The effects of STEM versus humanities in high school

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Motivation

Broad interest in having more people pursue STEM studies and careers:

- earnings, inequality, innovation, economic growth, etc.

Concurrent decline in the humanities:

- Possible cost: humanities $\rightarrow$ empathy, civic-mindedness, etc. (Nussbaum 2010)

A number of policies have been explored to stimulate STEM participation:

- role models, providing information, summer camps, teacher gender/ethnicity, etc.

Less studied policy:

- increased early exposure to STEM coursework
  - idea: studying STEM early may change trajectories by shifting preferences, abilities, beliefs about abilities, beliefs about returns, etc.

What we do

Research Questions:

1. Does studying STEM v. Hum. in high school affect college outcomes and career plans?
   - Is there heterogeneity for high v. low achievers? those strong in lang. v. math? ...
2. What are the mechanisms that drive this?
   - beliefs about own abilities, preferences, peers' or teachers' influence, etc.?
3. What are the effects of STEM v. Hum. in high school on other outcomes?
   - wellbeing, social ties, time use, expectations, political preferences, etc.

There is some recent literature on (1):

- U.S. (Cortes et al. 2016, Darolia et al. 2019, Goodman 2019, Cohodes et al. 2022, Liu et al. 2024)
- Europe (Joensen and Nielsen 2009, 2016, De Philippis 2023, Dahl et al. 2023)

But very little in the way of causal research on (2) and (3).

Setting and Approach

Setting:

- Romania's centralized public high school system
- Students are divided into tracks that:
  - are self-contained units within schools
  - differ in their curriculum
    - three broad categories of curricula: Humanities/SS, Math/science (STEM), "Technical"

Approach:

- Regression discontinuity applied to:
  - Administrative data on high school admission, enrollment, and performance
  - Survey data on college enrollment, career plans, mechanisms, various "other" outcomes

$\rightarrow$ Calculate effects of being assigned to a STEM v. Hum./SS high school track

Preview of findings

Effects on high school outcomes, college outcomes, and career plans

- Being assigned to STEM (v. Hum./SS) $\Rightarrow$ students pursue STEM more
  - $\uparrow$ of 67 pp in graduating from high school STEM
  - $\uparrow$ of 24 pp in enrolling in college STEM
  - $\uparrow$ of 23 pp in planning to have a STEM career

  $\rightarrow$ little heterogeneity by gender, relative academic ability, or preferences for STEM
- But STEM is risky:
  - $\downarrow$ in performance on high school exit exam
  - $\downarrow$ in probability of attending any college (16 pp for low achievers)

Preview of findings, cont.

What are the mechanisms that drive the shift towards STEM?

- ↑ in confidence in own STEM abilities and in enjoying STEM subjects
  - → impacts are positive for everyone, but become smaller by one year after high school
- Peer mimicry, teacher encouragement, family approval, sunk costs play less of a role

Preview of findings, cont.

Effects on high school and college satisfaction

- Little effect on high school satisfaction at the end of high school
- $\downarrow$ in liking the high school curriculum by one year after high school
  - esp. for females, low-achievers
- Negative effect on liking college
  - esp. for females
- But no impact on regret over high school/college application choices

Preview of findings, cont.

Effects on other outcomes (at the end of high school)

- Wellbeing: ↑, esp. for females
- Time use: ↑ homework
  - females: ↓ social media
  - males: ↓ video games, reading
- Friends: ↑ male friends and ↓ female friends
- Males: ↑ traditionalist expectations and political conservatism

→ effects 1.5 years after high school TBA

Setting and Data

Setting: Romania's public high schools

1. Choice:
   - high school **tracks** (e.g. Hum./SS track in high school A)
   - students submit a (virtually limitless) list of preferences over high schools-tracks
2. Centralized Allocation:
   - based on **transition score**:
     - grades 5-8 GPA
     - score on national, standardized high school admission exam
   - mechanism: **serial dictatorship** with high transition score students having priority
     - students assigned to their most preferred track where seats are still available after higher-scoring students made their choices
     - features: truthful revelation
     - leads to minimum transition score **cutoffs** for each track
3. Tracks
   - are stand-alone units within schools
   - instruction hours vary significantly across curricula Hours of instruction

Data: administrative data

2015-2019 high school entering cohorts in 16/42 Romanian counties

1. High school admission data (grade 9):
   - transition score data: middle school GPA, scores on admission exam components
   - choices data: students' ranked choices over high school tracks
   - allocation data: final assignment of students to tracks
2. High school enrollment data:
   - enrollment histories at the high school-track-classroom level
3. High school performance data:
   - graduation
   - scores on a national, standardized, curriculum-specific exam ("the bac.")

Data: surveys

1. In-class survey one month before high school graduation
   - 10,267 students in 292 high schools, 94 towns
     - college plans, beliefs about own abilities, high school experience, friends, time use, wellbeing, expectations, political views
     - tracking info for follow-up work
2. Follow-up survey one year after high school
   - 2,051 students (from those in the first survey)
     - performance on the bac exam, college enrollment, career plans, beliefs about own abilities, preferences over subjects, high school and college experience, high school and college regret
3. Phone survey about peers:
   - asked students about their high school class peers' bac performance and college enrollment
     - info on 6,359 peers from 1,759 students
4. Almost completed: follow-up survey 1.5 years after high school:
   - college enrollment, beliefs & prefs for careers, friends, time use, wellbeing, expectations, voting

Methodology

Methodology

Regression Discontinuity:

- compare students on either side of an admission cutoff whose assignment switches between STEM and Hum./SS depending on where they fall

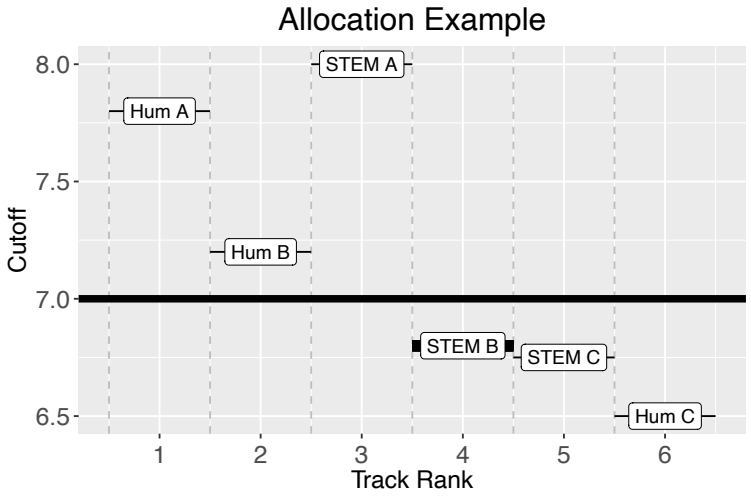
Four scenarios:

- Students who rank a STEM track above a Hum./SS track:
  - above the cutoff $\rightarrow$ STEM
  - below the cutoff $\rightarrow$ Hum./SS
- Students who rank a Hum./SS track above a STEM track:
  - above the cutoff $\rightarrow$ Hum./SS
  - below the cutoff $\rightarrow$ STEM

