

Information Inequality

Gender Gaps in Knowledge

Molly M. King

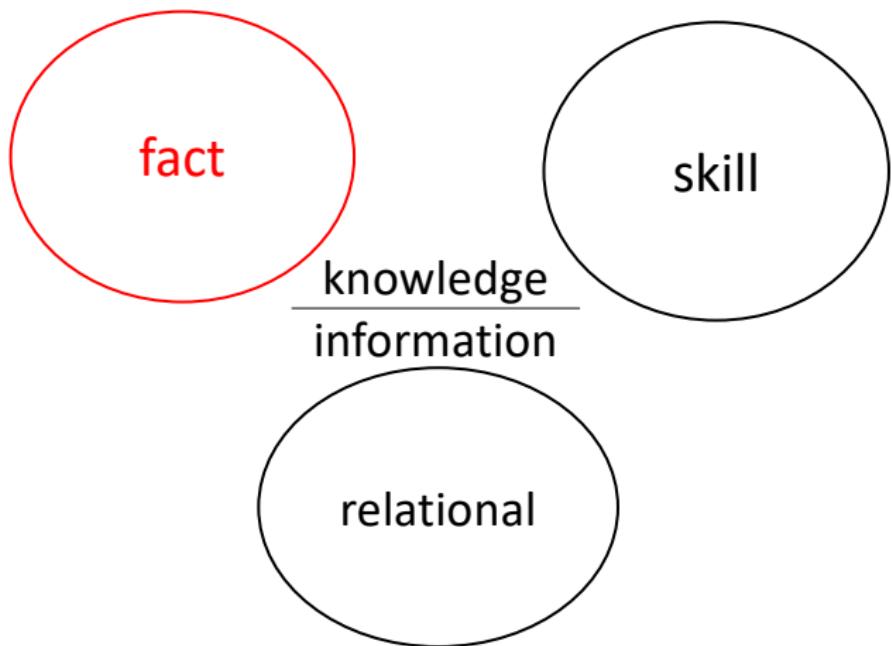
Santa Clara University

August 11, 2019



(Related theory: Hidalgo 2015, Simon 1971 | Cartoon credit: Loren Fishman | cartoonstock.com)

Types of Knowledge



Why care about knowledge inequality?

- A virtue in itself

(Crisp 2015)

Why care about knowledge inequality?

- A virtue in itself
- Access to resources, outcomes, capabilities

(Weber [1922]1968, DiMaggio 1987, Ridgeway 2014,
Lareau 2002, Lareau 2003, Sen 1992, Nussbaum 2011)

Why care about knowledge inequality?

- A virtue in itself
- Access to resources, outcomes, capabilities
- Outcome of unequal social status

Research Questions

Is there a gender gap in knowledge?

Does the gender gap in knowledge vary by domain?

What social process(es) explain(s) this gap?

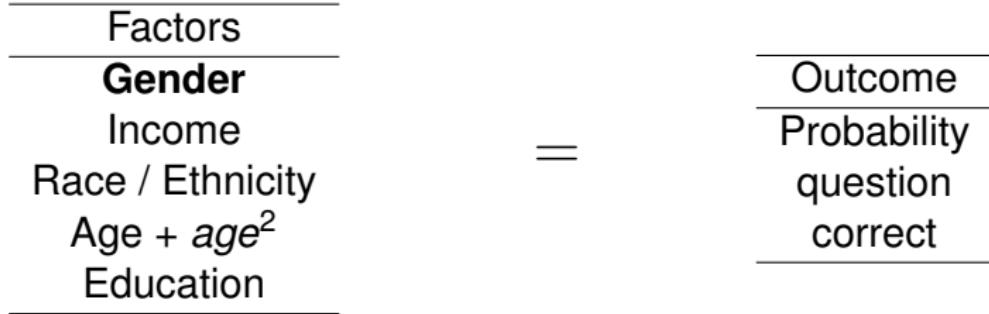
Datasets Gathered

Data Source	No. Datasets	No. Questions
Chicago Survey of Amer. Public Opinion	1	2
General Social Survey	5	40
Global Views American Public Opinion	1	2
Health Information National Trends Survey	7	125
Integrated Health Interview Series	1	12
Kaiser Family Foundation	1	7
National Financial Capability Studies	3	16
National Politics Study	1	5
Outlook on Life Survey	1	6
Pew Research Center	20	222
Rand American Life Panel	2	24
USC's Understanding America Study	3	48
21st Century Americanism survey	1	4
Total	48	513

Knowledge Domains (Categories)

- biological science
- current events
- domestic politics
- economics
- finance
- foreign politics
- geography
- health
- language
- math
- natural world
- physical science
- religion
- social science
- technology
- war

Logistic Regression (x 513)

