POPULATED PRE-ANALYSIS PLAN

for

Remote delivery of STEM and entrepreneurship role models at scale changes college major choice*

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1. Introduction

On April 16th, 2021, we uploaded a pre-analysis plan (PAP) to the AEA RCT registry (ID number AEARCTR-0003593; https://doi.org/10.1257/rct.5982-1.0). The document offers guidelines to assess a field experiment where high-school students watch videos introducing role models. The videos feature 20 successful individuals working as STEM professionals and entrepreneurs. We test two main treatments, i) the impact of watching a gender-balanced set of role models and ii) the impact of watching a same-sex set of role models on multiple outcomes related to STEM and entrepreneurship preferences, beliefs, and choices. We introduce placebo videos for comparison.

We construct the PAP following the results from an earlier intervention that features the same treatment in a slightly different group of students.[1] Henceforth, we will refer to it as Experiment 1. The current document features the results of the experiment described in the PAP. In the remaining, we will refer to it as Experiment 2.

1.1. Target population

Experiment 2 targeted a sample of high school students in their senior year. We gather about 31,000 Ecuadorian students (1,014 schools) from both educational (geographical) regions in Ecuador, the Highlands-Amazon and the Coast.[2] Students worked with the treatment from home due to the school closure mandate associated with the Coronavirus outbreak. An agreement with the Ministry of Education of Ecuador allows access to a representative sample of students from the technical specialization[3]. The treatment replaces their mandatory internship, which was canceled due to the health emergency.

1.2. Outcome variables

We collect survey data pre- and post-treatment and combine it with administrative records to construct a set of outcomes that allow us to study the effect of role models on students' academic and career choices (Appendix A for more details). Below, we list the key outcomes featured in the PAP. We introduce the treatment effects for all of the listed variables.

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[1] High school students in the last three years of high school. These students belong to Zone 2, one out of nine administrative zones in Ecuador. This sample gathers students from science and technical specializations.

[2] We feature further characteristics of the sample in the PAP, Section 2. A description of the effective sample is described in Table 1 of the submitted paper.

[3] It is one out of two specializations in high school. It prepares students to face the challenges of the labor market or university, offering (soon to be) graduates a broad set of options.

a) *Psychological Outcomes related to Entrepreneurship* – it clusters entrepreneurial self-efficacy, positive entrepreneurial attitudes, entrepreneurship attitudes, and entrepreneurial interests. We capture average standardized measures from each variable, and a general standardized index.

b) *Entrepreneurial intentions and opportunity identification* – it clusters the following variables, entrepreneurial intentions, and opportunity identifications. We capture average standardized measures from each variable, and a general standardized index.

c) *STEM Intentions*: which is calculated as a z-score of an average of items asking students about their intentions to study and work as a STEM professional when they finish high school.

d) *STEM Attitude*: which is calculated as a z-score of an average of items asking students about their perception towards study or work in a STEM area.

e) *Occupational preference*: we use information from section 7.c (career selection) based on the Inter-American Development Bank classification to define STEM occupations (López-Bassols et al. 2018).[4] We choose occupations related to science, engineering, health, and Information and Communication Technologies (ICTs). We cannot assess entrepreneurship preference in the occupational search tool because it is a cross-sectional activity.

f) *Study program preference.* We used a measure that was collected at the baseline and midline survey, constructed based on the question: "List the three education programs you want to study at the university." We define treated students' interest in Entrepreneurship and STEM areas based on the following list among all possible searchable educational programs:

   a. *STEM* – Natural sciences, mathematics and statistics, Information and Communication Technologies (ICTs), and Engineering, manufacturing, and construction based in the International Standard Classification of Education (ISCED).
   b. *Entrepreneurship* – Business administration and Law, and Economics according to the International Standard Classification of Education (ISCE).

g) *Gender stereotype* - "Stereotype index S" - z-scores of the average of STEM-related questions. "Stereotype index E" - z-scores of the average of entrepreneurship-related questions.

[4] Notice that these outcome data are only available for a third of the students, but is available for both placebo and control students.

a. Notice that we can see how gender stereotypes at the baseline condition the impact of watching role models only for students in the Coastal region. As an alternative, we plan to use the "*Stereotype Index ST* " to identify changes in gender perceptions from baseline to endline in the entire sample.

h) *College education choice*: STEM_college and Entrepreneurship_college. We assign 1 if students report one, 0 otherwise, respectively.

2. Main treatment hypotheses

We propose that even though the videos in this intervention are short, a documented role model identification can appear between students and individuals of the same gender in the videos and that this leads to increased intentions, attitudes, occupational preference, and study program preference, compared to those not watching the role model videos. The role model video is also proposed to debias students towards less gender biased opinions.

We further predict that with increased exposure for the same-gender role model shown in the video the intentions, attitudes, occupational preference, and study program preference also increase. We predict that gender biases will decrease for females, but they may be more difficult to affect for male students.

Because the fraction of same gender watched is the complement of the fraction of the opposite gender watched, the effect for the fraction of the opposite gender will by construction be a linear function of the fraction of same gender but with reverse sign. We will therefore not estimate the impact of the fraction of the opposite gender.

Hypothesis 1.1: Compared to watching placebo videos from Educa TV, watching an instructional Role model video treatment with mixed female and male entrepreneurs and scientists will lead to greater psychological outcomes, intentions, opportunity identifications, occupational preference, and study program preference and choices towards Entrepreneurship and STEM careers. It will reduce gender stereotypes.

We examine the outcomes by student gender to test whether girls and boys exhibit similar responses when watching the role model videos.

Hypothesis 1.2: The greater the fraction of same gender watched in an instructional Role model video treatment with mixed entrepreneurs and scientists the greater the psychological outcomes, intentions, opportunity identifications, occupational preference, study program preference and

choices towards Entrepreneurship and STEM careers, and the lower the gender stereotypes conditional on watching the Role model video treatment.

Hypothesis 1.3: The effect of watching the fraction of same gender in an instructional Role model video treatment with mixed entrepreneurs and scientists on psychological outcomes, intentions, opportunity identifications, occupational preference, study program preference and choices, and gender stereotypes will be greater for female than for male students.

3. Statistical Methods

Unless otherwise mentioned, all equations presented here are run separately for entrepreneurship and STEM family measures and separately for boys and girls. For each specification there are thus multiple estimates, but we do not write them out to save space. For testing hypothesis 1.1, to estimate the impact of watching role model videos regardless of gender composition, we are going to use the ANCOVA specification:

$$Y_{i,j,t,girls} = \beta_0 + \beta_{RM} RM_j + \pi Y_{i,j,0} + M_{ik,0} + Controls_{i,j,0} + Strata'_{k,j}\,\Theta + \varepsilon_{i,j} \qquad (1.1)$$

$$Y_{i,j,t,boys} = \beta_0 + \beta_{RM} RM_j + \pi Y_{i,j,0} + M_{i,k,0} + Controls_{i,j,0} + Strata'_{k,j}\,\Theta + \varepsilon_{i,j} \qquad (1.2)$$

where:

$Y_{i,j,t}$ – dependent variable as described in section 8a,

i –student indicator,

j –school indicator,

t –time we measure the outcome. It can take the values 0 for baseline, 1 midline, 2 endline.

