

# Navigating Gender Biases in Academia

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# Overview

- ▶ Today I will discuss several *patterns* of the gender gap in the political science profession & identify *strategies* to address these issues
  - Promotion to higher ranks (Hesli et al 2012)
  - Salaries (Claypool et al 2017)
  - Academic service (Mitchell & Hesli 2013)
  - Citations to scholarly research (Mitchell et al 2013; Dion, Sumner, & Mitchell 2018)
- ▶ Motivations
  - Personal experiences
  - Desire to conduct systematic analyses using data from our profession

# Issue #1: Promotion to Higher Ranks

- ▶ Leaky Pipeline: Increasing attrition rates for female scholars at all academic levels (Sarkees & McGlen 1999; Mitchell & Hesli 2013)

## APSA Survey Data, 2009

Rank	Female	Male	Total
Lecturer	11 (3.2%)	20 (2.1%)	31 (2.4%)
Assistant Professor	144 (42.1%)	252 (26.2%)	396 (30.3%)
Associate Professor	88 (25.7%)	269 (27.9%)	357 (27.4%)
Full Professor	99 (29%)	422 (43.8%)	521 (39.9%)
Total	342 (26.2%)	963 (73.8%)	1,305

$$\chi^2 (3) = 36.9 (p < .0001)$$

## National Comparisons for 2009 in Political Science

- 45% of bachelor's degrees given to women (NSF)
- 40% of doctoral degrees given to women (NSF)
- 28% of faculty are female (APSA)

TABLE 1. Tenure-Line Positions

	<i>Authors (n = 893)</i>		<i>International Studies Association (ISA)-collected (n = 3,888)</i>		<i>TRIP (n = 1,112)</i>	
	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>
Assistant Professor	50	34	50	37	48	32
Associate Professor	28	28	30	29	27	27
Full Professor	22	38	20	34	25	41

Sources: Email communications with the ISA (December 2010) and Daniel Maliniak, the lead author of the 2008 Teaching, Research, and International Politics (TRIP) study (<http://irtheoryandpractice.wm.edu/projects/trip/>).

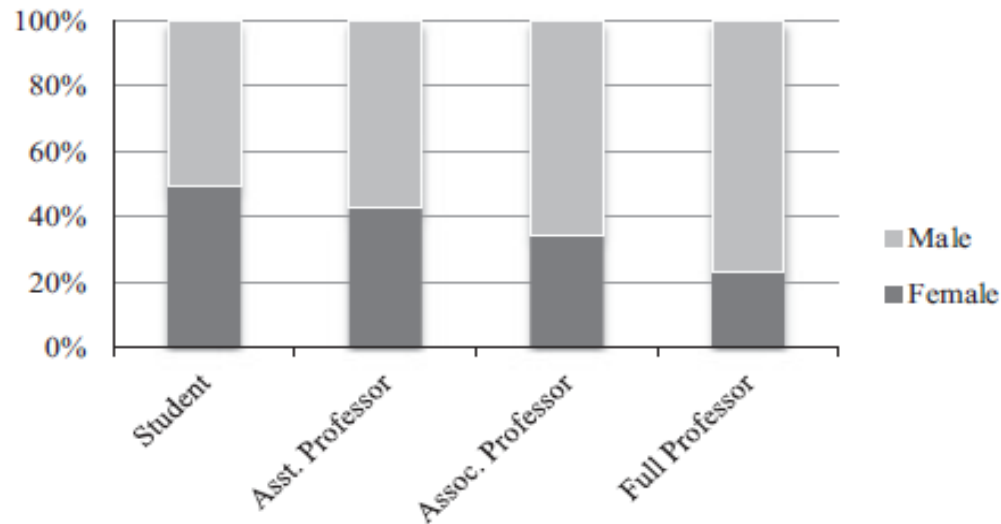


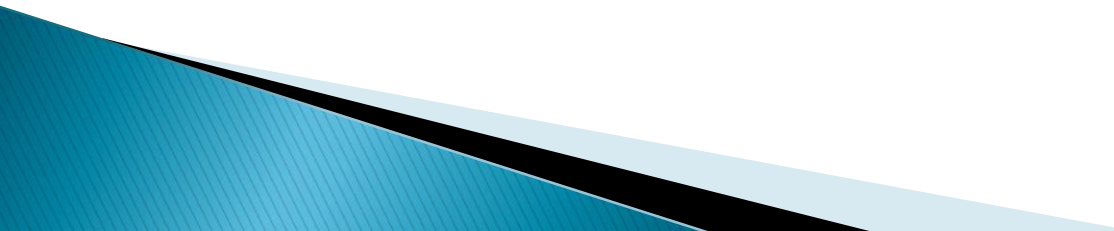
FIG. 1. Current Position, Percentage of Females and Males at Each Position

Source: Hancock, Baum, and Breuning (2013: 6)

# Political Science Data

- ▶ To see if there is a gender gap in academic promotions in the political science profession, Vicki Hesli, Jae-Mook Lee, and I analyzed a 2009 APSA survey of 1,399 respondents with PhDs in the field.
- ▶ Sample Selection
  - Target population: the names contained within the APSA “faculty” file. This file was used to generate 11,559 names to create a sample population file of size 5,179 names.
  - The original “faculty” file was stratified by department size. Faculty from medium- and small-size schools were oversampled to ensure adequate representation.
  - Names were selected randomly from the “faculty” file for the “sample” file.
- ▶ Survey administration
  - Among the 5,179 original addresses, 1,399 completed the survey (252 invalid addresses, 105 refusals, and 3,423 non-respondents).