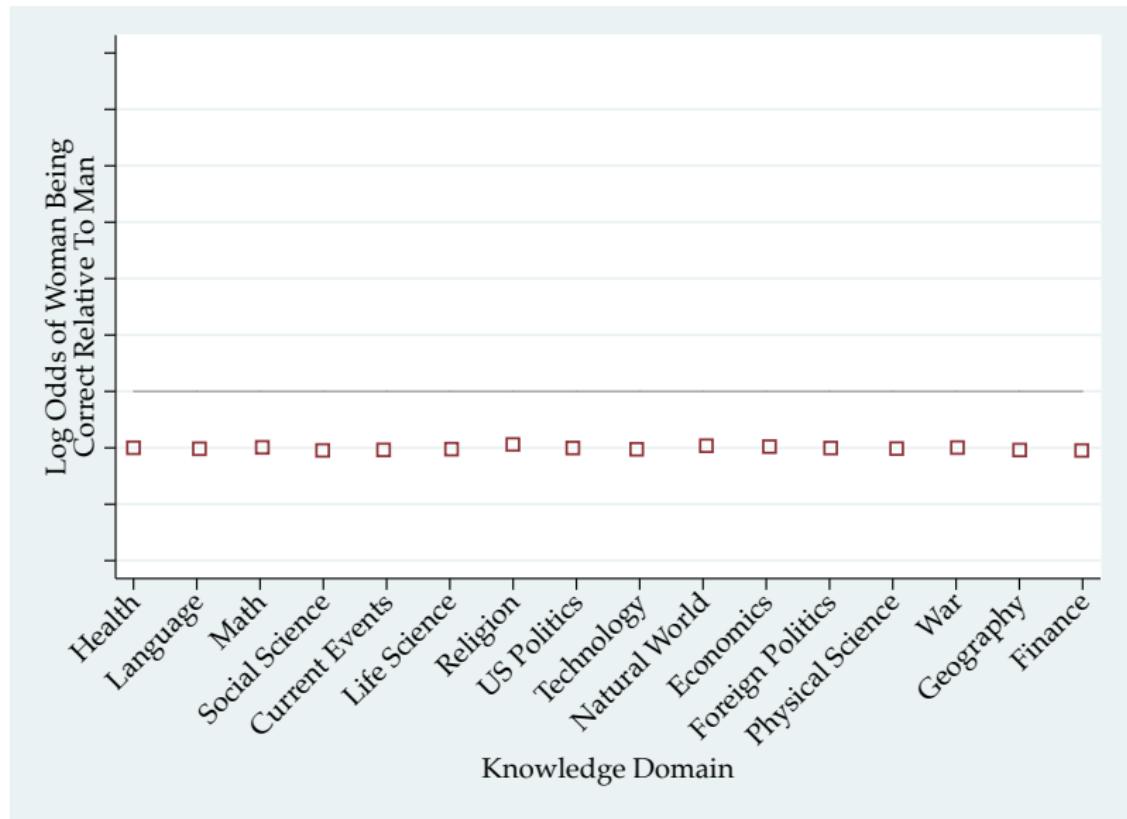


Hypothesis: Question Maker Bias

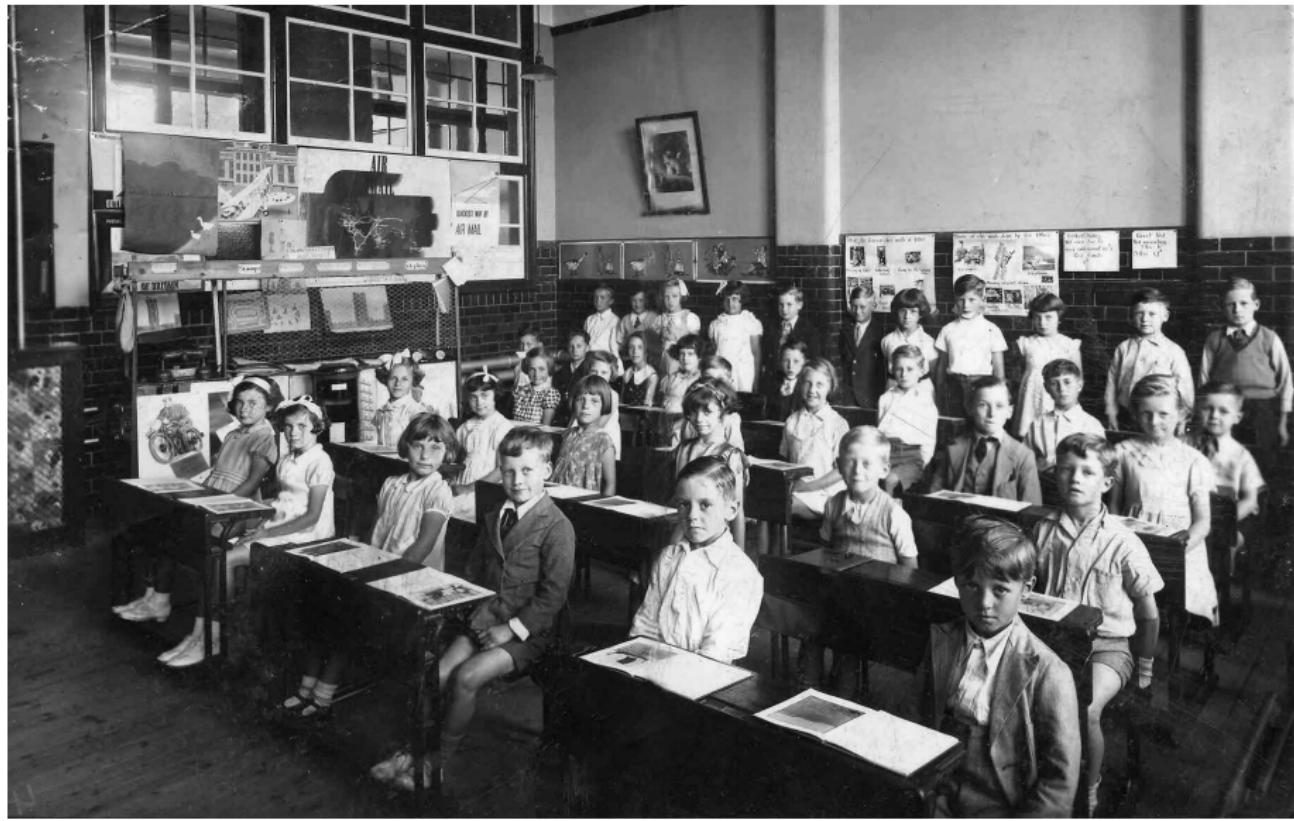


(Photo credit: Wellcome Images)

