Publishing while female

Are women held to higher standards? Evidence from peer review.

Erin Hengel
University of Liverpool

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Women are *really* underrepresented at top journals

- In 2015, the average ratio of female authors was 15 percent. Only 7.5 percent of papers were majority female-authored. Just 4 percent were written entirely by women.
- *QJE* did not publish a single exclusively female-authored paper in 2015…or 2016…or 2017…
- …in several recent years, *Econometrica* and *JPE* have not either.

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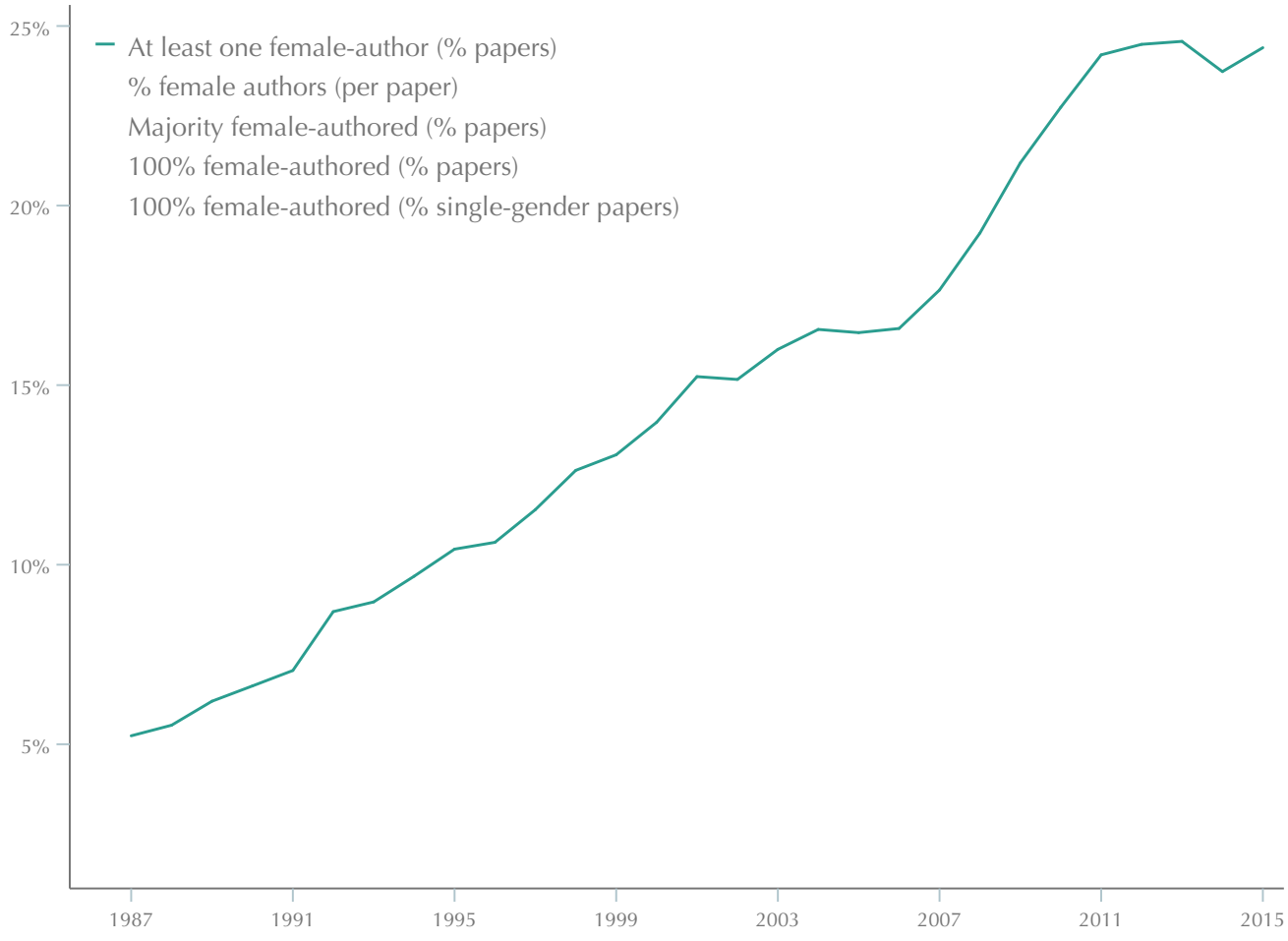
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Majority female-authored (% papers)
100% female-authored (% papers)
100% female-authored (% single-gender papers)
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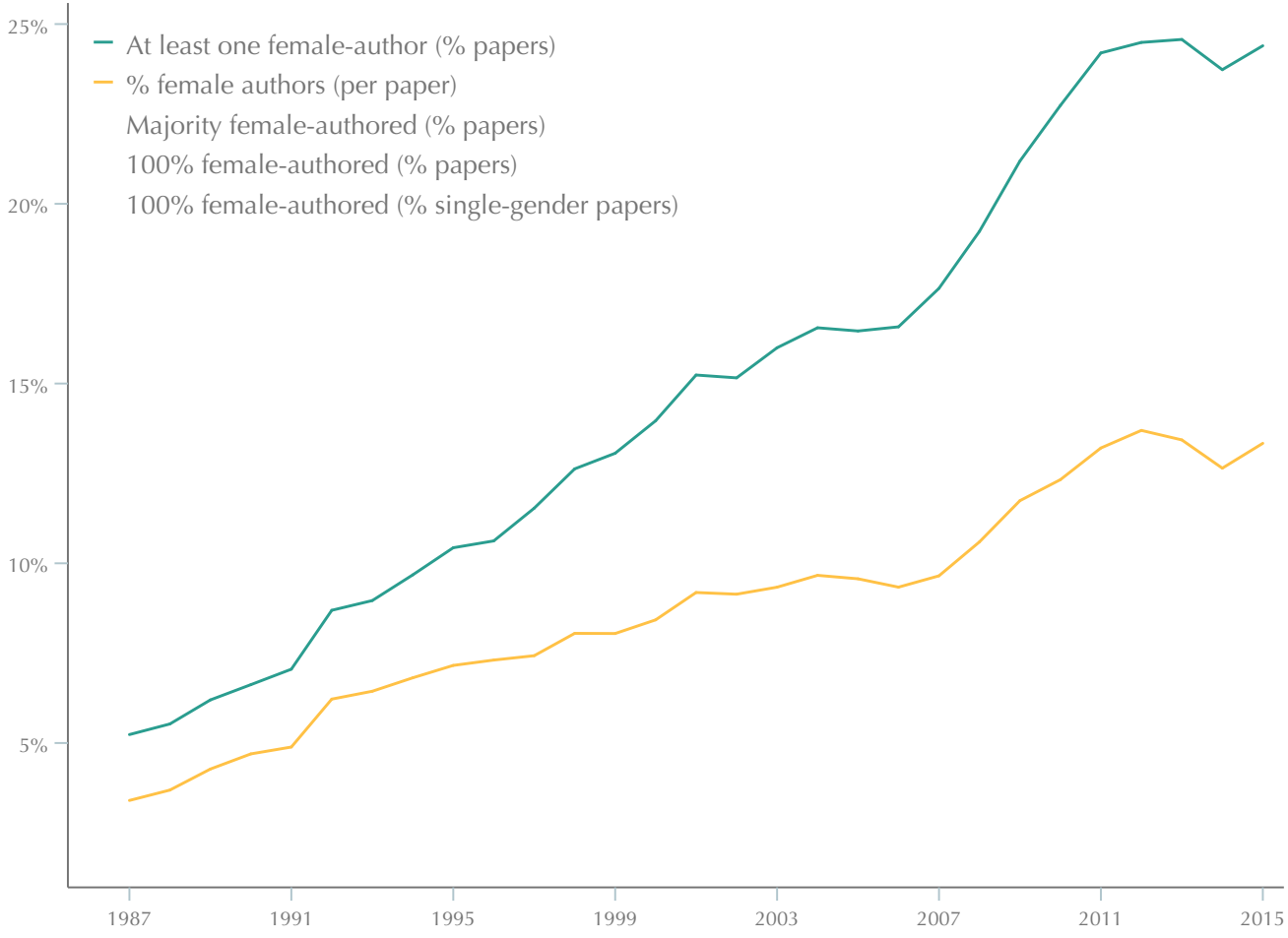
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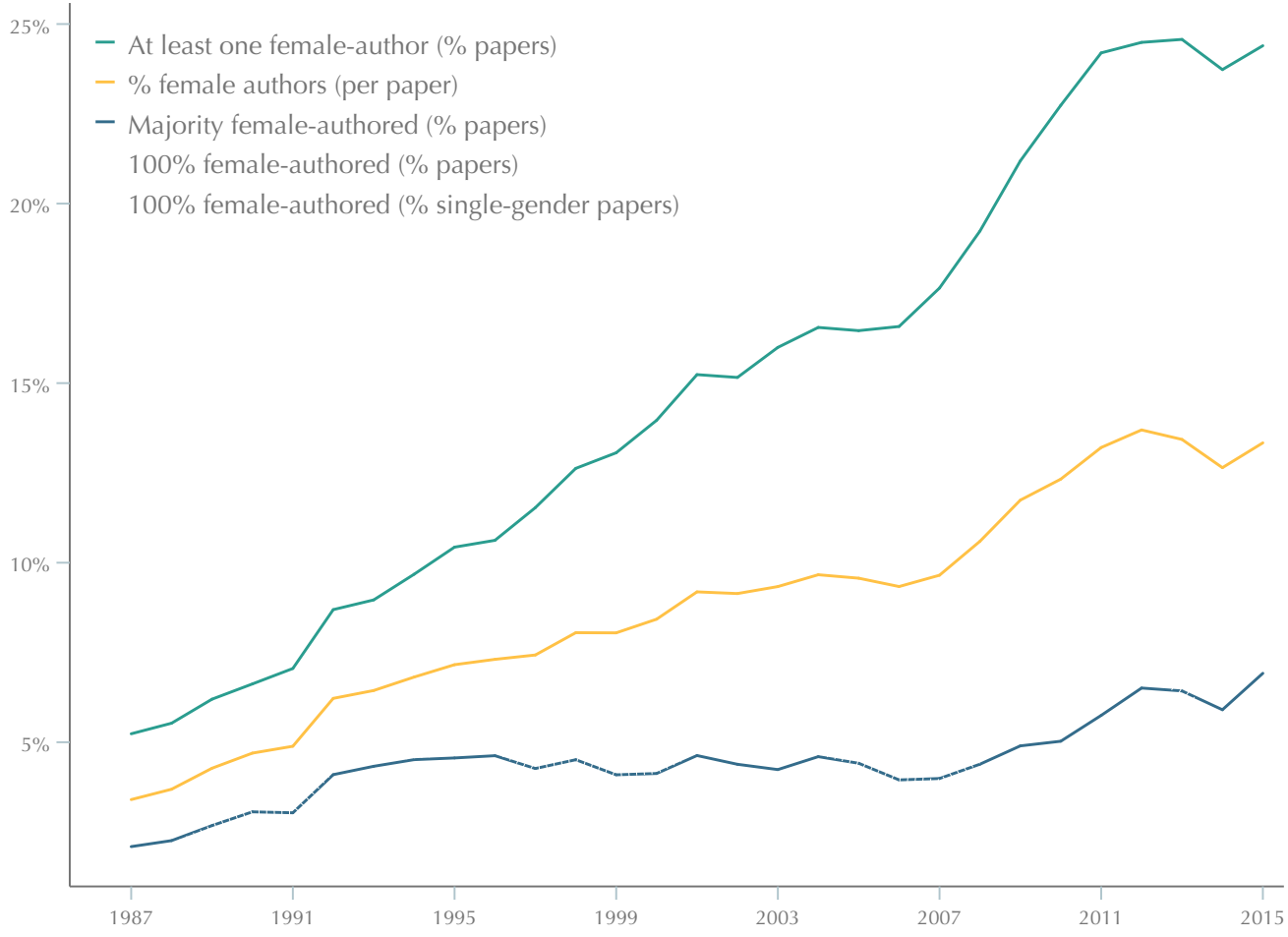
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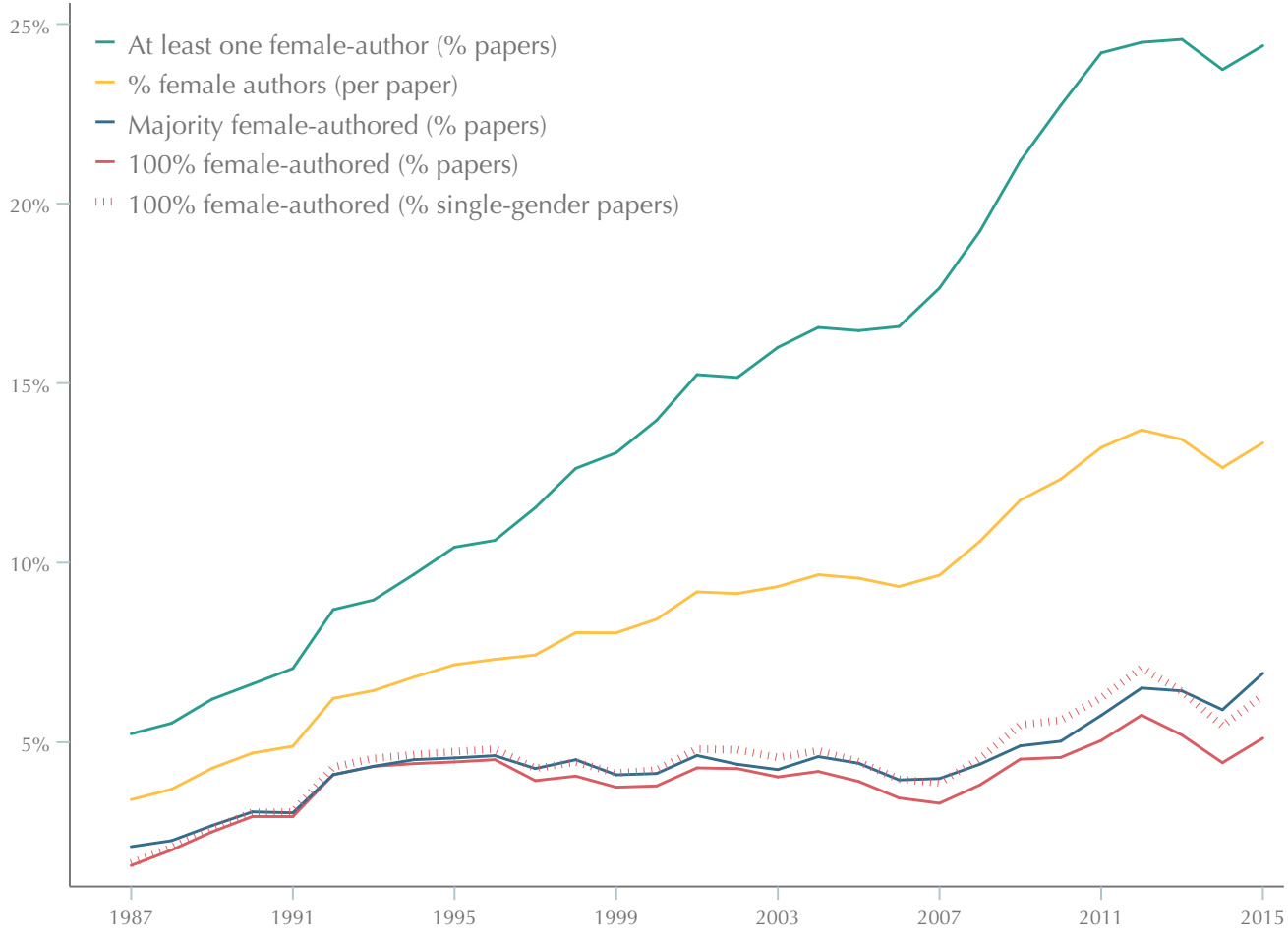
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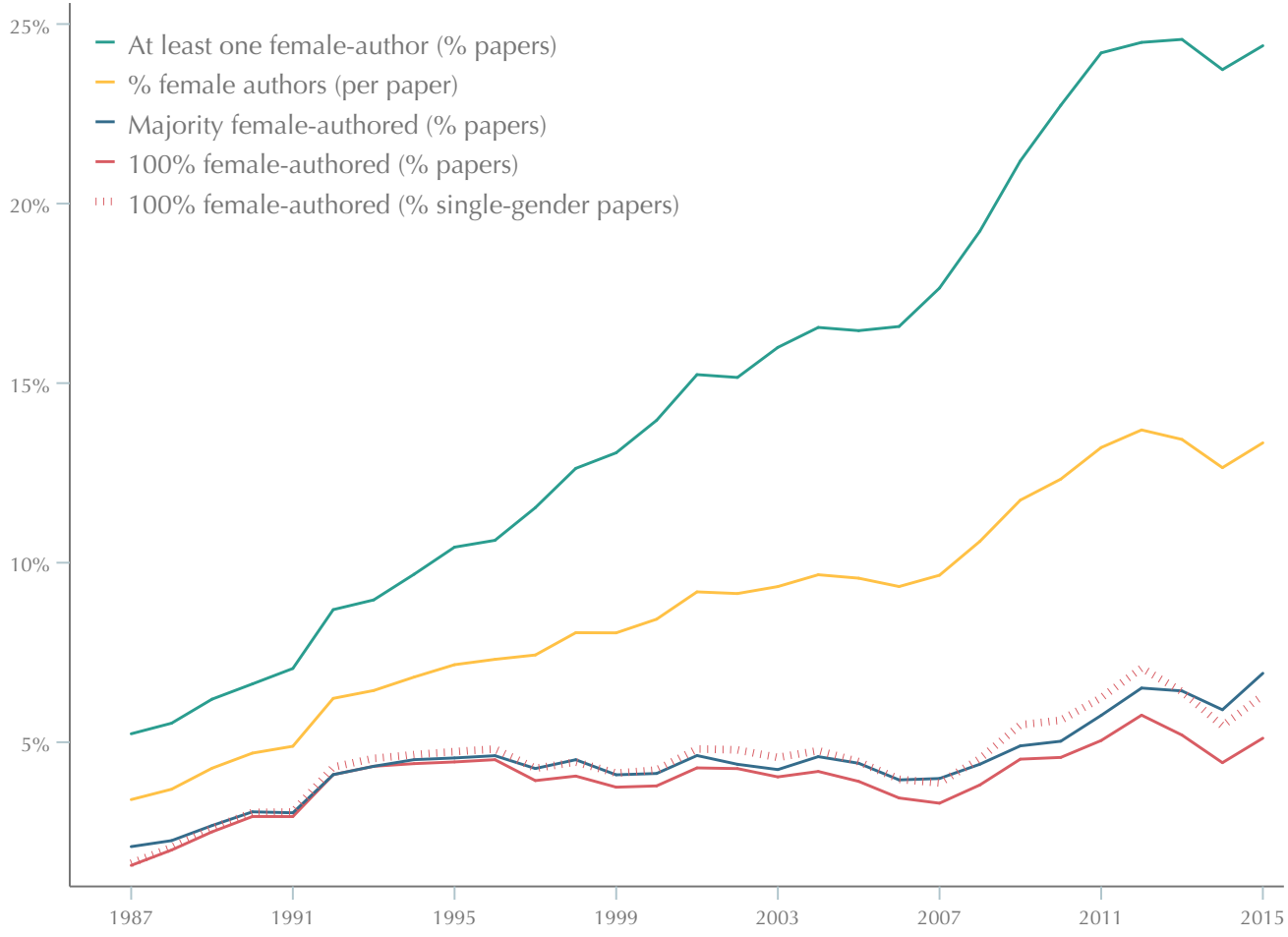

