Do Optional Information Policies Increase Equity? Evidence From Two Large-Scale Grading Experiments

Christine L. Exley [1] Raymond Fisman [2] Judd B. Kessler [3] Louis-Pierre Lepage [4]
Xiaomeng Li [5] Corinne Low [3] Xiaoyue Shan [7] Mattie Toma [6] Basit Zafar [5]

[1]Harvard Business School

[2]Boston University

[3]The Wharton School, University of Pennsylvania

[4]Stockholm University

[5]University of Michigan

[6]University of Warwick

[7]National University of Singapore

July 25, 2023

Motivation

Why a pass/fail option is a good move for everyone

Opinion by David M. Perry
Updated 4:12 PM EDT, Wed March 18, 2020

March 18, 2020

#PassFailNation

As classes move online, some colleges are choosing to go pass/fail to relieve student stress. Is that the right move?

By [redacted]

[redacted] "We had a conversation about do we allow it at the course-level decision, but all the same questions we would ask if everybody did it would have to be asked if only a handful did it."

COLUMBIA UNIVERSITY

Columbia Dumps SAT Admissions Requirement for Good

Harvard, Cornell, Yale, Princeton, Penn and NYU are test-optional for now, but their policies have expiration dates

By Tom Shea • Published March 2, 2023 • Updated on March 4, 2023 at 5:33 am

The Washington Post
Democracy Dies in Darkness

HIGHER EDUCATION

Harvard won't require SAT or ACT through 2026 as test-optional push grows

The fast-spreading movement aims to limit the role of the standardized exams in college admissions

By Nick Anderson
December 16, 2021 at 7:00 p.m. EST

EDUCATION Higher Education Add Topic +

SAT, ACT testing requirements paused during pandemic are now permanently optional at some colleges

Kayla Jimenez
USA TODAY

Published 5:19 p.m. ET March 2, 2023 | Updated 6:47 p.m. ET March 2, 2023

The New York Times

Pass-Fail Raises the Question: What's the Point of Grades?

This pandemic has surfaced a dilemma frequently ignored: A-F grades are used poorly and for too many different purposes.

June 25, 2020

Motivation

- Persistent gender gaps in pay and representation in the labor market (Lang and Lehmann, 2012; Blau and Kahn, 2017)
- Policy debate: can voluntary information disclosure increase equity?
  - Pandemic brought on a range of test and grade optional policies, many of which are now being made permanent
- Can have disparate and unintended consequences:
  - Employers / admissions increase statistical discrimination (Agan and Starr, 2018)
    - Emerging evidence ambiguity may offer added scope for discrimination (Chan 2022, Kessler, Low, and Shan 2022)
  - Less well-understood: workers / students respond endogenously (Borghesan, 2022)
    - Prior work suggests women are less likely to share successes (Coffman, 2014)

This paper

Investigates equity implications of a grading policy at two US universities, where students could change a letter grade to "Credit" or "No Credit" **after** receiving the final grade:

1. Use administrative transcript records to study differential take-up by gender, and the equilibrium impacts

2. Conduct a complementary experiment with real employers to investigate implications for the labor market

3. Use student survey and employer experiment to try to understand mechanisms

Roadmap

Grade Disclosure Natural Experiment

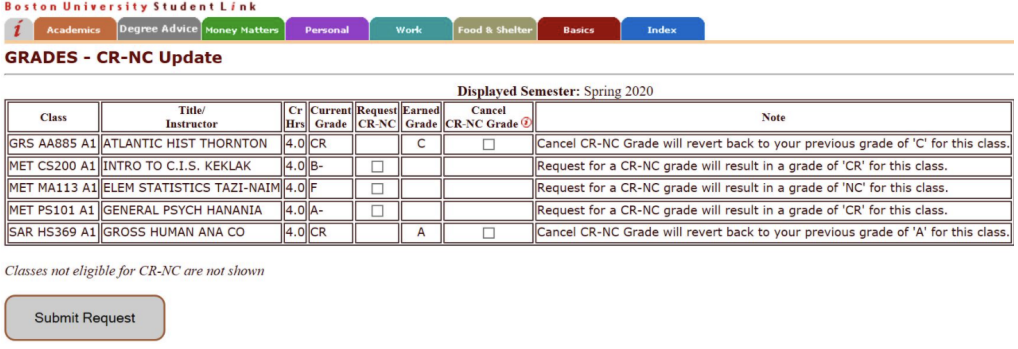
Employer Experiment

Discussion of Mechanisms

Transcript Records

- Meant to mitigate the impact of negative shocks from COVID
  - Boston University: Spring 2020
  - A flagship state university: Fall 2020 and Winter 2021 (Winter announced ex ante)

- At the end of the semester, students given the option of keeping their assigned grades, or switching to "credit" or "no credit"



Boston University Student Link

i Academics | Degree Advice | Money Matters | Personal | Work | Food & Shelter | Basics | Index

GRADES - CR-NC Update

Displayed Semester: Spring 2020

Class	Title/ Instructor	Cr Hrs	Current Grade	Request CR-NC	Earned Grade	Cancel CR-NC Grade	Note
GRS AA885 A1	ATLANTIC HIST THORNTON	4.0	CR		C	☐	Cancel CR-NC Grade will revert back to your previous grade of 'C' for this class.
MET CS200 A1	INTRO TO C.I.S. KEKLAK	4.0	B-	☐			Request for a CR-NC grade will result in a grade of 'CR' for this class.
MET MA113 A1	ELEM STATISTICS TAZI-NAIM	4.0	F	☐			Request for a CR-NC grade will result in a grade of 'NC' for this class.
MET PS101 A1	GENERAL PSYCH HANANIA	4.0	A-	☐			Request for a CR-NC grade will result in a grade of 'CR' for this class.
SAR HS369 A1	GROSS HUMAN ANA CO	4.0	CR		A	☐	Cancel CR-NC Grade will revert back to your previous grade of 'A' for this class.

Classes not eligible for CR-NC are not shown

Submit Request

Transcript Records

- Meant to mitigate the impact of negative shocks from COVID
  - Boston University: Spring 2020
  - A flagship state university: Fall 2020 and Winter 2021 (Winter announced ex ante)
- At the end of the semester, students given the option of keeping their assigned grades, or switching to "credit" or "no credit"
- Two important features:
  1. Students observe their letter grades before deciding which grades to reveal
  2. Faculty submitted letter grades to the registrar, prior to students' decisions
- We thus observe students' grades (relative to their GPA) as well as their decisions of whether to reveal the grade to future schools/employers

Summary statistics

	Boston University		A flagship state university	
	Female	Male	Female	Male
Individual-Term level				
Eligible students	9,148	6,542	30,852	30,025
Used masking	0.378	0.498	0.229	0.331
Cumulative GPA	3.400	3.272	3.635	3.538
Average grade	3.478	3.280	3.628	3.480
Individual-Course level				
Number of grades	37,899	27,191	136,410	127,721
Fraction CR-NR	0.155	0.227	0.076	0.129