# Issue #1: Leaky Pipeline: Why?

- We find women have a significantly lower likelihood of being an associate professor than men (compared with assistant professors).
  - Yet, there are no significant differences between males and females in the likelihood of achieving full professor status.
  - We also find that the effect of publications on achieving associate rank is insignificant for women!
  - Other factors include work–life balance, higher service load, more hostile work climate, etc.
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*Table 2*  
**Predicting Academic Rank: Factors Affecting the Likelihood of Being an Associate Professor in Contrast with an Assistant Professor (binary logistic models via multiple imputation)**

INDEPENDENT VARIABLES	MODEL 2A		MODEL 2B		MODEL 2C	
	Coefficient (Std. Err.)	Odds Ratio	Coefficient (Std. Err.)	Odds Ratio	Coefficient (Std. Err.)	Odds Ratio
Female	-0.481** (0.199)	0.618	-0.899*** (0.237)	0.407	-0.720** (0.282)	0.487
Minority	-0.051 (0.318)	0.951	-0.079 (0.330)	0.924	-0.080 (0.458)	0.923
Married or partnered	0.148 (0.306)	1.159	-0.143 (0.359)	0.867	0.166 (0.442)	1.181
Number of children	0.123 (0.090)	1.131	0.065 (0.102)	1.067	-0.023 (0.119)	0.977
Partner employed	0.429* (0.224)	1.536	0.630** (0.255)	1.878	0.308 (0.287)	1.361
PhD program rank	0.116* (0.071)	1.123	0.078 (0.084)	1.081	0.030 (0.100)	1.031
Number of years to complete PhD	-0.156*** (0.056)	0.855	-0.165*** (0.062)	0.848	-0.125 (0.077)	0.882
Age	0.165*** (0.018)	1.179	0.165*** (0.018)	1.180	0.115*** (0.022)	1.122

- Women have a significantly lower likelihood of being an associate professor than men (compared with an assistant professors).
- Yet, no significant difference between males and females in the likelihood of achieving full professor status after having become an associate professor.

Table 4

Predicting Academic Rank: Associate Professor Compared with Assistant Professor (spilt sample)

INDEPENDENT VARIABLES	MODEL 4A		MODEL 4B		MODEL 4C		MODEL 4D	
	Men Only		Women Only		Men Only		Women Only	
	Coef. (Std. Err.)	Odds Ratio	Coef. (Std. Err.)	Odds Ratio	Coef. (Std. Err.)	Odds Ratio	Coef. (Std. Err.)	Odds Ratio
American subfield					0.155 (0.492)	1.168	1.170 (0.848)	3.223
Comparative subfield					-0.176 (0.601)	0.838	1.141 (1.042)	3.130
IR subfield					-0.212 (0.550)	0.809	0.919 (1.214)	2.507
Theory subfield					0.010 (0.701)	1.010	1.907 (1.412)	6.732
More than 7 years in the current position					2.581*** (0.477)	13.214	3.188*** (0.833)	23.239
Less departmental influence					0.030 (0.088)	1.030	-0.430* (0.221)	0.651
Total number of publications					0.713*** (0.230)	2.041	0.303 (0.453)	1.353
Frequency of reviewing books					0.038 (0.066)	1.038	0.211* (0.117)	1.235
Frequency of reviewing articles					0.004 (0.017)	1.004	0.019 (0.046)	1.019
Frequency of serving on an editorial boards					0.356 (0.234)	1.427	-0.1289 (0.344)	0.880
Constant	-8.404*** (1.330)	0.0002	-10.103** (3.329)	0.0004	-8.665*** (1.989)	0.0002	-9.719* (4.434)	0.0006
N	442		264		442		264	
N of simulations	1000		1000		1000		1000	


Total number of publications is positive and significant for men to be associate professors relative to assistants; insig. for women!



# Strategies for Success: Leaky Pipeline

- ▶ Better mentoring
  - Help women navigate the tenure track more successfully
    - More women at UI in STEM fields have left for voluntary reasons than men
  - Women at associate ranks need to put themselves forward for full professor
    - Women at UI spend more years in the associate track than their male peers
- ▶ Better parental leave policies
- ▶ Ensure a fair tenure process

# Issue #2: Salary Gap

- ▶ Gender gap in academic salaries once we control for many other factors (Claypool et al 2017).
  - ▶ In our analyses of Political Science data, we find about a \$3500–4000 salary gap.
  - ▶ We find that women make more than men at the Assistant Professor rank, but that they quickly fall behind in salary at higher ranks.
  - ▶ We find that while negotiating salaries increases men's salaries, negotiations have no effect on women's salaries.
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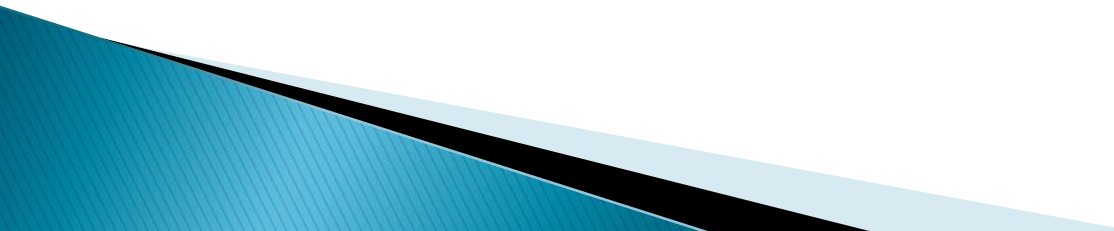
**Table 1**  
**OLS & WLS Salary Regressions**