Is peer review in economics affirmative action for men?

- Women are not creating the ideas we publish in top journals.

Background

Women are held to higher standards

- Men are rated more competent when compared to otherwise equally competent women (Foschi, 1996).
- Male undergraduate students underestimate female classmates' ability (Grunspan et al., 2016).
- Female graduate students are rated less qualified for laboratory management positions (Moss-Racusin et al., 2012).
- When collaborating with men, women are given less credit for mutual work (Heilman and Haynes, 2005; Sarsons, 2017).
- Manuscripts by female authors are rated lower quality (Goldberg, 1968; Paludi and Bauer, 1983; Krawczyk and Smyk, 2016).

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"Women must do twice as well to be thought half as good."[1]

–Charlotte Whitton

[1] Lightly paraphrased.

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- Most papers undergo major referee-requested revisions (Abrevaya and Hamermesh, 2012)—referees and editors may be more likely to double-check technical details, demand robustness checks or require clearer exposition in a female-authored paper.
- Consequently, female-authored papers should be higher quality in dimensions where higher standards apply.

"I have no doubt that one of [discrimination's] results has been that those women who do manage to make their mark are much abler than their male colleagues."

–Milton Friedman

Writing clarity

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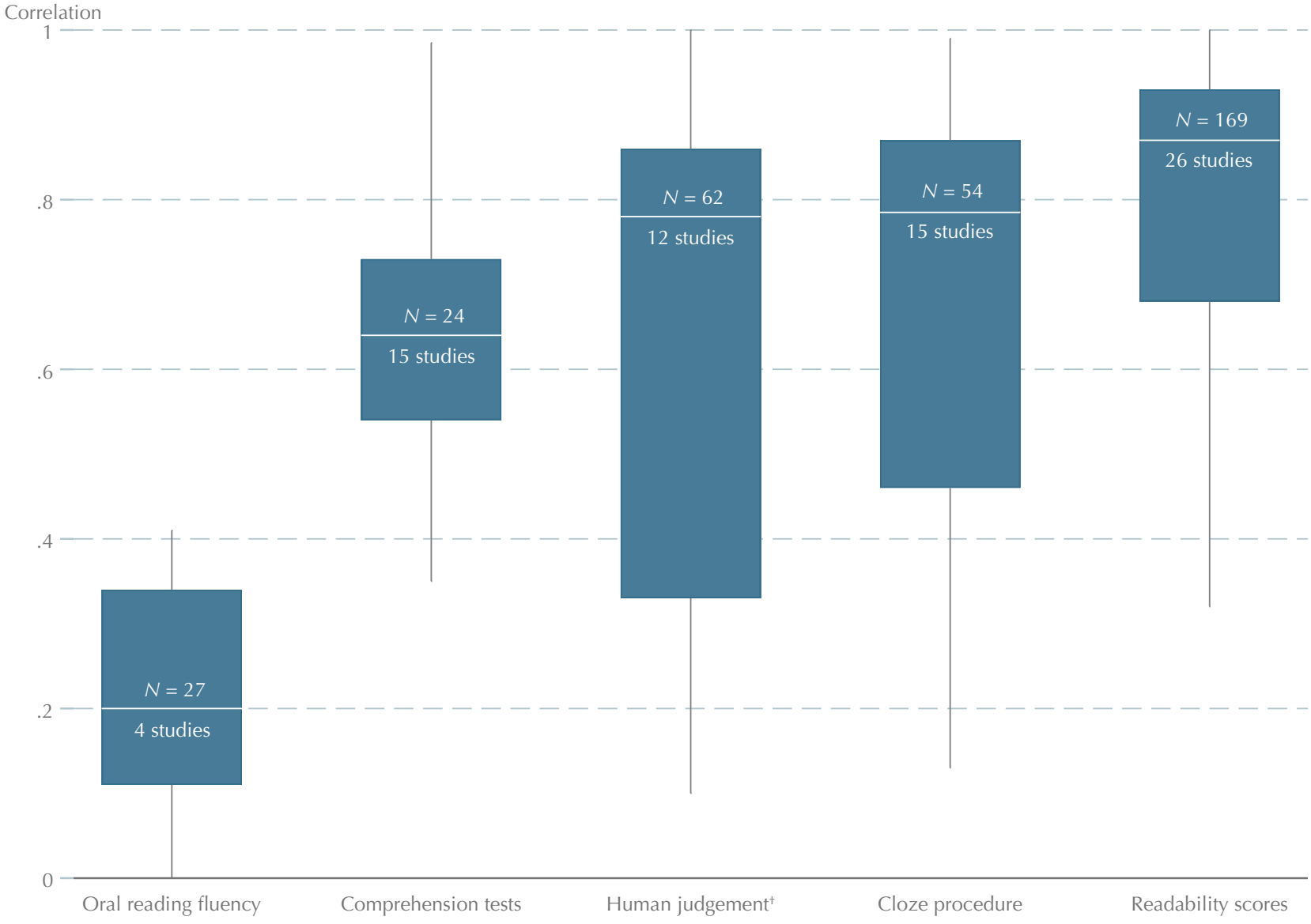
2. Good writing is highly correlated with simple vocabulary and short sentences.
   - Flesch Reading Ease, Flesch-Kincaid, Gunning Fog, SMOG and Dale-Chall.
   - Developed primarily for adults and tested on technical documents (see DuBay, 2004).
   - Used in research, particularly in finance and political science (see Loughran and Mcdonald, 2016; Benoit et al., 2017).
   - Validated against surrogate masures of reading comprehension, including readership (Swanson, 1948; Richardson, 1977), reading persistence, efficiency and retention (Klare et al., 1957; Klare and Smart, 1973).
   - Readable academic articles win more awards (Sawyer et al., 2008), are downloaded more often (Guerini et al., 2012) and cited more frequently.

Correlation with alternative measures



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  - Using abstracts reduces measurement error.
    - Largely exist as machine readable text.
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    - Standardised layout—readability less influenced by non-textual cues.
    - Most read portion of a paper (King et al., 2006).

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    - Standardised layout—readability less influenced by non-textual cues.
    - Most read portion of a paper (King et al., 2006).
  - Readability scores highly correlated across abstract, introduction and discussion sections of a paper (Hartley et al., 2003; Plavén-Sigray et al., 2017).

Empirical strategy

Establish that there is a gender difference in readability.

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Identification

1. Causally link the gender gap to the peer review process.
2. Establish sufficient conditions to verify discrimination is present in academic publishing.
   - Conditions are satisfied on average for two different measures of research quality: readability *and* citation counts.
   - Use matching to make the causal link between women's better writing and higher standards by referees and/or editors.

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Consequences

- **Time tax**. Female-authored papers take longer in peer review.
- **Behaviourial change**. As women update beliefs about referees' standards, they increasingly meet those standards before peer review.

Article-level analysis

$$R_j^s = \beta_0 + \beta_1 \text{female ratio}_j + \theta\, \mathbf{X}_j + \varepsilon_j.$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flesch Reading Ease	0.90*	0.87*	0.83*	0.81	0.97*	0.52	0.92
	(0.48)	(0.48)	(0.50)	(0.48)	(0.50)	(0.53)	(0.71)
Flesch-Kincaid	0.19*	0.18	0.18	0.19*	0.22*	0.23*	0.25*
	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)	(0.14)
Gunning Fog	0.33***	0.33***	0.33***	0.33***	0.37***	0.34**	0.36**
	(0.12)	(0.12)	(0.12)	(0.13)	(0.14)	(0.14)	(0.16)
SMOG	0.21**	0.21**	0.22**	0.21**	0.23**	0.19*	0.23*
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.12)
Dale-Chall	0.10**	0.10**	0.10**	0.09**	0.11**	0.09*	0.13**
	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.06)
Editor effects	✓	✓	✓	✓	✓	✓	✓
Journal effects	✓	✓	✓	✓	✓	✓	✓
Year effects		✓	✓	✓	✓	✓	✓
Journal×Year effects			✓	✓	✓	✓	✓
Institution effects				✓	✓	✓	✓
Quality controls					✓[1]	✓[1]	✓[1]
Native speaker					✓	✓	✓
JEL (primary) effects						✓	
JEL (tertiary) effects							✓

Notes. 9,122 articles in (1)–(5); 5,216 articles in (6); 5,777 articles—including 561 from *AER Papers & Proceedings*—in (7). Figures represent the coefficient on female ratio from an OLS regression on the relevant readability score. Quality controls denoted by ✓[1] include citation count and max. T_j fixed effects. Standard errors clustered on editor in parentheses. ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

Female-authored abstracts are 1–2 percent more clearly written.

- Women write every paragraph 1–2 percent more clearly.
- Substantial difference in a paper of 200–300 paragraphs.

Author-level analysis

Everyone writes better when co-authoring with women!

- Female-authored abstracts are 2–6 percent more clearly written.
- Convex relationship between readability and female ratio.

$$R^s_{j_{it}} = \beta_0 R^s_{it-1} + \beta_1 \text{female ratio}_j + \beta_2 \text{female ratio}_j \times \text{male}_i + \theta \mathbf{X}_j + \alpha_i + \varepsilon_{it}.$$

	Flesch Reading Ease	Flesch-Kincaid	Gunning Fog	SMOG	Dale-Chall
Female ratio (women)	2.37**	0.35*	0.66***	0.47**	0.23**
	(1.00)	(0.20)	(0.24)	(0.19)	(0.10)
Female ratio (men)	0.57	0.10	0.15	0.09	0.10
	(1.31)	(0.25)	(0.29)	(0.21)	(0.11)
N_j	✓	✓	✓	✓	✓
Editor effects	✓	✓	✓	✓	✓
Journal effects	✓	✓	✓	✓	✓
Year effects	✓	✓	✓	✓	✓
Journal×Year effects	✓	✓	✓	✓	✓
Institution effects	✓	✓	✓	✓	✓
Quality controls	✓[1]	✓[1]	✓[1]	✓[1]	✓[1]
Native speaker	✓	✓	✓	✓	✓

Notes. Sample 9,186 observations (2,827 authors). Figures from first-differenced, IV estimation of the regression equation (Arellano and Bover, 1995; Blundell and Bond, 1998). Quality controls denoted by ✓[1] include citation count and max. T_j fixed effects. Regressions weighted by $1/N_j$; standard errors adjusted for two-way clustering on editor and author (in parentheses). ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

Causal impact of peer review

	FGLS			OLS
	Working paper	Published article	Difference	Change in score
Flesch Reading Ease	2.26**	3.21***	0.95*	0.94
	(1.00)	(1.21)	(0.57)	(0.60)
Flesch-Kincaid	0.31	0.75***	0.44**	0.44**
	(0.23)	(0.28)	(0.18)	(0.19)
Gunning Fog	0.44*	0.86***	0.42**	0.42**
	(0.24)	(0.29)	(0.19)	(0.20)
SMOG	0.33**	0.56***	0.24**	0.24*
	(0.15)	(0.19)	(0.12)	(0.12)
Dale-Chall	0.32***	0.45***	0.13**	0.13**
	(0.10)	(0.11)	(0.05)	(0.05)
Editor effects	✓	✓		✓
Journal effects	✓	✓		✓
Year effects	✓	✓		
Journal×Year effects	✓	✓		✓
Quality controls	✓[2]	✓[2]		✓[3]
Native speaker	✓	✓		✓

Peer review causes a large increase in the readability gap

- Readability gap is 2–3 times as large in the published article.
- Suggests peer review causes female-authored abstracts to become about 2–5 percent more readable.

Robustness

- Using the change in score as the dependent variable implicitly controls for field.
- Adding field controls to FGLS estimates does not change results. table
- No significant gap under double-blind review. table figure
  - *Caution*: small samples, particularly of female-authored papers.
- Abstract word limits do not seem to drive results. table
- Timing independence: female-authored manuscripts are submitted to journals *first*; released as NBER Working Papers *second*. figure

Causal impact of discrimination: theory

Why does peer review cause women to write more clearly?

Possibility 1 Women voluntarily write better papers—*e.g.*, they're more sensitive to referee criticism.

Possibility 2 Better written papers are women's response to higher standards imposed by referees and/or editors.

- Model an author's decision making process within a subjective expected utility framework.