Hypothesis: Question Maker Bias

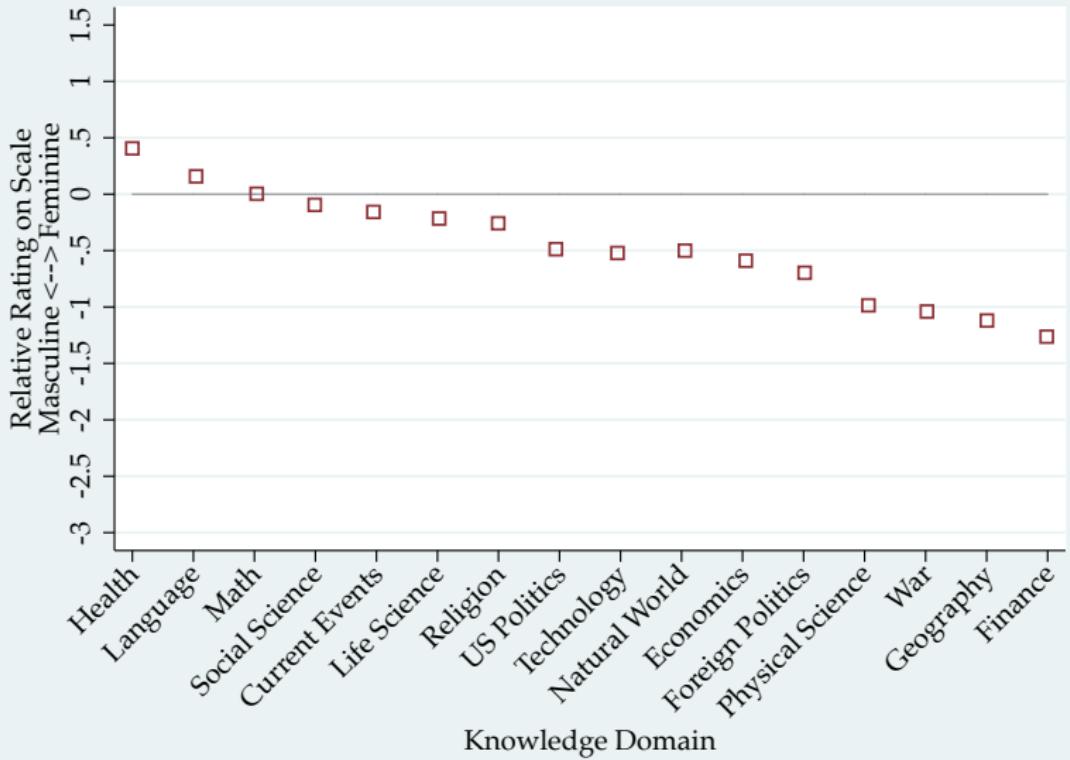


Hypothesis: Socialized Essentialism

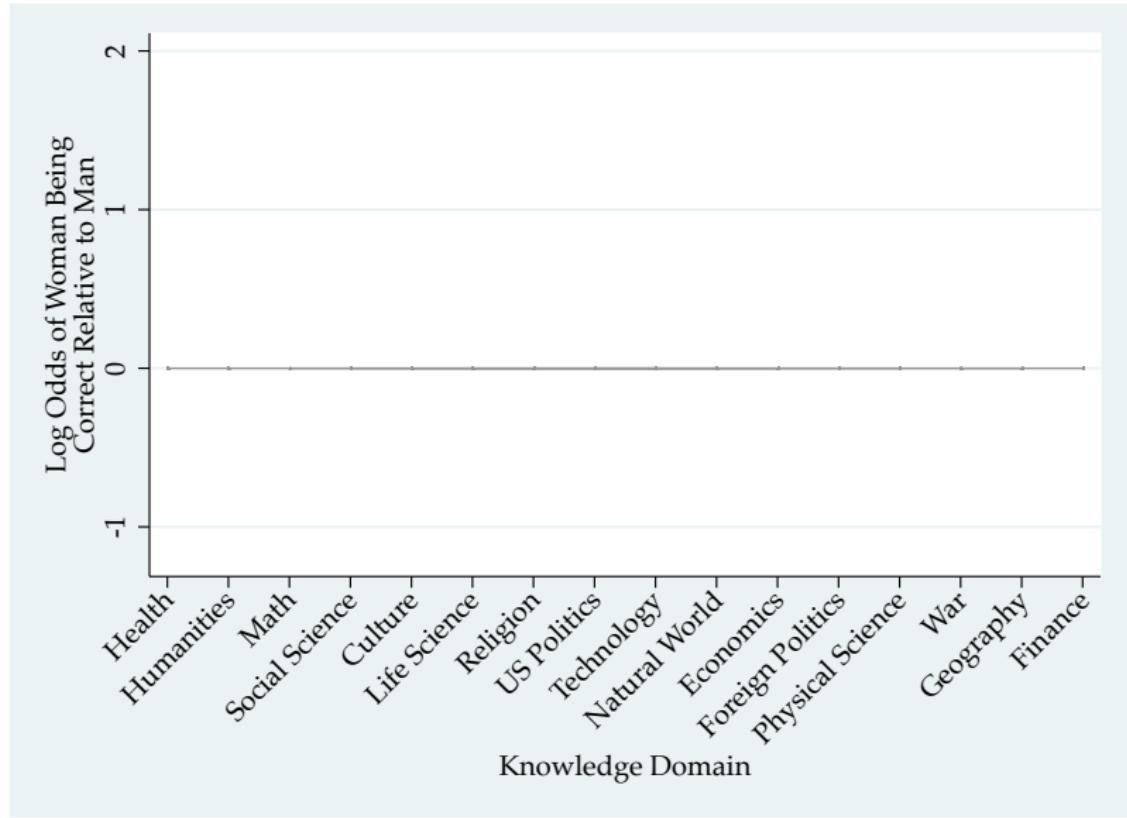


(Related theory: Ridgeway 2006, West 1987, Cech 2013, Charles 2009 | Photo credit: Medium.com)