Gender gap in use of policy to mask grades

Table: Likelihood of concealing GPA by gender and grade impact

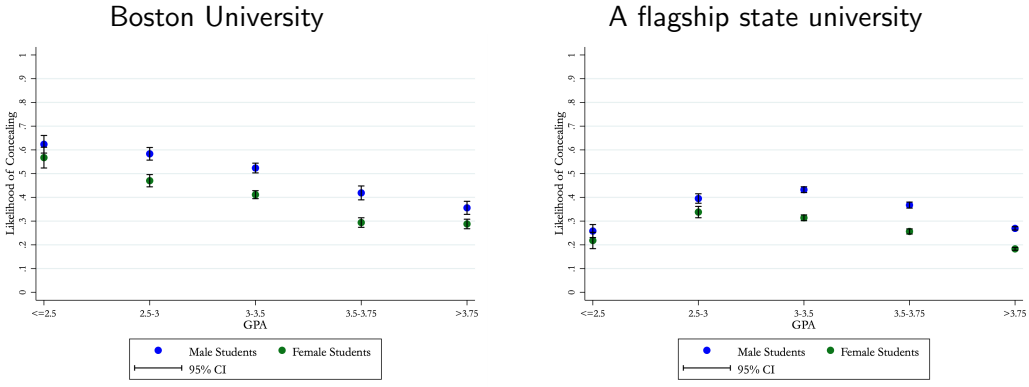
	(1) All	(2) Below GPA	(3) Same as GPA	(4) Above GPA
Panel A: Boston University				
Female	-0.020***			
	(0.003)			
Observations	62,005			
Conceal mean	0.181			
Panel B: A flagship state university				
Female	-0.021***			
	(0.002)			
Observations	222,449			
Conceal mean	0.106			
Controls & FEs				
Controls	Yes			
Major FE	Yes			
Course level FE	Yes			
Year×GPA gains FE	Yes			

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Gap exists across previous GPAs

Figure: Likelihood of concealing at least one grade by gender and GPA before policy

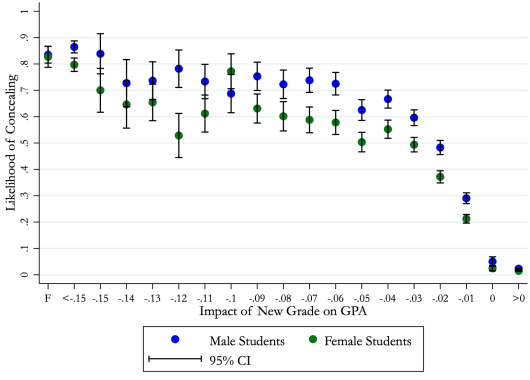


▸ by course grade

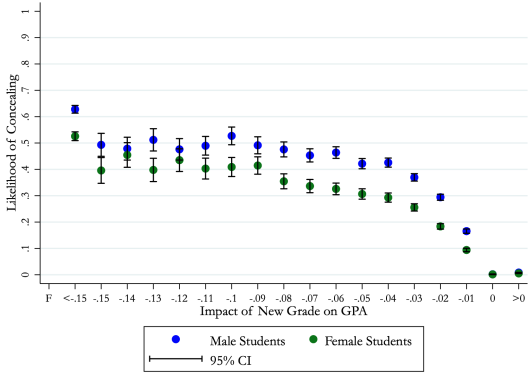
Students conceal when grades bring down their GPA

Figure: Likelihood of concealing at least one grade by gender and impact of new grade on GPA

Boston University



A flagship state university



Gender gap particularly pronounced in masking poor performance

Table: Likelihood of concealing grade by gender and GPA impact

	(1) All	(2) Below GPA	(3) Same as GPA	(4) Above GPA
Panel A: Boston University				
Female	-0.020***	-0.047***	-0.026	-0.006**
	(0.003)	(0.008)	(0.018)	(0.002)
Observations	62,005	19,495	1,248	41,261
Conceal mean	0.181	0.536	0.043	0.018
Panel B: A flagship state university				
Female	-0.021***	-0.061***	0.000	-0.003***
	(0.002)	(0.005)	(0.001)	(0.001)
Observations	222,449	69,112	14,086	139,250
Conceal mean	0.106	0.329	0.002	0.007
Controls & FEs				
Controls	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes
Course level FE	Yes	Yes	Yes	Yes
Year×GPA gains FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

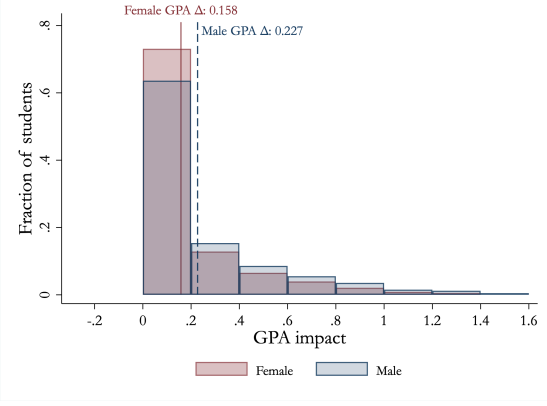
Gap also appears at intensive margin

Table: Gender gap in the number of concealed grades conditional on concealing at least one grade

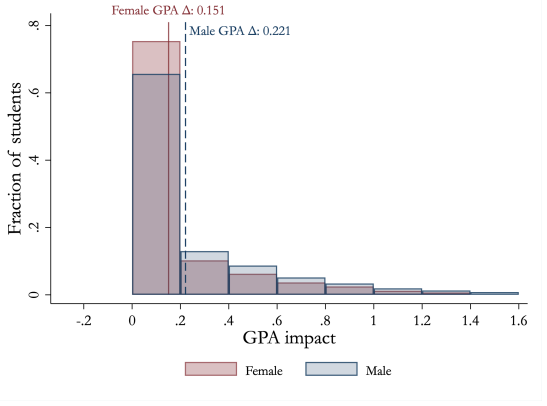
	Boston University	**A flagship state university**
	(1)	(2)
Female	-0.104***	-0.154***
	(0.025)	(0.016)
Observations	6,287	14,829
Conceal mean	1.787	1.595
Controls	Yes	Yes
Major FE	Yes	Yes