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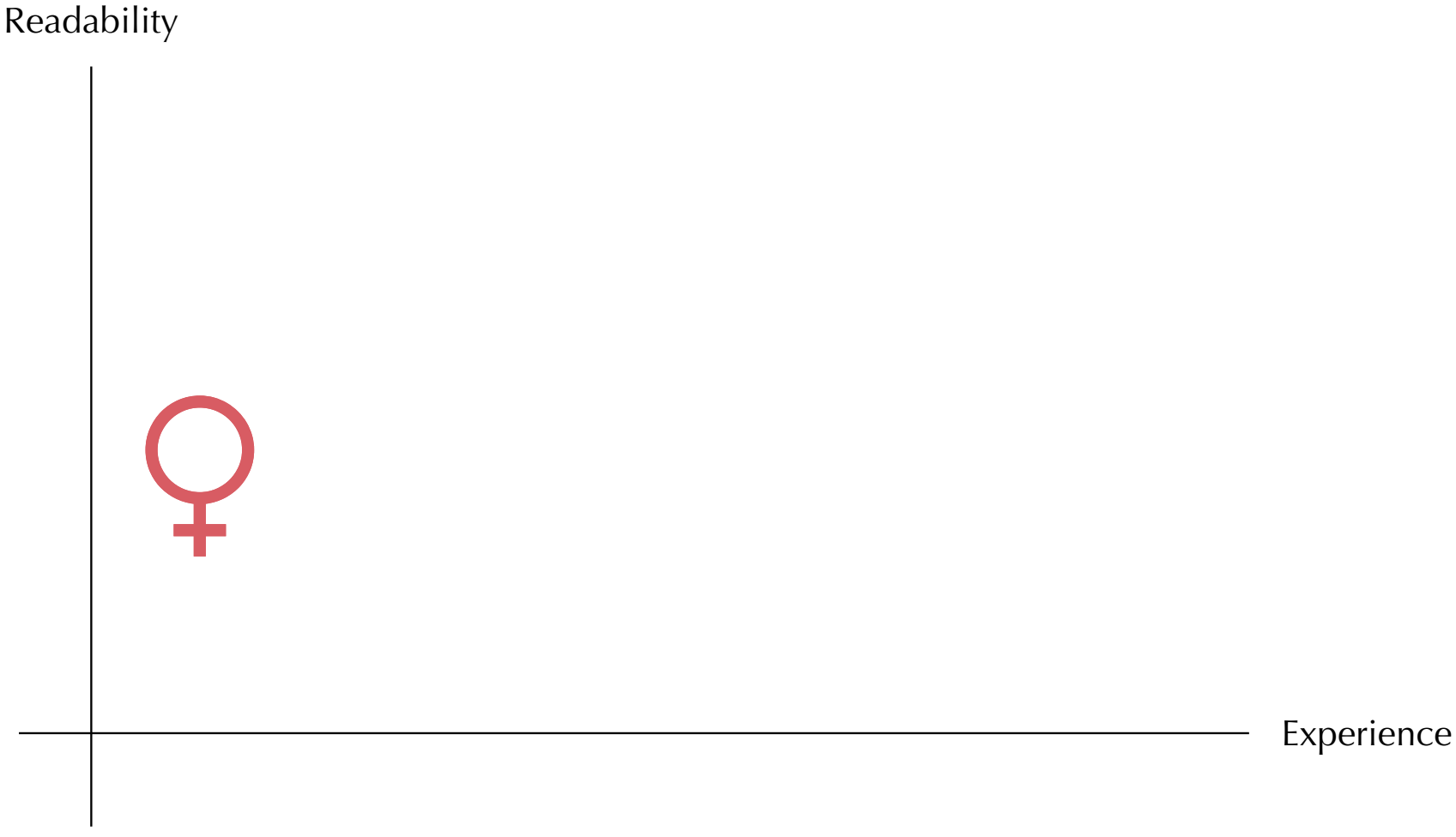

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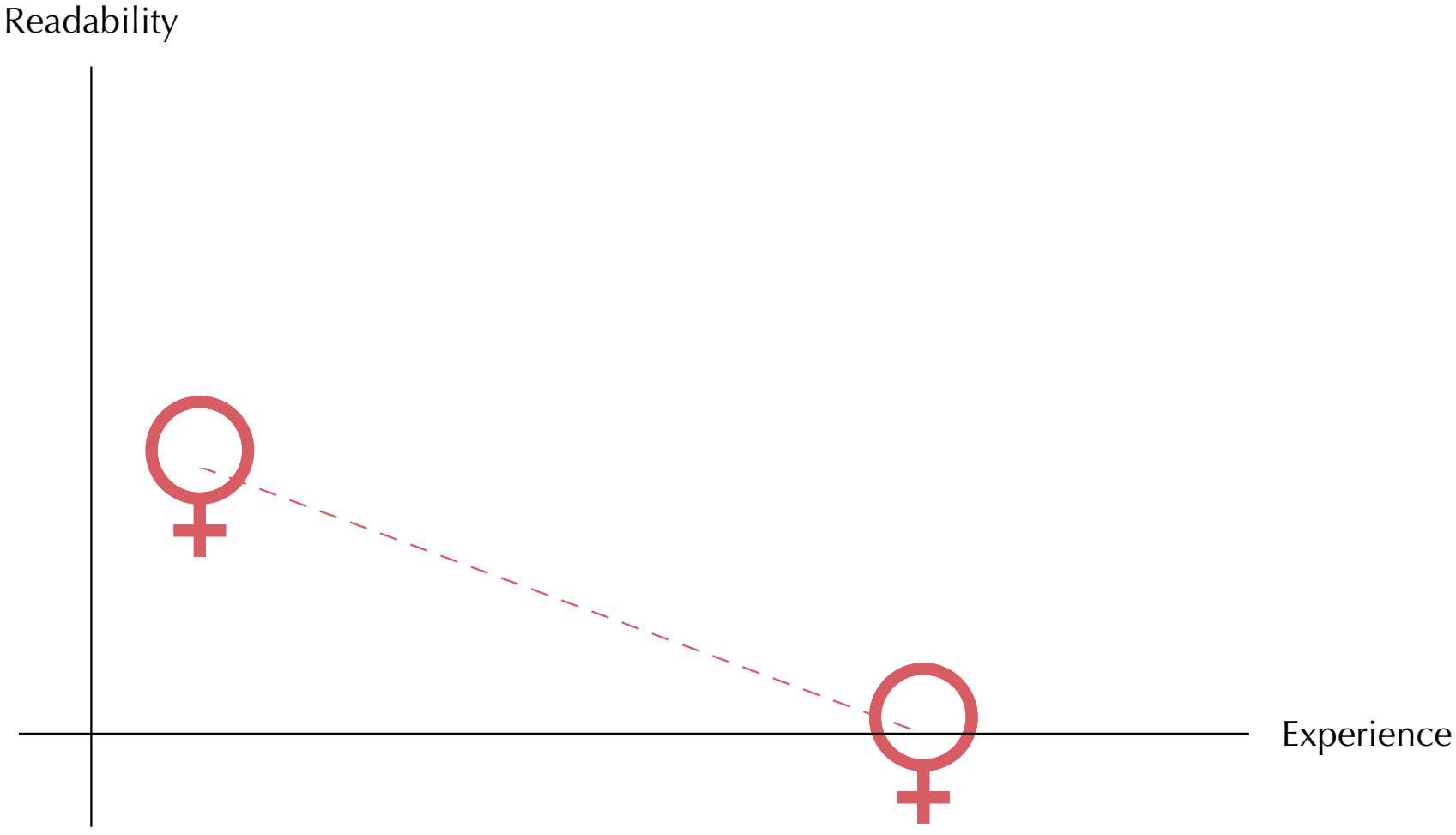

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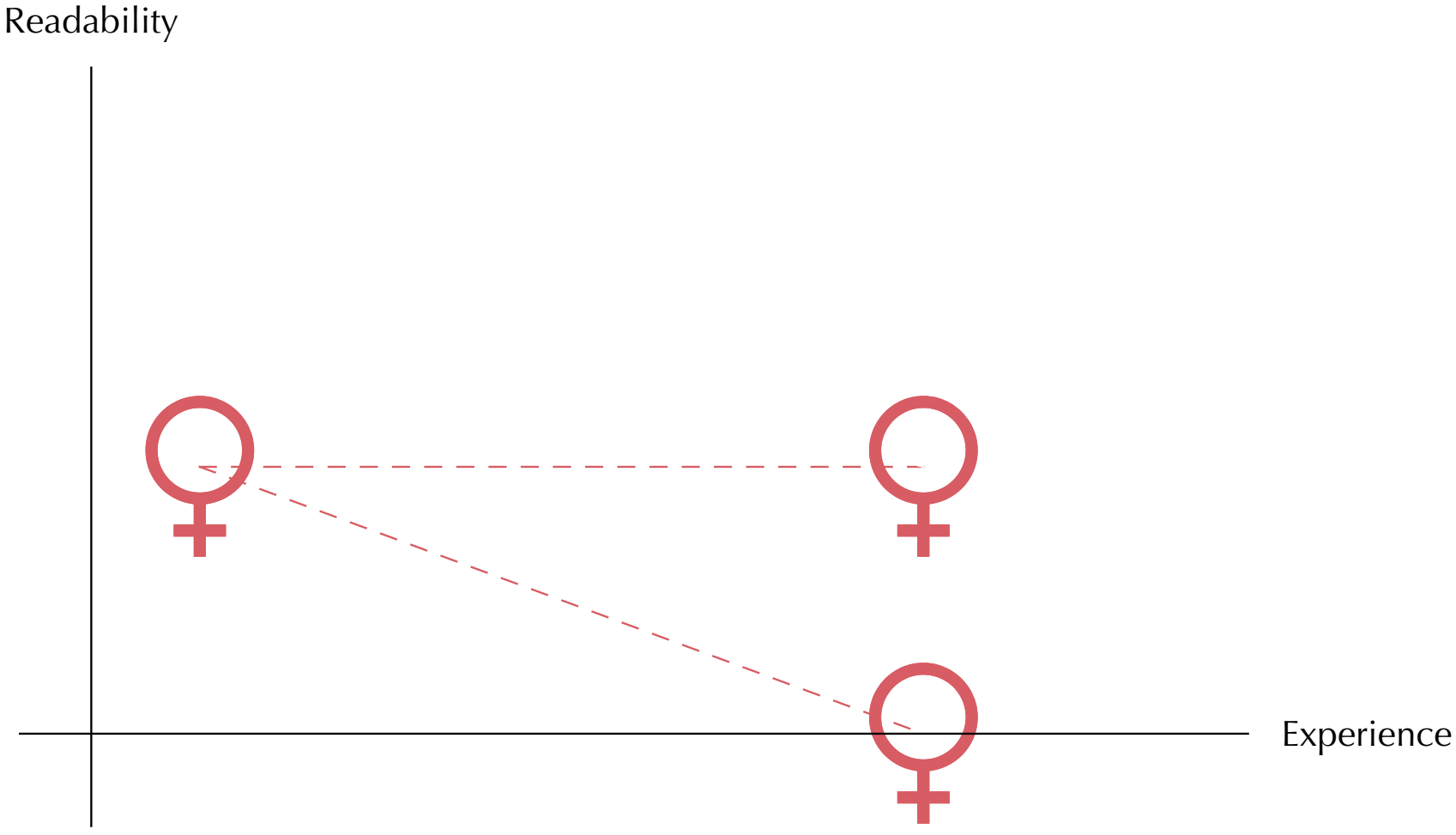

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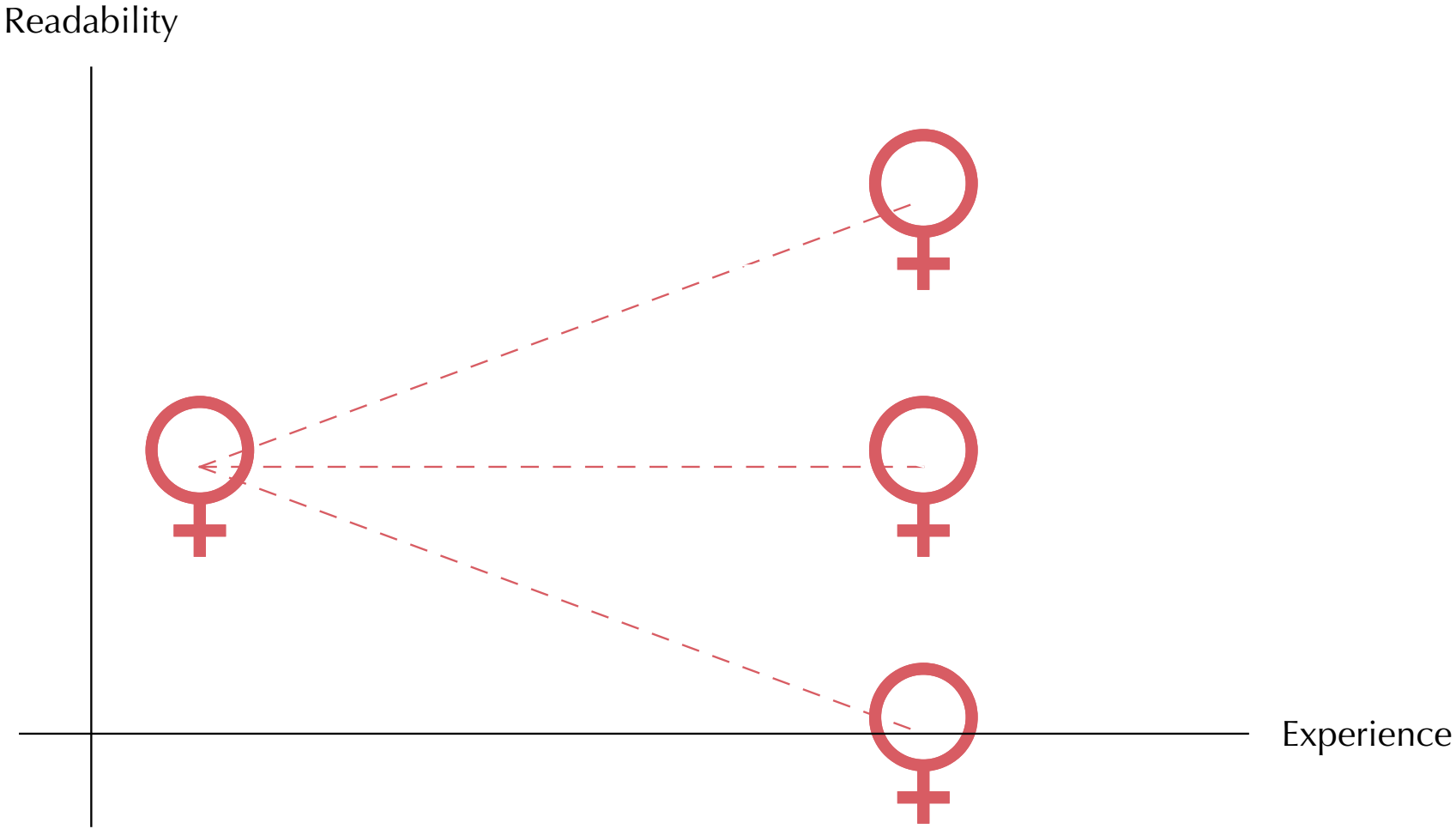