RM - dummy variable for role model treatment that takes value 1 if the student i watch role models and 0 if student watch placebo videos,

$Y_{i,j,0}$ – outcome variables from the baseline survey,

k – indicator of strata. We create strata to randomize school allocation,

$M_{i,k,o}$ dummy if the value is missing at the baseline for student i in strata *k,*

$Controls_{i,j,0}$-vector of control variables,

$Strata'_{k,j}$– vector of randomization strata dummy variables clustered at the school level,

$\varepsilon_{i,j}$ – standard error clustered at the school level.

We cluster the intervention at the school level. For binary outcomes, we plan to estimate Linear Probability Models. We will use the post-double selection Lasso method for all regressions to control for baseline variables to boost power through including variables strongly predictive of outcomes. To test differences between boys and girls we test if β_{RM} in equation 1.1. is statistically significantly different from β_{RM} in equation 1.2. Alternatively, we pool boys and girls, introduce a dummy for girls and add an interaction between that dummy and RM.

For testing hypothesis 1.2 we examine the effect of the same-gender role model separately for girls and boys conditional on being in the treated group with the following equations:

$$Y_{i,j,t,girls,RM=1} = \beta_0 + \sum_{n=0}^{n=20} \delta_n G + \pi Y_{i,0} + M_{i,0} + Controls_{i0} + u_l + \varepsilon_i \quad (2.1)$$

$$Y_{i,j,t,boys,RM=1} = \beta_0 + \sum_{n=0}^{n=20} \delta_n G + \pi Y_{i,0} + M_{i,0} + Controls_{i,j,0} + u_l + \varepsilon_i \quad (2.2)$$

where, in addition to before:

n – an index representing the number of the overall females/males presented in lesson 1 and 2, where n can take the values from 0 to 20 that account for each females/males segment out of 20 segments,

G – share of same gender segments, computed as $n_{\text{same gender}}/20$

l – indicator of class,

u_l – class fixed effects,

ε_i – standard error at the student level.

Since the variation is at the individual level, we do not use school clustering. Instead, we include class fixed effects since randomization was within class.

If the effects of the fraction of same gender is statistically no different than linear, we will reduce the model complexity to just one parameter estimating a linear effect

$$Y_{i,j,t,girls,RM=1} = \beta_0 + \beta_1 G + \pi Y_{i,0} + M_{i,0} + Controls_{i0} + u_l + \varepsilon_i \quad (2.1.1)$$

$$Y_{i,j,t,boys,RM=1} = \beta_0 + \beta_1 G + \pi Y_{i,0} + M_{i,0} + Controls_{i,j,0} + u_l + \varepsilon_i \quad (2.2.1)$$

We capture the effect of hypothesis 1.3 with the following specification. We compute the effect on the treated students. We capture the effect with G as the share of female interviews. An alternative is to compare the sizes of the coefficients β_1 in equation 2.1 and 2.2 above.

$$Y_{i,t,RM=1} = \beta_0 + \beta_1 G(1+F) + \pi Y_{i,0} + M_{i,0} + Controls_{i,,0} + u_l + \varepsilon_i \qquad (2.3)$$

where, in addition to (1):

F – dummy variable that takes the value of 1 if the student is a girl and 0 if it is a boy,

ε_i – standard error at the student level.

Since the variation is at the individual level, we use no school clustering. Instead, we include class fixed effects since randomization was within class.

Finally, we would like to assess the distributional consequences of our treatment. To do so, we plan to run a Quantile Regression. We will report the treatment effects for five quantiles (Q1=0.1, Q2=0.25, Q3=0.50, Q4=0.75, Q5=0.9) when the outcome is a continuous variable.

$$Y_{i,t} = Q^{\tau}_{y_{i,t,1}} - Q^{\tau}_{y_{i,t,0}} \,|\pi Y_{i,j,0}, M_{i,k,0}, Controls_{ij,0} + Strata'_{k,j}\,\Theta \qquad (4)$$

Where:

$Q^{\tau}_{y_{i,t,1}} - Q^{\tau}_{y_{i,t,0}}$: is the QTE at quantile $\tau\ \epsilon$ (0.1, 0.25, 0.50, 0.75, 0.9) derived by taking the difference between the τ quantile of the outcome variable for treated ($Q^{\tau}_{y_{i,t,1}}$) and untreated ($Q^{\tau}_{y_{i,t,0}}$).

$Y_{i,0}$ – outcome variables from the baseline survey.

$M_{i,k,o}$ dummy if the value is missing at the baseline for student i.

$Controls_{i,k,0}$-vector of control variables.

$Strata'_{k,j}$– vector of randomization strata dummy variables clustered at the school level

The quantile regression for the effect of the same-gender interviews separately by girls and boys sample should be the following:

$$Y_{i,t,girls} = [Q^{\tau}_{y_{i,t,1}} * \beta_1 G] - [Q^{\tau}_{y_{i,t,0}} * \beta_1 G] | \pi Y_{i,j,0}, M_{i,k,0}, Controls_{i,j,0} + Strata'_{k,j}\,\Theta \qquad (4.1)$$

$$Y_{i,t,boys} = [Q^{\tau}_{y_{i,t,1}} * \beta_1 G] - [Q^{\tau}_{y_{i,t,0}} * \beta_1 (1-G)]\,|\pi Y_{i,0}, M_{i,k,0}, Controls_{i,k,0} + Strata'_{k,j}\,\Theta \qquad (4.2)$$

Where:

$Q^{\tau}_{y_{i,t,1}} - Q^{\tau}_{y_{i,t,0}}$: is the QTE at quantile $\tau\ \epsilon$ (0.1, 0.25, 0.50, 0.75, 0.9) derived by taking the difference between the τ quantile of the outcome variable for treated ($Q^{\tau}_{y_{i,t,1}}$) and untreated ($Q^{\tau}_{y_{i,t,0}}$).

G – share of same gender role models in the set of videos shown.

$Y_{i,0}$ – outcome variables from the baseline survey.

$M_{i,k,o}$ dummy if the value is missing at the baseline for student i.

$Controls_{i,j,0}$-vector of control variables.

$Strata'_{k,j}$– vector of randomization strata dummy variables clustered at the school level

Addressing differences in distribution, however, requires an assumption of rank invariance. It means the rank of the individual in the outcome distribution should be invariant to the treatment status. In other words, the rank assigned to the individual at the outcome variable should not change based on the treatment allocation. A violation of the assumption implies that the reported effects cannot be interpreted as causal.