The optional disclosure policy has equity implications

Boston University

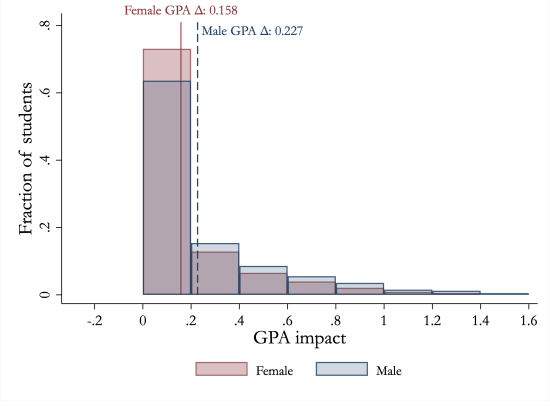


A flagship state university

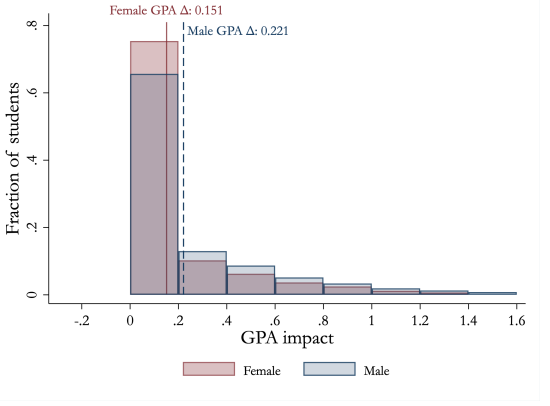


The optional disclosure policy has equity implications

Boston University



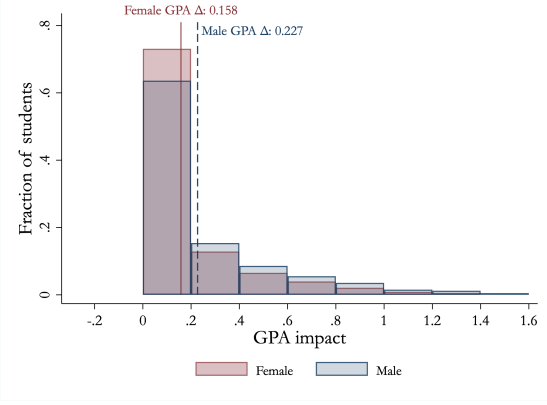
A flagship state university



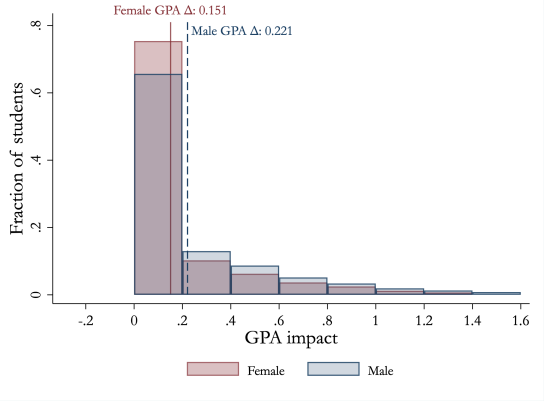
- Because people conceal when GPA impact is negative, and men use the policy more...
- Gender gap in GPA moves in favor of men (by about 0.07 points in favor of men at both schools).

The optional disclosure policy has equity implications

Boston University



A flagship state university



- Because people conceal when GPA impact is negative, and men use the policy more...
- Gender gap in GPA moves in favor of men (by about 0.07 points in favor of men at both schools).
- Here, mandatory information would be more gender equitable.

Roadmap

Grade Disclosure Natural Experiment

Employer Experiment

Discussion of Mechanisms

Incentivized Resume Rating

- Incentivized Resume Rating paradigm (Kessler et al, 2019):
  - Employers evaluate hypothetical resumes with randomized student characteristics including gender
  - Incentivized by matching with 10 real UPenn students based on evaluations
  - Found race and gender discrimination among employers recruiting in STEM
- This data: New wave of IRR data from Penn
  - Ratings of 1560 resumes from 39 employers during 2020–2021 academic year
  - Note this was the first year after COVID, and after the George Floyd protests over the summer
- GPA omitted from a subset of the resumes $\Rightarrow$ allows us to assess how employers evaluate candidates when performance transparency varies

Example Resumes

Devonte Jefferson

School Address: [redacted]
Permanent Address: [redacted]

EDUCATION

University of Pennsylvania, Philadelphia, PA
School of Engineering and Applied Science
BS in Computer Engineering
Cumulative GPA: 3.36/4.00 Expected May 2021

TEST SCORES

SAT I: 800 (M) 720 (CR) 800 (W)

WORK EXPERIENCE

Accenture, San Francisco,CA
Vision Labs Intern June - August 2020

- Cancelled due to COVID-19

CB Insights, New York, NY
Summer Analyst June - August 2020

- An information services firm that tracks private companies, investors, and M&A activity
- Built Human Capital Management (HCM) Technology Analyst industry vertical to assist corporations and investors in understanding the sector
- Built Excel model for predictive analysis and ranking of venture capital firms to aid limited partners with investment decisions

LEADERSHIP EXPERIENCE

College Republicans, University of Pennsylvania, Philadelphia, PA
Member of Outreach & Communications Board 2019-2020

- Coordinated with club directors to brainstorm event ideas
- Identified and contacted individuals to speak at club events
- Managed and communicated administrative messages to club members

Badminton A Team, Philadelphia, PA
Team Manager 2018-2020

- Collected dues; coordinated home/away games against other Ivy Leagues and colleges
- Arranged tournaments and other competitions beyond intercollegiate level

SKILLS

Basic knowledge of Solidworks and Loggerpro; Advanced knowledge of Microsoft Word, Excel and Powerpoint

LANGUAGES

English (native), Mandarin (fluent)

Jillian Long

[redacted]

EDUCATION

University of Pennsylvania, School of Engineering and Applied Science **Philadelphia, PA**
BS in Computer Engineering **Expected May 2021**

TEST SCORES

SAT I: 740 (M) 730 (CR) 790 (W)

WORK EXPERIENCE

Morgan Stanley Wealth Management, New York, NY
Wealth Management Analyst **June - August 2020**

- Accepted an internship offer, however this was rescinded due to COVID-19

Soom Foods, Philadelphia, PA
Sales & Branding Intern **June - August 2020**

- Introduced brand to more than 120 restaurants and grocers, determining and following up with 43 potential leads, establishing 2 sales relationships and 11 hot leads by summer's end
- Maintained Excel sheet for tracking leads overseen by the Co-Founder and Director of Sales
- Promoted products and events, by serving samples and handing out flyers at 9 events

LEADERSHIP EXPERIENCE

Metropolitan Library Homework Help Center, Philadelphia, PA
Volunteer Tutor **2018-2019**

- Helped children, who attended local schools, with math, science, reading and writing
- Assisted people, ages 6-18, with their homework in all topics

UPenn Social Planning and Events, Philadelphia, PA
Assistant Director of Special Events **2018-2019**

- Managed vendor relations, implemented multiple comprehensive marketing plans, and allocated a $10,000 budget
- Planned and executed 6 school-wide events with over 1500 attendees

SKILL SUMMARY

Mac OS X, Windows, Word, Excel, PowerPoint, Adobe PS CS6, After Effects, Java, HTML, Ocaml

LANGUAGES

English (native), French (conversational)

GPA positive on labor market

Table: Impact of candidate characteristics on likelihood of receiving an interview

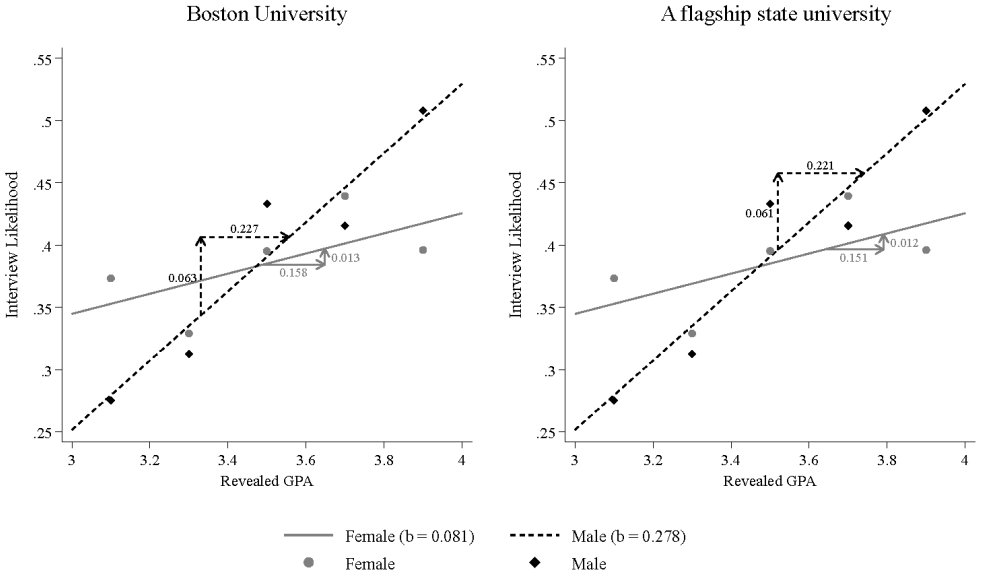
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS		Double Lasso			
			plugin	cv	adaptive	bic
GPA	0.182**					
	(0.075)					
GPA × Male						
Male	0.003					
	(0.029)					
White	-0.045*					
	(0.026)					
Top Internship	0.056**					
	(0.027)					
Work-for-Money Job	-0.018					
	(0.017)					
Second Job	0.037					
	(0.026)					
Observations	1,401					