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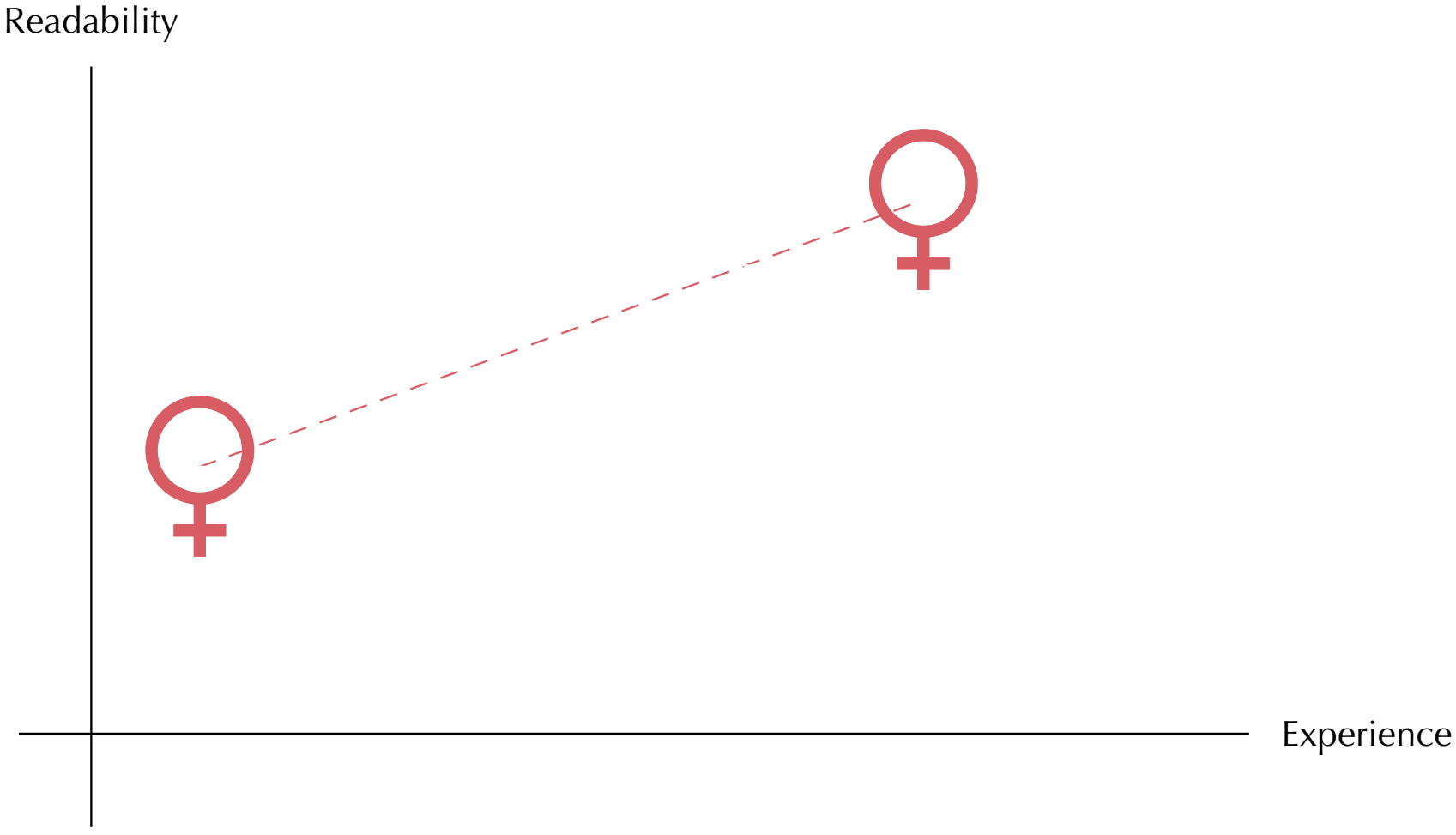

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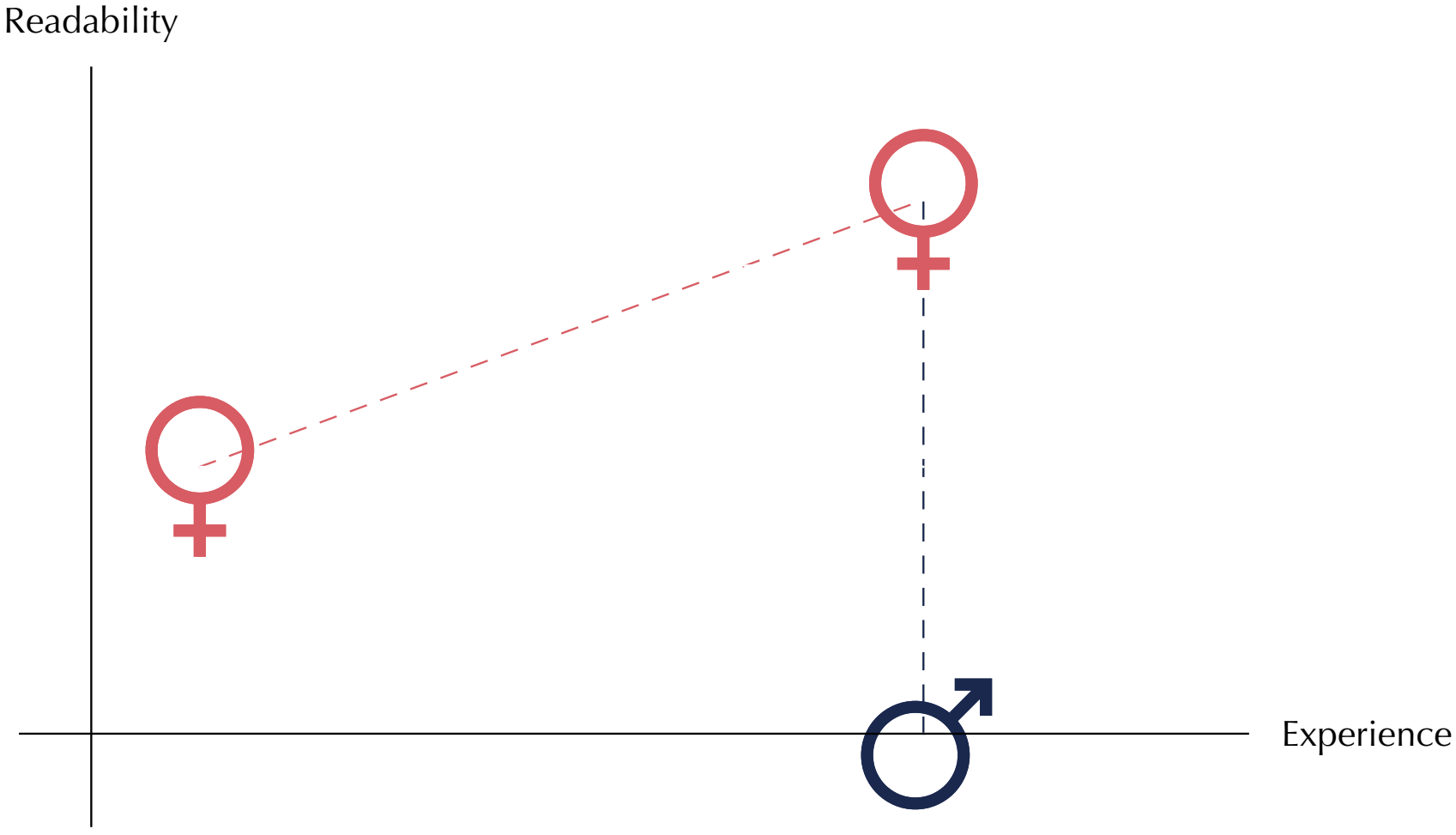

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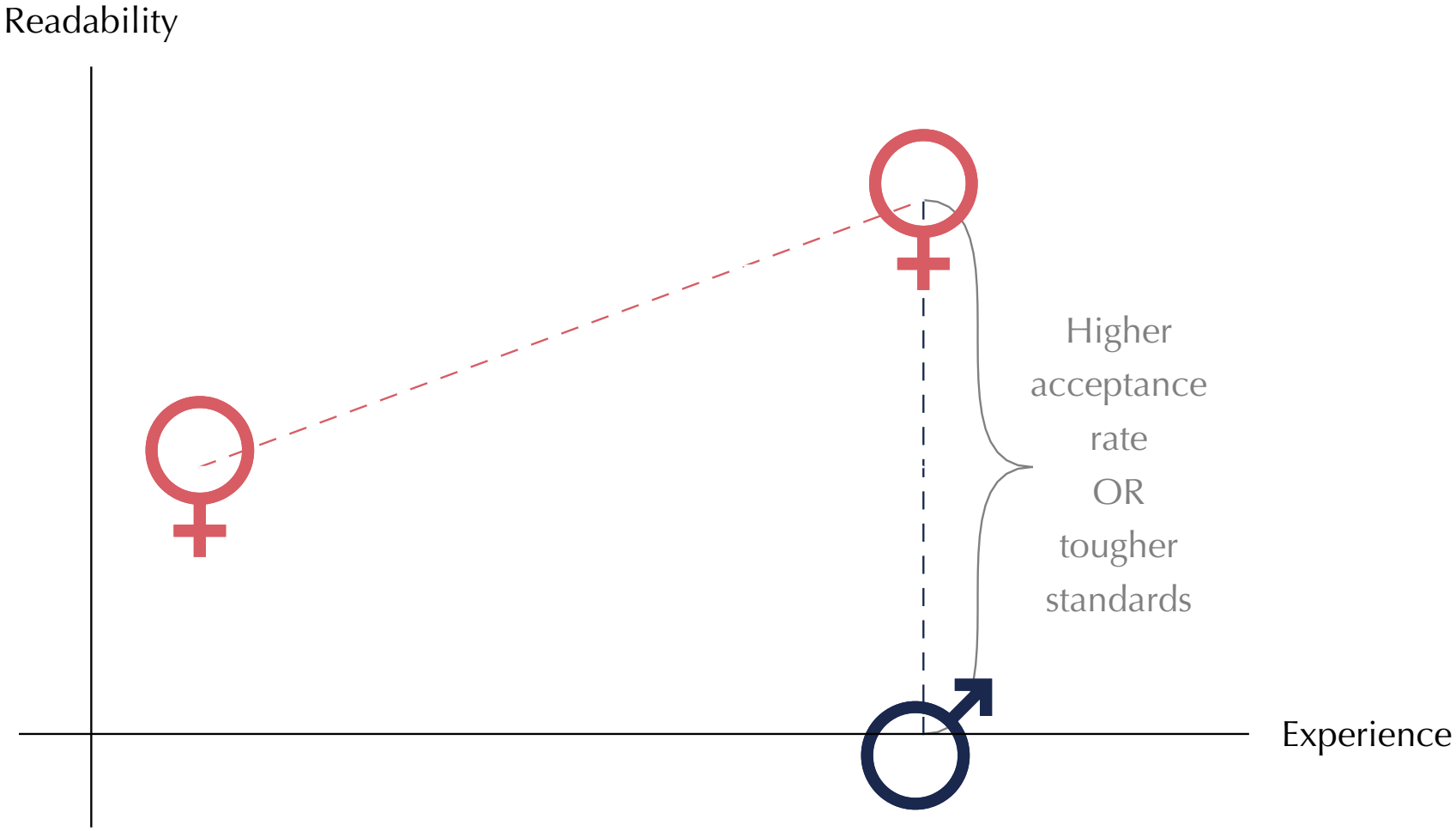
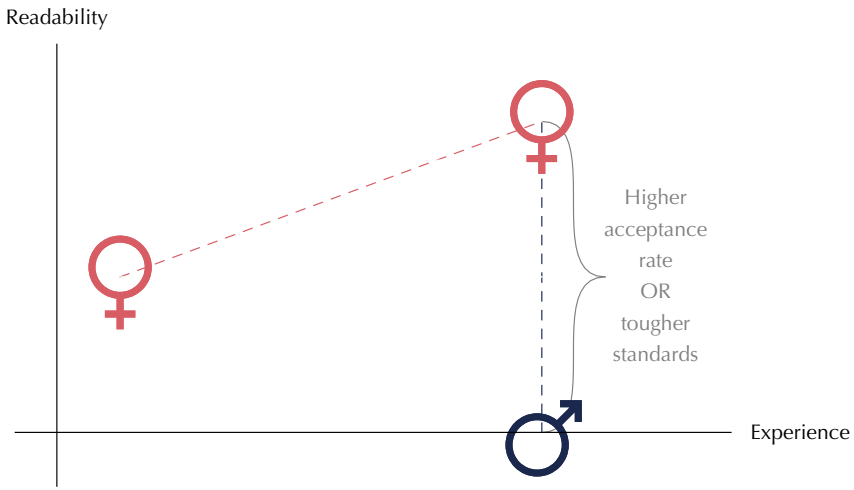


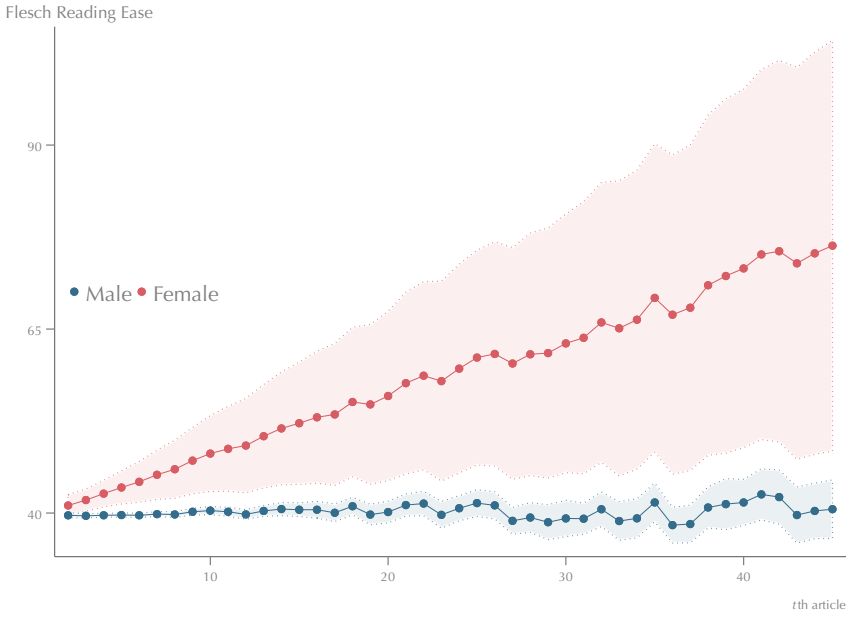
Causal impact of discrimination: evidence (II)



- Establishes 3 sufficient conditions that distinguish Possibility 1 from Possibility 2.

1. Experienced women write better than equivalent men.
2. Women improve their writing over time.
3. Female-authored papers are accepted no more often than equivalent male-authored papers.

Causal impact of discrimination: evidence (I)



1. Experienced female economists write better than equivalent male economists
2. Women improve their writing over time.

No female advantage in acceptance rates (Ceci et al., 2014).

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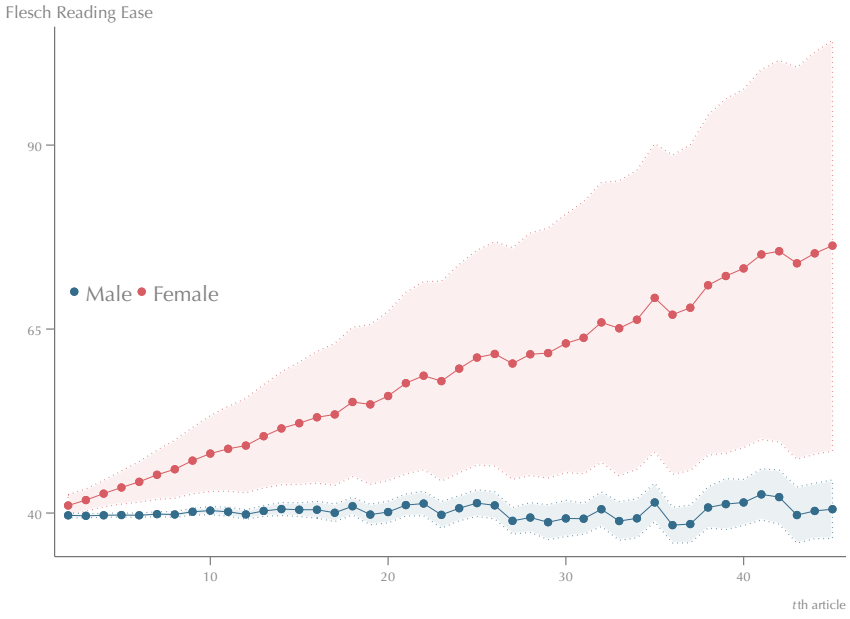

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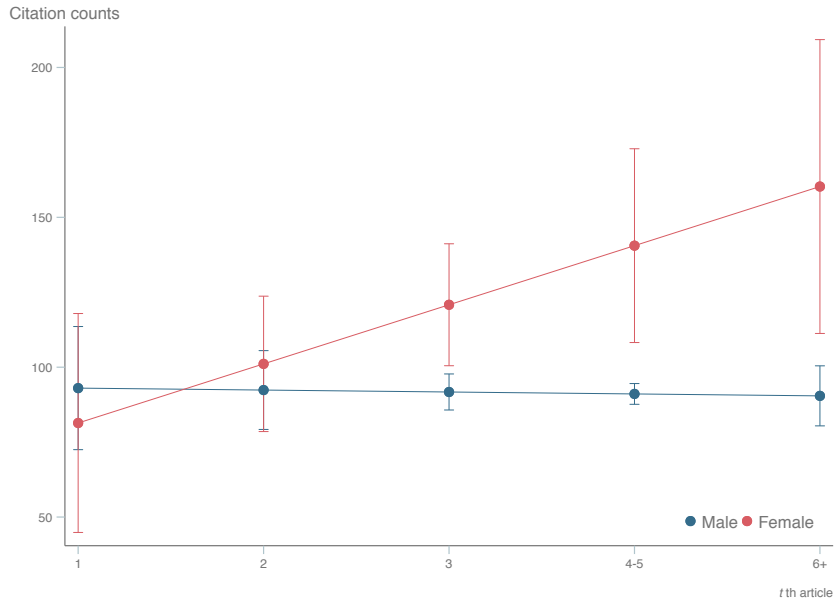


1. Experienced female economists are cited more than equivalent male economists.
2. Women increase citation counts over time.