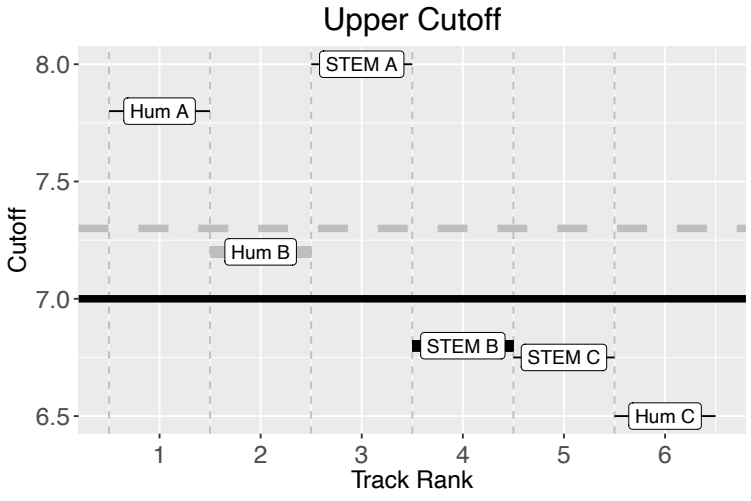
Two possible relevant cutoffs for each student:

- the lowest cutoff they narrowly scored below
- the highest cutoff they narrowly scored above

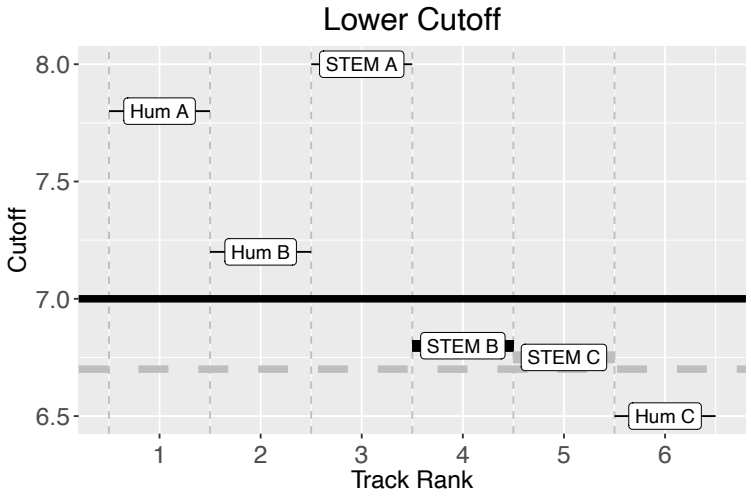
Example


Allocation Example
8.0
7.5
7.0
6.5
Cutoff
STEM A
Hum A
Hum B
STEM B
STEM C
Hum C
1
2
3
4
5
6
Track Rank

Example


Upper Cutoff
8.0
7.5
7.0
6.5
Cutoff
STEM A
Hum A
Hum B
STEM B
STEM C
Hum C
1
2
3
4
5
6
Track Rank

Example


Lower Cutoff
8.0
7.5
7.0
6.5
Cutoff
STEM A
Hum A
Hum B
STEM B
STEM C
Hum C
1
2
3
4
5
6
Track Rank

Methodology

- Categorize cutoffs into two types: STEM above and STEM below
- The running variable differs by cutoff type:
  - STEM above: student transition score − cutoff score
  - STEM below: cutoff score − student transition score

  $\rightarrow$ this way, running var. $> 0 \Rightarrow$ assigned to STEM
- Regression controls:
  - (a) cutoff FE's, (b) linear spline in the running variable, and (c) an indicator for STEM assignment, all interacted with the cutoff type
- Calculate the ATE of STEM assignment:
  - simple average of the effects for each cutoff type
- Inference: s.e.'s via the Delta Method, cluster in two ways by cutoff and student

Representativeness, manipulation, balance, and sample selection

- Students in the RD sample are representative of those in the top 3/5ths of the national distribution ▸ Distribution of cutoffs and students ▸ The percent choosing both STEM and Hum./SS
- No evidence of running variable manipulation ▸ Manipulation ▸ Manipulation
- Good balance:
  - ▸ Admin data balance
  - ▸ End-of-high-school survey balance
  - ▸ Follow-up or peer survey balance
  - ▸ Follow-up survey balance
- Lack of selection into the survey samples ▸ Selection

What we're measuring...

What sub-treatments are embedded in our RD TE?

The RD TE of just getting into STEM (or Hum./SS) captures the impacts of:

a. a different curriculum
   - courses, teachers, etc.
b. different types of peers
   - gender composition, relative ability in math v. language
c. scoring above/below a cutoff
   - having higher/lower achieving peers, being the lowest-/higher-achieving student in the track

Which of (a)-(c) do we care about?

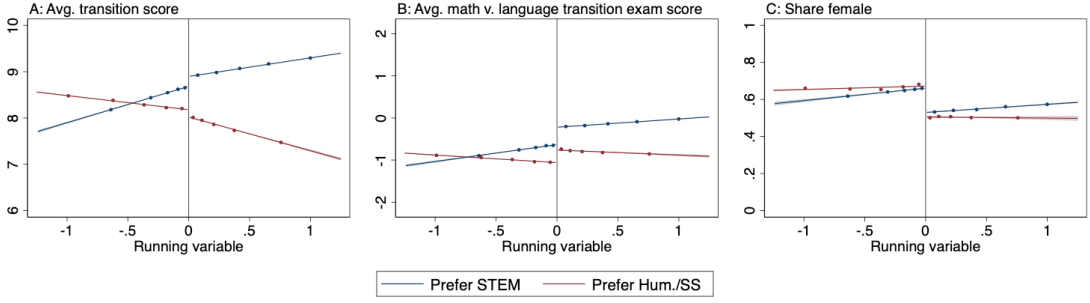
We're most interested in (a) and (a)+(b), least interested in (c)

- (a) is relevant to policymakers deciding whether to give everyone more STEM instruction
- (a)+(b) is relevant to:
  - students deciding what to study
  - policymakers deciding whether to change the # of seats in different tracks

$\rightarrow$ By averaging effects for STEM above and STEM below, we obtain (a)+(b)

- We do some work to disentangle (a) and (b), but can't do so fully

Effects on attributes of students' assigned tracks



- ATE is the avg. of the gaps betw. the blue lines and red lines at the cutoff

→ ATE is 0 for peer quality, but not for peer math v. lang. strength or share female

High school outcomes

Effects on high school enrollment

	Years of enrollment				Graduate			
	All	STEM	Hum./SS	Technical	All	STEM	Hum./SS	Technical
STEM	0.004	2.99***	-3.02***	0.029***	0.000	0.665***	-0.676***	0.011***
	(0.008)	(0.025)	(0.025)	(0.008)	(0.004)	(0.008)	(0.008)	(0.003)
Intercept	3.90	0.52	3.33	0.06	0.96	0.17	0.78	0.02
Std. dev.	0.40	1.88	1.87	0.38	0.17	0.50	0.49	0.12
Cutoffs	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172
Students	34,691	34,691	34,691	34,691	34,691	34,691	34,691	34,691
Student-cutoffs	40,105	40,105	40,105	40,105	40,105	40,105	40,105	40,105

- No effect on overall years of enrollment or graduation
- But an ↑ in STEM enrollment and graduation (strong first stage)
- Little heterogeneity