	Model 1	Model 2	Model 3	Model 4	Model 5
	OLS	OLS	OLS	OLS	WLS
Female	-3.99** (1.72)	-3.05* (1.81)	-1.96 (1.72)	-1.61 (1.73)	-3.50* (1.87)
Caucasian	5.27** (2.29)	3.56 (2.34)	1.48 (2.35)	1.44 (2.34)	4.77** (2.05)
Has Children	-0.57 (1.86)	0.04 (1.95)	-0.34 (1.88)	-0.11 (1.90)	-3.42* (1.88)
NRC Top 20	6.99*** (2.03)	6.67*** (2.04)	5.54*** (1.86)	5.53*** (1.89)	2.12 (1.95)
Northeast/West	4.28** (1.73)	4.30** (1.75)	4.84*** (1.69)	4.79*** (1.67)	9.12*** (1.75)
PhD granting	4.19* (2.38)	2.98 (2.37)	5.67*** (1.97)	6.09*** (2.01)	0.67 (1.98)
Private Institution	3.74* (1.94)	3.53* (1.97)	4.10** (1.92)	4.22** (1.95)	6.76*** (1.87)
Salary negotiation	6.30*** (1.79)	4.60** (1.86)	5.09*** (1.81)	5.19*** (1.83)	7.95*** (1.79)
Undergrad Courses	-3.38*** (0.46)	-3.25*** (0.50)	-3.15*** (0.43)	-3.17*** (0.43)	-2.72*** (0.43)
Total Service Index	0.72*** (0.20)	0.47** (0.21)	0.26 (0.21)	0.26 (0.22)	0.80*** (0.20)
Work Hours		0.27*** (0.09)	0.25*** (0.09)	0.27*** (0.09)	0.43*** (0.06)
Journal Articles		0.35*** (0.13)	0.20 (0.12)	0.29** (0.14)	0.17* (0.10)
Full Professor			20.73*** (6.55)	20.71*** (6.47)	2.69 (4.74)
Associate Professor			7.75* (4.34)	7.83* (4.22)	6.70* (3.59)
Assistant Professor			-0.06 (4.32)	-0.05 (4.18)	0.16 (3.77)

**Table 3**  
**OLS Salary Regression Split by Academic Rank**

	Assistant	Associate
	Professor	
Female	1.85 (2.52)	-4.43* (2.28)
Caucasian	7.62** (3.31)	-0.56 (3.62)
Children	2.11 (3.36)	0.74 (2.24)
NRC Top 20	8.08*** (2.95)	7.01*** (2.30)
Northeast/West	0.63 (2.66)	6.88*** (2.08)
PhD granting	0.75 (3.06)	6.60** (2.78)
Private Institution	-1.76 (2.56)	5.70** (2.61)
Salary negotiation	6.01** (2.62)	2.07 (2.46)
Work Hours	0.13 (0.12)	0.29** (0.13)
Undergrad Courses	-3.03*** (0.68)	-3.67*** (0.64)
Total Service Index	0.62* (0.36)	-0.16 (0.28)
Years Since Degree	0.17 (0.92)	0.57 (0.84)
Journal Articles	0.81*** (0.26)	0.28** (0.13)
Books Edited	3.11 (4.59)	1.30 (1.05)
Constant	53.50*** (11.58)	65.19*** (10.41)
Observations	150	345
R-square	0.42	0.37

# Issue #2: Salary Gap: Why?

- ▶ Women publish fewer articles than men, which can influence salaries.
  - ▶ Women are less mobile on the job market than men.
  - ▶ Women have fewer resources (e.g. lab space & other financial support).
  - ▶ Women spend more time on teaching and service relative to research compared with male peers.
  - ▶ Negotiations don't succeed as often for women.
- 

# Strategies for Success: Salaries

- ▶ Our data suggests that publications have a higher salary boost for women faculty than men.
- ▶ Yet women publish fewer articles & books, thus we need to develop strategies to increase productivity.
  - Ensure equality of lab spaces & other resources
- ▶ Women may be less likely to ask & less likely to succeed in negotiations
  - Administrators need to be aware of these biases & take steps to remedy them.

# Issue #3: Service Gender Gap

- ▶ National Survey of Postsecondary Faculty (NSOPF) data shows that:
  - Faculty work between 50–64 hours on average a week
- ▶ Misra et al (2008–09) find that:
  - Women are often taxed to do more service in academia, especially as they become more senior.
  - Women take on major service roles (e.g. DUS) earlier in their careers, which contributes to the leaky pipeline.
- ▶ Women engage in more “token” service

Table 3: Total Number of Advisees: Undergraduates, Graduates (MA, PhD), Post-Docs

Independent Variables	All Respondents	Male Respondents	Female Respondents
Rank	0.212** (0.049)	0.117** (0.058)	0.386** (0.093)
Female	0.167** (0.082)	----	----
Minority	0.057 (0.111)	0.094 (0.130)	-0.012 (0.207)
Children	-0.142* (0.082)	-0.138 (0.099)	-0.149 (0.150)
PhD program	-0.348** (0.089)	-0.319** (0.106)	-0.411** (0.161)
MA program	0.115 (0.103)	0.234* (0.121)	-0.136 (0.192)
Tenured female faculty	0.029 (0.122)	0.187 (0.138)	-0.317 (0.249)
Outside offer	-0.069 (0.085)	-0.054 (0.098)	-0.037 (0.169)
Constant	2.664** (0.167)	2.894** (0.198)	2.434** (0.283)
Observations	1,020	696	324
Test of $\alpha = 0$	$\chi^2=50.68^{**}$	$\chi^2=31.96^{**}$	$\chi^2=28.23^{**}$