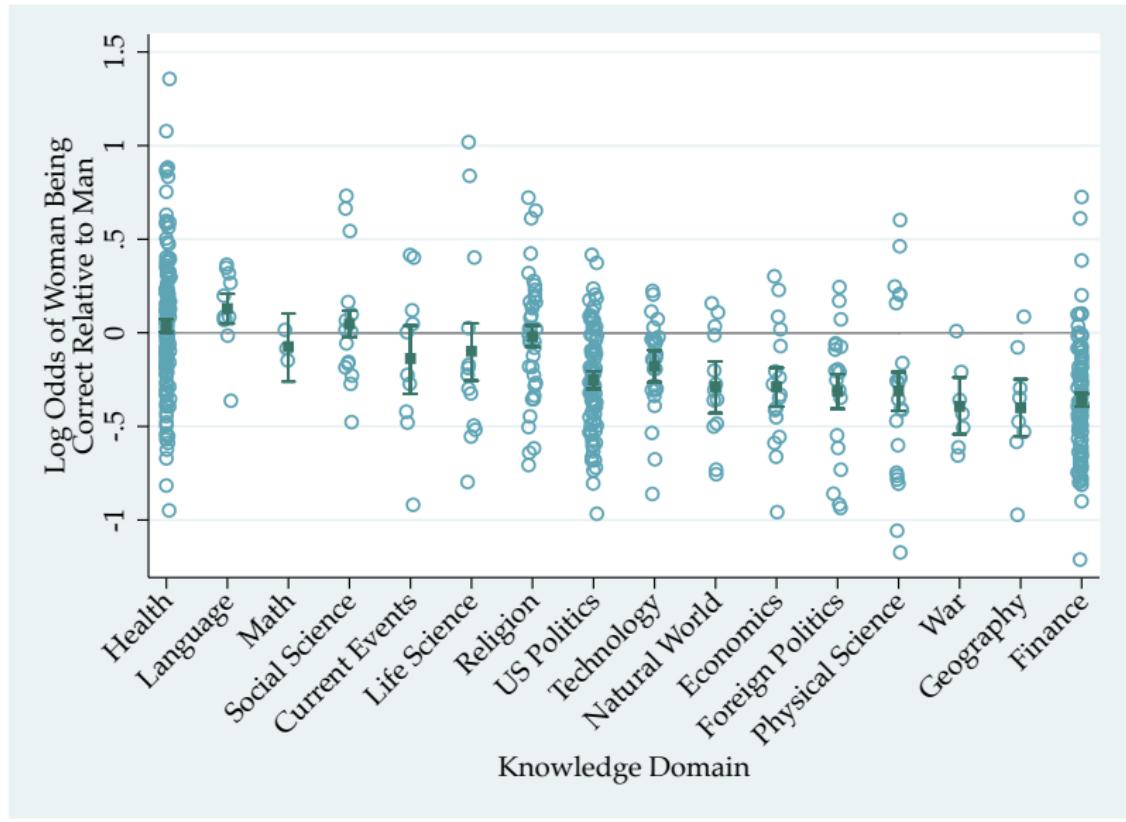
Hypothesis: Socialized Essentialism



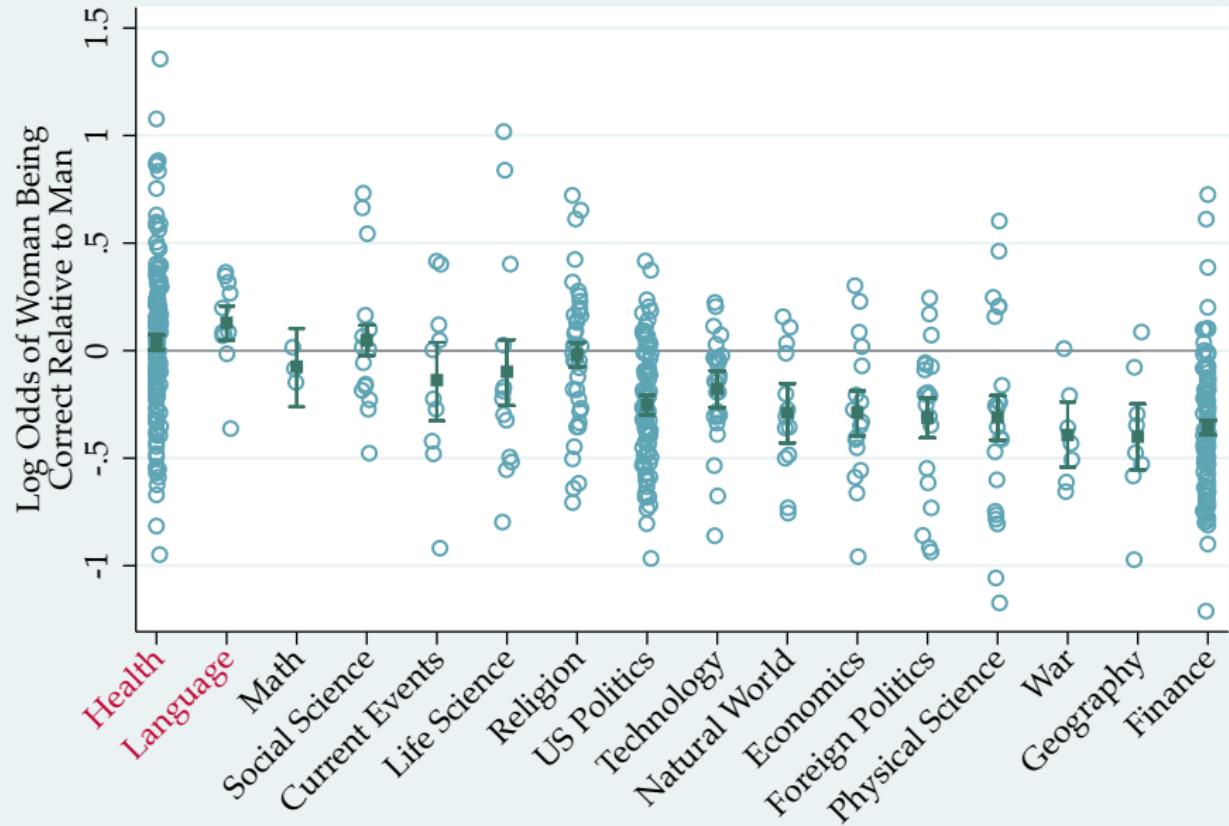
Domains Across X-Axis



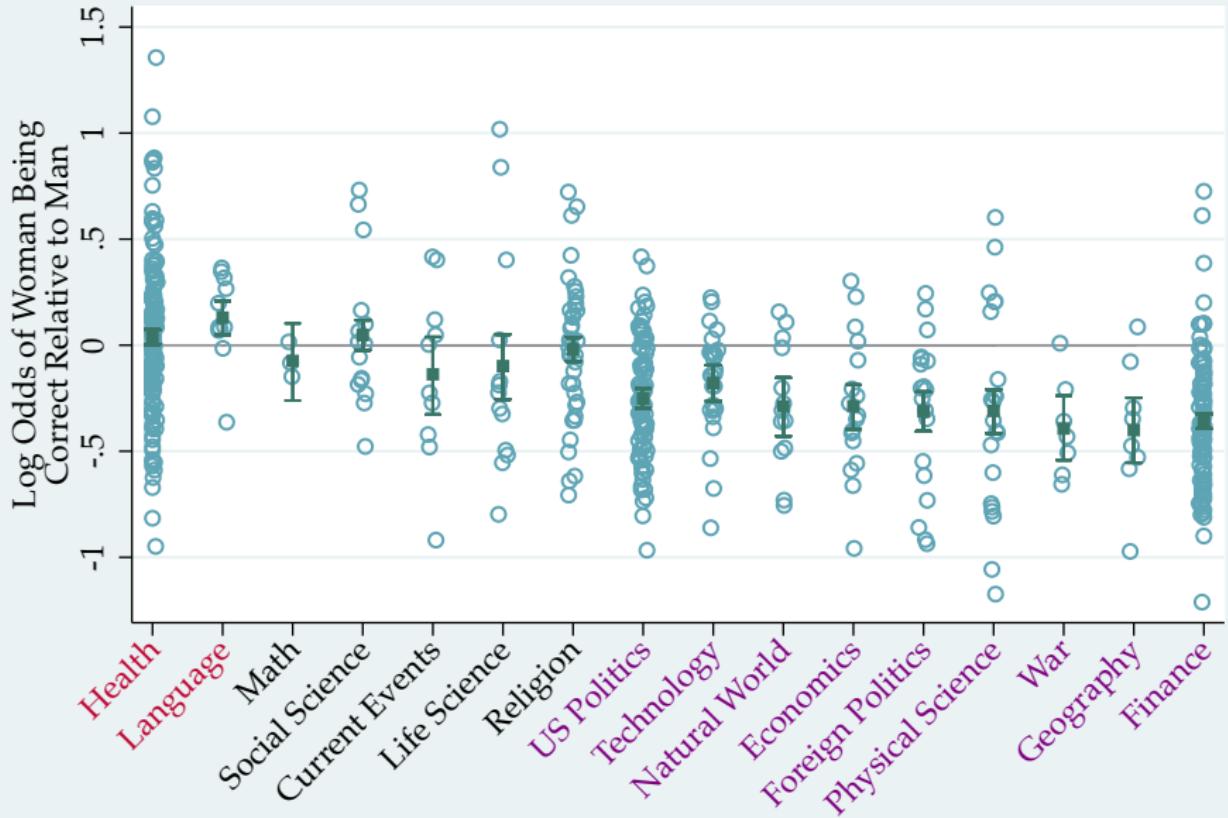