No female advantage in acceptance rates (Ceci et al., 2014).

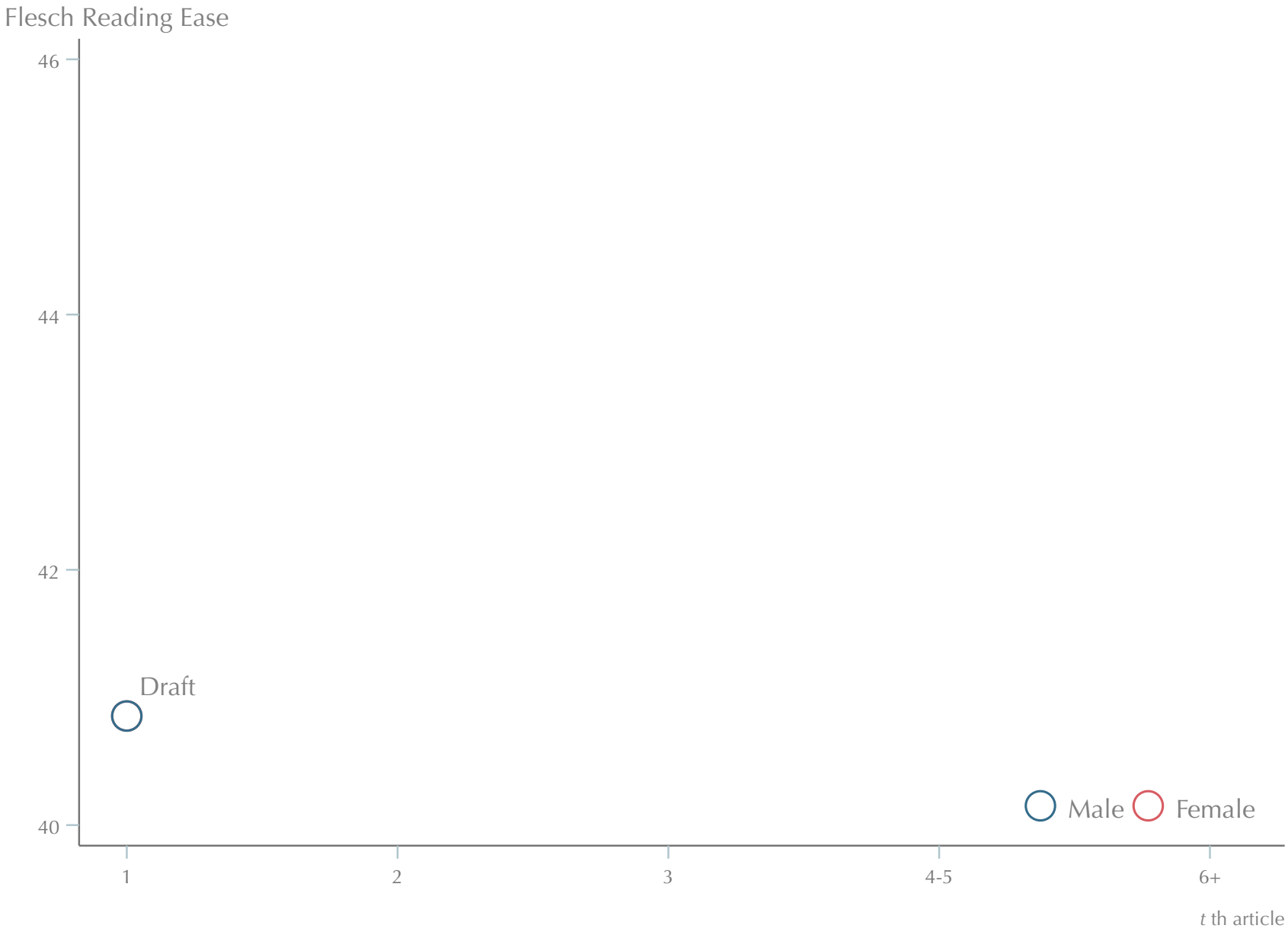
Causal impact of discrimination: evidence (II)

- Use a matching estimator to account for the fact that each condition must hold for the same author in two different situations:
  - Before and after gaining experience.
  - When compared to an equivalent, experienced author of the opposite gender.
- Matches based on observable characteristics: primary *JEL* category, citation counts, decade, institution, *etc*.

Results figure table

- Evidence of discrimination in 60–70 percent of matched pairs; almost always against women.
- Suggests discrimination causes women to write 7 percent more clearly than they otherwise would.

Behaviourial changes



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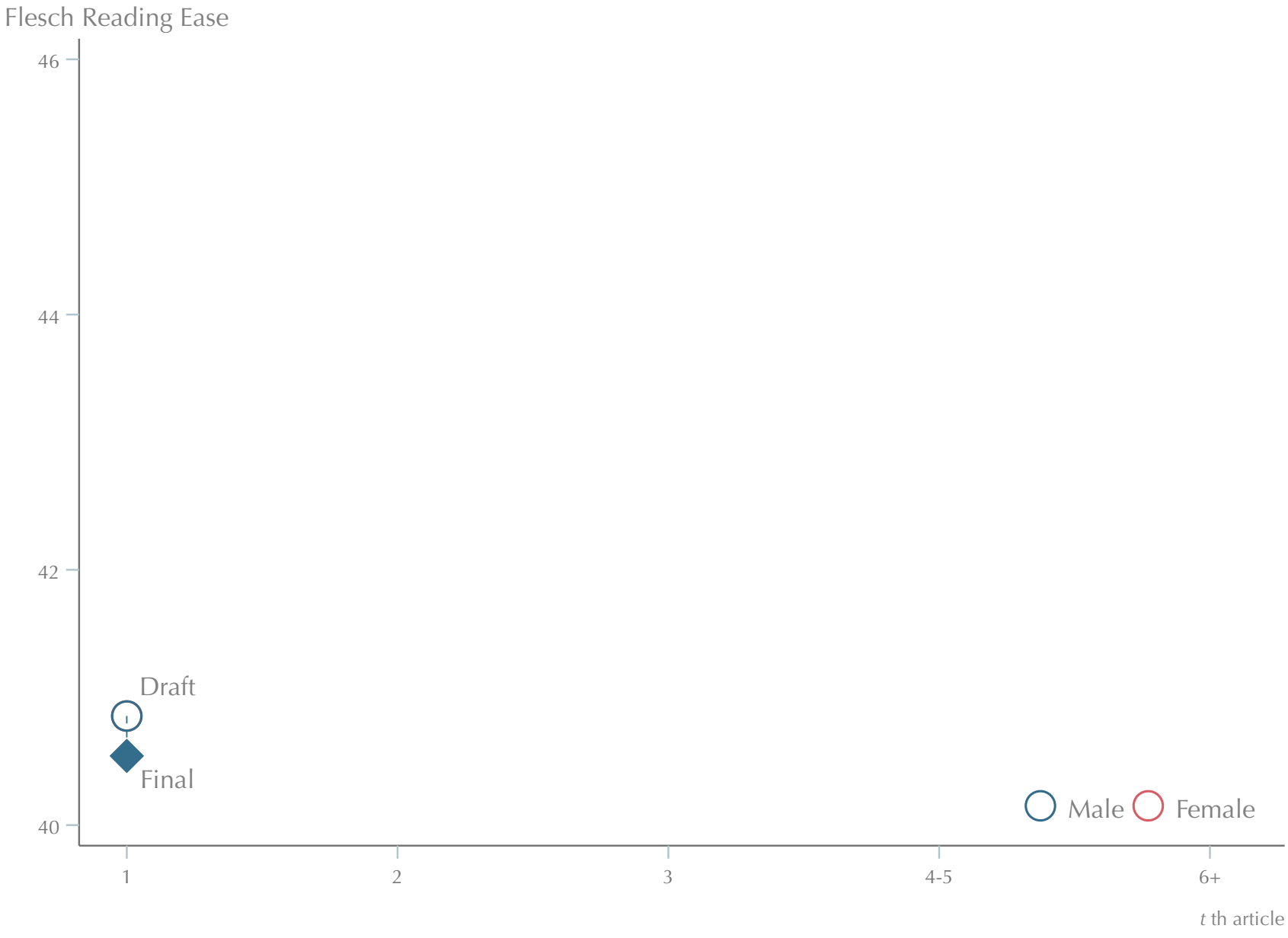

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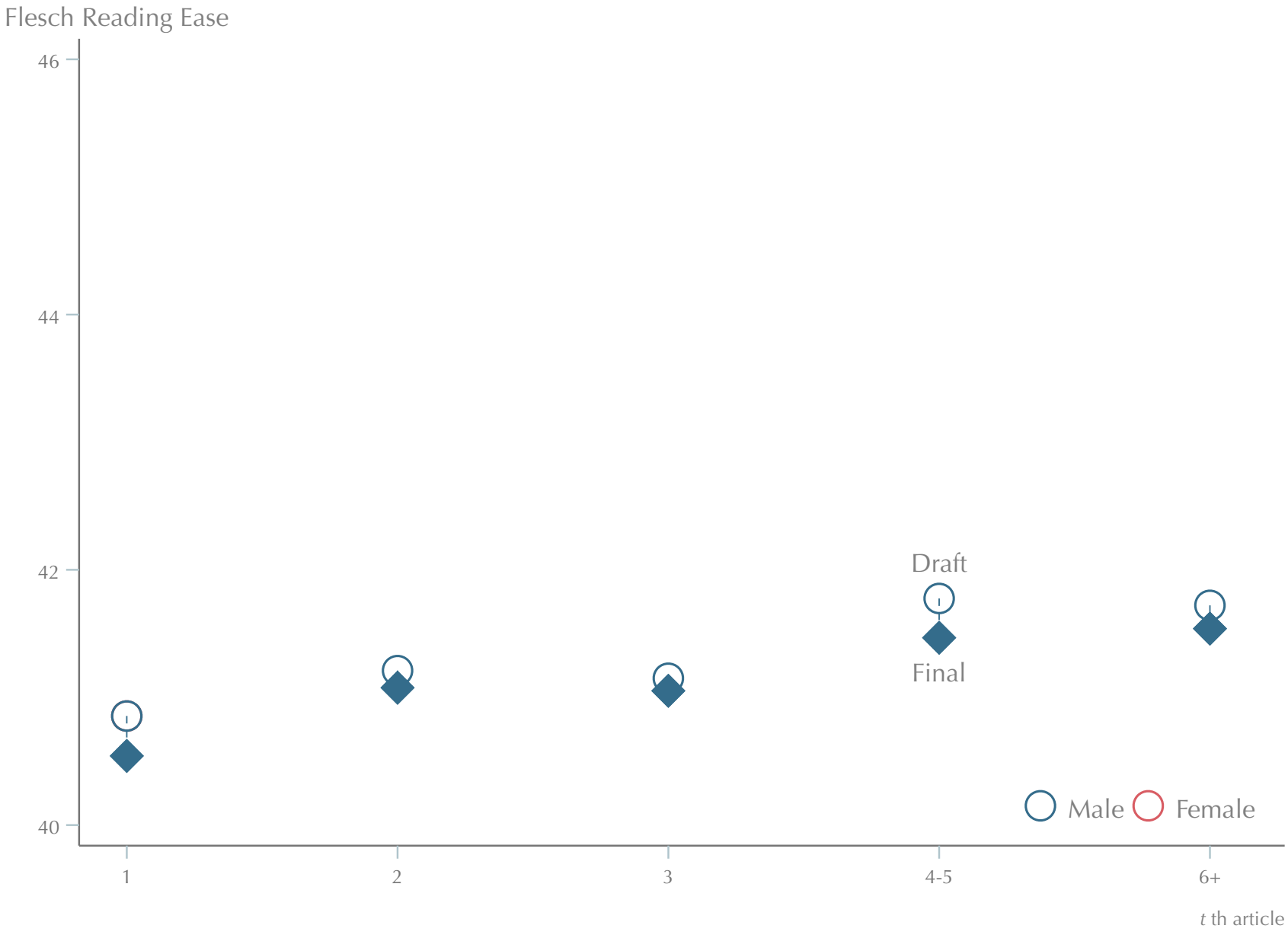

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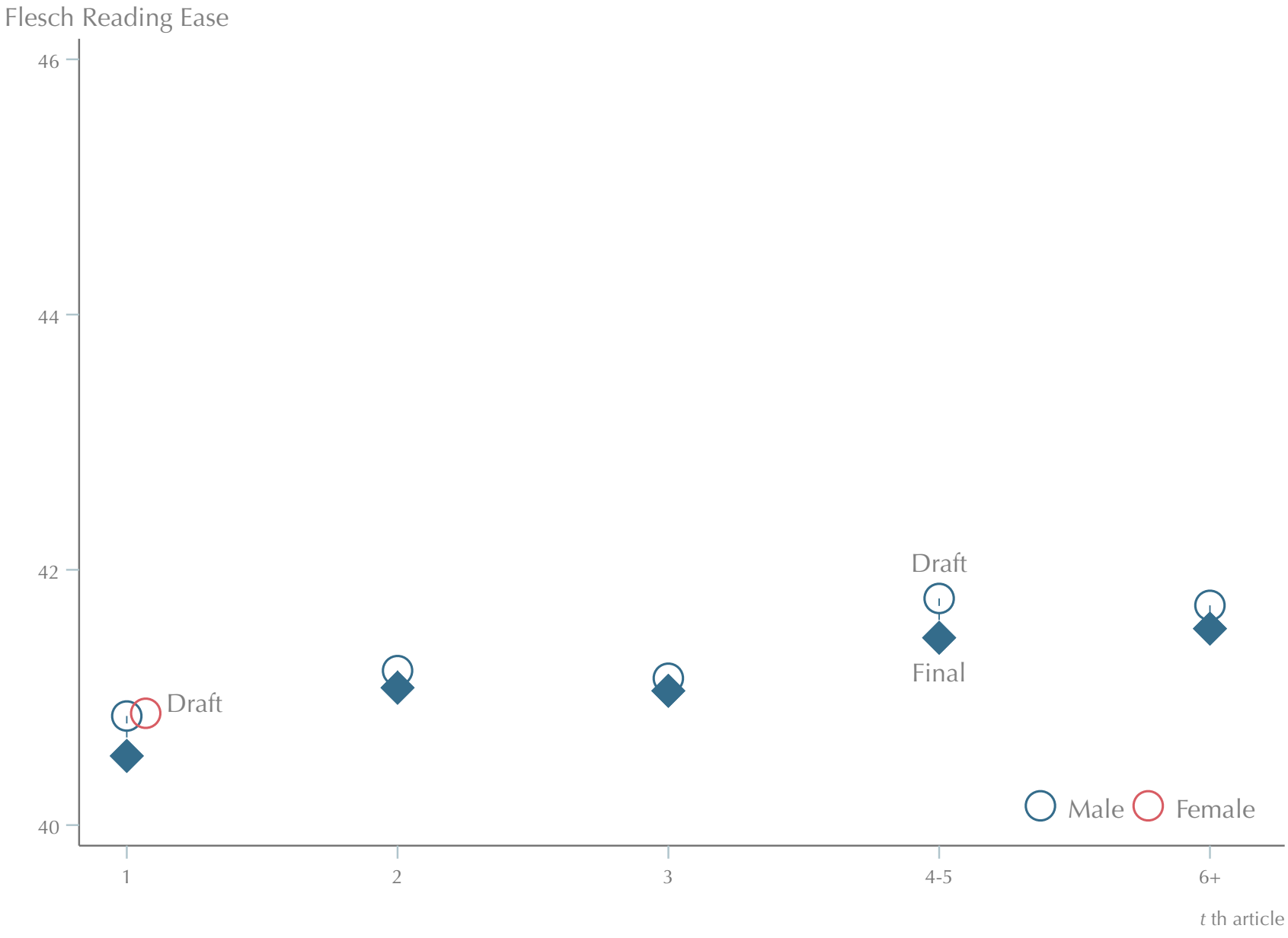