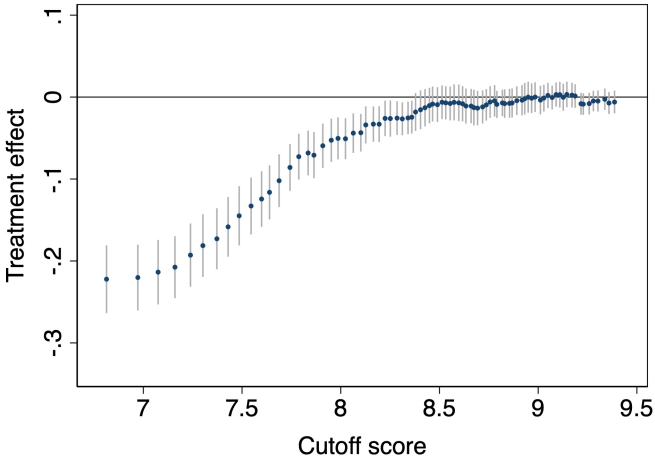
Effects on baccalaureate performance

	Take the exam	Pass the exam	Exam score	Pass in STEM	Pass in Hum./SS	Pass in Technical
STEM	-0.011**	-0.045***	-0.390***	0.607***	-0.660***	0.008***
	(0.004)	(0.006)	(0.021)	(0.009)	(0.009)	(0.002)
Intercept	0.95	0.91	8.08	0.15	0.75	0.01
Std. dev.	0.21	0.28	1.21	0.50	0.48	0.10
Cutoffs	1,172	1,172	1,157	1,172	1,172	1,172
Students	34,691	34,691	33,035	34,691	34,691	34,691
Student-cutoffs	40,105	40,105	38,266	40,105	40,105	40,105

STEM assignment $\Rightarrow$ do worse on the bac.:

- Less likely to take and pass; lower score conditional on taking
- But more likely to pass in STEM

Effects on passing the bac. by cutoff score



→ Effect on passing is strongly negative for low-achievers (those at less selective cutoffs) and 0 for high-achievers

- Effect on exam score is sizable and negative for everyone

Recap

Findings:

- STEM $\Rightarrow \downarrow$ passing the bac.
- STEM $\Rightarrow \downarrow$ bac. scores
- STEM $\Rightarrow \downarrow\downarrow$ pass rates for **low-achievers**

Comments:

- Effect on bac. scores is understated due to negative selection into exam taking
- Two possible explanations for the reduction in performance:
  1. STEM tracks do a worse job at preparing students
  2. STEM is more difficult

  $\rightarrow$ STEM students think the STEM bac. exam is more difficult ▸ Bac. outcomes from the survey data

College outcomes

College plans at the end of high school

	Any	STEM			Hum., law, & social science				Business	Other/ unsure
		Any	Math & CS	Medicine	Any	Humanities	Law	Social science		
STEM	-0.003	0.239***	0.172***	0.067**	-0.242***	-0.073***	-0.073***	-0.096***	0.010	-0.010
	(0.023)	(0.034)	(0.028)	(0.028)	(0.035)	(0.023)	(0.025)	(0.022)	(0.028)	(0.027)
Intercept	0.88	0.19	0.10	0.09	0.38	0.12	0.13	0.13	0.14	0.17
Cutoffs	233	233	233	233	233	233	233	233	233	233
Students	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856

- At the end of high school, no effect on plans to attend any college
- But $\uparrow$ in plans to study STEM and $\downarrow$ in plans to study Humanities

Initial college enrollment

	Any	STEM			Hum., law, & social science				Business	Other/ unsure
		Any	Math & CS	Medicine	Any	Humanities	Law	Social science		
STEM	-0.065**	0.245***	0.210***	0.035	-0.275***	-0.134***	-0.097***	-0.044**	0.001	-0.037
	(0.033)	(0.039)	(0.035)	(0.026)	(0.036)	(0.026)	(0.025)	(0.020)	(0.028)	(0.031)
Intercept	0.84	0.20	0.12	0.08	0.38	0.17	0.13	0.08	0.11	0.15
Cutoffs	226	226	226	226	226	226	226	226	226	226
Students	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Student-cutoffs	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421

- In contrast with end-of-high-school plans, STEM assignment ⇒ less likely to attend college
- But still more likely to attend and study STEM
- Reduction in college attendance is 16 pp for low-achievers ▸ Heterogeneity for initial college enrollment

Continued college enrollment one year after high school

	Any	STEM			Hum., law, & social science				Business	Other/ unsure
		Any	Math & CS	Medicine	Any	Humanities	Law	Social science		
STEM	-0.062*	0.240***	0.203***	0.037	-0.271***	-0.131***	-0.096***	-0.044**	0.003	-0.035
	(0.033)	(0.039)	(0.035)	(0.026)	(0.036)	(0.026)	(0.025)	(0.020)	(0.026)	(0.030)
Intercept	0.82	0.19	0.11	0.07	0.38	0.17	0.13	0.08	0.10	0.15
Cutoffs	226	226	226	226	226	226	226	226	226	226
Students	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Student-cutoffs	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421

- Results for continued enrollment are similar to those for initial enrollment

Other college outcomes

	Type of college			Paying for college			Pass winter exams	Expect to finish
	Public	Private	Outside Romania	Scholarship	Tax exemption	Out of pocket		
STEM	-0.056	-0.026	0.006	-0.143***	0.069	-0.056	-0.120	-0.180
	(0.056)	(0.020)	(0.015)	(0.050)	(0.076)	(0.068)	(0.162)	(0.168)
Intercept	0.80	0.05	0.01	0.27	0.37	0.30	3.23	3.28
Std. dev.	0.41	0.13	0.20	0.44	0.49	0.45	1.09	1.17
Cutoffs	154	154	154	154	154	154	154	154
Students	814	814	814	814	814	814	814	814
Student-cutoffs	891	891	891	891	891	891	891	891

STEM assignment has neg. effects on other college outcomes

- Less likely to get a scholarship
- Low-achievers: less likely to attend a public (prestigious) college, pass first-year winter exams, expect to finish ▸ Heterogeneity for other college outcomes

Career plans one year after high school

	Tech or engineering	Medicine	Art, education law, or social services	Business	Other/ unsure
STEM	0.231***	-0.019	-0.149***	-0.042	-0.021
	(0.061)	(0.054)	(0.049)	(0.076)	(0.047)
Intercept	0.13	0.17	0.20	0.32	0.19
Cutoffs	154	154	154	154	154
Students	814	814	814	814	814
Student-cutoffs	891	891	891	891	891

- STEM assignment ↑'s plans for tech and engineering careers and ↓'s plans for humanities-related careers
- For low-achievers also ↑'s plans for business careers ▸ Heterogeneity for career plans

Mechanisms

- Explore effects on beliefs about own abilities and preferences for academic subjects
- Outcomes on a scale of 1-5:
  - How good do you think you are at . . . ?
  - How much do you like . . . ?

$\rightarrow$ Partially rule out other channels via descriptive survey evidence

Beliefs about own high school abilities

	STEM subjects	Humanities subjects	Social science subjects
Beliefs at the end of high school			
STEM	0.839***	-0.225***	-0.607***
	(0.095)	(0.074)	(0.095)
Intercept	2.60	4.11	3.94
Std. dev.	1.29	0.89	1.18
Cutoffs	233	233	233
Students	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856

- By the end of high school, STEM assignment makes students think they're better at STEM and worse at Hum./SS
- Little heterogeneity: ▸ Heterogeneity for beliefs at the end of high school

Beliefs about own high school abilities, cont

	STEM subjects	Humanities subjects	Social science subjects
Change in beliefs in the year after high school			
STEM	-0.254*	-0.198	-0.316**
	(0.152)	(0.122)	(0.149)
Intercept	0.29	0.22	0.25
Std. dev.	1.06	0.94	1.15
Cutoffs	154	154	154
Students	814	814	814
Student-cutoffs	891	891	891

- In the year after high school, STEM-assigned students receive a more negative update about their abilities
- Driven by low-achievers ▸ Heterogeneity for the change in beliefs

Beliefs about own high school abilities, cont

	STEM subjects	Humanities subjects	Social science subjects
Beliefs one year after high school			
STEM	0.744***	-0.207**	-0.836***
	(0.135)	(0.099)	(0.143)
Intercept	2.91	4.19	4.12
Std. dev.	1.14	0.84	1.14
Cutoffs	154	154	154
Students	814	814	814
Student-cutoffs	891	891	891