4. Results

4.1. Watching role models regardless of the gender composition

Table 1: Treatment effects for the Psychological Outcomes related to Entrepreneurship

	Self-efficacy (1)	Positive Attitudes (2)	Attitudes (3)	Interest (4)	Summary Index (5)
Panel 1: Female students					
Treatment (RM)	0.016	0.010	0.032	0.009	0.022
	(0.016)	(0.009)	(0.014)	(0.015)	(0.016)
	[-0.014, 0.047]	[-0.008, 0.028]	[0.004, 0.059]	[-0.021, 0.040]	[-0.009, 0.054]
p-values	0.300	0.269	0.023	0.547	0.169
q-values	0.375	0.375	0.115	0.547	0.375
Placebo mean	-0.02	0.019	0.079	-0.035	0.008
N. obs	12,816	12,794	12,898	12,816	12,775
N. clusters	770	770	770	770	770
Panel 2: Male students					
Treatment (RM)	-0.008	0.000	-0.001	-0.006	-0.008
	(0.014)	(0.009)	(0.017)	(0.013)	(0.017)
	[-0.034, 0.019]	[-0.019, 0.018]	[-0.035, 0.033]	[-0.031, 0.019]	[-0.041, 0.024]
p-values	0.579	0.980	0.972	0.652	0.622
q-values	0.98	0.98	0.98	0.98	0.98
Placebo mean	0.009	-0.021	-0.074	0.023	-0.018
N. obs	14,678	14,656	14,827	14,679	14,646
N. clusters	758	758	760	758	758
H0(a): Girls = Boys	0.25	0.43	0.15	0.45	0.19
H0(b): Girls = Boys	0.458	0.499	0.241	0.735	0.328

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment is watching Business and STEM role models, regardless of their gender composition, on students' Psychological Outcomes related to Entrepreneurship. Columns 1 to 4 examine individual outcomes, and Column 5 introduces a

summary index. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing and the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

Table 2: Treatment effects for Entrepreneurial intentions and opportunity identification

	Intentions	Opportunities Identification	Summary Index
	(1)	(2)	(3)
Panel 1: Female students			
Treatment (RM)	0.016	0.006	0.015
	(0.014)	(0.015)	(0.016)
	[-0.012, 0.044]	[-0.024, 0.036]	[-0.017, 0.047]
p-values	0.272	0.691	0.358
q-values	0.537	0.691	0.537
Placebo mean	0.058	-0.024	0.024
N. obs	12,896	12,794	12,775
N. clusters	770	770	770
Panel 2: Male students			
Treatment (RM)	0.009	0.010	0.015
	(0.016)	(0.016)	(0.019)
	[-0.023, 0.041]	[-0.021, 0.040]	[-0.021, 0.052]
p-values	0.572	0.532	0.408
q-values	0.572	0.572	0.572
Placebo mean	-0.057	0.02	-0.027
N. obs	14,827	14,656	14,646
N. clusters	760	758	758
H0(a): Girls = Boys	0.76	0.87	0.99
H0(b): Girls = Boys	0.830	0.963	0.966

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment is watching Business and STEM role models, regardless of their gender composition, on students' Entrepreneurial intentions and opportunity identification. Columns 1 and 2 examine individual outcomes, and Column 3 introduces a summary index. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing and the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

Table 3: Treatment effects for STEM Intentions and Attitudes

	Attitudes (1)	Self-efficacy (2)	Intentions (3)
Panel 1: Female students			
Treatment (RM)	0.020	-0.005	0.010
	(0.014)	(0.021)	(0.015)
	[-0.008, 0.048]	[-0.046, 0.036]	[-0.020, 0.039]
p-values	0.163	0.808	0.530
q-values	0.489	0.808	0.795
Placebo mean	0.034	-0.032	-0.008
N. obs	12,896	7,019	12,896
N. clusters	770	459	770
Panel 2: Male students			
Treatment (RM)	-0.003	0.007	-0.002
	(0.016)	(0.019)	(0.015)
	[-0.034, 0.028]	[-0.031, 0.045]	[-0.031, 0.027]
p-values	0.847	0.720	0.885
q-values	0.885	0.885	0.885
Placebo mean	-0.035	0.033	-0.004
N. obs	14,825	7,075	14,825
N. clusters	760	450	760
H0(a): Girls = Boys	0.28	0.67	0.58
H0(b): Girls = Boys	0.531	0.530	0.953

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment is watching Business and STEM role models, regardless of their gender composition, on students' STEM intentions, self-efficacy, and attitudes. We collect STEM self-efficacy only for the subsample of students of the Coast regime. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing and the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

Table 4: Treatment effects for Study and Occupation preferences

	STEM		Business
	Study preferences	Work preferences	Study preferences
	(1)	(2)	(3)
Panel 1: Female students			
Treatment (RM)	-0.013	-0.025	0.006
	(0.007)	(0.011)	(0.007)
	[-0.026, 0.001]	[-0.046, -0.004]	[-0.008, 0.020]
p-values	0.079	0.020	0.424
q-values	0.118	0.059	0.424
Placebo mean	0.168	0.305	0.205
N. obs	12,768	12,815	12,768
N. clusters	777	782	777
Panel 2: Male students			
Treatment (RM)	0.004	-0.020	-0.004
	(0.009)	(0.013)	(0.006)
	[-0.013, 0.021]	[-0.045, 0.006]	[-0.015, 0.007]
p-values	0.672	0.126	0.457
q-values	0.672	0.379	0.672
Placebo mean	0.387	0.384	0.094
N. obs	14,233	14,655	14,233
N. clusters	758	759	758
H0(a): Girls = Boys	0.15	0.76	0.28
H0(b): Girls = Boys	0.066	0.050	0.066

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment is watching Business and STEM role models, regardless of their gender composition, on students' study and career preferences toward STEM and Entrepreneurship. Columns 1 and 2 examine study and occupation preferences toward STEM areas, and Column 3 introduces study preferences for business. All three outcomes are collected at the midline. Due to the atypical organization of the country, we collected midline data between two (Highlands and Amazon region) and six weeks (Coast regime) after watching the treatment videos. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing and the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

Table 5: Treatment effects for Gender Stereotypes

	Gender stereotype		Index
	STEM	Entrepreneurship	Stereotype
	(1)	(2)	(3)
Panel 1: Female students			
Treatment (RM)	0.031	0.012	-0.015
	(0.019)	(0.017)	(0.007)
	[-0.005, 0.068]	[-0.021, 0.044]	[-0.029, 0.000]
p-values	0.094	0.490	0.048
q-values	0.141	0.490	0.141
Placebo mean	-0.17	-0.159	0.322
N. obs	7,020	7,020	12,768
N. clusters	459	459	777
Panel 2: Male students			
Treatment (RM)	-0.010	-0.005	-0.005
	(0.016)	(0.014)	(0.007)
	[-0.040, 0.021]	[-0.032, 0.021]	[-0.018, 0.008]
p-values	0.538	0.700	0.467
q-values	0.7	0.7	0.7
Placebo mean	0.176	0.165	0.727
N. obs	7,075	7,075	14,233
N. clusters	450	450	758
H0(a): Girls = Boys	0.09	0.44	0.33
H0(b): Girls = Boys	0.156	0.590	0.219