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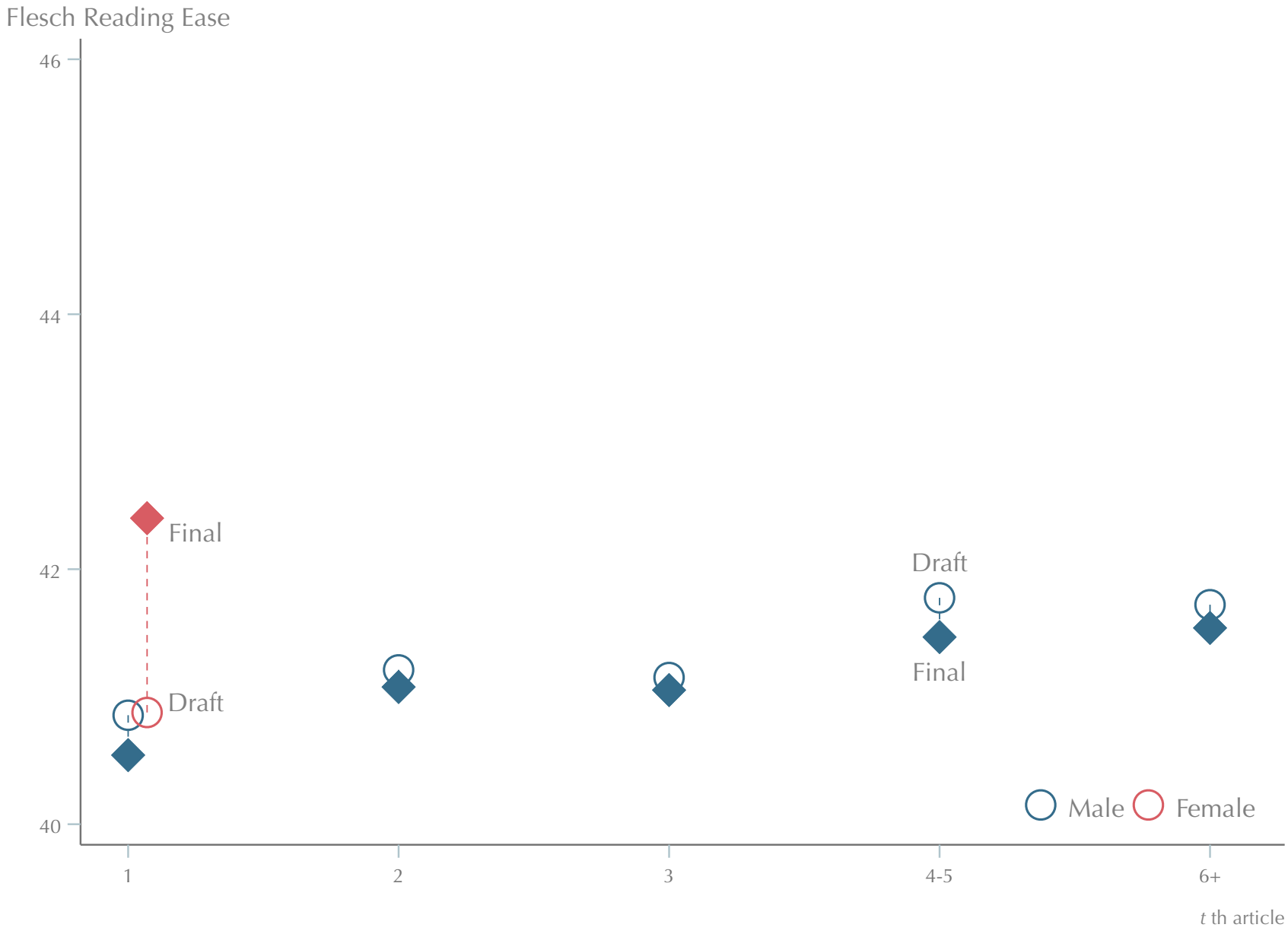

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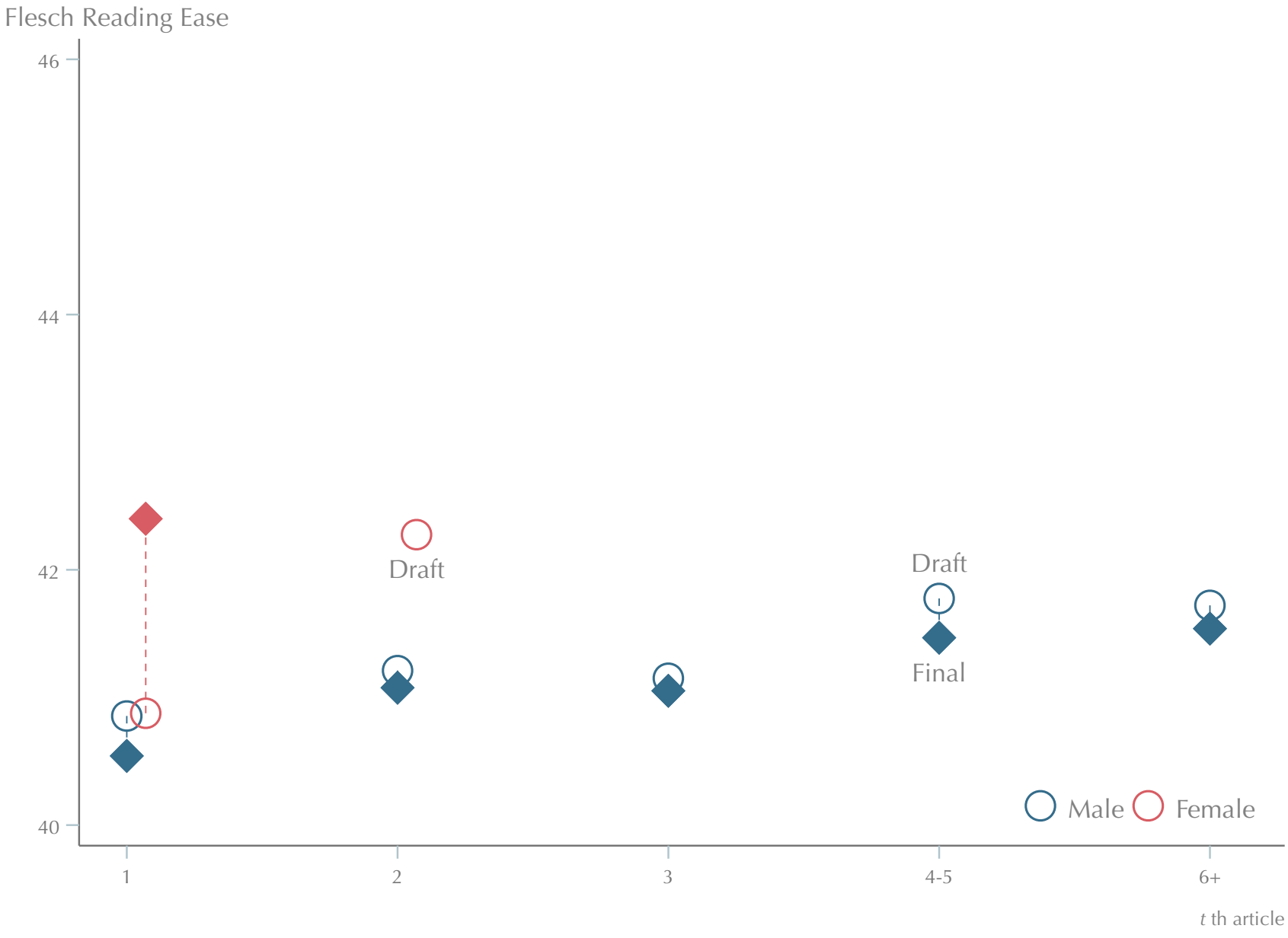

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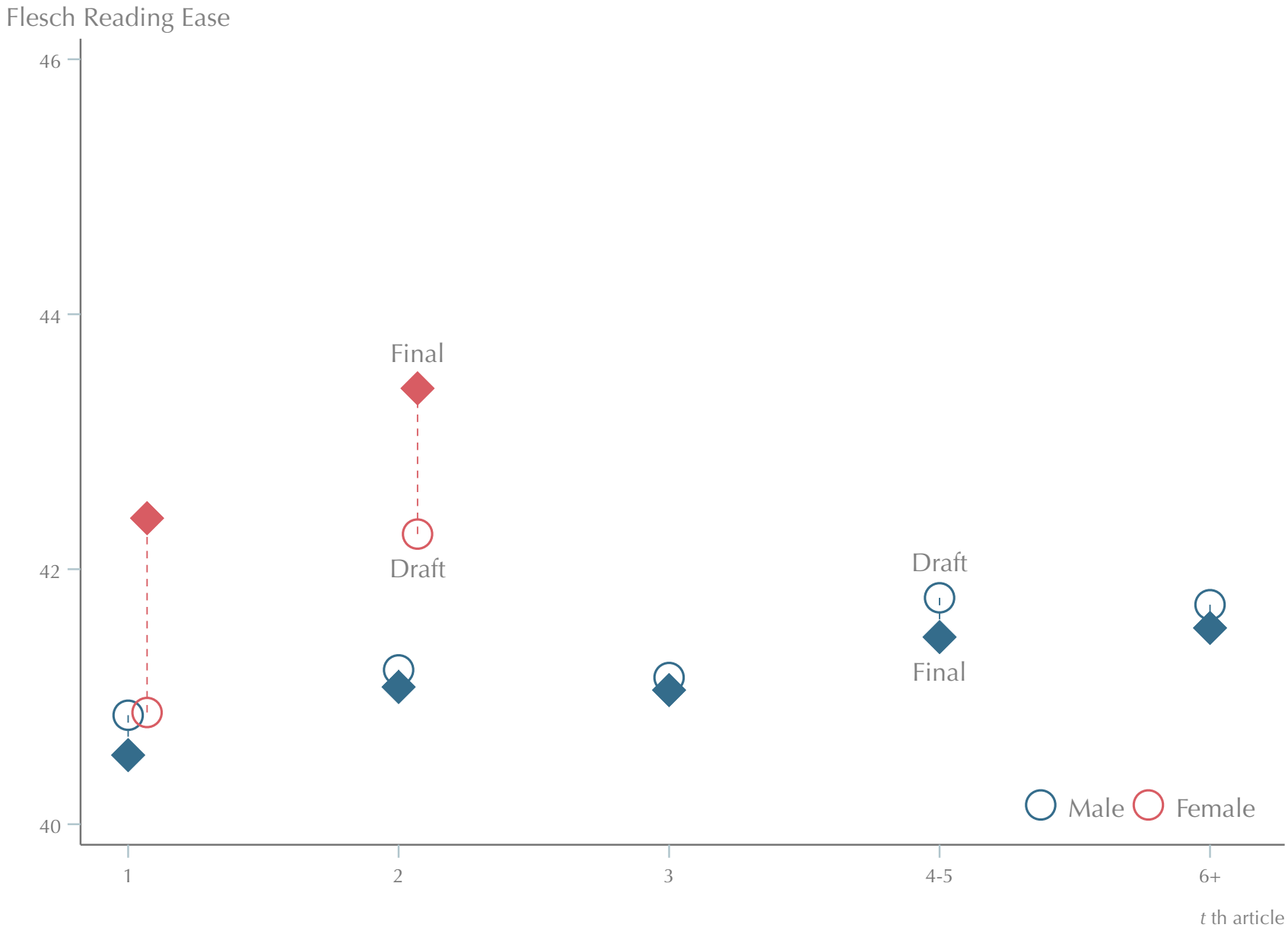