- Nonetheless, by a year after high school, STEM assignment still makes students think they're better at STEM ▸ Heterogeneity for beliefs a year after high school

Preferences for high school subjects

	STEM subjects	Humanities subjects	Social science subjects
Preferences one year after high school			
STEM	1.07***	-0.352***	-0.819***
	(0.167)	(0.112)	(0.147)
Intercept	2.67	4.10	4.14
Std. dev.	1.37	1.05	1.22
Cutoffs	154	154	154
Students	814	814	814
Student-cutoffs	891	891	891

- By a year after high school, STEM assignment makes students like STEM more and Hum./SS less
- Little heterogeneity

Comments on mechanisms

1. Similar results if look at college subjects (not high school)
2. Can't rule out other mechanisms but don't think they play as large a role
   - We asked students what factors they weighed when choosing a college program
   - Most important was whether the program matched their abilities and interests
   - Less important: mimicking peers, learning about career paths, conforming to teacher or parental pressures, being tied down by sunk costs ▸ Why students chose their college program

High school and college satisfaction

- Asked students how much they liked high school and college on different dimensions
  - scale of 1-5
- Also asked whether they regret their high school and college application choices

High school satisfaction

	Liked the:				Curriculum
	Experience	Curriculum	Peers	Teachers	was good fit
Satisfaction at the end of high school					
STEM	0.113	0.019	0.262***	0.003	0.002
	(0.077)	(0.078)	(0.081)	(0.080)	(0.061)
Intercept	3.72	3.33	3.50	3.60	3.39
Std. dev.	0.99	1.04	1.12	1.01	0.87
Cutoffs	233	233	233	233	233
Students	2,598	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856	2,856

- Little effect on high school satisfaction at the end of high school
  - But STEM assignment makes students like their peers more
- Little heterogeneity

High school satisfaction, cont.

	Liked the:				Curriculum
	Experience	Curriculum	Peers	Teachers	was good fit
Change in satisfaction in the year after high school					
STEM	0.051	-0.273*	0.061	-0.033	-0.372**
	(0.133)	(0.164)	(0.160)	(0.146)	(0.149)
Intercept	0.33	-0.02	0.45	0.33	0.27
Std. dev.	1.05	1.25	1.15	1.09	1.20
Cutoffs	154	154	154	154	154
Students	814	814	814	814	814
Student-cutoffs	891	891	891	891	891

- Also, little effect on the *change* in high school satisfaction in the year after high school
- But STEM assignment causes a decline in liking the high school curriculum and thinking it was a good fit, esp. for females and low-achievers
- ▸ Heterogeneity for the change in high school satisfaction

College Satisfaction

	Like the:				Curriculum	Well
	Experience	Curriculum	Peers	Instructors	is good fit	prepared
Satisfaction one year after high school						
STEM	-0.411**	-0.169	-0.414**	-0.307*	0.192	0.586***
	(0.181)	(0.152)	(0.197)	(0.164)	(0.131)	(0.173)
Intercept	2.41	2.48	2.40	2.59	3.92	2.73
Std. dev.	1.15	1.07	1.23	1.13	0.80	1.29
Cutoffs	141	141	141	141	141	141
Students	679	679	679	679	679	679
Student-cutoffs	746	746	746	746	746	746

- STEM assignment causes students to like college less, esp. for females
- ▸ Heterogeneity: experience, curriculum, peers ▸ Heterogeneity: instructors, fit, preparedness
- But also makes students think they are better prepared for college

Regret over application choices

	Satisfied with ranking	If could do over, would: Make no change	Rank STEM tracks higher	Rank Hum./SS tracks higher	Rank Technical tracks higher
Regret one year after high school					
STEM	0.055	0.059	-0.040	-0.018	-0.000
	(0.149)	(0.048)	(0.040)	(0.039)	(0.010)
Intercept	4.19	0.80	0.11	0.08	0.01
Std. dev.	0.94	0.37	0.28	0.26	0.12
Cutoffs	154	154	154	154	154
Students	814	814	814	814	814
Student-cutoffs	891	891	891	891	891

- STEM assignment doesn't affect whether students regret their high school application choices (and not much heterogeneity)
- Same for college choices

→ Students think that STEM is unpleasant but worth it?

Other outcomes

- Explored effects on non-cognitive outcomes, time use, friends, expectations, and political preferences
- Outcomes are often indices:
  - Averages of standardized values of component questions
  - The component questions are taken from psychological screeners, the General Social Survey, and the European Values Study
- Currently, all outcomes are measured at the end of high school

Non-cognitive outcomes

	Wellbeing	Empathy	Grit	Trust
STEM	0.159***	-0.054	0.084*	-0.020
	(0.059)	(0.053)	(0.045)	(0.063)
Intercept	-0.11	0.03	-0.06	-0.04
Std. dev.	0.74	0.71	0.61	0.82
Cutoffs	233	233	233	233
Students	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856

- STEM assignment causes an ↑ in wellbeing at the end of high school
  - but only for females ▸ Heterogeneity for non-cognitive outcomes
- Possibly also an increase in grit

Time use on a typical weekday

	Doing homework	Playing video games	On social media	Reading	Watching TV	With friends	Working for pay	Caring for others	Doing extra-curriculars
STEM	0.234*	-0.116	-0.521***	-0.243**	-0.123	-0.198	-0.002	-0.046	0.019
	(0.123)	(0.127)	(0.129)	(0.108)	(0.089)	(0.121)	(0.136)	(0.068)	(0.097)
Intercept	2.51	1.39	3.42	1.43	0.88	2.64	1.66	0.53	0.85
Std. dev.	1.64	1.62	1.67	1.34	1.21	1.72	1.84	1.09	1.35
Cutoffs	233	233	233	233	233	233	233	233	233
Students	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856

- STEM assignment makes students spend more time on homework
- Also ↓'s social media use (esp. for females) ▸ Heterogeneity for time use
  - → Potential explanation for the ↑ in wellbeing for females
- For males, ↓'s time reading and playing video games ▸ Heterogeneity for time use, cont.

Friends

	Good friends			Very close friends
	Any	Female	Male	
STEM	-0.107	-0.509**	0.403*	-0.216
	(0.422)	(0.258)	(0.230)	(0.213)
Intercept	7.94	4.37	3.56	3.94
Std. dev.	5.17	2.93	3.08	2.75
Cutoffs	233	233	233	233
Students	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856

- STEM assignment makes students have fewer female friends and more male friends
  - Consistent with a lower share of female peers in STEM tracks
- Little heterogeneity: Heterogeneity for friends

Expectations

- Asked students what they expect for their lives at age 30:

	Work amount	Bread-winner	Wealth decile	Number of children	Locale type	Traditionalist expectations
STEM	0.002	0.101**	0.126	0.056	-0.041	0.090**
	(0.034)	(0.039)	(0.111)	(0.082)	(0.064)	(0.038)
Intercept	2.78	2.13	7.50	1.71	2.86	-0.03
Std. dev.	0.48	0.50	1.43	1.02	0.89	0.52
Cutoffs	233	233	233	233	233	233
Students	2,598	2,598	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856	2,856	2,856

- For all students, STEM assignment $\Rightarrow \uparrow$'d expectation of being the breadwinner
- For male students, an overall $\uparrow$ in "traditionalist" expectations: ▸ Heterogeneity for expectations
  - Average of: work more, be breadwinner, be richer, have more children, live in a smaller locale
  - Males especially expect to have more children (0.3)

Political Preferences

- Asked students for their views on various economic and social issues
  - e.g., redistribution, meritocracy, divorce, tradition, etc.