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment involves watching Business and STEM role models, regardless of their gender composition, on students' Gender stereotypes. Columns 1 and 2 examine the endline stereotype index gathered from students at the Coast regime, and Column 3 introduces the so-called stereotype index at the midline. Due to the atypical organization of the country, we collect midline data between two (Highlands and Amazon region) to six weeks (Coast regime) after watching the treatment videos. Furthermore, we collected endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing and the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

Table 6: Treatment effects for Academic Choices

	STEM majors (1)	Business majors (2)
Panel 1: Female students		
Treatment (RM)	-0.022	0.016
	(0.007)	(0.009)
	[-0.036, -0.008]	[-0.001, 0.033]
p-values	0.002	0.071
q-values	0.002	0.036
Placebo mean	0.108	0.113
N. obs	13,597	13,597
N. clusters	790	790
Panel 2: Male students		
Treatment (RM)	-0.034	0.002
	(0.010)	(0.006)
	[-0.052, -0.015]	[-0.011, 0.015]
p-values	0.000	0.775
q-values	0.000	0.388
Placebo mean	0.238	0.045
N. obs	15,646	15,646
N. clusters	771	771
H0(a): Girls = Boys	0.32	0.2
H0(b): Girls = Boys	0.123	0.091

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Standard errors clustered at the school level in parentheses. Each regression includes strata dummies, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. The treatment involves watching Business and STEM role models, regardless of their gender composition, on students' Academic Choices. We use administrative records from the Ministry of Higher Education of Ecuador (Senescyt). Since the timing of the intervention varies by region, we control for it in the estimation. We also account for the strata of random allocation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above.

4.2. Matching role models and students by sex

Since we could not reject the null hypothesis that the estimation is non-linear, we introduce the results of the alternative specification here. Estimates for the main specification are provided in the Appendix.

Table 7: Matching effects of watching same-sex role models for the Psychological Outcomes related to Entrepreneurship

	Self-efficacy (1)	Positive Attitudes (2)	Attitudes (3)	Interest (4)	Summary Index (5)
Panel 1: Female students					
Share of female segments	0.150	0.015	0.028	0.069	0.106
	(0.086)	(0.054)	(0.084)	(0.083)	(0.091)
	[-0.018, 0.318]	[-0.090, 0.120]	[-0.137, 0.193]	[-0.093, 0.232]	[-0.073, 0.286]
p-values	0.080	0.780	0.743	0.405	0.245
q-values	0.400	0.780	0.780	0.674	0.612
Placebo mean	-0.013	0.034	0.106	-0.031	0.027
N. obs	6,309	6,296	6,351	6,309	6,285
Panel 2: Male students					
Share of female segments	-0.009	0.032	0.031	-0.026	-0.004
	(0.080)	(0.053)	(0.093)	(0.079)	(0.093)
	[-0.167, 0.148]	[-0.071, 0.136]	[-0.150, 0.212]	[-0.180, 0.129]	[-0.187, 0.179]
p-values	0.907	0.539	0.738	0.745	0.964
q-values	0.964	0.964	0.964	0.964	0.964
Placebo mean	-0.024	-0.033	-0.09	-0.019	-0.058
N. obs	6,854	6,841	6,912	6,854	6,835
H0(a): Girls = Boys	0.17	0.82	0.98	0.41	0.4
H0(b): Girls = Boys	0.171	0.894	0.807	0.461	0.352

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

Table 8: Matching effects of watching same-sex role models for the Entrepreneurial intentions and opportunity identification

	Intentions (1)	Opportunities Identification (2)	Summary Index (3)
Panel 1: Female students			
Share of female segments	-0.006	-0.028	-0.021
	(0.090)	(0.091)	(0.098)
	[-0.182, 0.171]	[-0.206, 0.150]	[-0.213, 0.172]
p-values	0.951	0.757	0.834
q-values	0.951	0.951	0.951
Placebo mean	0.075	-0.006	0.051
N. obs	6,350	6,296	6,285
Panel 2: Male students			
Share of female segments	0.127	-0.027	0.080
	(0.093)	(0.092)	(0.097)
	[-0.055, 0.309]	[-0.208, 0.153]	[-0.109, 0.270]
p-values	0.170	0.767	0.406
q-values	0.509	0.767	0.609
Placebo mean	-0.069	0.024	-0.032
N. obs	6,912	6,841	6,835
H0(a): Girls = Boys	0.3	1	0.46
H0(b): Girls = Boys	0.321	0.829	0.396

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

Table 9: Matching effects of watching same-sex role models for the STEM Attitudes and Intentions

	Attitudes (1)	Self-efficacy (2)	Intentions (3)
Panel 1: Female students			
Share of female segments	0.068	0.170	0.112
	(0.089)	(0.126)	(0.091)
	[-0.107, 0.243]	[-0.077, 0.417]	[-0.067, 0.291]
p-values	0.444	0.178	0.219
q-values	0.444	0.328	0.328
Placebo mean	0.027	-0.074	-0.047
N. obs	6,350	3,354	6,350
Panel 2: Male students			
Share of female segments	0.113	-0.032	0.063
	(0.093)	(0.116)	(0.091)
	[-0.069, 0.294]	[-0.260, 0.196]	[-0.115, 0.242]
p-values	0.224	0.783	0.488
q-values	0.672	0.783	0.732
Placebo mean	-0.039	0.036	-0.026
N. obs	6,912	3,532	6,912
H0(a): Girls = Boys	0.73	0.24	0.7
H0(b): Girls = Boys	0.990	0.161	0.486

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). We collect STEM self-efficacy only for the subsample of students of the Coast regime. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

Table 10: Matching effects of watching same-sex role models for Study and Occupation Preferences

	STEM		Business
	Study preferences	Work preferences	Study preferences
	(1)	(2)	(3)
Panel 1: Female students			
Share of female segments	0.023	0.059	0.001
	(0.032)	(0.051)	(0.036)
	[-0.040, 0.086]	[-0.041, 0.159]	[-0.069, 0.072]
p-values	0.474	0.249	0.968
q-values	0.710	0.710	0.968
Placebo mean	0.143	0.269	0.222
N. obs	6,295	6,324	6,295
Panel 2: Male students			
Share of female segments	-0.026	-0.098	0.021
	(0.042)	(0.053)	(0.026)
	[-0.109, 0.057]	[-0.202, 0.006]	[-0.030, 0.072]
p-values	0.535	0.065	0.419
q-values	0.535	0.195	0.535
Placebo mean	0.375	0.364	0.1
N. obs	6,627	6,828	6,627
H0(a): Girls = Boys	0.35	0.03	0.66
H0(b): Girls = Boys	0.304	0.044	0.568