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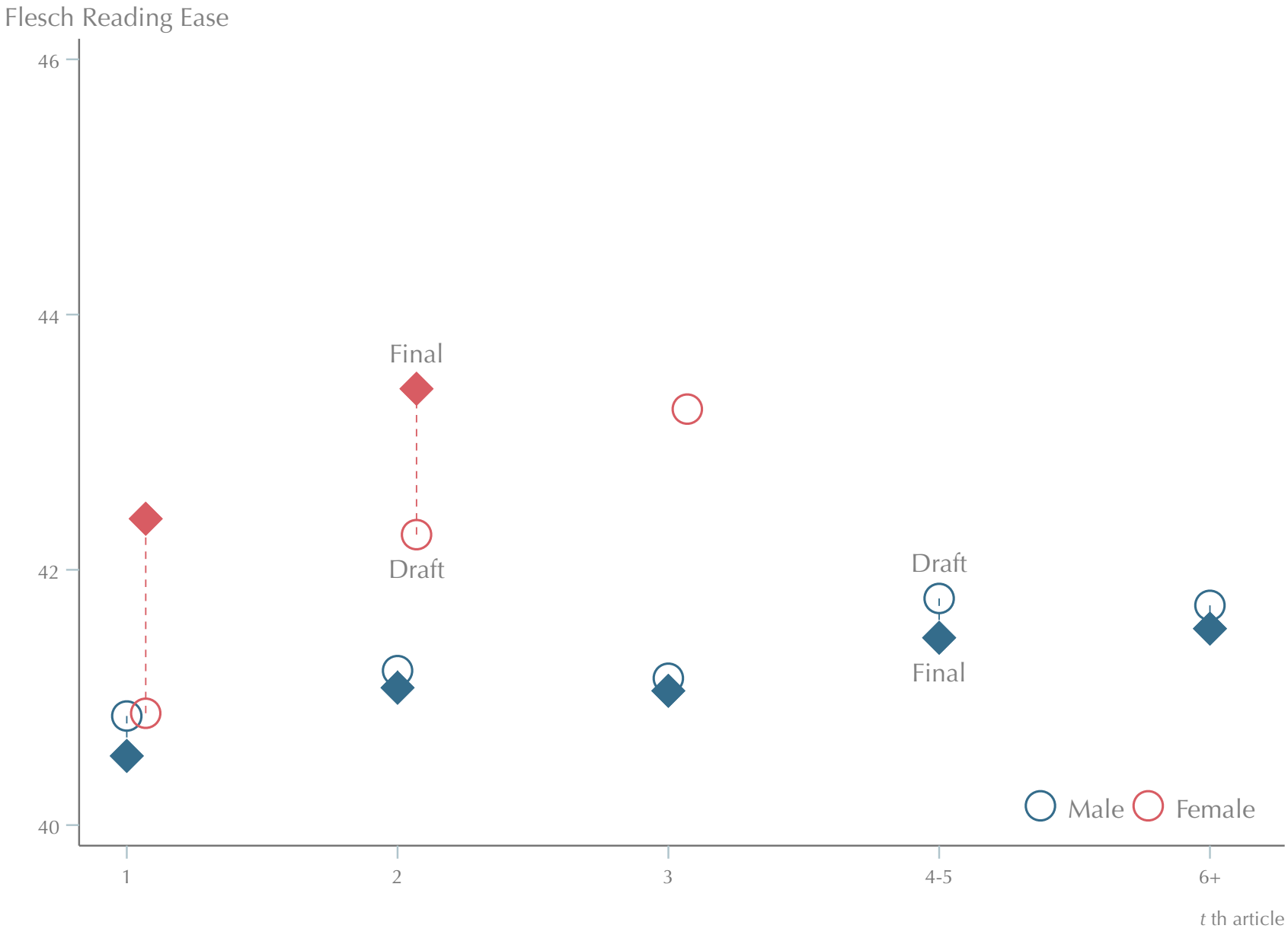
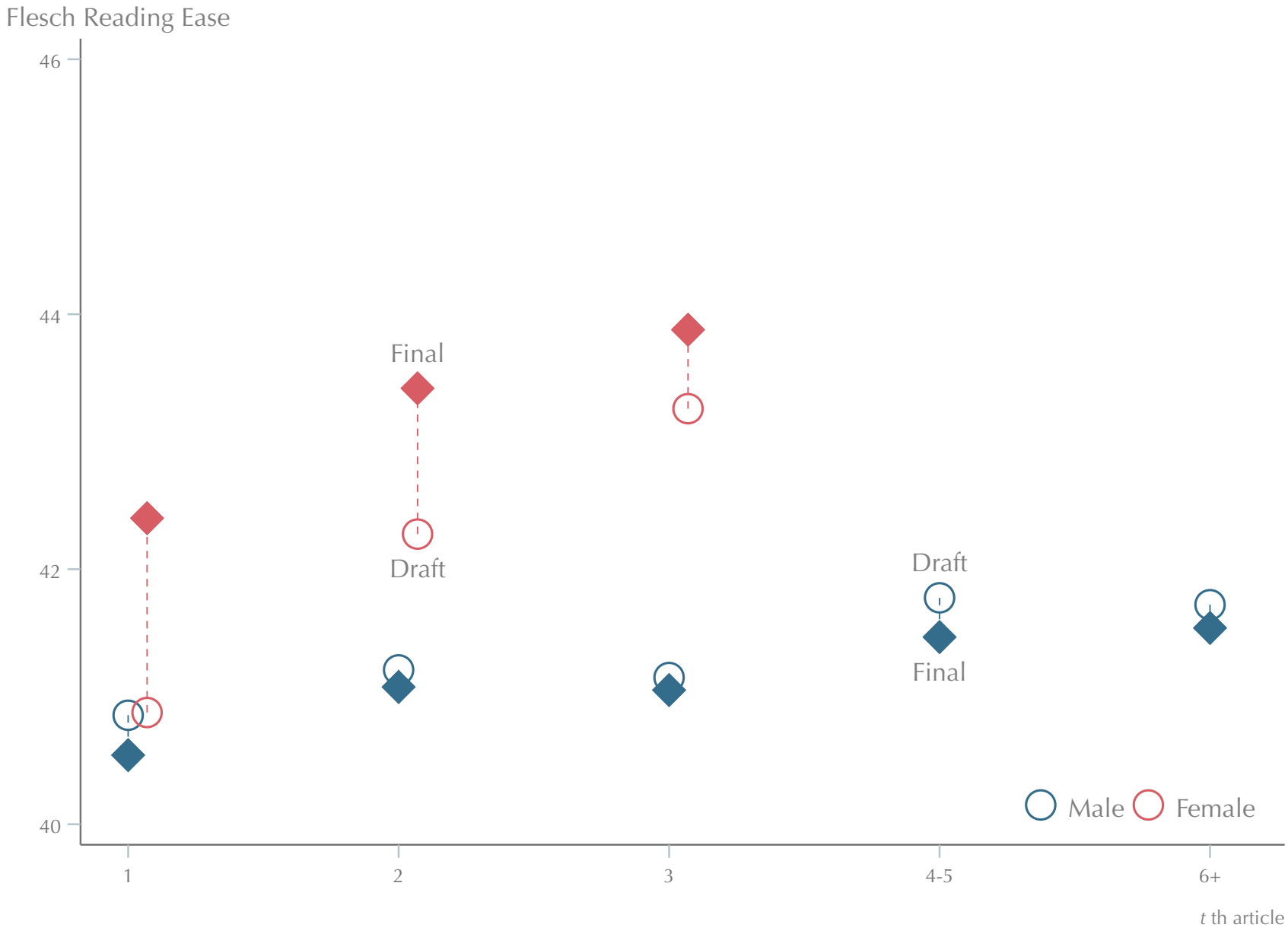
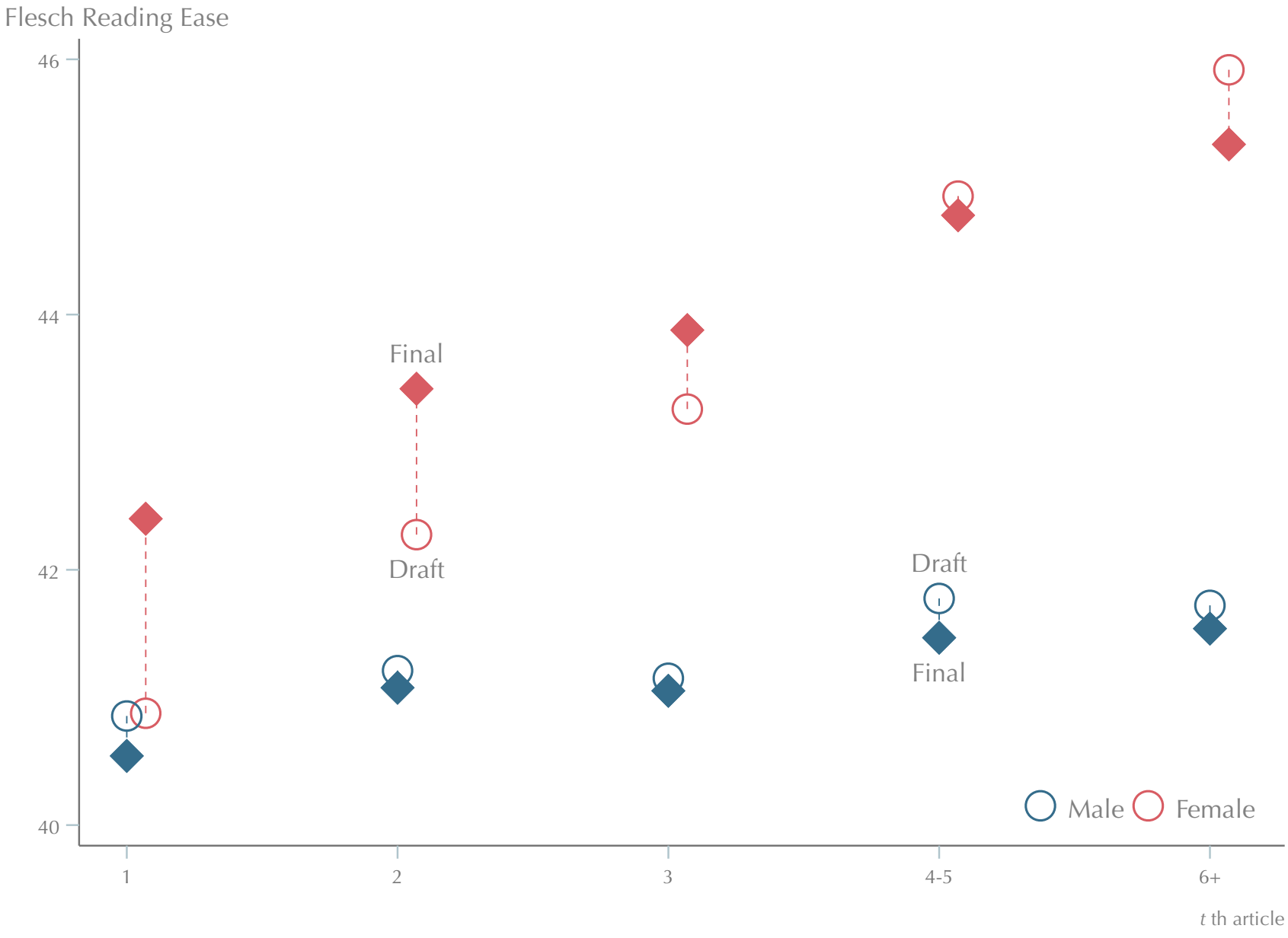


Behaviourial changes



Behaviourial changes



Prolonged peer review

	(1)	(2)	(3)	(4)	(5)	(6)
Female ratio	5.29**	6.63***	6.64***	5.54***	6.65***	8.80***
	(2.01)	(2.16)	(2.14)	(2.05)	(2.15)	(2.72)
Max. t_j	-0.16**	-0.17**	-0.17**	-0.16**	-0.16**	-0.17*
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)
No. pages	0.18***	0.18***	0.18***	0.18***	0.18***	0.21***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
N	1.02**	0.97**	0.96**	1.01**	0.97**	1.149
	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)	(0.70)
Order	0.22**	0.22**	0.22**	0.22**	0.22**	0.50**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.22)
No. citations	0.00	0.00	0.00	0.00	0.00	-0.00***
	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother			-6.66**		-10.93***	-17.67***
			(2.68)		(3.21)	(3.29)
Birth				-2.25	7.58*	12.34**
				(3.36)	(4.17)	(5.59)
Constant	37.71***	37.60***	37.79***	37.69***	37.89***	14.85***
	(2.04)	(2.08)	(2.05)	(2.05)	(2.06)	(2.79)
Editor effects	✓	✓	✓	✓	✓	✓
Year effects	✓	✓	✓	✓	✓	✓
Institution effects	✓	✓	✓	✓	✓	✓
JEL effects						✓
No. observations	2,626	2,610	2,626	2,626	2,626	1,281

Prolonged peer review

	(1)	(2)	(3)	(4)	(5)	(6)
Female ratio	5.29**	6.63***	6.64***	5.54***	6.65***	8.80***
	(2.01)	(2.16)	(2.14)	(2.05)	(2.15)	(2.72)
Max. t_j	-0.16**	-0.17**	-0.17**	-0.16**	-0.16**	-0.17*
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)
No. pages	0.18***	0.18***	0.18***	0.18***	0.18***	0.21***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
N	1.02**	0.97**	0.96**	1.01**	0.97**	1.149
	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)	(0.70)
Order	0.22**	0.22**	0.22**	0.22**	0.22**	0.50**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.22)
No. citations	0.00	0.00	0.00	0.00	0.00	-0.00***
	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother			-6.66**		-10.93***	-17.67***
			(2.68)		(3.21)	(3.29)
Birth				-2.25	7.58*	12.34**
				(3.36)	(4.17)	(5.59)
Constant	37.71***	37.60***	37.79***	37.69***	37.89***	14.85***
	(2.04)	(2.08)	(2.05)	(2.05)	(2.06)	(2.79)
Editor effects	✓	✓	✓	✓	✓	✓
Year effects	✓	✓	✓	✓	✓	✓
Institution effects	✓	✓	✓	✓	✓	✓
JEL effects						✓
No. observations	2,626	2,610	2,626	2,626	2,626	1,281

Prolonged peer review

	(1)	(2)	(3)	(4)	(5)	(6)
Female ratio	5.29**	6.63***	6.64***	5.54***	6.65***	8.80***
	(2.01)	(2.16)	(2.14)	(2.05)	(2.15)	(2.72)
Max. t_j	-0.16**	-0.17**	-0.17**	-0.16**	-0.16**	-0.17*
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)
No. pages	0.18***	0.18***	0.18***	0.18***	0.18***	0.21***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
N	1.02**	0.97**	0.96**	1.01**	0.97**	1.149
	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)	(0.70)
Order	0.22**	0.22**	0.22**	0.22**	0.22**	0.50**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.22)
No. citations	0.00	0.00	0.00	0.00	0.00	-0.00***
	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother			-6.66**		-10.93***	-17.67***
			(2.68)		(3.21)	(3.29)
Birth				-2.25	7.58*	12.34**
				(3.36)	(4.17)	(5.59)
Constant	37.71***	37.60***	37.79***	37.69***	37.89***	14.85***
	(2.04)	(2.08)	(2.05)	(2.05)	(2.06)	(2.79)
Editor effects	✓	✓	✓	✓	✓	✓
Year effects	✓	✓	✓	✓	✓	✓
Institution effects	✓	✓	✓	✓	✓	✓
JEL effects						✓
No. observations	2,626	2,610	2,626	2,626	2,626	1,281

Econometrica

- 5–9 months longer in peer review

Prolonged peer review

	(1)	(2)	(3)	(4)	(5)	(6)
Female ratio	5.29**	6.63***	6.64***	5.54***	6.65***	8.80***
	(2.01)	(2.16)	(2.14)	(2.05)	(2.15)	(2.72)
Max. t_j	-0.16**	-0.17**	-0.17**	-0.16**	-0.16**	-0.17*
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)
No. pages	0.18***	0.18***	0.18***	0.18***	0.18***	0.21***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
N	1.02**	0.97**	0.96**	1.01**	0.97**	1.149
	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)	(0.70)
Order	0.22**	0.22**	0.22**	0.22**	0.22**	0.50**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.22)
No. citations	0.00	0.00	0.00	0.00	0.00	-0.00***
	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother			-6.66**		-10.93***	-17.67***
			(2.68)		(3.21)	(3.29)
Birth				-2.25	7.58*	12.34**
				(3.36)	(4.17)	(5.59)
Constant	37.71***	37.60***	37.79***	37.69***	37.89***	14.85***
	(2.04)	(2.08)	(2.05)	(2.05)	(2.06)	(2.79)
Editor effects	✓	✓	✓	✓	✓	✓
Year effects	✓	✓	✓	✓	✓	✓
Institution effects	✓	✓	✓	✓	✓	✓
JEL effects						✓
No. observations	2,626	2,610	2,626	2,626	2,626	1,281

Econometrica

- 5–9 months longer in peer review

Energy Economics

- 27–29 days longer in peer review
- More revision rounds & referee reports
- Desk rejected at higher rates

Conclusions for academia

Implications for measuring productivity

- Women may produce better quality output…
- But quality costs time, so women produce less.
- Women appear less productive than they actually are.

"Publishing Paradox" may not be so paradoxical…

Quantity vs. quality tradeoff elsewhere…

1. Lower quantity
   - Female academics publish fewer academic articles (Ceci et al., 2014).
   - Female physicians see fewer patients (Bloor et al., 2008) and submit fewer grant proposals (Waisbren et al., 2008; Gordon et al., 2009).
   - Female novelists produce less non-fiction output (Crozier, 1999).
   - Female reporters write fewer front-page bylines (Klos, 2014).
   - Female real estate agents list fewer homes (Trulia.com, 2011).
2. (Unrewarded) Higher quality

Quantity vs. quality tradeoff elsewhere…

1. Lower quantity
2. (Unrewarded) Higher quality
   - Female students earn better grades (Voyer and Voyer, 2014).
   - Female auditors are more accurate and efficient (Chung and Monroe, 2001; O'Donnell and Johnson, 2001; Niskanen et al., 2011; Ittonen et al., 2013).
   - Congresswomen secure more federal funding for their districts, sponsor more legislation and score higher on a composite measure of legislative effectiveness (Anzia and Berry, 2011; Volden et al., 2013);
   - Houses listed by female real estate agents sell for higher prices (Salter et al., 2012; Seagraves and Gallimore, 2013);
   - Patients treated by female physicians are less likely to die or be readmitted to hospital (Tsugawa et al., 2017).
   - Female pilots are involved in fewer fatal accidents (Vail and Ekman, 1986; Bazargan and Guzhva, 2011).

Conclusions beyond academia

Modified "Lucas Critique" may apply to observational studies of gender differences

- May explain lower female productivity in a variety of high-skilled professions, *e.g.*, female lawyers (Azmat and Ferrer, 2017).
- Suggests wage equations that control for unadjusted performance indicators may underestimate labour market discrimination.
- Efforts to increase female productivity (flexible hours, sharing household responsibilities) will have a limited effect on breaking the "glass ceiling".