	Right-wing preferences		
	Any	Economic	Social
STEM	0.056	0.058	0.055
	(0.039)	(0.051)	(0.051)
Intercept	-0.02	-0.02	-0.02
Std. dev.	0.45	0.59	0.64
Cutoffs	233	233	233
Students	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856

- STEM assignment doesn't have a stat. sign. avg. effect on political preferences
- But makes males more right-wing, esp. on economic issues ▸ Heterogeneity for political preferences
- Follow-up: voting in presidential and parliamentary elections

Recap

By the end of high school, STEM assignment:

- ↑'s wellbeing for females, possibly due to less time on social media
- Makes everyone have fewer female/more male friends, spend more time on HW
- Makes males expect a more traditionalist lifestyle and be more politically conservative
  - Some of the effect on male expectations may be accurate (e.g., STEM does ↑ earnings)
  - Some of the effect on male conservatism could be instrumental
    - e.g., due to expecting to be richer
  - But some could also be due to less humanities exposure
    - less time reading, fewer female friends, etc.
  - Questions for future work!

→ Also, effects may differ once students are out of high school—results soon!

Conclusion

Curriculum v. peers

- As mentioned, the effects we've shown capture two treatments:
  a. a change in the curriculum
  b. exposure to different types of peers
- What is the relative importance of (a) v. (b)?
- Evidence is suggestive that (a) is the main driver:
  1. In surveys, students report that peers aren't a big influence on their decisions
  2. When study cutoffs betw. *same*-curriculum tracks, find null results
  3. Do an analysis of cutoff-specific effects—find that first stages on peer attributes don't have much explanatory power for the size of the main TEs

→ but can't disentangle fully

Recap

- Studied the effects of being assigned to STEM v. Hum./SS in high school
- Find that doing STEM puts students on a STEM trajectory
  - Like STEM more, think are better in STEM, choose to study STEM in college, plan to have a STEM career, etc.
- No adverse effects on wellbeing or satisfaction at the end of high school
- But STEM is harder $\Rightarrow$ risky for low-achievers. And college STEM may be less pleasant than high school STEM
  - Consistent with this, some evidence of negative updating (beliefs, satisfaction) in the year after high school
- Also effects on friends, time use, and—for males—expectations and political preferences

Taking stock

- Overall, the results suggest that more STEM in high school is a successful policy at getting people to do STEM later on
- But STEM is (i) risky for low-achievers and (ii) painful in college
- In addition, there is some backing for claims about benefits from studying humanities (e.g. Nussbaum 2010)
- As such, additional STEM is not without costs:
  - Low-achievers may fall off-track
  - Students (esp. females) may have a worse experience in college
  - People (esp. males) may need humanities to develop empathy, civic-mindedness, etc

Appendix

Back

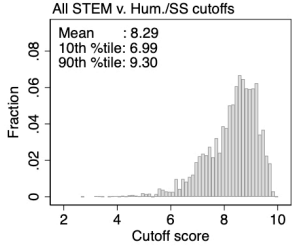
Hours of instruction

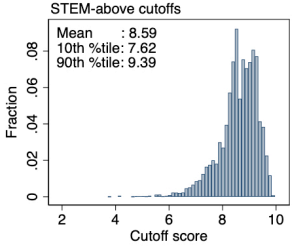
	STEM	Hum./SS
Science and Math	14	8
Languages and Humanities	12	17
Other	3	4
Total	29	29

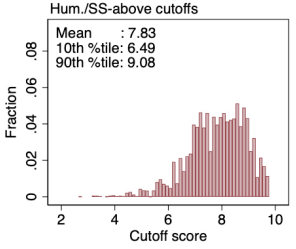
Number of hours of instruction per week in different subjects for STEM and Hum./SS tracks

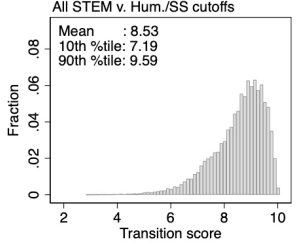
Back

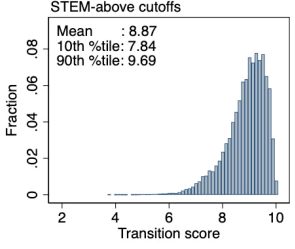
Distribution of cutoffs and students

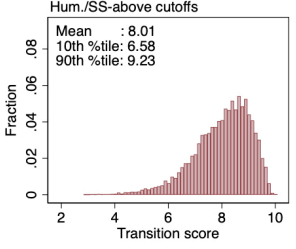












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The percent choosing both STEM and Hum./SS

	At all	In top 10	In top 5
All students	70	58	45
Top three quintiles:			
All	78	65	50
Stronger in math	75	61	46
Stronger in language	83	72	58
Male	75	61	47
Female	81	68	53

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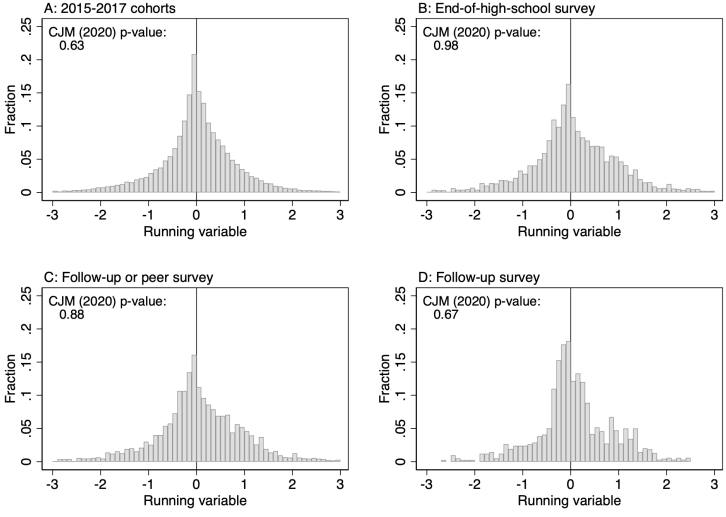
Manipulation



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Admin data balance

	Above the cutoff	Prefer STEM	Transition score				Female	Years of schooling	
			Overall score	Math exam score	Language exam score	Grades 5-8 GPA		Father	Mother
Panel A: 2015-2017 cohorts									
STEM	0.000	0.000	0.000	-0.007	0.001	0.007	-0.018*	-	-
	(0.000)	(0.000)	(0.000)	(0.011)	(0.011)	(0.007)	(0.010)	-	-
Intercept	0.50	0.50	8.26	7.73	8.23	9.16	0.52	-	-
Mean	0.70	0.61	8.59	8.18	8.53	9.33	0.56	-	-
Std. dev.	0.46	0.49	0.98	1.51	1.06	0.56	0.50	-	-
Cutoffs	1,172	1,172	1,172	1,172	1,172	1,172	1,172	-	-
Students	34,691	34,691	34,691	34,691	34,691	34,691	34,691	-	-
Student-cutoffs	40,105	40,105	40,105	40,105	40,105	40,105	40,105	-	-
Panel B: 2019 cohort									
STEM	0.000	0.000	0.000	-0.024	0.009	0.015	-0.020	-	-
	(0.000)	(0.000)	(0.000)	(0.019)	(0.019)	(0.011)	(0.016)	-	-
Intercept	0.50	0.50	8.05	7.05	8.42	9.29	0.55	-	-
Mean	0.69	0.59	8.36	7.52	8.65	9.42	0.57	-	-
Std. dev.	0.46	0.49	0.96	1.49	1.06	0.48	0.50	-	-
Cutoffs	397	397	397	397	397	397	397	-	-
Students	11,439	11,439	11,439	11,439	11,439	11,439	11,439	-	-
Student-cutoffs	13,271	13,271	13,271	13,271	13,271	13,271	13,271	-	-