Standard errors in parentheses

\* significant at 90%; \*\* significant at 95%

Table 4: Service to Department, College, and University

Independent Variables	<i>Recruitment<sup>1</sup></i>		<i>Status</i>		<i>Asked to Administrate<sup>2</sup></i>	
	Volunteered	Asked to Serve	Served	Chaired	Department Chair	Dept. Program or Section Director
Rank	0.146** (0.05)	0.122** (0.04)	0.155** (0.02)	0.207** (0.04)	1.769** (0.12)	0.904** (0.09)
Female	0.010 (0.089)	0.110* (0.06)	0.101** (0.04)	-0.137** (0.065)	-0.491** (0.18)	-0.346** (0.16)
Minority	-0.056 (0.12)	-0.138* (0.08)	-0.070 (0.06)	0.010 (0.08)	-0.086 (0.23)	0.393* (0.20)
Children	-0.013 (0.09)	0.038 (0.06)	0.058 (0.04)	0.045 (0.07)	0.280 (0.18)	0.338** (0.16)
PhD program	-0.296** (0.10)	0.149** (0.06)	0.025 (0.04)	0.027 (0.07)	-1.133** (0.19)	0.344** (0.16)
MA program	0.158* (0.10)	0.092 (0.08)	0.115** (0.05)	0.017 (0.07)	-0.443** (0.22)	0.538** (0.19)
Tenured female faculty	0.222* (0.12)	0.100 (0.09)	0.055 (0.06)	-0.005 (0.09)	0.519** (0.26)	-0.064 (0.23)
Outside offer	0.103 (0.09)	0.113* (0.06)	0.064 (0.04)	0.004 (0.06)	0.261 (0.174)	0.273* (0.16)
Constant	0.235 (0.17)	0.552** (0.13)	0.712** (0.09)	0.091 (0.16)	-5.673** (0.41)	-3.610** (0.32)
Observations	329	517	882	571	1,046	992
Test of $\alpha = 0$	$\chi^2=0.29$	$\chi^2=11.56^{**}$	$\chi^2=8.23^{**}$	-- <sup>3</sup>		

Standard errors in parentheses

\* significant at 90%; \*\* significant at 95%



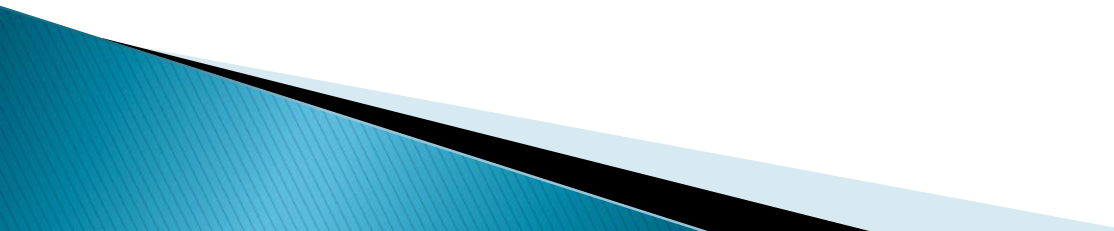
Table 5: Service to Discipline

Independent Variables	Total Service	# of Books Reviewed	# of Articles Reviewed	# of Editorial Boards	# of Professional Committees
Rank	0.312** (0.04)	0.442** (0.05)	0.236** (0.05)	0.864** (0.07)	0.509** (0.06)
Female	-0.080 (0.06)	-0.229** (0.08)	-0.068 (0.09)	0.155 (0.11)	0.422** (0.10)
Minority	-0.135 (0.08)	-0.026 (0.10)	-0.222* (0.12)	0.208 (0.15)	0.085 (0.13)
Children	0.108* (0.06)	0.006 (0.08)	0.146* (0.09)	-0.032 (0.12)	0.123 (0.10)
PhD program	0.794** (0.07)	0.060 (0.08)	1.076** (0.09)	0.945** (0.11)	0.566** (0.11)
MA program	0.269** (0.08)	-0.067 (0.10)	0.362** (0.11)	0.239 (0.15)	0.530** (0.13)
Tenured female faculty	-0.331** (0.10)	-0.185 (0.12)	-0.365** (0.13)	-0.651** (0.22)	-0.261 (0.17)
Outside offer	0.220** (0.07)	0.187** (0.08)	0.138 (0.09)	0.619** (0.10)	0.477** (0.10)
Constant	1.253** (0.12)	-0.341** (0.16)	0.911** (0.17)	-3.893** (0.27)	-2.209** (0.22)
Observations	1,035	1,071	1,071	1,071	1,071
Test of $\alpha = 0$	$\chi^2=8137^{**}$	$\chi^2=1438^{**}$	$\chi^2=9086^{**}$	$\chi^2=241^{**}$	$\chi^2=507^{**}$


Standard errors in parentheses

\* significant at 90%; \*\* significant at 95%

# Summary of findings

- ▶ The data show that women faculty are asked to serve more often and that they agree to do service more often than male faculty.
  - ▶ The service they engage in is often less prestigious; they are not being recruited for jobs like department chair or directing a program.
  - ▶ Women spend more time advising students as well, which may hurt their research productivity.
- 