GPA positive on labor market, *and* moreso for men

Table: Impact of candidate characteristics on likelihood of receiving an interview

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS		Double Lasso			
			plugin	cv	adaptive	bic
GPA	0.182**	0.092	0.100	0.095	0.092	0.094
	(0.075)	(0.081)	(0.078)	(0.079)	(0.079)	(0.079)
GPA × Male		0.185**	0.169**	0.180**	0.180**	0.187**
		(0.088)	(0.085)	(0.085)	(0.085)	(0.085)
Male	0.003	-0.642**	-0.585**	-0.621**	-0.617**	-0.647**
	(0.029)	(0.307)	(0.294)	(0.293)	(0.295)	(0.295)
White	-0.045*	-0.043*	-0.038	-0.040	-0.038	-0.044*
	(0.026)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Top Internship	0.056**	0.055**	0.056**	0.055**	0.054**	0.056**
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Work-for-Money Job	-0.018	-0.019	-0.016	-0.013	-0.014	-0.015
	(0.017)	(0.017)	(0.019)	(0.019)	(0.019)	(0.018)
Second Job	0.037	0.038	0.035	0.037	0.036	0.041
	(0.026)	(0.026)	(0.026)	(0.027)	(0.027)	(0.026)
Observations	1,401	1,401	1,401	1,401	1,401	1,401

Men thus benefit even more in employer returns than just in GPA



Policy affects gender equity in 3 ways

Men and women respond to optional information policies differently, and these endogenous decisions will interact with employer and admissions committee reactions

1. Men use the policy more to conceal grades with negative GPA impact, and so experience relative GPA gains. Decision-makers could be expected to respond positively to this, and we show that employers do (although of course they may adjust to inflation over time).

2. Men also experience a higher *return to quality* by employers. This may reflect the dynamics between implicit and explicit bias (Kessler, Low, and Shan 2022). Thus, their total gain in employer (and possibly admissions) interest is higher than the GPA gain.

Policy affects gender equity in 3 ways

Men and women respond to optional information policies differently, and these endogenous decisions will interact with employer and admissions committee reactions

1. Men use the policy more to conceal grades with negative GPA impact, and so experience relative GPA gains. Decision-makers could be expected to respond positively to this, and we show that employers do (although of course they may adjust to inflation over time).

2. Men also experience a higher *return to quality* by employers. This may reflect the dynamics between implicit and explicit bias (Kessler, Low, and Shan 2022). Thus, their total gain in employer (and possibly admissions) interest is higher than the GPA gain.

3. Finally, recall that we randomized whether GPA appeared on these resumes. Do men receive a differential return to concealing GPA?

Men benefit on the labor market from concealing their GPA

Table: Gender gap in the impact of concealing GPA on interview likelihood

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		OLS			Double Lasso		
	All	Exp>0	Exp>1	plugin	cv	adaptive	bic
GPA Concealed	-0.009	-0.005	-0.053	-0.009	-0.008	-0.005	-0.009
	(0.065)	(0.065)	(0.068)	(0.063)	(0.063)	(0.064)	(0.065)
GPA Concealed × Male	0.164*	0.190**	0.279***	0.177*	0.160*	0.157*	0.164*
	(0.093)	(0.093)	(0.098)	(0.095)	(0.092)	(0.092)	(0.093)
GPA	0.091	0.118	0.142	0.084	0.093	0.094	0.091
	(0.081)	(0.082)	(0.100)	(0.083)	(0.081)	(0.082)	(0.081)
GPA × Male	0.186**	0.212**	0.216*	0.195**	0.183**	0.182**	0.186**
	(0.089)	(0.091)	(0.108)	(0.091)	(0.089)	(0.089)	(0.089)
Male	-0.648**	-0.727**	-0.768*	-0.672**	-0.633**	-0.626**	-0.648**
	(0.309)	(0.316)	(0.375)	(0.315)	(0.309)	(0.309)	(0.309)
Observations	1,560	1,480	1,160	1,560	1,560	1,560	1,560

Policy affects gender equity in 3 ways

Men and women respond to optional information policies differently, and these endogenous decisions will interact with employer and admissions committee reactions

1. Men use the policy more to conceal grades with negative GPA impact, and so experience relative GPA gains. Decision-makers could be expected to respond positively to this, and we show that employers do (although of course they may adjust to inflation over time).

2. Men also experience a higher *return to quality* by employers. This may reflect the dynamics between implicit and explicit bias (Kessler, Low, and Shan 2022). Thus, their total gain in employer (and possibly admissions) interest is higher than the GPA gain.

3. Finally, recall that we randomized whether GPA appeared on these resumes. Do men receive a differential return to concealing GPA? Relative to a low GPA (3.0), men benefit from concealing GPA. If we extrapolate to grades, men are differentially less penalized (or even rewarded) for concealing. Aligns with evidence on greater bias in presence of ambiguity (Chan 2022).

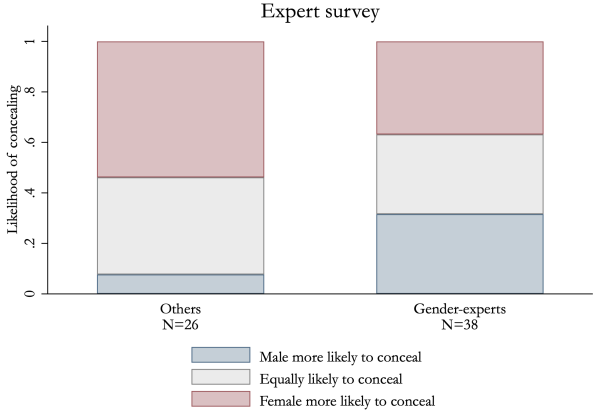
Were these negative gender equity effects expected? We survey experts...

"Consider one male and one female student with identical cumulative GPAs and grades in a given course. Which student, if any, do you think would be more likely to mask their grade for the course?"

Were these negative gender equity effects expected? We survey experts...

"Consider one male and one female student with identical cumulative GPAs and grades in a given course. Which student, if any, do you think would be more likely to mask their grade for the course?"