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End-of-high-school survey balance

	Above the cutoff	Prefer STEM	Transition score				Female	Years of schooling	
			Overall score	Math exam score	Language exam score	Grades 5-8 GPA		Father	Mother
Panel C: End-of-high-school survey									
STEM	0.000	0.000	0.000	-0.040	0.016	0.014	-0.074**	-0.168	-0.061
	(0.000)	(0.000)	(0.000)	(0.041)	(0.040)	(0.023)	(0.037)	(0.145)	(0.161)
Intercept	0.50	0.50	7.91	6.80	8.34	9.28	0.64	12.9	13.3
Mean	0.72	0.60	8.29	7.39	8.61	9.42	0.63	13.1	13.3
Std. dev.	0.45	0.49	0.98	1.52	1.07	0.46	0.48	2.07	1.94
Cutoffs	233	233	233	233	233	233	233	233	233
Students	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598
Student-cutoffs	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856

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Follow-up or peer survey balance

	Above the cutoff	Prefer STEM	Transition score				Female	Years of schooling	
			Overall score	Math exam score	Language exam score	Grades 5-8 GPA		Father	Mother
Panel D: Follow-up or peer survey									
STEM	0.000	0.000	0.000	-0.050	0.026	0.012	-0.079*	-0.207	-0.133
	(0.000)	(0.000)	(0.000)	(0.042)	(0.039)	(0.025)	(0.041)	(0.169)	(0.169)
Intercept	0.50	0.50	7.92	6.81	8.36	9.29	0.64	12.9	13.3
Mean	0.71	0.60	8.29	7.39	8.63	9.42	0.63	13.1	13.4
Std. dev.	0.45	0.49	0.97	1.53	1.04	0.46	0.48	2.07	1.94
Cutoffs	226	226	226	226	226	226	226	226	226
Students	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Student-cutoffs	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421

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Follow-up survey balance

	Above the cutoff	Prefer STEM	Transition score				Female	Years of schooling	
			Overall score	Math exam score	Language exam score	Grades 5-8 GPA		Father	Mother
Panel E: Follow-up survey									
STEM	0.000	0.000	0.000	-0.019	0.015	0.002	-0.052	-0.396	-0.268
	(0.000)	(0.000)	(0.000)	(0.074)	(0.072)	(0.042)	(0.062)	(0.290)	(0.281)
Intercept	0.50	0.50	8.02	6.96	8.43	9.33	0.66	13.0	13.5
Mean	0.70	0.62	8.36	7.50	8.69	9.45	0.66	13.0	13.4
Std. dev.	0.46	0.49	0.88	1.44	0.91	0.42	0.48	2.13	1.99
Cutoffs	154	154	154	154	154	154	154	154	154
Students	814	814	814	814	814	814	814	814	814
Student-cutoffs	891	891	891	891	891	891	891	891	891

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Selection

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: End-of-high-school survey									
STEM	0.007	0.018	-0.003	0.012	-0.000	0.047**	-0.020	0.012	0.010
	(0.013)	(0.016)	(0.018)	(0.017)	(0.019)	(0.019)	(0.017)	(0.022)	(0.017)
Intercept	0.19	0.17	0.21	0.18	0.21	0.15	0.23	0.22	0.17
Mean	0.22	0.22	0.21	0.21	0.23	0.19	0.24	0.25	0.20
Panel B: Follow-up or peer survey									
STEM	0.005	0.019	-0.008	0.004	0.001	0.039**	-0.019	0.020	0.001
	(0.012)	(0.015)	(0.016)	(0.017)	(0.018)	(0.018)	(0.017)	(0.020)	(0.015)
Intercept	0.17	0.15	0.19	0.16	0.18	0.13	0.20	0.18	0.15
Mean	0.18	0.19	0.18	0.18	0.20	0.16	0.20	0.21	0.17
Panel C: Follow-up survey									
STEM	-0.001	0.007	-0.008	0.004	-0.005	0.015	-0.016	0.005	-0.004
	(0.009)	(0.011)	(0.012)	(0.011)	(0.015)	(0.012)	(0.014)	(0.016)	(0.010)
Intercept	0.08	0.07	0.08	0.07	0.08	0.06	0.10	0.09	0.07
Mean	0.07	0.07	0.07	0.07	0.07	0.06	0.08	0.07	0.07
Cutoffs	397	212	185	355	333	354	362	197	200
Students	11,439	7,814	5,457	6,528	4,871	4,892	6,515	4,923	6,795
Student-cutoffs	13,271	7,814	5,457	7,546	5,659	5,706	7,519	5,232	8,039

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Bac. outcomes from the survey data

	Follow-up or peer		Follow-up				
	Take the exam	Pass the exam	Take the exam	Pass the exam	Exam score	Prepared	Hard
Panel A: All students							
STEM	0.002	-0.038**	0.006	-0.022	-0.563***	0.046	0.281***
	(0.002)	(0.016)	(0.008)	(0.025)	(0.166)	(0.045)	(0.096)
Intercept	1.00	0.98	1.00	0.98	8.55	0.82	1.90
Std. dev.	0.06	0.19	0.05	0.14	1.13	0.34	0.73
Cutoffs	226	226	154	154	153	154	154
Students	2,200	2,200	814	814	801	814	814
Student-cutoffs	2,421	2,421	891	891	877	891	891
Panel B: Students at cutoffs with low cutoff scores							
STEM	-0.001	-0.074***	0.005	-0.066	-0.974***	-0.047	0.415***
	(0.005)	(0.028)	(0.016)	(0.045)	(0.231)	(0.078)	(0.150)
Panel C: Students at cutoffs with high cutoff scores							
STEM	0.000	-0.006	0.000	0.002	-0.305	0.108**	0.306**
	(0.000)	(0.010)	(0.000)	(0.013)	(0.222)	(0.052)	(0.142)

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Heterogeneity for initial college enrollment

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Initial college enrollment: any college									
STEM	-0.065**	-0.048	-0.083	-0.093**	-0.080*	-0.008	-0.097**	-0.160***	0.008
	(0.033)	(0.033)	(0.054)	(0.045)	(0.044)	(0.068)	(0.043)	(0.057)	(0.033)
Intercept	0.84	0.91	0.77	0.89	0.81	0.81	0.86	0.81	0.92
Panel B: Initial college enrollment: STEM									
STEM	0.245***	0.283***	0.208***	0.223***	0.250***	0.306***	0.195***	0.179***	0.303***
	(0.039)	(0.052)	(0.049)	(0.069)	(0.045)	(0.072)	(0.047)	(0.055)	(0.055)
Intercept	0.20	0.22	0.17	0.30	0.15	0.24	0.18	0.20	0.22

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Heterogeneity for other college outcomes