Each Circle is a Question



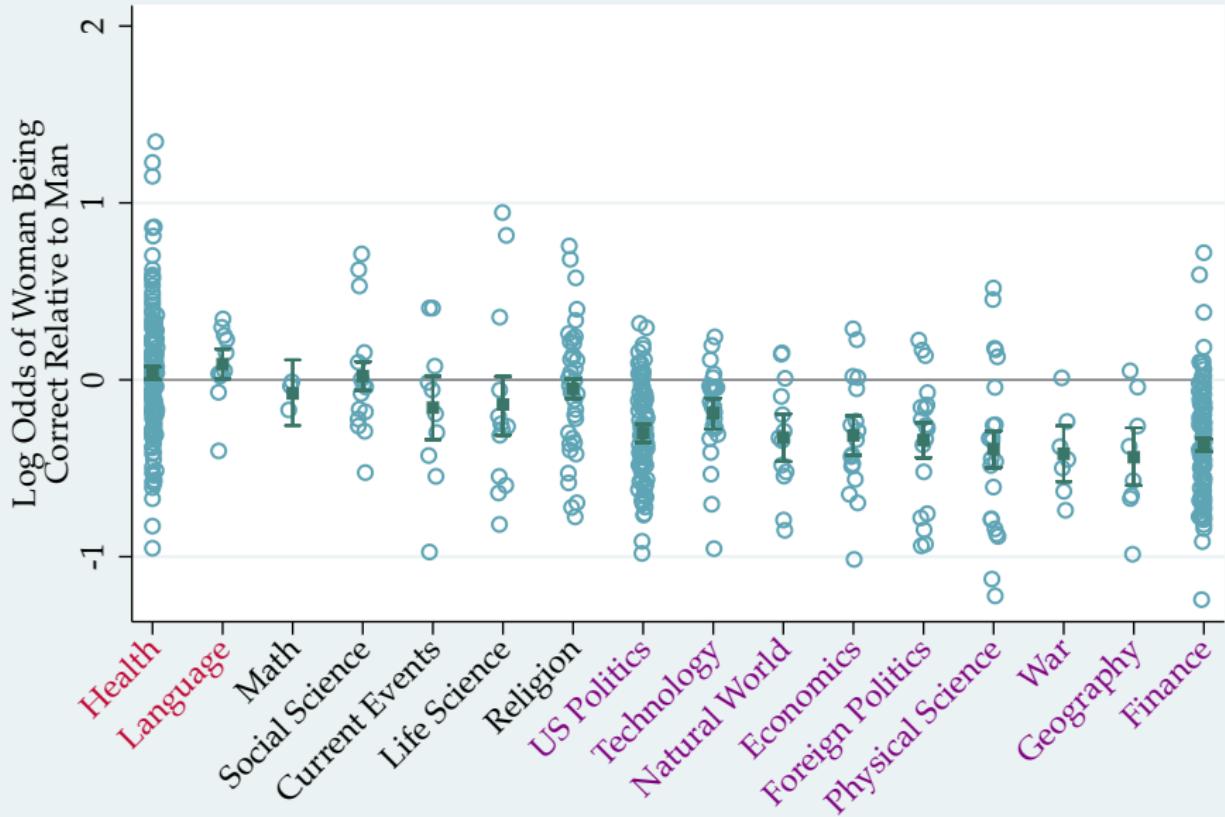
No mean gender difference in 5/16 domains



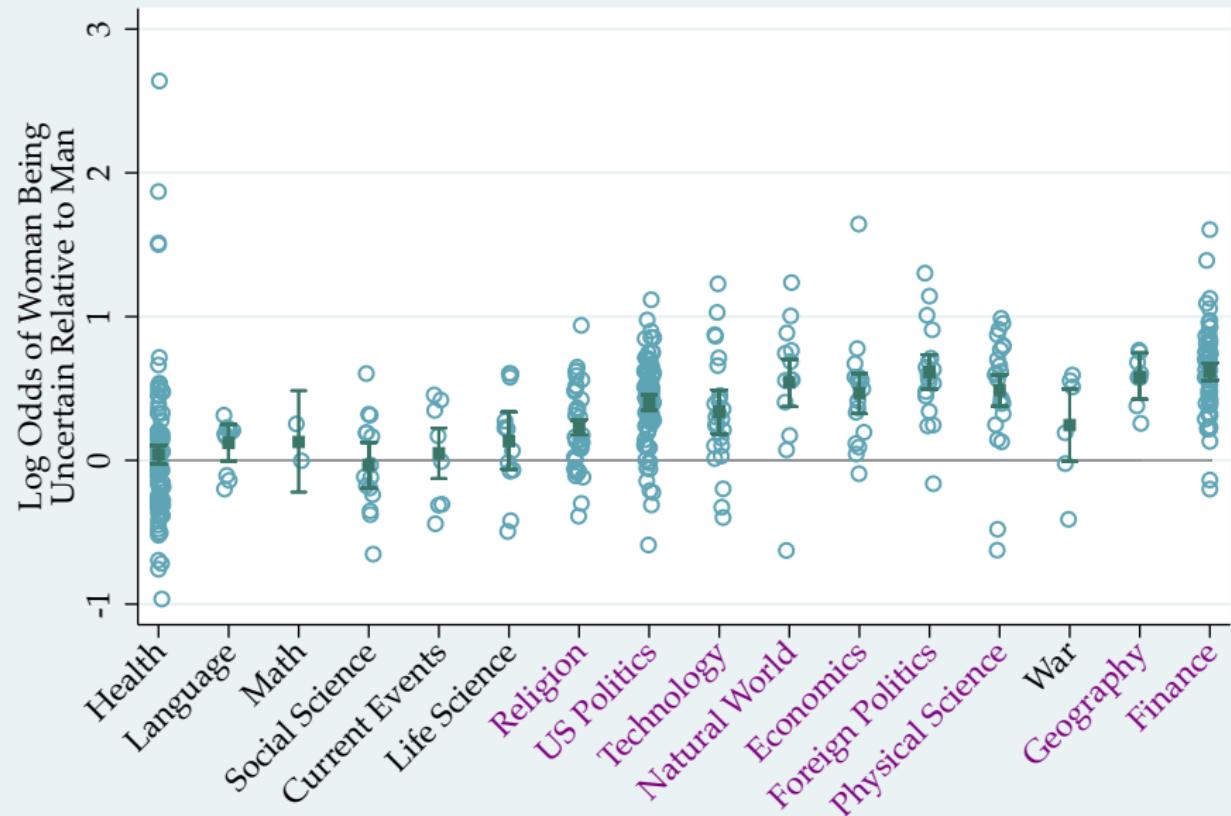
Men have greater knowledge in 9/16 domains



