (2011). "International Relations in the U.S. Academy," International Studies Quarterly 55: 437-464.

Mitchell, Sara McLaughlin, Samantha Lange, and Holly Brus. 2012. "Gendered Citation Patterns in International Relations Journals" Paper presented at the International Studies Association annual convention, San Diego, CA.

Monroe, K., Ozyurt, S., Wrigley, T., and Alexander, A. 2008. "Gender Equality in Academia: Bad News from the Trenches, and Some Possible Solutions." *Perspectives on Politics*, 6(02):215–233.

Østby, Gudrun, Håvard Strand, Nils Petter Gleditsch & Ragnhild Nordås. 2012 "Gender gap or gender bias in peace research? A study of publication patterns and citation rates for Journal of Peace Research 1983–2008." Paper presented at the International Studies Association annual convention, San Diego, CA.

Reuters, T. (2008). "The Thomson Scientific Impact Factor." [http://www. thomsonreuters. com/business units/scientific/free/essays/impactfactor].

Schuck, V. (1969). "Women in Political Science: Some Preliminary Observations." *PS: Political Science and Politics,* 2(4):pp. 642–653.

Sedowski, L. and Brintnall, M. (2007). "Data snapshot: The proportion of women in the political science profession."

Symonds, M. R., Gemmell, N. J., Braisher, T. L., Gorringe, K. L., and Elgar, M. A. (2006). "Gender differences in Publication Output: Towards an unbiased metric of research performance." *PLoS ONE*, 1(1):127.

Tolleson-Rinehart, S. and Carroll, S. J. (2006). "Far from Ideal: The Gender Politics of Political Science." *American Political Science Review*, 100(4):507.