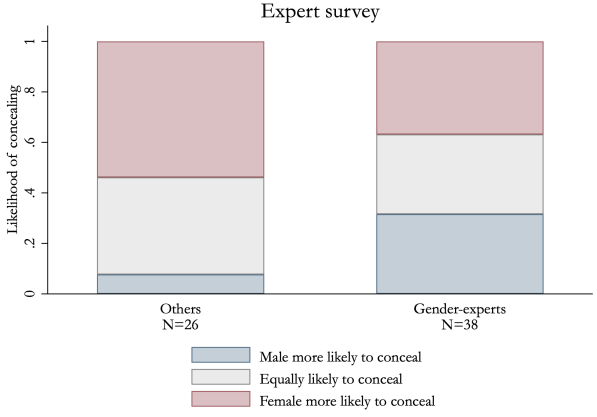
- Both students equally likely to mask **(34.4%)**
- Male student more likely to mask **(21.9%)**
- Female student more likely to mask **(43.8%)**



Were these negative gender equity effects expected? We survey experts...

"Consider one male and one female student with identical cumulative GPAs and grades in a given course. Which student, if any, do you think would be more likely to mask their grade for the course?"

- Both students equally likely to mask **(34.4%)**
- Male student more likely to mask **(21.9%)**
- Female student more likely to mask **(43.8%)**

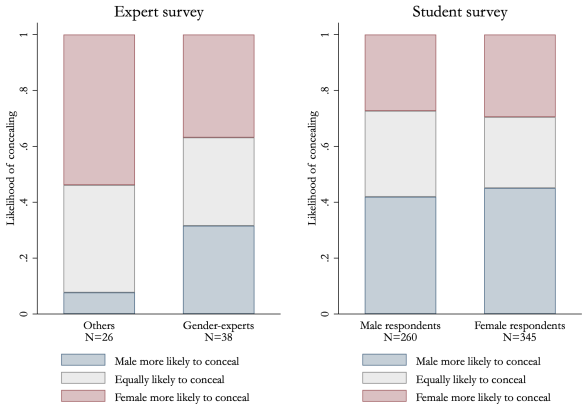


- Experts expect Men to conceal more than women
- Decision-makers could be miscalibrated on the equity impacts of optional info policies

Unlike experts, students expect men to conceal more often than women

"Consider one male and one female student with identical cumulative GPAs and grades in a given course. Which student, if any, do you think would be more likely to mask their grade for the course?"

- Both students equally likely to mask **(34.4%) versus (28.3%)**
- Male student more likely to mask **(21.9%) versus (43.1%)**
- Female student more likely to mask **(43.8%) versus (28.7%)**



- What do students understand about these decisions that experts missed?
- What are some possible mechanisms of the gender transparency gap?

Roadmap

Grade Disclosure Natural Experiment

Employer Experiment

Discussion of Mechanisms

We find little evidence for...

1. Confidence about (future) grades
   - No uncertainty about what the grade will be, since can conceal ex post
   - Gap exists for grades much below current (and presumably future) GPA
   - Gap no larger for students in earlier program years
2. Preferences for transparency
3. Awareness of the policy, conscientiousness, impact of COVID

Gender gap isn't larger for students in earlier years

Confidence about (future) grades

Table: Gender gap in concealing grades across program years

Panel A: Boston University				
	(1)	(2)	(3)	(4)
	Freshman	Sophmore	Junior	Senior
Female	-0.026	-0.074***	-0.062***	-0.009
	(0.017)	(0.016)	(0.018)	(0.019)
Observations	4,967	6,062	4,500	3,965
Mean of Y	0.518	0.533	0.566	0.526
Panel B: A flagship state university				
	(1)	(2)	(3)	(4)
	Freshman	Sophmore	Junior	Senior
Female	-0.039**	-0.060***	-0.060***	-0.065***
	(0.014)	(0.009)	(0.009)	(0.008)
Observations	4,478	16,970	21,685	25,978
Mean of Y	0.225	0.286	0.346	0.359
Controls and FEs				
Controls	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes
Course level FE	Yes	Yes	Yes	Yes
Year × GPA gains FE	Yes	Yes	Yes	Yes

We find little evidence for...

1. Confidence about (future) grades
2. Preferences for transparency
   - Gap is no greater for low or failing grades
   - No evidence that men are less inclined towards *transparency* $\Rightarrow$ men not more likely to conceal very low grades (only possible at Boston University)
3. Awareness of the policy, conscientiousness, impact of COVID

Gender gap isn't driven by concealment of low or failing grades

Preferences for transparency

Table: Gender gap in concealing grades across letter grades

Panel A: Boston University									
	(1) A-	(2) B+	(3) B	(4) B-	(5) C+	(6) C	(7) C-	(8) D	
Female	0.007	-0.009	-0.056**	-0.071**	-0.017	-0.042	0.017	0.054*	
	(0.015)	(0.020)	(0.020)	(0.024)	(0.027)	(0.024)	(0.031)	(0.023)	
Observations	2,143	3,993	4,026	2,549	1,540	1,573	718	857	
Conceal mean	0.072	0.319	0.465	0.616	0.813	0.833	0.916	0.935	
Panel B: A flagship state university									
	(1) A-	(2) B+	(3) B	(4) B-	(5) C+	(6) C	(7) C-		(9) Concealed by default
Female	-0.017***	-0.060***	-0.076***	-0.066***	-0.017	-0.042**	0.012		-0.004
	(0.004)	(0.009)	(0.010)	(0.014)	(0.016)	(0.015)	(0.023)		(0.011)
Observations	15,091	17,654	16,307	7,697	4,821	4,535	1,971		3,271
Conceal mean	0.042	0.228	0.347	0.499	0.712	0.730	0.735		0.921
Controls and FEs									
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Course level FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year × GPA gains FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

We find little evidence for...

1. Confidence about (future) grades
2. Preferences for transparency
3. Awareness of the policy, conscientiousness, impact of COVID
   - Survey found little gender difference in awareness
   - Little gender difference in COVID impact on course-taking and performance Details

Using a student survey, we find more evidence for...

1. Graduate school plans
2. Anticipated scrutiny of grades
3. Risk aversion

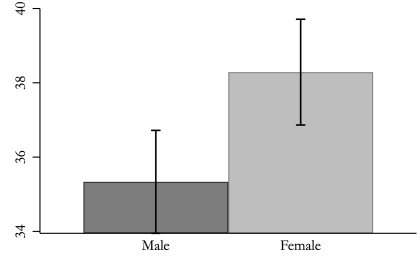
Student Survey

- Fielded early in Fall 2022 at the flagship state university
- Population: random sample of juniors and seniors who experienced the policy
- 631 students completed the survey, 10% response rate ▸ Respondent overview

We find more evidence for...

1. Graduate school plans
   - Letter grades could matter for admissions
   - Survey indicates more women intend to attend grad school
2. Anticipated scrutiny of grades
   - Students expect a large share of employers look at individual grades
   - Expected to look more for female applicants
3. Risk aversion
   - Uncertainty about need for letter grades and consequences of concealing
   - Survey finds women to be more risk averse

"Consider 100 employers who receive resumes of students. Of these 100 employers, how many do you think would take a look at some of the grades instead of only the overall GPA of the students?"