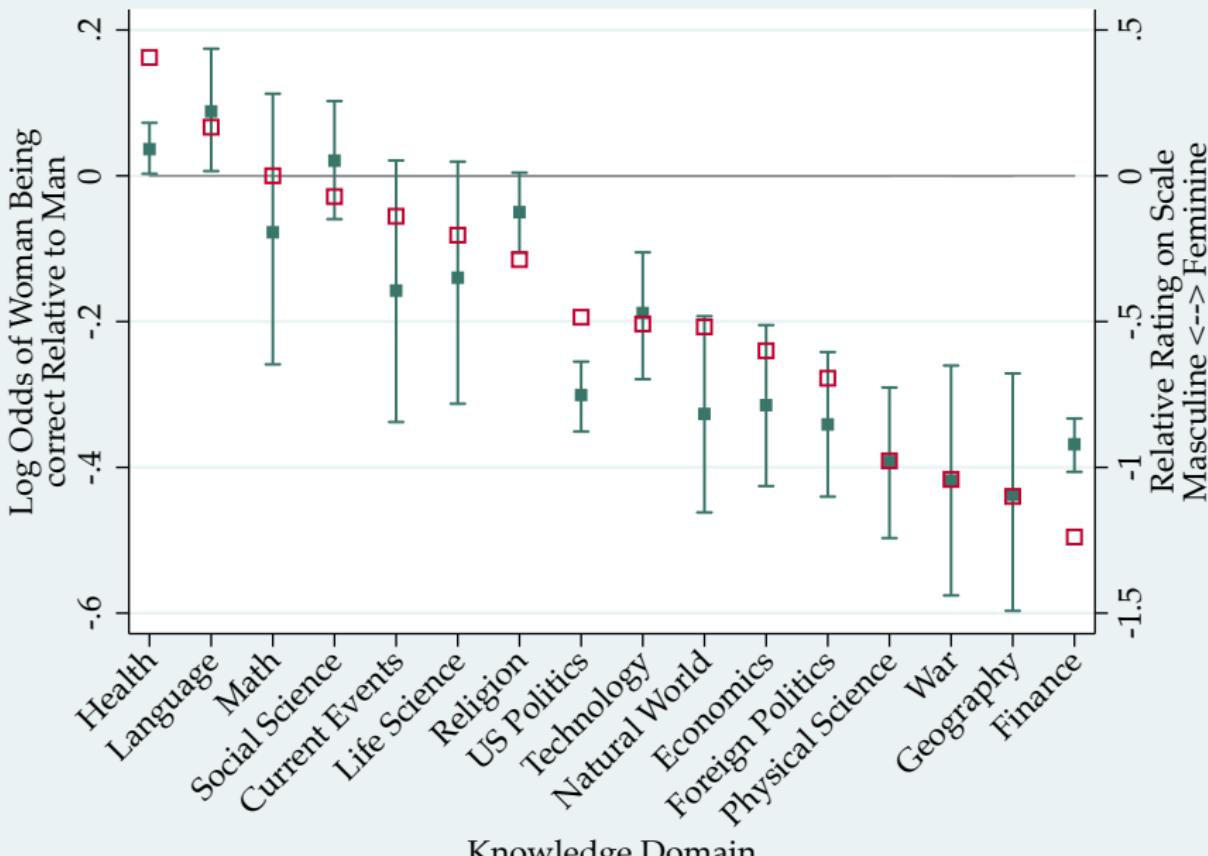
Result holds when controlling for education



Women answer more questions “don’t know”



Results: Socialized Essentialism



Thank You

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Supplemental Slides

- Theory: Status Differences

Methods

- Data Search & Selection
- Data Sources
- Data Structure
- Logit Details
- Multiple Comparisons
- Confidence Interval Simulations
- My Survey on Gendered Perception of Knowledge Questions
- Model for Don't Know Responses by Gender
- Adjusting for the Guessing Gap

Results

- Mean significance vs. Question significance (3 slides)
- Proportion of Don't Know Responses by Gender
- Proportion of Population Correct by Domain
- Proportion of Population Don't Know by Domain

Other Research

- Gender & Self Citation: Proportions
- Gender & Self Citation: Ratio

Information & Status Differences

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Data Search & Selection

Databases searched:

- ICPSR – 4,581 surveys reviewed
- Data.gov – 1,117 surveys reviewed

Inclusion criteria:

- survey search includes the term “knowledge”
- years 2005 – 2015
- U.S. nationally representative on race, gender, age

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Data Structure

sC_earthsun	Linearized				
	Odds Ratio	Std. Err.	t	P> t	
female	.4518979	.0450369	-7.97	0.000	
race_hisp	.7261311	.150449	-1.17	0.243	
race_black	.3949817	.0374355	-9.80	0.000	
race_asian	1.91988	.0824735	+17	0.000	
race_other	.7465925	.0794548	-2.75	0.007	
dV_fincG_1k	1.001214	.0005461	2.22	0.027	
edu_HS	1.673856	.000793	9.58	0.000	
edu_someCol	2.300979	.0567248	33.80	0.000	
edu_colPlus	6.263558	.5777689	19.89	0.000	
_cons	3.218947	.2726742	13.80	0.000	

DOMAIN	Literature		Science		
STATUS	L1	L2	S1	S2	S3
Gender (G)	GL1	GL2	GS1	GS2	GS3
Class (C)	CL1	CL2	CS1	CS2	CS3
Race (R)	RL1	RL2	RS1	RS2	RS3

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Logit Details

Factors	=	Outcome
Gender		Probability
Income		that you get
Race / Ethnicity	x 513	the question
Age + age^2		correct
Education		

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Adjusting for Multiple Comparisons

<u>P-VALUE</u>	<u>INTERPRETATION</u>
0.001	
0.01	
0.02	HIGHLY SIGNIFICANT
0.03	
0.04	
0.049	SIGNIFICANT
0.050	OH CRAP. REDO CALCULATIONS.
0.051	
0.06	ON THE EDGE OF SIGNIFICANCE
0.07	
0.08	HIGHLY SUGGESTIVE, SIGNIFICANT AT THE $p < 0.10$ LEVEL
0.09	
0.099	HEY, LOOK AT
≥ 0.1	THIS INTERESTING SUBGROUP ANALYSIS

Confidence Interval Simulations

Draw 1000 repetitions from a standard normal distribution, generate a distribution of 1000 possible coefficients for each knowledge question:

$$\hat{\beta}_i = \beta + (SE * x_i),$$

where $x_i \sim N(0, 1)$.

Order all $\hat{\beta}_i$ such that

$$\hat{\beta}_i \leq \hat{\beta}_{i+1}$$

Find value of $\hat{\beta}_i$ at the 2.5th percentile and the 97.5th percentile.

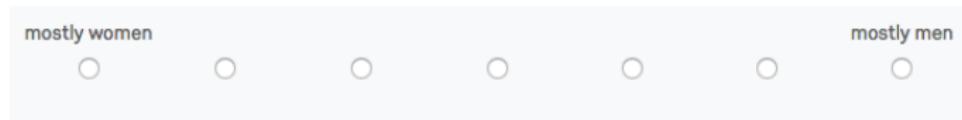
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My Survey: Gendered Perception of Knowledge Questions

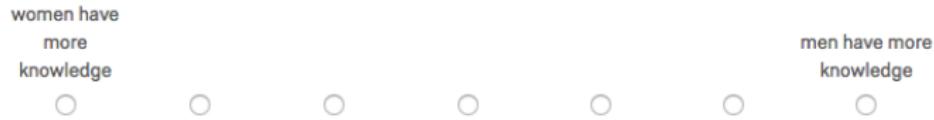
- Who mostly watches news about X?



- Who mostly talks to their friends about X?



- Who do most people in our society think has more knowledge about X?