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). Columns 1 and 2 examine study and occupation preferences toward STEM areas, and Column 3 introduces study preferences for business. All three outcomes are collected at the midline. Due to the atypical organization of the country, we collected midline data between two (Highlands and Amazon region) and six weeks (Coast regime) after watching the treatment videos. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

Table 11: Matching effects of watching same-sex role models for Gender Stereotypes

	Gender stereotype		Index
	STEM	Entrepreneurship	Stereotype
	(1)	(2)	(3)
Panel 1: Female students			
Share of female segments	0.097	0.128	-0.007
	(0.102)	(0.100)	(0.022)
	[-0.104, 0.297]	[-0.068, 0.324]	[-0.050, 0.035]
p-values	0.344	0.199	0.743
q-values	0.517	0.517	0.743
Placebo mean	-0.126	-0.144	0.289
N. obs	3,354	3,354	6,295
Panel 2: Male students			
Share of female segments	0.120	0.007	-0.009
	(0.098)	(0.090)	(0.019)
	[-0.072, 0.312]	[-0.169, 0.183]	[-0.047, 0.029]
p-values	0.220	0.941	0.639
q-values	0.660	0.941	0.941
Placebo mean	0.166	0.149	0.717
N. obs	3,532	3,532	6,627
H0(a): Girls = Boys	0.87	0.37	0.95
H0(b): Girls = Boys	0.914	0.285	0.996

Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). Columns 1 and 2 examine study and occupation preferences toward STEM areas, and Column 3 introduces study preferences for business. Columns 1 and 2 examine the endline stereotype index gathered from students at the Coast regime, and Column 3 introduces the so-called stereotype index at the midline. Due to the atypical organization of the country, we collect midline data between two (Highlands and Amazon region) to six weeks (Coast regime) after watching the treatment videos. Furthermore, we collected endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. The estimation controls for the difference in timing. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

Table 12: Matching effects of watching same-sex role models for Academic Choices

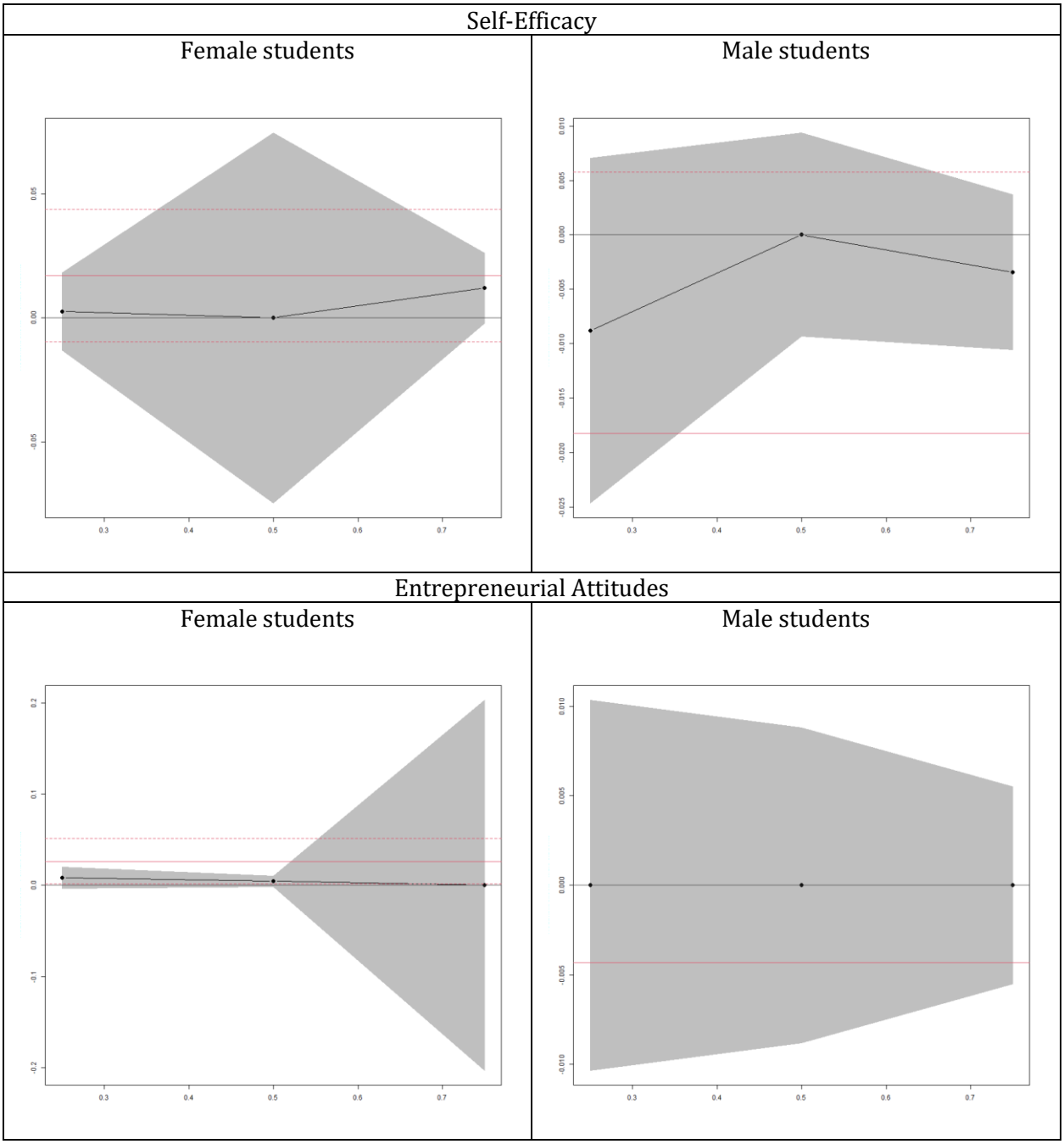
	STEM majors (1)	Business majors (2)
Panel 1: Female students		
Share of female segments	0.022	-0.053
	(0.028)	(0.032)
	[-0.033, 0.076]	[-0.117, 0.010]
p-values	0.438	0.101
q-values	0.438	0.201
Placebo mean	0.084	0.14
N. obs	6,741	6,741
Panel 2: Male students		
Share of female segments	0.008	0.014
	(0.036)	(0.021)
	[-0.062, 0.079]	[-0.027, 0.055]
p-values	0.820	0.517
q-values	0.82	0.82
Placebo mean	0.191	0.047
N. obs	7,329	7,329
H0(a): Girls = Boys	0.77	0.08
H0(b): Girls = Boys	0.689	0.060