# Issue #3: Service Gender Gap: Why?

- ▶ Leaky pipeline creates fewer women at higher ranks and thus puts more pressure on women to engage in service.
    - “We need a woman on this committee!”
  - ▶ Women are more likely to provide academic service when asked than their male peers.
  - ▶ Women have a stronger desire to build a community on their campuses.
- 

# Strategies for Success: Service

- ▶ Make sure women/minorities aren't simply placed on committees to ensure diversity
- ▶ Protect women's time in the assistant & associate tracks and encourage them to say no to service requests
  - 24 hour rule
  - Ask (yourself) if your presence on a committee matters (lose the control issues)
  - Think about allocation of service across department, college, university, & discipline/profession
  - Bargain for resources when you agree to service
  - Ask to chair committees

# Issue #4: Citation Gender Gap

- ▶ Is research by women cited less frequently than research by men in the same field?
- ▶ Does a critical mass of women in a field reduce the citation gender gap?
- ▶ Citations are important:
  - Measure of scholarly impact for tenure and promotion decisions
  - Journals use impact factor scores to evaluate their success
  - Search algorithms like Scholar Google are sorted based on citations
  - Citations can increase salary (\$50–\$1300)

# Why Gendered Citation Patterns?

- ▶ The Matthew effect: men publish more research & accrue more citations; more central in citation networks.
  - Indices like the h-index are especially prone to gender biases in fields where men generate a higher quantity of publications (Symonds et al 2006).
- ▶ The Maltilda effect: (Rossiter 1993)
  - Women's contributions are recognized less often or ignored in fields dominated by male scholars.
  - Women less represented in bibliographies, textbooks, syllabi, etc.
- ▶ Women cite their own work less often than men (Maliniak et al 2013) and self-citations increase future citations (Hutson 2006; Ghiasi et al 2016).

# Evidence

- ▶ In analyses of two IR journals (Mitchell, Lange, & Brus 2013), we find that women are 2–3 times more likely to cite the work of female scholars than male peers.
- ▶ Mixed gender teams behave like all male teams.

Table 2: Gender & Article References, International Studies Quarterly (2005)

Author(s) Sex	Sex of Author(s) in References			Total
	Male	Female	Male & Female	
Male	1,009 (83%)	139 (11%)	73 (6%)	1,221 (59%)
Female	298 (57%)	177 (33%)	52 (10%)	527 (26%)
Male & Female	247 (81%)	35 (11%)	24 (8%)	306 (15%)
Total	1,544 (76%)	351 (17%)	149 (7%)	2,054 (100%)