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Adjusting for the Guessing Gap

Upper Bound:

$$\text{ceiling}_W = C_W + \left(\frac{C_W}{C_W + W_W} \right) D_W$$

which simplifies to

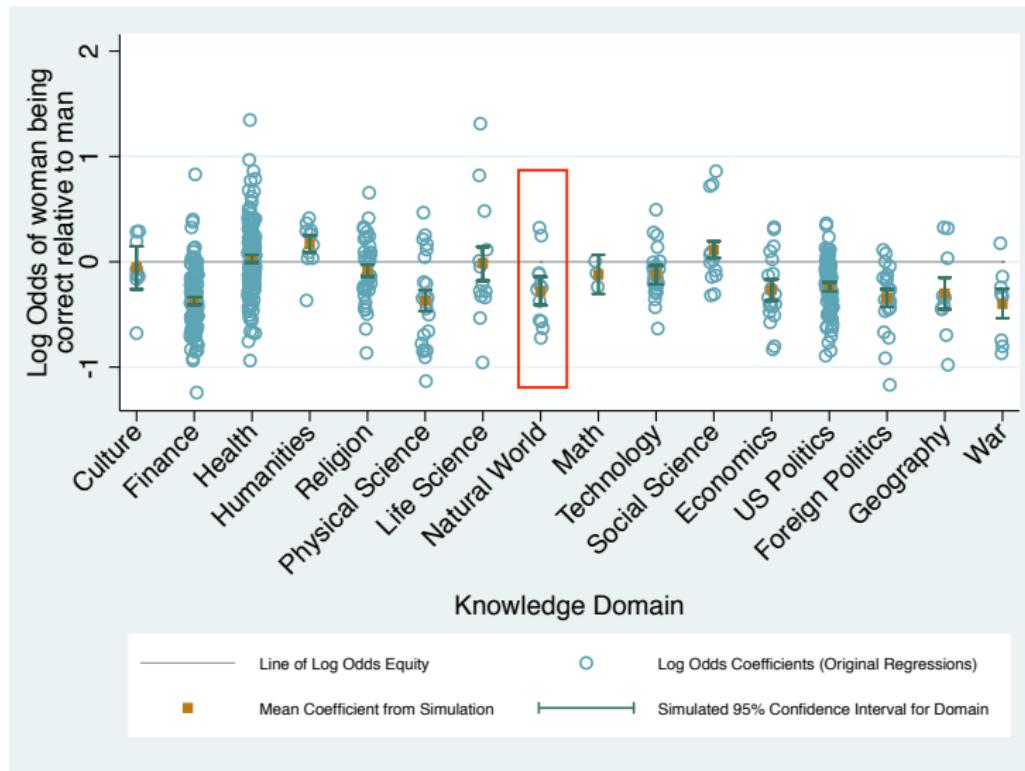
$$= C_W + (C_W * D_W).$$

Lower Bound:

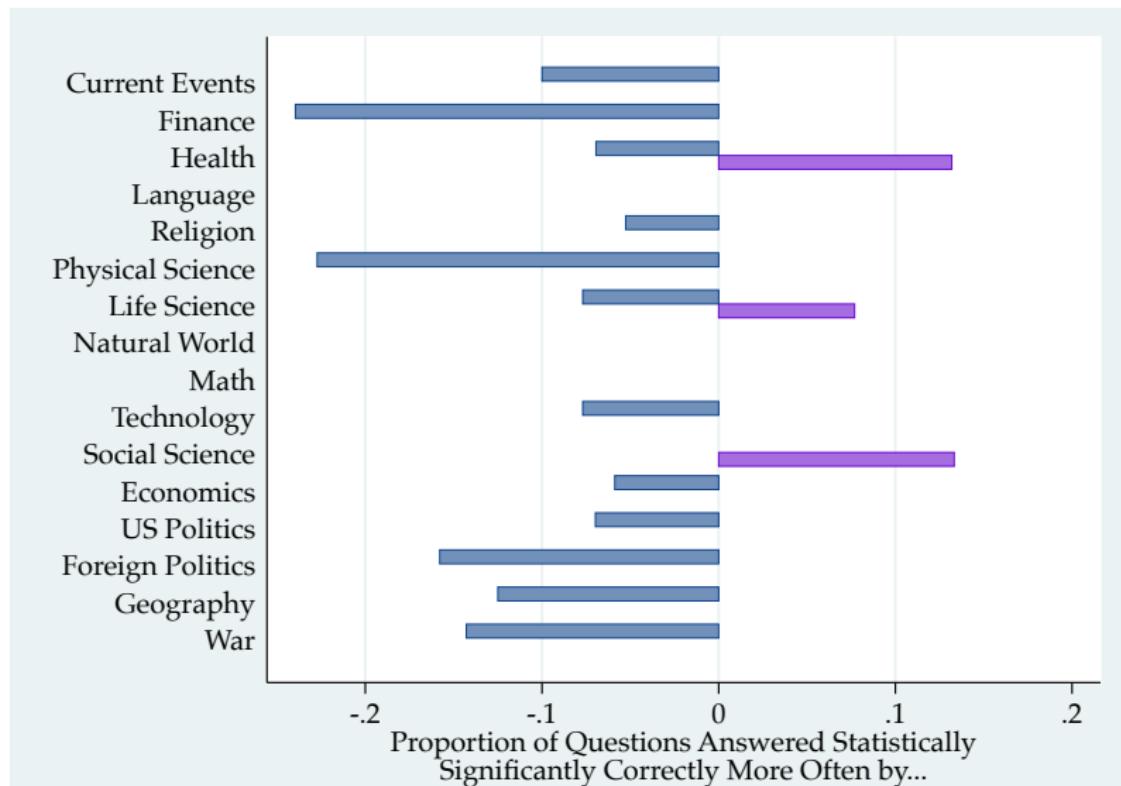
$$\text{floor}_W = C_W + \left(\frac{1}{K_Q} \right) D_W$$

(Back)