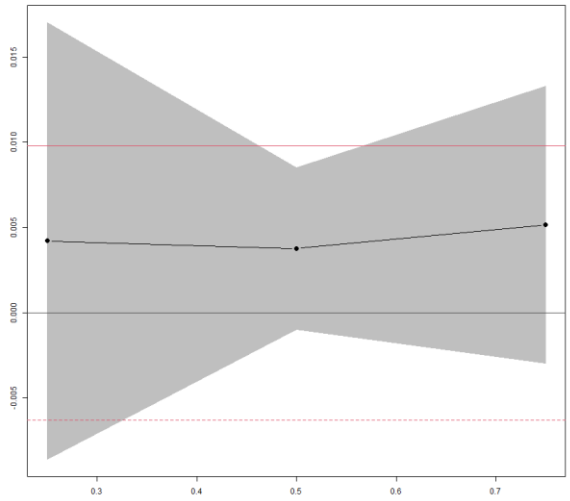
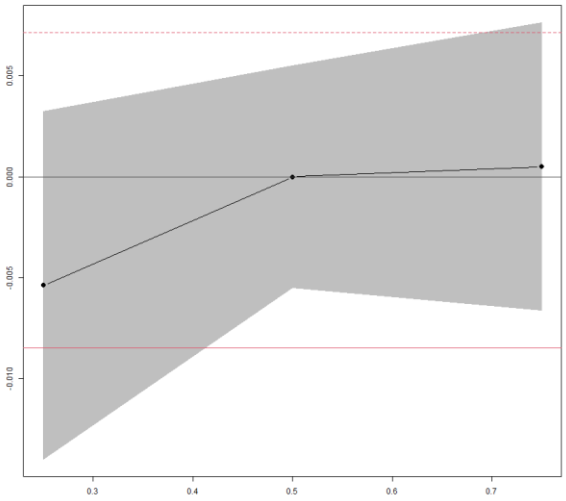
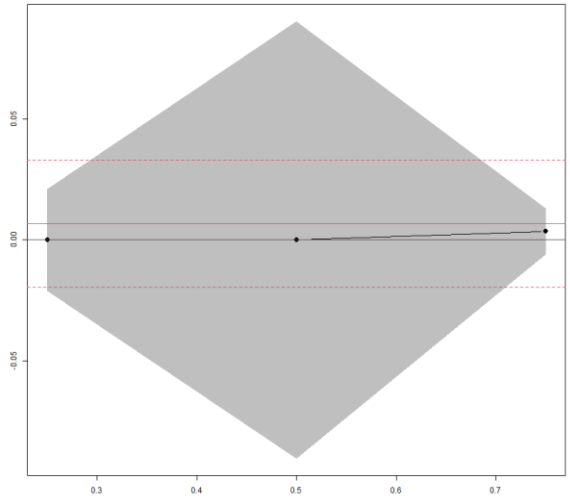
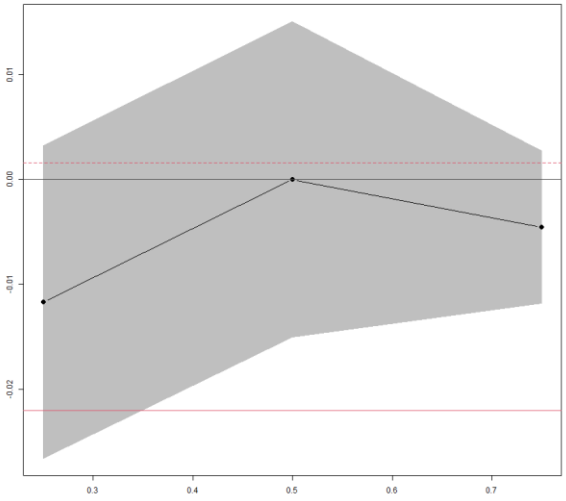
Note: The table reports the treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. The treatment is watching female segments of STEM and business role models compared to watching male segments (omitted group). We test the treatment at the individual level. Thus, we report the results of the subset of students enrolled in treated schools (T.RM=1). The treatment involves watching Business and STEM role models, regardless of their gender composition, on students' Academic Choices. We use administrative records from the Ministry of Higher Education of Ecuador (Senescyt). Since the timing of the intervention varies by region, we control for it in the estimation. 95% confidence intervals are in square brackets, followed by p-values. Sharpened p-values (q-values) are given for the False Discovery Rate (FDR). The q-values account for corrections by subject (Entrepreneurship and STEM) and gender (male and female). The bottom panel tests hypothesis 1.3, that girls and boys exhibit equal treatment effects. We test this hypothesis using the two alternatives described above. Each regression includes class fixed effects, a lagged outcome variable collected at the baseline, and covariates selected with a double-lasso selection procedure. We report robust standard errors in brackets.

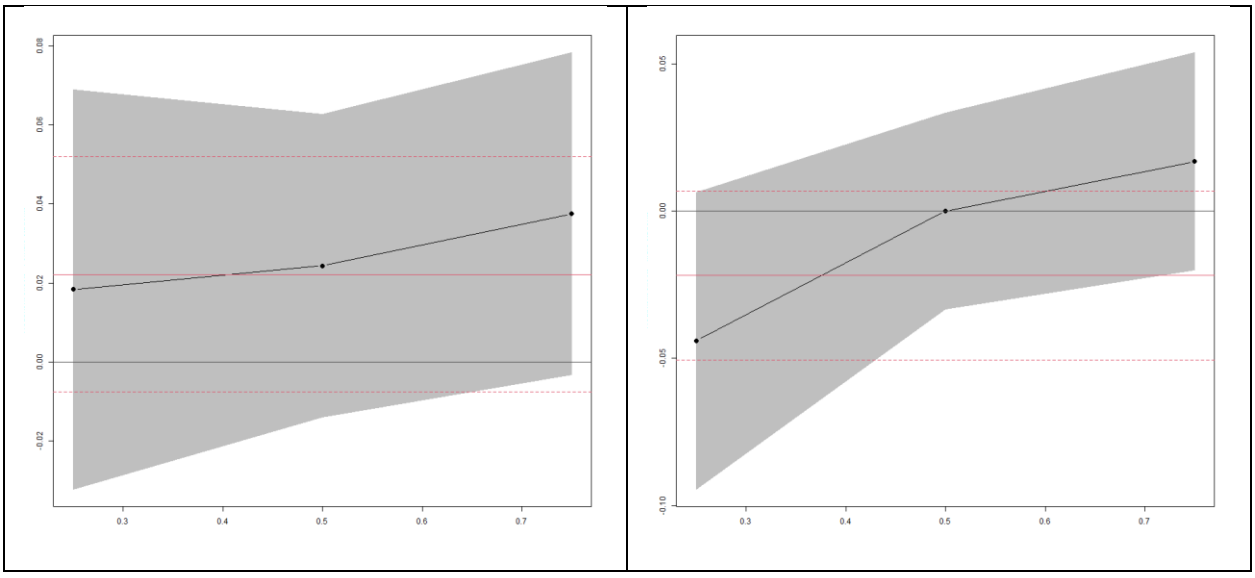
4.3. Distributional treatment effects for watching role models regardless of the gender composition

We report results only for continuous outcomes since one cannot compute distributional effects for binary variables. We report results for the model without control variables to avoid singularity issues.