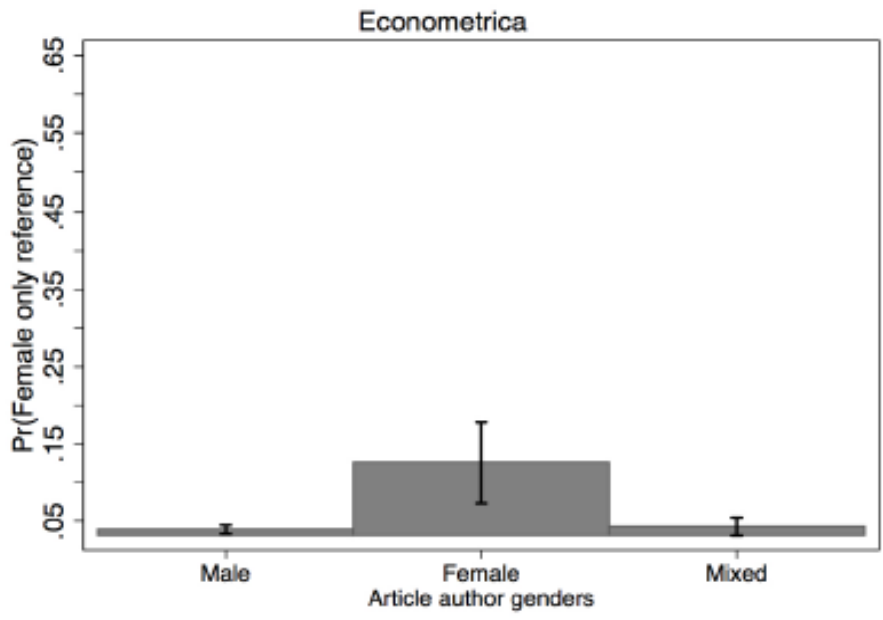
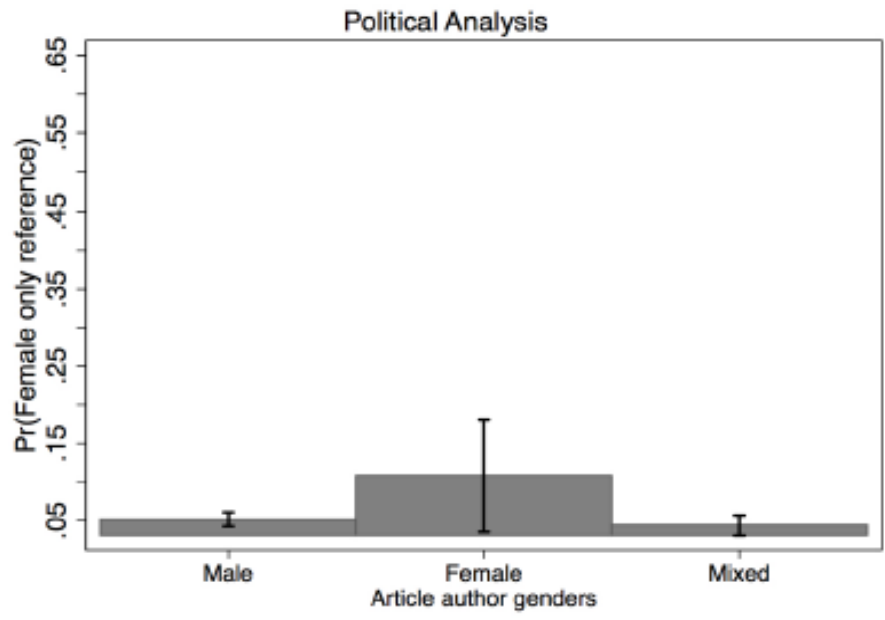
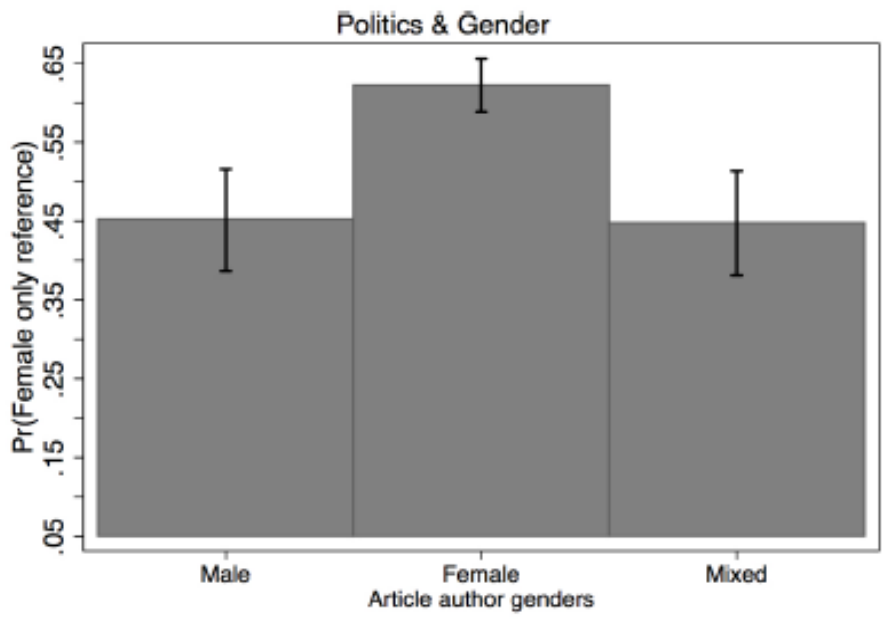
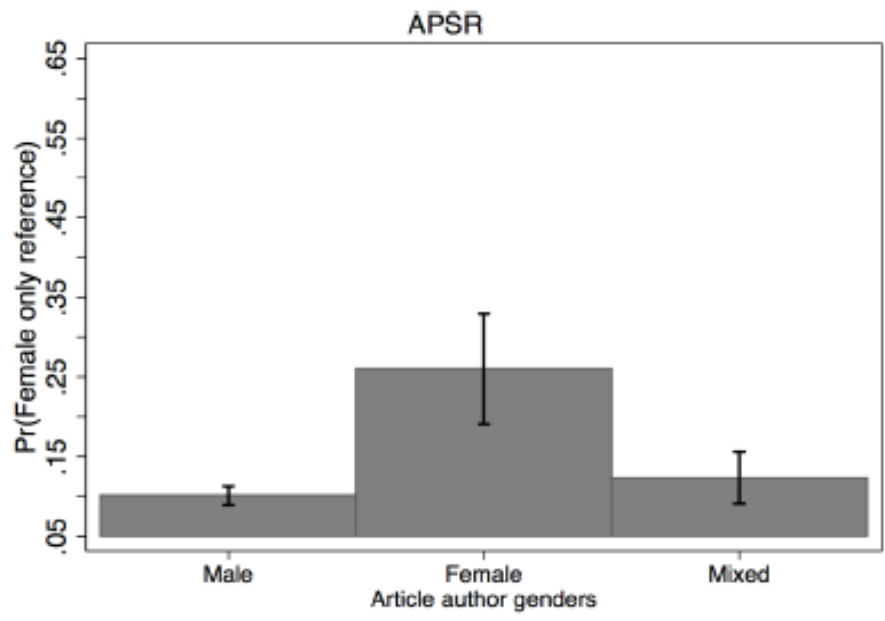
$$\chi^2(4) = 155.1 (p < .0001)$$