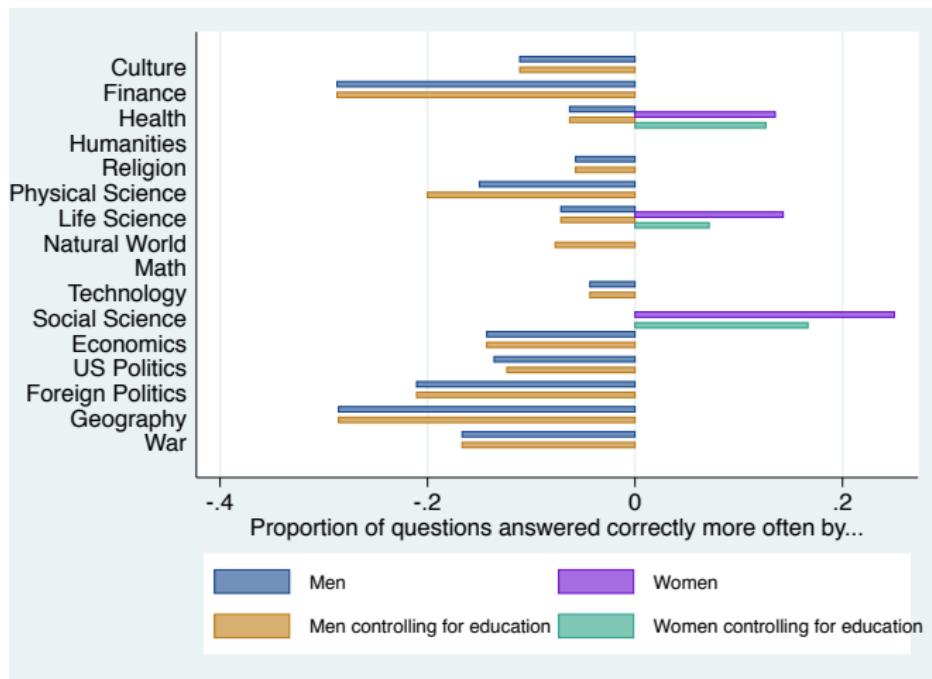
Mean significance vs. Question significance



Men answer greater proportion of questions correctly in 65% of domains



Controlling for education, men answer greater proportion of questions correctly in 63% domains



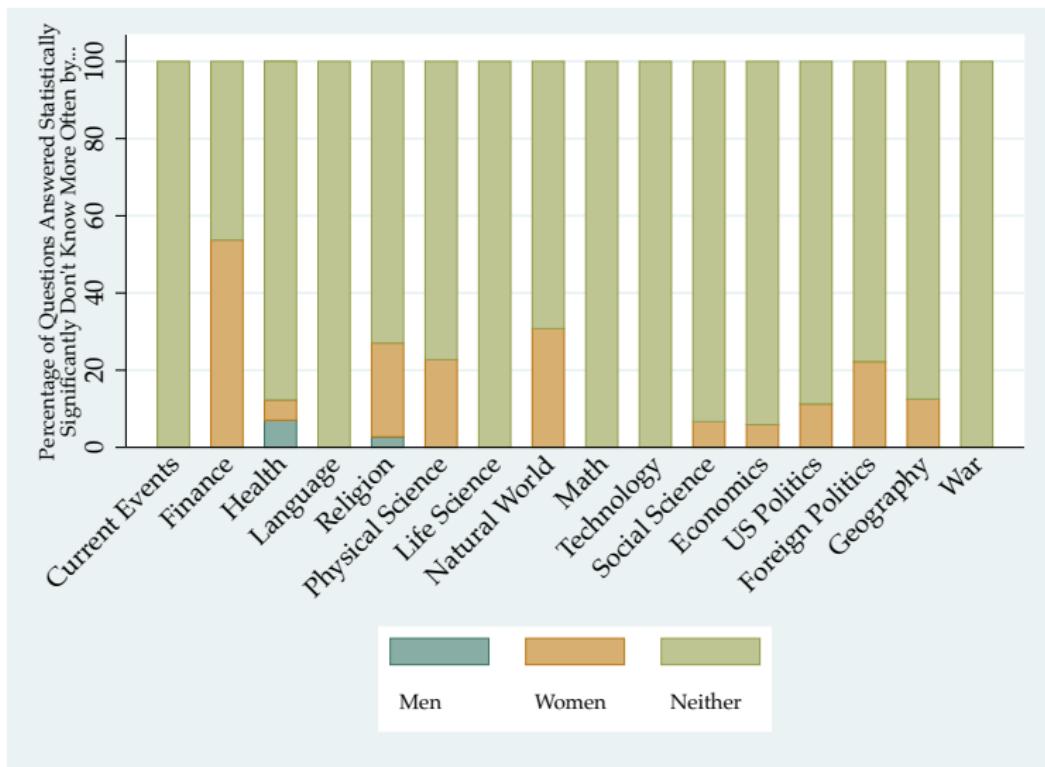
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“Don’t Know” Model

$$\begin{array}{c} \text{Factors} \\ \hline \text{Gender} \\ \text{Income} \\ \text{Race / Ethnicity} \\ \text{Age} + \text{age}^2 \\ (\text{Education}) \end{array} = \begin{array}{c} \text{Outcome} \\ \hline \text{Probability} \\ \text{that you} \\ \text{answer} \\ \text{“don’t know”} \end{array}$$

(Back)

Controlling for education, women answer greater proportion of questions “don’t know”



Research Questions

How much factual knowledge do U.S. adults know and say they 'don't know'?

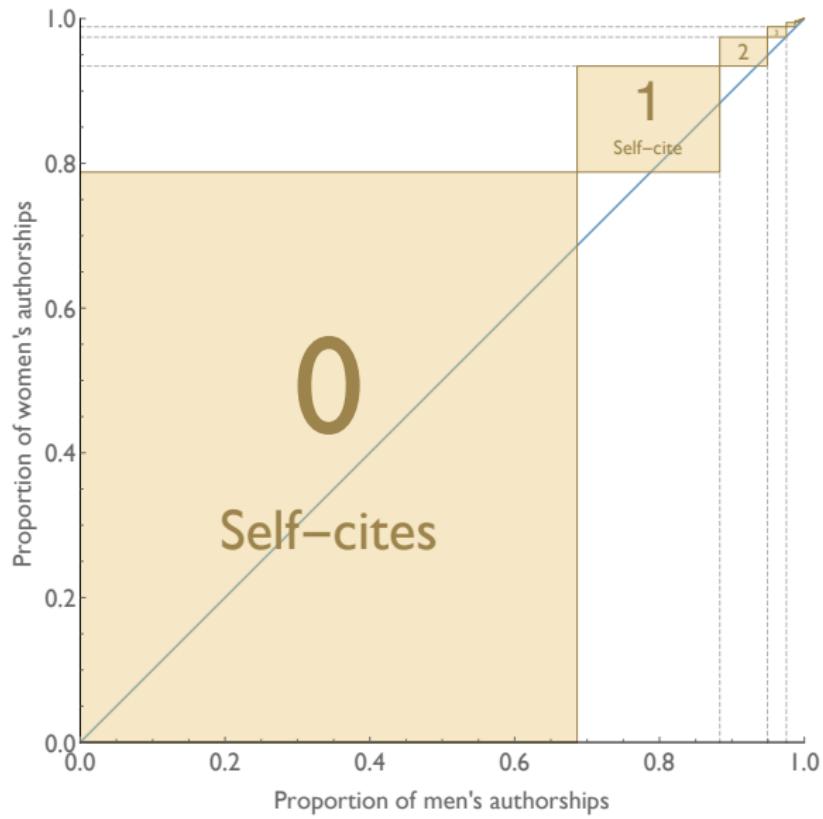
Proportion of population answering correctly



Proportion of population answering 'don't know'



Gender & Self Citation: Proportion with Self Citation



Gender & Self Citation: Ratio

Ratio M:W