Figure D 1: Distributional effects for the Psychological Outcomes related to Entrepreneurship

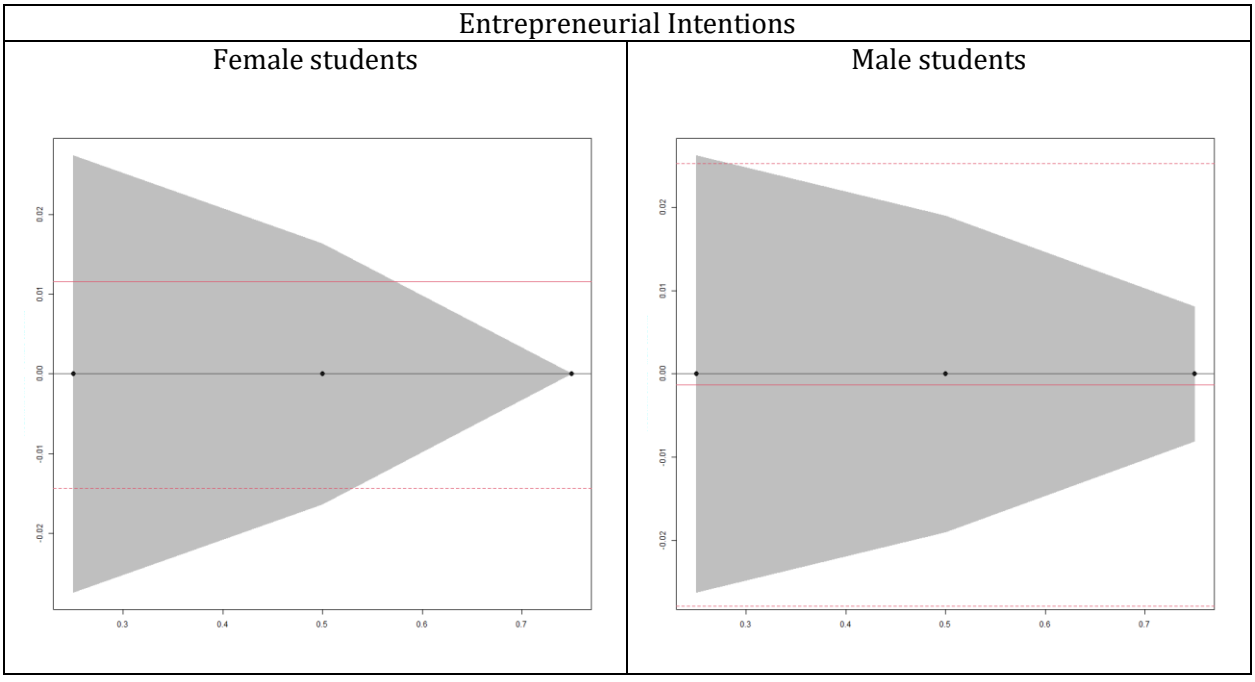


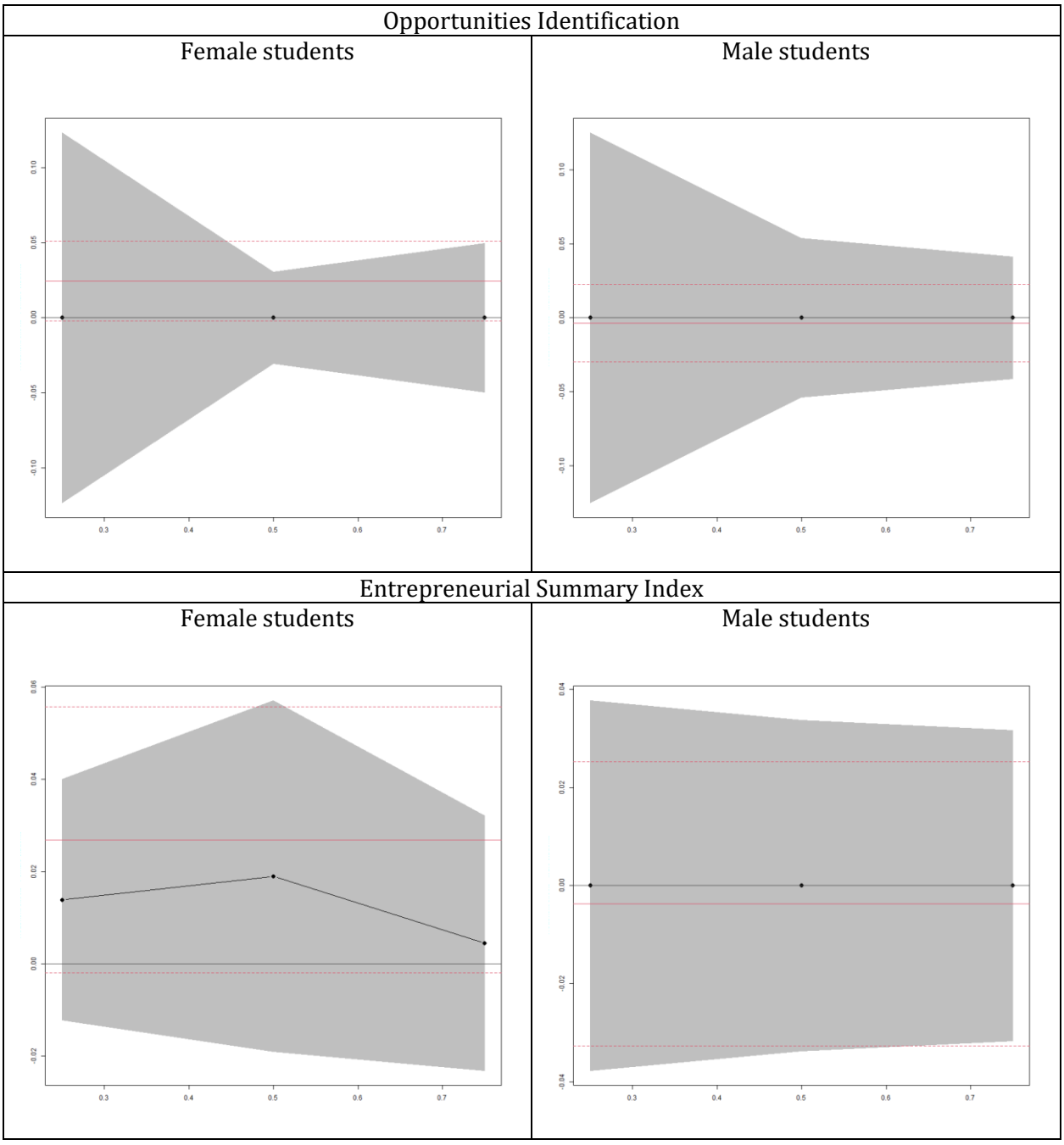
Entrepreneurial Positive Attitudes	
Female students	Male students
	