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APPENDIX

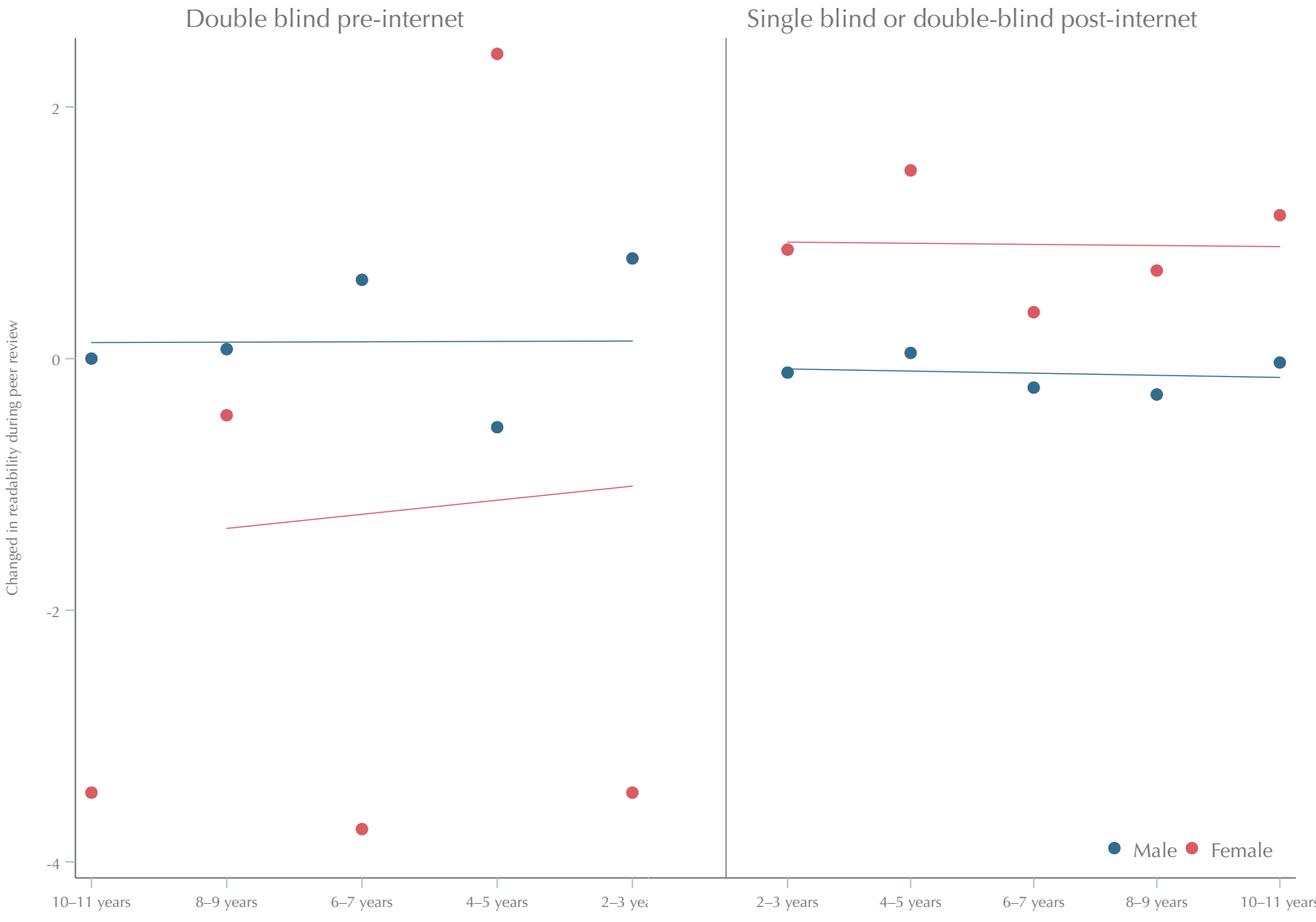
Double-blind review

	Flesch Reading Ease	Flesch-Kincaid	Gunning Fog	SMOG	Dale-Chall
Non-blind	0.93	0.43**	0.41**	0.23*	0.12**
	(0.60)	(0.19)	(0.20)	(0.12)	(0.05)
Blind	-1.51	-0.56	-0.54	-0.36	-0.13
	(3.05)	(0.70)	(0.82)	(0.59)	(0.18)
Difference	2.44	1.00	0.95	0.59	0.25
	(3.14)	(0.75)	(0.87)	(0.61)	(0.18)
Editor effects	✓	✓	✓	✓	✓
Journal effects	✓	✓	✓	✓	✓
Journal×Year effects	✓	✓	✓	✓	✓
Quality controls	✓[3]	✓[3]	✓[3]	✓[3]	✓[3]
Native speaker	✓	✓	✓	✓	✓

Notes. Sample 1,988 NBER working papers; 1,986 published articles. Standard errors clustered by year in parentheses. Quality controls denoted by ✓[3] includes max. t_j, only. ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

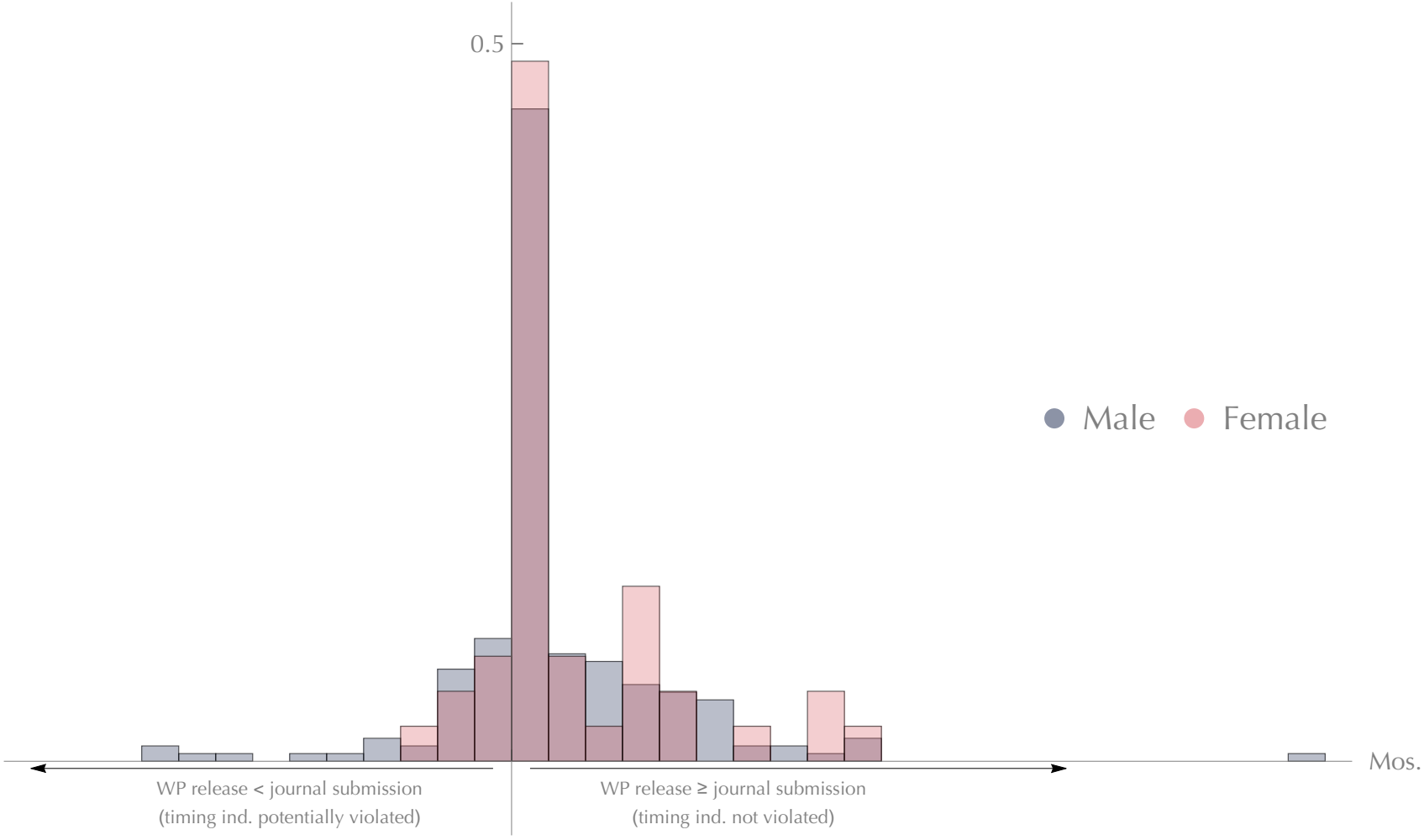
No significant gap under double-blind review

Double-blind review



causal impact of peer review

Timing independence



Female-authored manuscripts are submitted to journals *first*; released as NBER Working Papers *second*.

Are abstract word limits driving results?

	OLS	FGLS			OLS
	Published article	Working paper	Published article	Difference	Change in score
Flesch Reading Ease	0.91	2.29	2.83*	0.54	0.56
	(0.88)	(1.53)	(1.61)	(0.83)	(0.89)
Flesch-Kincaid	0.55**	0.04	0.58*	0.54**	0.54*
	(0.27)	(0.35)	(0.33)	(0.27)	(0.29)
Gunning Fog	0.56**	0.19	0.71**	0.52**	0.53*
	(0.24)	(0.39)	(0.35)	(0.26)	(0.28)
SMOG	0.27*	0.21	0.44*	0.23	0.23
	(0.15)	(0.27)	(0.23)	(0.16)	(0.17)
Dale-Chall	0.23***	0.33***	0.50***	0.17**	0.17**
	(0.09)	(0.12)	(0.12)	(0.07)	(0.08)
Editor effects	✓	✓	✓		✓
Journal effects	✓	✓	✓		✓
Year effects	✓	✓	✓		
Journal × Year effects	✓	✓	✓		✓
Quality controls	✓[2]	✓[2]	✓[2]		✓[3]
Native speaker	✓	✓	✓		✓

Notes. Sample 1,067 NBER working papers; 1,065 published articles. ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

causal impact of peer review

Sample restricted to abstracts below journals' official word limits

No meaningful impact

- Sample size is smaller.
- Coefficients and standard errors are generally larger.

Accounting for field

	OLS	FGLS		
	Published article	Working paper	Published article	Difference
Flesch Reading Ease	1.32**	2.80***	3.68***	0.88
	(0.58)	(1.04)	(1.17)	(0.59)
Flesch-Kincaid	0.55***	0.46*	0.90***	0.44**
	(0.18)	(0.24)	(0.30)	(0.20)
Gunning Fog	0.51***	0.53**	0.92***	0.39*
	(0.18)	(0.24)	(0.32)	(0.21)
SMOG	0.29**	0.39***	0.60***	0.21
	(0.12)	(0.15)	(0.19)	(0.13)
Dale-Chall	0.14***	0.32***	0.42***	0.10*
	(0.05)	(0.10)	(0.10)	(0.05)
Editor effects	✓	✓	✓	
Journal effects	✓	✓	✓	
Year effects	✓	✓	✓	
Journal×Year effects	✓	✓	✓	
Quality controls	✓[2]	✓[2]	✓[2]	
Native speaker	✓	✓	✓	
JEL (primary) effects	✓	✓	✓	

Notes. Sample 1,505 NBER working papers; 1,503 published articles. ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

Adding field controls does not change results.

Causal impact of discrimination: evidence (II)

- Determine whether conditions 1 and 2 hold for one member in each matched pair.
- If so, then discrimination is present within that matched pair.
- If not, then my test for discrimination is inconclusive.

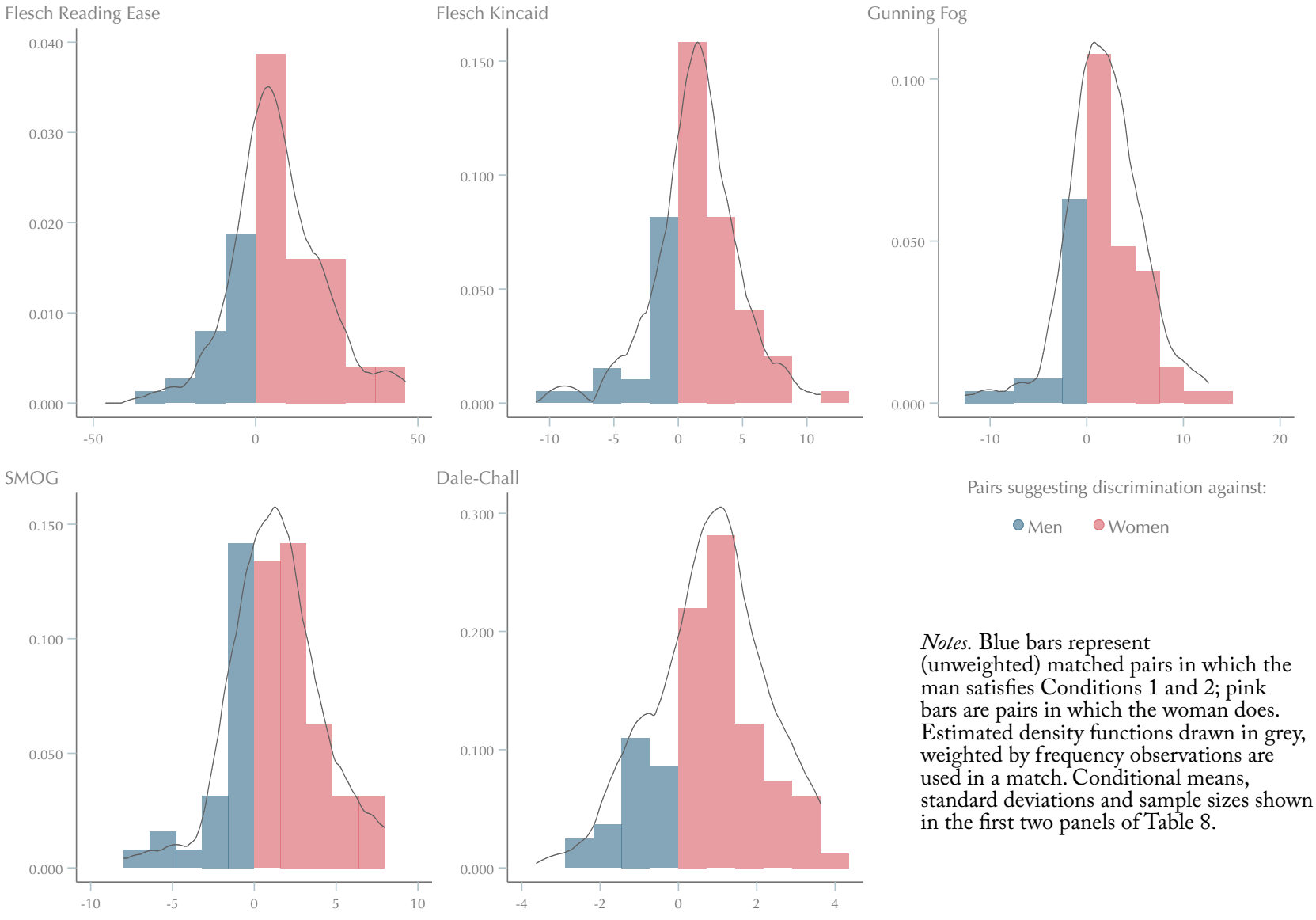
$\underline{D}_{ik}$, **??**

	Discrimination against women ($\underline{D}_{ik} > 0$)			Discrimination against men ($\underline{D}_{ik} < 0$)			Mean, all observations	
	Mean	S.D.	*N*	Mean	S.D.	*N*	(1)	(2)
Flesch Reading Ease	13.19	10.96	59	-7.75	7.85	23	4.85***	3.67***
							(1.12)	(1.21)
Flesch Kincaid	2.85	2.25	60	-2.50	2.41	23	0.94***	0.77***
							(0.26)	(0.27)
Gunning Fog	3.42	2.83	58	-2.58	2.73	23	1.20***	0.95***
							(0.30)	(0.33)
SMOG	2.74	1.98	51	-1.56	1.82	26	0.81***	0.63***
							(0.22)	(0.23)
Dale-Chall	1.38	0.92	63	-1.03	0.68	21	0.57***	0.48***
							(0.11)	(0.12)

Notes. Sample 121 matched pairs (110 and 121 distinct men and women, respectively). First and second panels display conditional means, standard deviations and observation counts of $\underline{D}_{ik}$ (**??**) from subpopulations of matched pairs in which the woman or man, respectively, satisfies Conditions 1 and 2. Third panel displays mean $\underline{D}_{ik}$ over all observations. To account for the 30–40 percent of pairs for which **??** is inconclusive, (1) sets $\underline{D}_{ik} = 0$, while (2) sets $\underline{D}_{ik} = \widehat{R}_{i3} - \widehat{R}_{k3}$ if $\widehat{R}_{i3} < \widehat{R}_{k3}$ (*i* female, *k* male) and zero, otherwise. Male scores are subtracted from female scores; $\underline{D}_{ik}$ is positive in panel one and negative in panel two. $\underline{D}_{ik}$ weighted by frequency observations are used in a match; degrees-of-freedom corrected standard errors in parentheses (panel three, only). ***, ** and * statistically significant at 1%, 5% and 10%, respectively.

causal impact of discrimination

Causal impact of discrimination: evidence (II)



Notes. Blue bars represent (unweighted) matched pairs in which the man satisfies Conditions 1 and 2; pink bars are pairs in which the woman does. Estimated density functions drawn in grey, weighted by frequency observations are used in a match. Conditional means, standard deviations and sample sizes shown in the first two panels of Table 8.