▸ STEM/BE versus non-STEM/BE

Gender differences in graduate school plans, grade scrutiny, risk aversion

Table: Survey evidence on concealing motives

	Female	Male	p-value
Risk preferences	3.974	3.535	0.000
Expected scrutiny of grades	1.274	1.057	0.061
Plan to attend graduate school	0.823	0.704	0.001
Reason for concealing			
Letter grade was not needed	2.649	2.730	0.636
Focus on learning	2.603	2.837	0.181
Reason for not concealing			
Need letter grades for my major	3.794	3.336	0.005
Not know about the policy	1.808	1.798	0.943
Deceiving	2.678	2.899	0.173
Observations	345	260	

These differences mostly do not explain the gender gap...

Table: Survey predictors of the gender gap in concealing grades

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.070***	-0.071***	-0.070**	-0.071***	-0.049	-0.064***	-0.001
	(0.022)	(0.023)	(0.035)	(0.022)	(0.046)	(0.023)	(0.066)
Expected scrutiny		-0.004	-0.004				
		(0.011)	(0.013)				
Female × expected scrutiny			-0.001				
			(0.022)				
Graduate school				0.029	0.043		
				(0.026)	(0.036)		
Female × graduate school					-0.031		
					(0.053)		
Risk aversion						-0.014	-0.003
						(0.009)	(0.013)
Female × risk aversion							-0.017
							(0.017)
Controls	YES	YES	YES	YES	YES	YES	YES
Major FE	YES	YES	YES	YES	YES	YES	YES
Course level FE	YES	YES	YES	YES	YES	YES	YES
Observations	1,157	1,073	1,073	1,157	1,157	1,157	1,157
Conceal mean	0.269	0.272	0.272	0.269	0.269	0.269	0.269
Adjusted R2	0.417	0.425	0.425	0.418	0.417	0.418	0.419

Plausible Mechanisms: Anticipated Discrimination

- Vast literature on gender discrimination in the labor market (Riach and Rich, 2002)
  - Kessler, Low, Sullivan, 2019, find that discrimination is stronger in STEM
- Women may expect employers to infer worse performance if they don't reveal their grade (Alston, 2019; Dustan, Koutout and Leo, 2020), which we've shown they do

Again from the student survey, we see that...

Students expect their peers to:

- Underestimate the average GPA of women relative to their own estimates ▸ Details
- Underestimate the average grade concealed by women *more* and the average grade concealed by men *less* than their own estimates ▸ Details

Students expect employers to:

- Prefer hiring male to female applicants ▸ Details
- Respond negatively to masking (Candidate who doesn't mask expected to be preferred) ▸ Details

Again from the student survey, we see that...

Students expect their peers to:

- Underestimate the average GPA of women relative to their own estimates ▸ Details
- Underestimate the average grade concealed by women *more* and the average grade concealed by men *less* than their own estimates ▸ Details

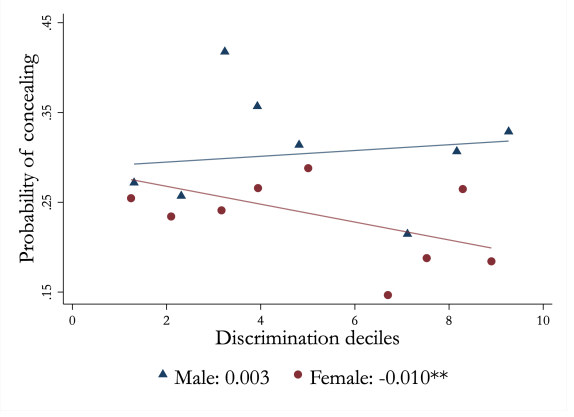
Students expect employers to:

- Prefer hiring male to female applicants ▸ Details
- Respond negatively to masking (Candidate who doesn't mask expected to be preferred) ▸ Details

We construct an expected discrimination index based on this survey...

Masking decreases in perceived discrimination, for women only

Figure: Probability of concealing by perceived discrimination

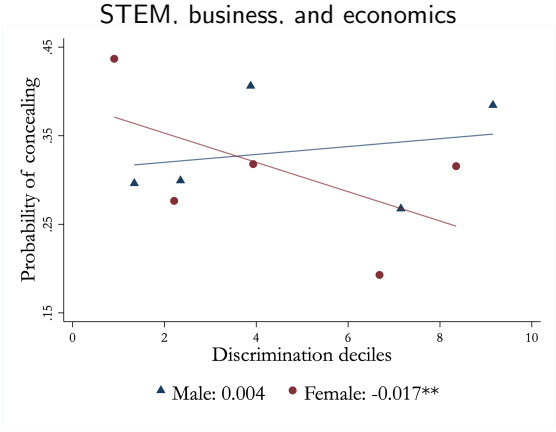


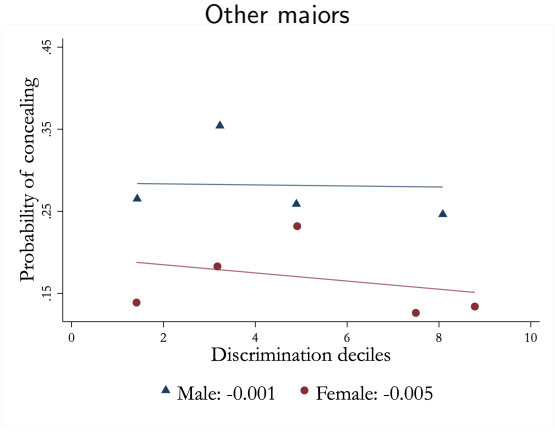
- Discrimination index = average of responses from the three survey questions about anticipated discrimination
- Index gives summary measure of subjective views about discrimination faced by female students, *relative* to male students (within their major of STEM, business, and economics or other)

▸ More details

This effect is largely driven by STEM, business and economics

Figure: Probability of concealing by perceived discrimination





Returning to IRR data: STEM employers favor males in absence of GPA

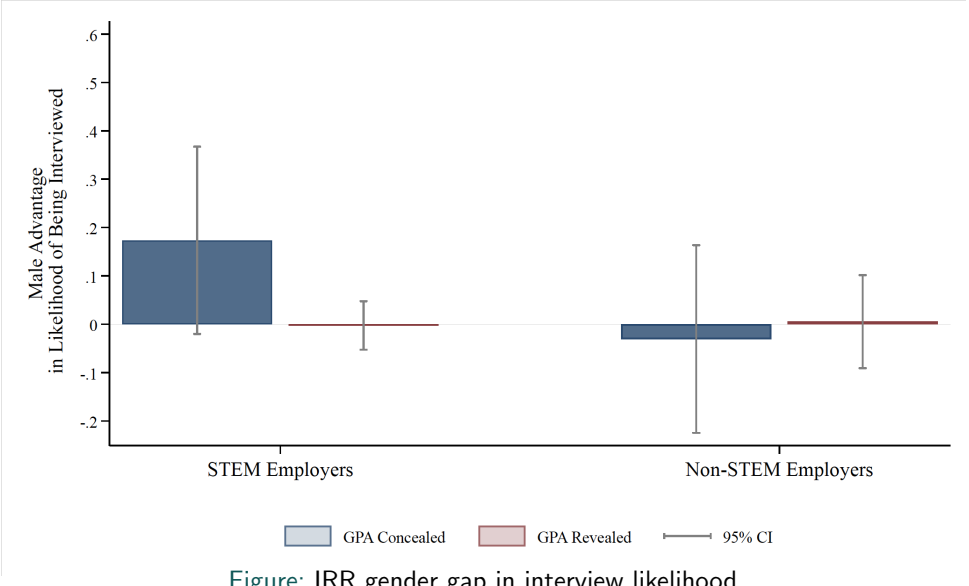


Figure: IRR gender gap in interview likelihood

Men in STEM seem to receive differential "benefit of the doubt"