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Attend a public college									
STEM	-0.056	-0.084	-0.029	-0.124	-0.049	-0.089	-0.052	-0.263***	0.027
	(0.056)	(0.063)	(0.091)	(0.090)	(0.078)	(0.136)	(0.076)	(0.087)	(0.067)
Intercept	0.80	0.91	0.69	0.96	0.74	0.77	0.83	0.87	0.86
Panel B: Receive a college scholarship									
STEM	-0.143***	-0.183***	-0.104	-0.064	-0.194**	-0.075	-0.199***	-0.279***	-0.128
	(0.050)	(0.066)	(0.066)	(0.095)	(0.077)	(0.111)	(0.068)	(0.082)	(0.079)
Intercept	0.27	0.38	0.17	0.25	0.26	0.26	0.31	0.32	0.29
Panel C: Pass the first-year winter exams									
STEM	-0.120	-0.201	-0.038	-0.351	-0.182	-0.493	-0.038	-0.607**	0.110
	(0.162)	(0.165)	(0.272)	(0.224)	(0.237)	(0.347)	(0.225)	(0.270)	(0.177)
Intercept	3.23	3.50	2.95	3.60	3.15	3.28	3.32	3.35	3.39
Panel D: Expect to finish the initial college program									
STEM	-0.180	-0.203	-0.157	-0.315	-0.304	-0.402	-0.079	-0.440	-0.232
	(0.168)	(0.180)	(0.277)	(0.228)	(0.262)	(0.315)	(0.233)	(0.281)	(0.153)
Intercept	3.28	3.58	2.99	3.63	3.21	3.22	3.40	3.15	3.71

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Heterogeneity for career plans

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Technology or engineering									
STEM	0.231***	0.343***	0.120	0.204*	0.267***	0.235*	0.165***	0.135	0.297***
	(0.061)	(0.075)	(0.094)	(0.112)	(0.079)	(0.136)	(0.055)	(0.123)	(0.084)
Intercept	0.13	0.10	0.15	0.23	0.09	0.29	0.12	0.20	0.09
Panel B: Art, education, law, or social services									
STEM	-0.149***	-0.184**	-0.113*	-0.174**	-0.194**	-0.179**	-0.166**	-0.250**	-0.206***
	(0.049)	(0.073)	(0.063)	(0.081)	(0.074)	(0.088)	(0.068)	(0.117)	(0.065)
Intercept	0.20	0.22	0.18	0.20	0.26	0.17	0.23	0.34	0.24
Panel C: Business									
STEM	-0.042	-0.081	-0.003	-0.009	0.015	-0.001	0.007	0.166*	-0.135
	(0.076)	(0.072)	(0.127)	(0.112)	(0.106)	(0.128)	(0.092)	(0.087)	(0.127)
Intercept	0.32	0.35	0.29	0.34	0.24	0.26	0.32	0.11	0.39

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Heterogeneity for beliefs at the end of high school

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Beliefs about own high school STEM abilities at the end of high school									
STEM	0.839***	0.848***	0.829***	0.939***	0.853***	0.798***	0.861***	0.848***	0.880***
	(0.095)	(0.110)	(0.135)	(0.152)	(0.128)	(0.147)	(0.119)	(0.149)	(0.126)
Intercept	2.60	2.85	2.35	2.78	2.44	2.71	2.53	2.34	2.87
Cutoffs	233	126	107	186	171	164	204	119	114
Students	2,598	1,727	1,129	1,400	1,152	933	1,620	1,250	1,408
Student-cutoffs	2,856	1,727	1,129	1,538	1,254	1,027	1,774	1,281	1,575

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Heterogeneity for the change in beliefs

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Change in beliefs about high school STEM abilities in the year after high school									
STEM	-0.254*	-0.034	-0.474**	0.023	-0.288	-0.206	-0.171	-0.518*	-0.156
	(0.152)	(0.180)	(0.236)	(0.283)	(0.206)	(0.289)	(0.187)	(0.294)	(0.222)
Intercept	0.29	0.13	0.45	0.21	0.27	0.29	0.31	0.54	0.20
Cutoffs	154	85	69	94	93	77	118	73	81
Students	814	550	341	417	333	249	509	347	483
Student-cutoffs	891	550	341	453	362	263	557	357	534

Heterogeneity for beliefs a year after high school

Back

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Beliefs about own high school STEM abilities one year after high school									
STEM	0.744***	0.754***	0.734***	0.938***	0.804***	0.910***	0.675***	0.626**	0.810***
	(0.135)	(0.158)	(0.192)	(0.232)	(0.176)	(0.196)	(0.190)	(0.249)	(0.219)
Intercept	2.91	3.16	2.66	3.02	2.69	2.90	2.92	2.71	3.04
Cutoffs	154	85	69	94	93	77	118	73	81
Students	814	550	341	417	333	249	509	347	483
Student-cutoffs	891	550	341	453	362	263	557	357	534

Back

Why students chose their college program

Explanation	Share selecting yes			Difference: STEM v. Hum./SS
	All	Assigned to STEM	Assigned to Hum./SS	
The subject matched my abilities	0.96	0.96	0.96	0.00
The subject matched my interests	0.95	0.95	0.95	-0.01
The subject would lead to a job that I would be happy with	0.92	0.90	0.94	-0.03
The subject would lead to a job with high earnings	0.90	0.92	0.87	0.05
My parents wanted me to study the subject	0.77	0.78	0.76	0.02
In high school, I learned about career paths related to the subject	0.55	0.56	0.53	0.03
My high school teachers encouraged me to study the subject	0.47	0.50	0.42	0.08
The subject matched what I studied in high school, and it was hard to change	0.39	0.44	0.32	0.11
I thought the subject would be easy	0.23	0.18	0.29	-0.11
The subject is the same as what my friends chose	0.20	0.20	0.20	0.00

Back

Heterogeneity for the change in high school satisfaction

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Change in liking the high school experience									
STEM	0.051	0.116	-0.013	0.050	-0.130	0.100	-0.068	-0.204	0.295*
	(0.133)	(0.151)	(0.200)	(0.197)	(0.208)	(0.241)	(0.165)	(0.232)	(0.167)
Intercept	0.33	0.40	0.27	0.28	0.42	0.40	0.32	0.61	0.16
Panel B: Change in liking the high school curriculum									
STEM	-0.273*	-0.239	-0.308	-0.219	-0.338	0.118	-0.604***	-0.607**	0.102
	(0.164)	(0.190)	(0.256)	(0.287)	(0.251)	(0.318)	(0.221)	(0.294)	(0.206)
Intercept	-0.02	-0.02	-0.01	-0.08	-0.05	0.33	-0.04	0.22	-0.32
Panel C: Change in thinking the high school school curriculum was a good fit									
STEM	-0.372**	-0.073	-0.671***	-0.597**	-0.442**	-0.307	-0.636***	-0.287	-0.381*
	(0.149)	(0.170)	(0.227)	(0.232)	(0.216)	(0.373)	(0.199)	(0.310)	(0.215)
Intercept	0.27	0.21	0.34	0.31	0.30	0.51	0.29	0.28	0.20

Back

Heterogeneity: experience, curriculum, peers

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Like the college experience									
STEM	-0.411**	-0.470**	-0.352	-0.626***	-0.134	-0.126	-0.529**	-0.432	-0.331*
	(0.181)	(0.217)	(0.263)	(0.233)	(0.327)	(0.356)	(0.239)	(0.431)	(0.194)
Intercept	2.41	2.45	2.37	2.48	2.28	2.08	2.50	2.52	2.29
Panel B: Like the college curriculum									
STEM	-0.169	-0.340*	0.002	-0.573**	0.054	0.238	-0.208	-0.230	-0.174
	(0.152)	(0.177)	(0.229)	(0.223)	(0.227)	(0.303)	(0.198)	(0.340)	(0.172)
Intercept	2.48	2.48	2.48	2.77	2.26	2.18	2.43	2.61	2.41
Panel C: Like the college peers									
STEM	-0.414**	-0.431*	-0.396	-0.406	-0.213	0.611	-0.575**	-0.665	-0.225
	(0.197)	(0.227)	(0.296)	(0.345)	(0.297)	(0.462)	(0.237)	(0.430)	(0.258)
Intercept	2.40	2.48	2.33	2.38	2.24	1.64	2.50	2.72	2.16