# Data and Methods

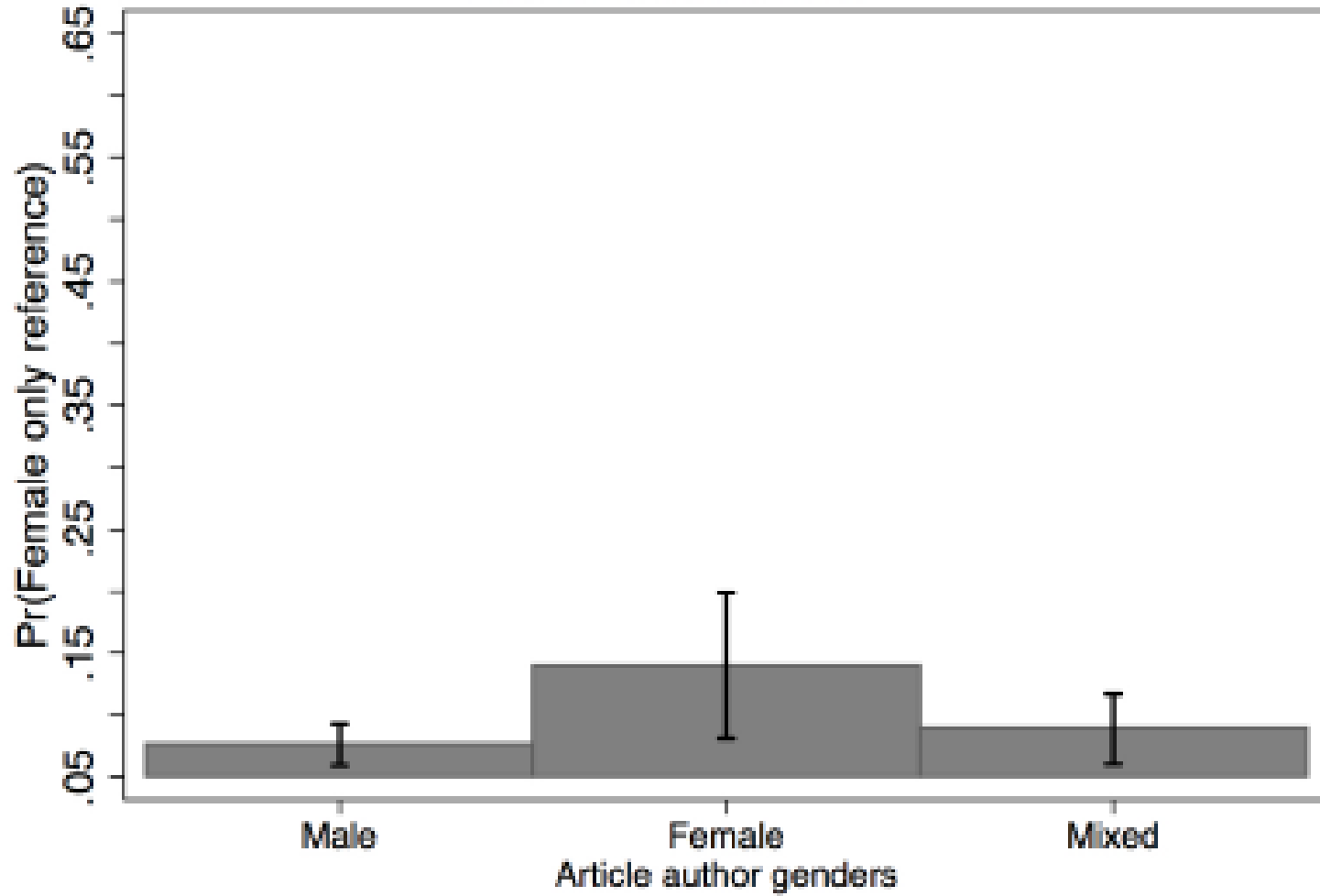
- Dion, Sumner, & Mitchell 2018 *PA* paper collects information on all articles published between 2007–2016 in:
  - 3 political science journal
    - *Political Analysis* (male dominated area)
    - *American Political Science Review* (disciplinary)
    - *Politics & Gender* (female dominated area)
  - 3 methods journals in the social sciences
    - *Econometrica*, *Political Analysis*, *Sociological Methods & Research*
- ▶ We code the sex of each article author and each author cited in the bibliography using GenderizeR (Sumner 2018).
- ▶ Logistic regression models (DV = 1 if author(s) in bibliography are female (solo or team); N=42,344)
  - Journal fixed effects in pooled model
  - Standard errors clustered by journal issue



Figure 1: Predicted probability of citing a female only reference



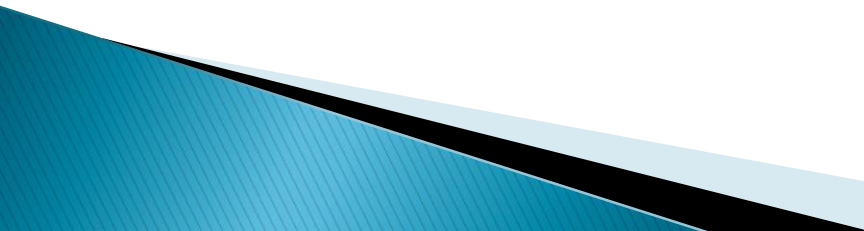
### Soc. Methods & Res.