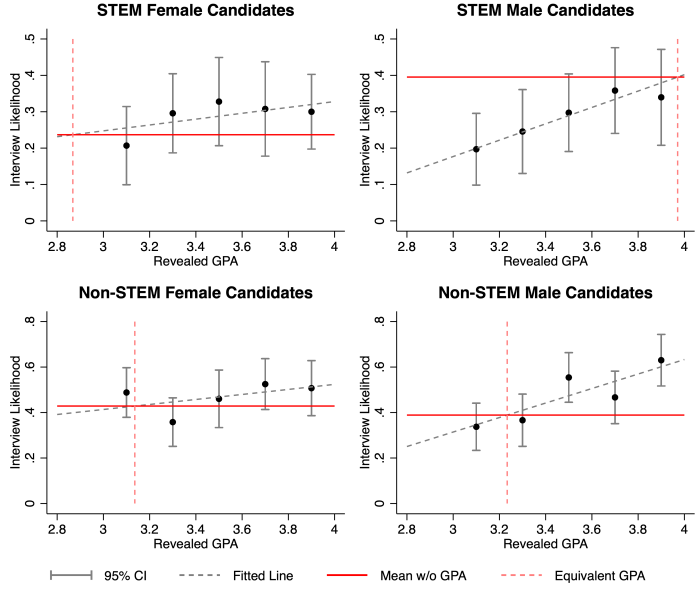


Figure: IRR interview likelihood by GPA

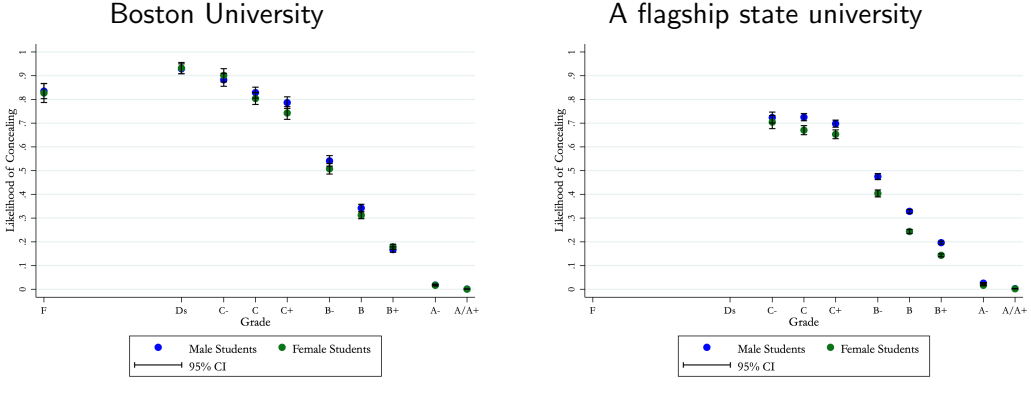
Conclusion

- We investigate the equity implications of two optional grade revelation policies
  - Large gender gap in use of policy to conceal grades below GPA
  - Three forms of gender effects:
    - Policy increases men's GPAs relative to women's
    - Men receive higher returns to GPA from employers
    - Employers respond differentially to men concealing GPA: women who do use the policy may be penalized
  - Thus, optional information disclosure policy had unintended equity consequences (which were unanticipated by experts)
- Evidence for potential mechanisms
  - Gender differences in risk aversion, grad school plans, and expected scrutiny of grades
  - Women may also anticipate discrimination, which seems justified by employer behavior
  - Instead of a single mechanism, appears that female students respond to a range of gender differences and anticipated gender impacts when choosing to use the policy
- Unclear what universities' goals are in optional info policies, but should not expect a *mechanical* increase in equity or even a neutral effect with increased flexibility

Thank you!

Masking and course grade

Figure: Likelihood of concealing at least one grade by gender and course grade



back

Sample comparison

Table: Student survey respondent overview

	Survey sample	Transcript sample	P-value
Female	0.58	0.51	0.00
Minority	0.13	0.13	0.86
Family income <$50k	0.19	0.13	0.00
Family income $50k-$100k	0.16	0.13	0.13
Family income $100k-$200k	0.23	0.22	0.71
Family income >$200k	0.21	0.28	0.00
SAT	1,423	1,399	0.00
STEM, business, and economics major	0.68	0.63	0.05
Cumulative GPA	3.73	3.62	0.00
Used concealing	0.28	0.27	0.67
Number of grades concealed	0.40	0.43	0.40
Observations	542	28,748	

back

Alternative specifications for the gender gap in concealing grades

Restricted to grades that would pull down a student's GPA if they remained unconcealed

Table: Alternative specifications for the gender gap in concealing grades

Panel A: Boston University					
	(1)	(2)	(3)	(4)	(5)
Female	-0.115***	-0.114***	-0.074***	-0.074***	-0.047***
	(0.009)	(0.009)	(0.010)	(0.010)	(0.008)
Observations	19,508	19,499	19,499	19,499	19,495
Conceal mean	0.536	0.535	0.535	0.535	0.536
Panel B: A flagship state university					
	(1)	(2)	(3)	(4)	(5)
Female	-0.108***	-0.107***	-0.072***	-0.073***	-0.061***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	70,882	69,155	69,155	69,154	69,112
Conceal mean	0.329	0.328	0.328	0.328	0.329
Controls and FEs					
Controls		Yes	Yes	Yes	Yes
Major FE			Yes	Yes	Yes
Course level FE				Yes	Yes
Year × GPA gains FE					Yes