Back Heterogeneity: instructors, fit, preparedness

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel D: Like the college instructors									
STEM	-0.307*	-0.248	-0.365	-0.317	-0.338	0.308	-0.520**	-0.224	-0.370*
	(0.164)	(0.180)	(0.256)	(0.213)	(0.317)	(0.391)	(0.236)	(0.368)	(0.198)
Intercept	2.59	2.52	2.66	2.62	2.59	2.06	2.62	2.54	2.62
Panel E: College curriculum is a good fit for own abilities									
STEM	0.192	0.154	0.229	0.297	0.095	-0.241	0.307*	0.168	0.054
	(0.131)	(0.144)	(0.210)	(0.232)	(0.201)	(0.215)	(0.158)	(0.286)	(0.128)
Intercept	3.92	3.97	3.87	3.80	3.99	4.19	3.89	3.82	4.08
Panel F: Well prepared for the college curriculum									
STEM	0.586***	0.823***	0.350	0.647**	0.443	1.200***	0.518**	0.346	0.598***
	(0.173)	(0.216)	(0.261)	(0.282)	(0.279)	(0.383)	(0.219)	(0.357)	(0.208)
Intercept	2.73	2.62	2.85	2.70	2.85	2.23	2.80	2.66	2.93

Back

Heterogeneity for non-cognitive outcomes

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Wellbeing									
STEM	0.159***	0.115	0.203***	0.158*	0.143*	0.014	0.228***	0.140	0.142
	(0.059)	(0.083)	(0.072)	(0.091)	(0.086)	(0.107)	(0.073)	(0.094)	(0.091)
Intercept	-0.11	-0.11	-0.10	-0.11	-0.08	0.06	-0.22	-0.05	-0.14
Panel B: Grit									
STEM	0.084*	0.040	0.128*	0.073	0.090	0.128*	0.056	0.084	0.071
	(0.045)	(0.047)	(0.066)	(0.068)	(0.072)	(0.077)	(0.064)	(0.068)	(0.059)
Intercept	-0.06	-0.07	-0.06	-0.06	-0.02	-0.10	-0.03	-0.08	-0.02

Back

Heterogeneity for time use

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Doing homework									
STEM	0.234*	0.310*	0.159	0.456**	0.058	0.316	0.369**	0.507**	0.050
	(0.123)	(0.163)	(0.152)	(0.216)	(0.167)	(0.214)	(0.152)	(0.237)	(0.177)
Intercept	2.51	2.57	2.45	2.54	2.56	1.89	2.76	2.19	2.82
Panel B: Playing video games									
STEM	-0.116	-0.206	-0.026	-0.161	0.013	-0.414*	-0.170	0.011	-0.251
	(0.127)	(0.159)	(0.168)	(0.200)	(0.178)	(0.233)	(0.131)	(0.203)	(0.183)
Intercept	1.39	1.54	1.24	1.49	1.35	2.58	0.77	1.50	1.39
Panel C: On social media									
STEM	-0.521***	-0.533***	-0.508***	-0.360	-0.533***	-0.391*	-0.550***	-0.243	-0.537***
	(0.129)	(0.153)	(0.174)	(0.218)	(0.201)	(0.218)	(0.172)	(0.214)	(0.171)
Intercept	3.42	3.34	3.51	3.32	3.49	2.95	3.66	3.24	3.40

Heterogeneity for time use, cont.

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel D: Reading									
STEM	-0.243**	-0.256*	-0.229*	-0.245	-0.206	-0.477***	-0.055	-0.341*	-0.345**
	(0.108)	(0.155)	(0.122)	(0.158)	(0.159)	(0.170)	(0.152)	(0.201)	(0.153)
Intercept	1.43	1.37	1.49	1.32	1.58	1.22	1.58	1.64	1.37
Panel E: With friends									
STEM	-0.198	-0.300**	-0.097	-0.102	-0.186	-0.183	-0.244	0.002	-0.332**
	(0.121)	(0.136)	(0.169)	(0.189)	(0.201)	(0.231)	(0.158)	(0.206)	(0.166)
Intercept	2.64	2.71	2.56	2.68	2.61	2.75	2.61	2.64	2.63

Back

Heterogeneity for friends

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Good female friends									
STEM	-0.509**	-0.218	-0.801**	-0.290	-0.517	-0.874*	-0.250	0.018	-0.934***
	(0.258)	(0.278)	(0.391)	(0.409)	(0.318)	(0.451)	(0.304)	(0.348)	(0.302)
Intercept	4.37	4.25	4.50	4.42	4.25	4.46	4.37	3.81	4.69
Panel B: Good male friends									
STEM	0.403*	0.853***	-0.048	0.942**	0.358	0.243	0.205	0.361	0.251
	(0.230)	(0.319)	(0.281)	(0.374)	(0.314)	(0.447)	(0.247)	(0.394)	(0.304)
Intercept	3.56	3.45	3.68	3.91	3.09	4.97	2.80	3.62	3.68

Back

Heterogeneity for expectations

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Expectations about being the breadwinner									
STEM	0.101**	0.089*	0.114**	0.127*	0.135**	0.118	0.027	0.075	0.131**
	(0.039)	(0.051)	(0.051)	(0.067)	(0.057)	(0.074)	(0.039)	(0.063)	(0.051)
Intercept	2.13	2.17	2.10	2.14	2.08	2.32	2.04	2.15	2.13
Panel B: Expected number of children									
STEM	0.056	0.095	0.017	0.086	0.081	0.304**	-0.044	0.097	0.042
	(0.082)	(0.115)	(0.101)	(0.146)	(0.096)	(0.135)	(0.095)	(0.116)	(0.118)
Intercept	1.71	1.59	1.83	1.75	1.69	1.60	1.73	1.77	1.67
Panel C: Traditionalist expectations									
STEM	0.090**	0.096*	0.084*	0.111*	0.149***	0.129**	0.008	0.072	0.084
	(0.038)	(0.052)	(0.047)	(0.061)	(0.048)	(0.058)	(0.039)	(0.058)	(0.054)
Intercept	-0.03	-0.04	-0.02	0.03	-0.09	0.27	-0.22	0.02	-0.05

Back

Heterogeneity for political preferences

	All	Prefer		Stronger in		Gender		Cutoff score	
		STEM	Hum./SS	Math	Language	Male	Female	Low	High
Panel A: Right-wing preferences									
STEM	0.056	0.039	0.074	0.072	0.058	0.162**	-0.011	0.027	0.085
	(0.039)	(0.049)	(0.055)	(0.065)	(0.052)	(0.064)	(0.046)	(0.061)	(0.053)
Intercept	-0.02	-0.05	0.01	-0.05	0.01	-0.02	-0.03	0.04	-0.06
Panel B: Right-wing economic preferences									
STEM	0.058	0.007	0.108	0.001	0.103	0.232***	-0.054	0.014	0.104
	(0.051)	(0.064)	(0.071)	(0.079)	(0.077)	(0.083)	(0.061)	(0.072)	(0.075)
Intercept	-0.02	0.01	-0.05	0.01	-0.04	-0.07	0.00	0.02	-0.05
Panel C: Right-wing social preferences									
STEM	0.055	0.071	0.039	0.142*	0.013	0.092	0.033	0.039	0.066
	(0.051)	(0.062)	(0.072)	(0.083)	(0.066)	(0.089)	(0.064)	(0.085)	(0.068)
Intercept	-0.02	-0.10	0.07	-0.11	0.06	0.02	-0.07	0.06	-0.08