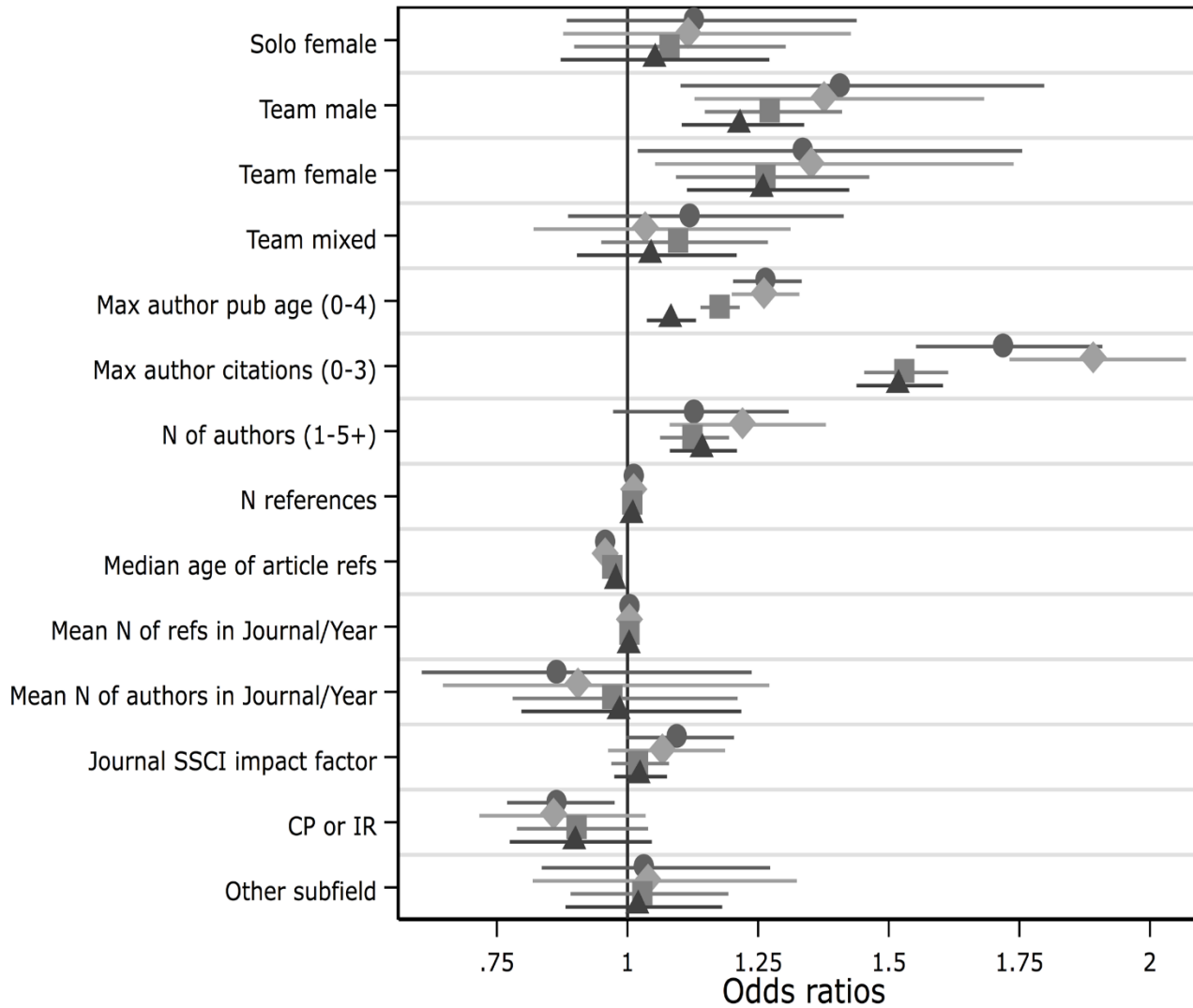
# Findings

- ▶ Female authors are more likely to cite work by women than mixed or male authors in all five journals.
  - Even in P&G (sponsoring section is 89% female)
  - The Matilda effect is larger in the *APSR*
- ▶ Citation gap is smaller in very male dominated areas, showing that the diversity of faculty in a subfield/discipline influences citation patterns.
- ▶ Confirms our earlier findings that mixed gender teams have citation patterns similar to all male teams.

# Issue #4: Citation Gender Gap: Why?

- ▶ Women don't cite themselves?
  - ▶ Women's work less visible in fields where they are a minority of the larger group.
  - ▶ Scholars trained to focus on contributions by male scholars.
  - ▶ Networking issues (e.g. edited volumes)
  - ▶ Contagion effects from looking at others' reference pages
  - ▶ Subconscious gender biases
- 

# Odds of Self-Citation in 5,482 articles (22 journals, 2007–2016)



Author genders  
 -18.77% female  
 -60.64% male  
 -20.59% mixed

Co-authorship  
 -48.6% solo-authored

Self-Citation  
 -52% of articles have at least one self-citation

● Logit (0/1)      ◆ Ordered logit (0-4+)  
 ■ Negative binomial (count)      ▲ Zero-inflated neg. bin. (count)

# Strategies for Success: Citations

- ▶ Use tools (GBAT–Sumner) to check gender balance of bibliographies/syllabi
  - <https://jlsumner.shinyapps.io/syllabustool/>
- ▶ Raise awareness with colleagues/editors/editorial boards
- ▶ Create more diversity in course syllabi
- ▶ Assignment for graduate courses to teach students about the issue (APSA Hackathon)
- ▶ Increase self-citations
- ▶ Help increase number of women in various research areas to generate a critical mass
- ▶ Rely more on Altmetrics in evaluations

<u>Independent Variable</u>	<u>Dependent Variable</u>	
	<u>Crossref Citation Count</u>	<u>Altmetrics Citation Count</u>
Crossref Citation Count		0.089 (0.006)***
Altmetrics Citation Count	0.268 (0.019)***	
First Author Female	-2.99 (0.752)***	0.210 (0.433)
Constant	18.42 (0.41)***	2.143 (.262)***
N	8,088	8,088

Note: Similar results for solo authored papers only (N=4,271)

#### ANOVA comparisons by primary Altmetrics platforms

<u>Source</u>	<u>Mean Male</u>	<u>Mean Female</u>	<u>Prob &gt; F</u>
ALL	10.5	9.81	.5142
Main Stream Media	1.99	1.81	.4327
Twitter	6.24	5.41	.3215
Facebook	1.64	1.26	.4496

Note: variance of counts for men > variance of counts for women for all measures

# Thank you for listening!

- ▶ Visit [www.saramitchell.org](http://www.saramitchell.org) for a copy of these slides and the published studies.