back

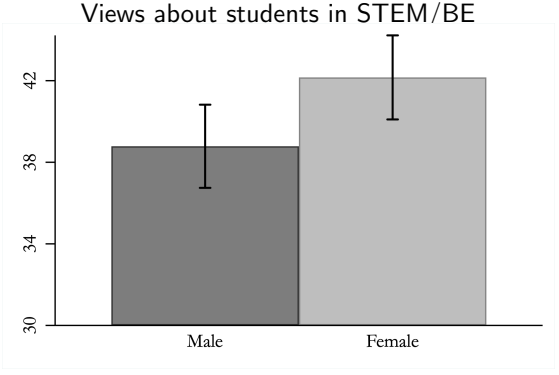
Course-taking and student performance

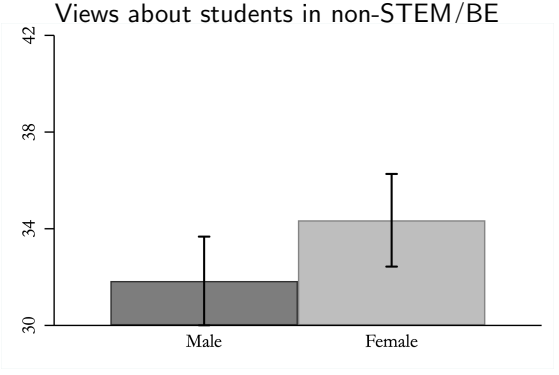
	(1) Credits attempted	(2) Credits earned	(3) Courses attempted	(4) Courses withdrew	(5) Core course attempted	(6) Cumulative GPA
Female	0.080**	0.226***	0.055**	-0.007	-0.012	0.083***
	(0.031)	(0.040)	(0.022)	(0.005)	(0.013)	(0.005)
Year 21/22	-0.083***	-0.199***	-0.019	0.048***	-0.030**	0.068***
	(0.031)	(0.039)	(0.022)	(0.005)	(0.013)	(0.004)
Year 21	0.196***	0.193***	0.057***	-0.007	0.113***	0.031***
	(0.031)	(0.037)	(0.021)	(0.005)	(0.014)	(0.003)
Female × Year 21/22	0.076*	0.042	-0.009	-0.004	0.039**	-0.001
	(0.043)	(0.053)	(0.031)	(0.007)	(0.018)	(0.006)
Female × Year 21/22 × Year 21	-0.005	0.035	0.027	-0.004	-0.008	-0.008*
	(0.043)	(0.051)	(0.030)	(0.007)	(0.019)	(0.004)
Program year	-0.826***	-0.792***	-0.818***	-0.005**	0.258***	-0.015***
	(0.011)	(0.015)	(0.008)	(0.002)	(0.004)	(0.002)
Constant	16.781***	16.066***	9.348***	0.102***	-0.382***	3.521***
	(0.112)	(0.142)	(0.074)	(0.016)	(0.038)	(0.021)
Major FE	YES	YES	YES	YES	YES	YES
Observations	90,616	90,616	90,616	90,616	90,616	90,616
Number of students	48228	48228	48228	48228	48228	48228
Outcome mean	14.436	13.714	6.964	0.113	0.837	3.560

back

Students think employers are more likely to look at grades of female students in STEM/BE and non-STEM/BE

"Consider 100 employers who receive resumes of students. Of these 100 employers, how many do you think would take a look at some of the grades instead of only the overall GPA of the students?"

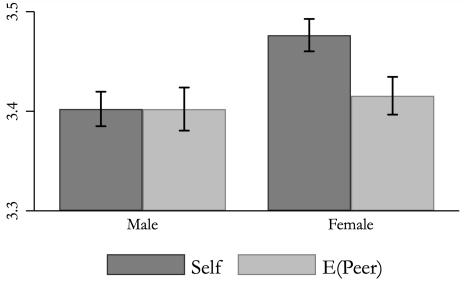


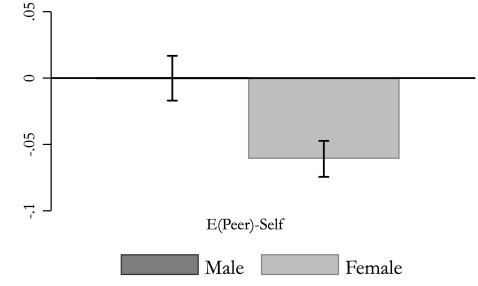


back

What is the average GPA of men and women? What do your peers think?

Figure: Own and perceived peer beliefs about the average GPA of men and women

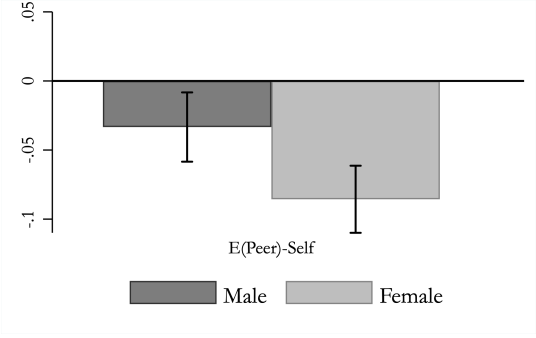




back

What is the average grade concealed by men and women? What do your peers think?

Figure: Own and perceived peer beliefs about the average grade concealed by men and women

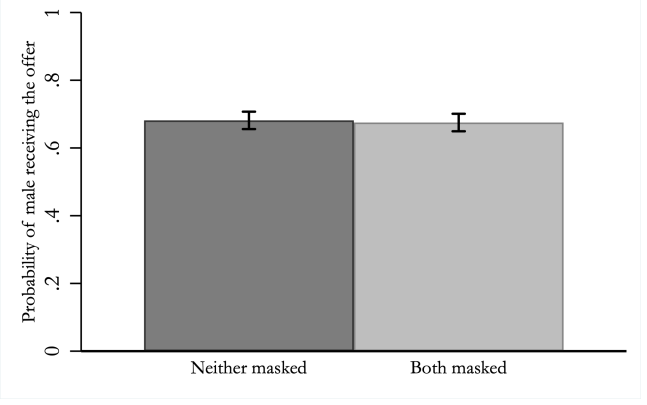


back

Students believe men have a hiring advantage

Consider the case where an employer receives job applications from a male and female [STEM/BE or non-STEM/BE] major. Both have similar profiles and seem equally qualified. The employer can make only one offer. Who do you think the employer will make an offer to if

- *Both the male and female applicant do not mask any grades*
- *Both the male and female applicant mask a grade*

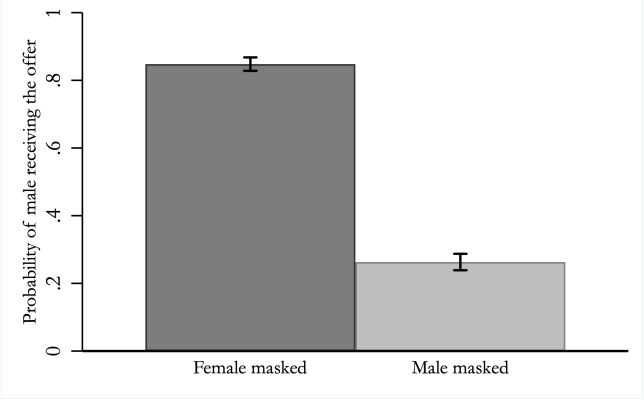


back

Students believe employers respond negatively to masking

Consider the case where an employer receives job applications from a male and female [STEM/BE or non-STEM/BE] major. Both have similar profiles and seem equally qualified. The employer can make only one offer. Who do you think the employer will make an offer to if:

- *The male applicant masks a grade but the female applicant does not*
- *The male applicant does not mask a grade but the female applicant does*



- If females mask, 85% of males expected to get an offer
- If males mask, 74% of females expected to get an offer

back

Description of the Discrimination Index

Specifically, we sum three variables that are constructed to take on values of -1 or 1:

1. Anticipated discrimination against female students in average GPA is 1 if $FO_F - SO_F - (FO_M - SO_M) > 0$ and -1 if $FO_F - SO_F - (FO_M - SO_M) < 0$, where FO_F and SO_F are first-order and second-order beliefs of respondents about the average GPA; FO_M and SO_M are similarly defined for male students.
2. We define a similar variable for beliefs about grades of male versus female students when the grade is concealed.
3. Anticipated discrimination against female students in employment $= 1$ if a male candidate would receive the offer when both genders conceal a grade and -1 otherwise.

The index is computed separately for views about students in STEM, business, and economics and other majors. Respondents anticipate that female students face discrimination across these different categories, as indicated by the positive index value. Anticipated discrimination against female students is more than twice as high in STEM, business and economics fields and reported to be much larger by female respondents.

back