Entrepreneurial Interest	
Female students	Male students
	
Entrepreneurial Summary Index	
Female students	Male students



Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching Business and STEM role models, regardless of their gender composition. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

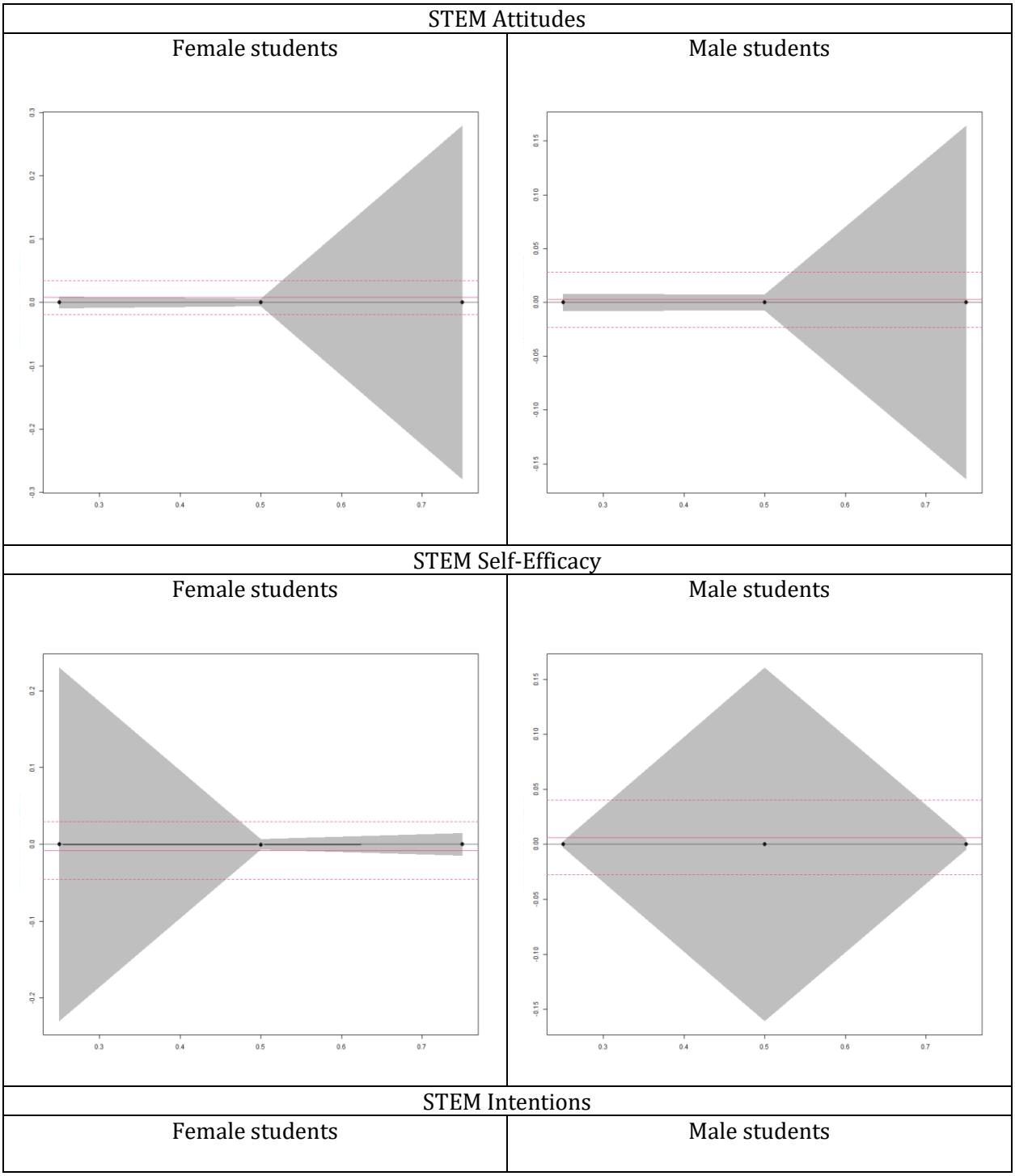
Figure D 2: Distributional effects for the Entrepreneurial Intentions and Opportunities Identification

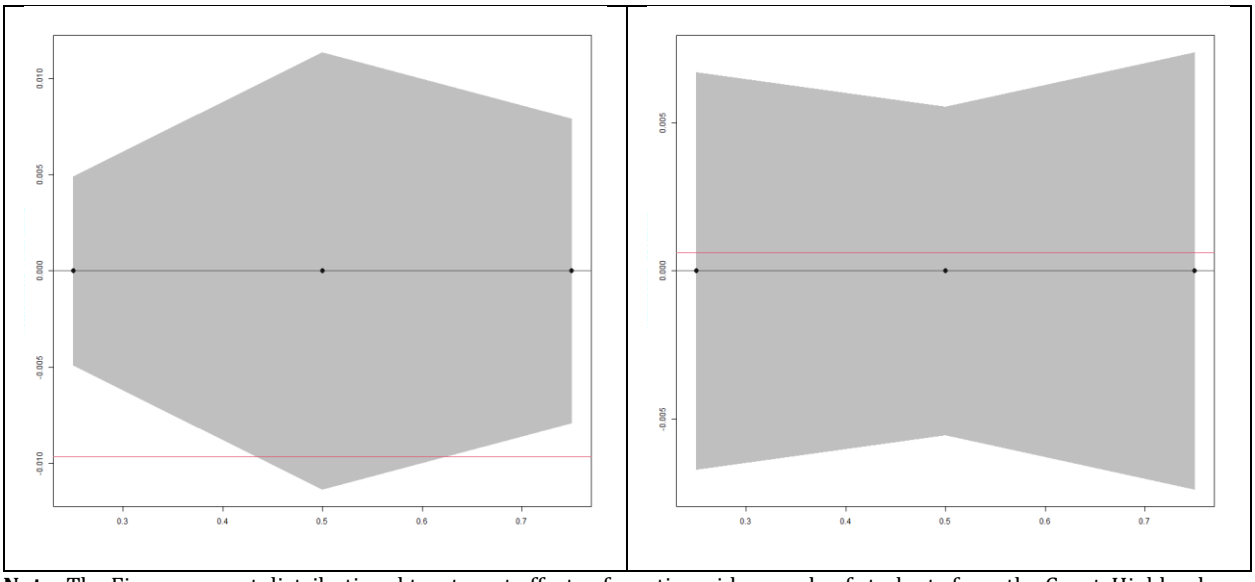




Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching Business and STEM role models, regardless of their gender composition. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

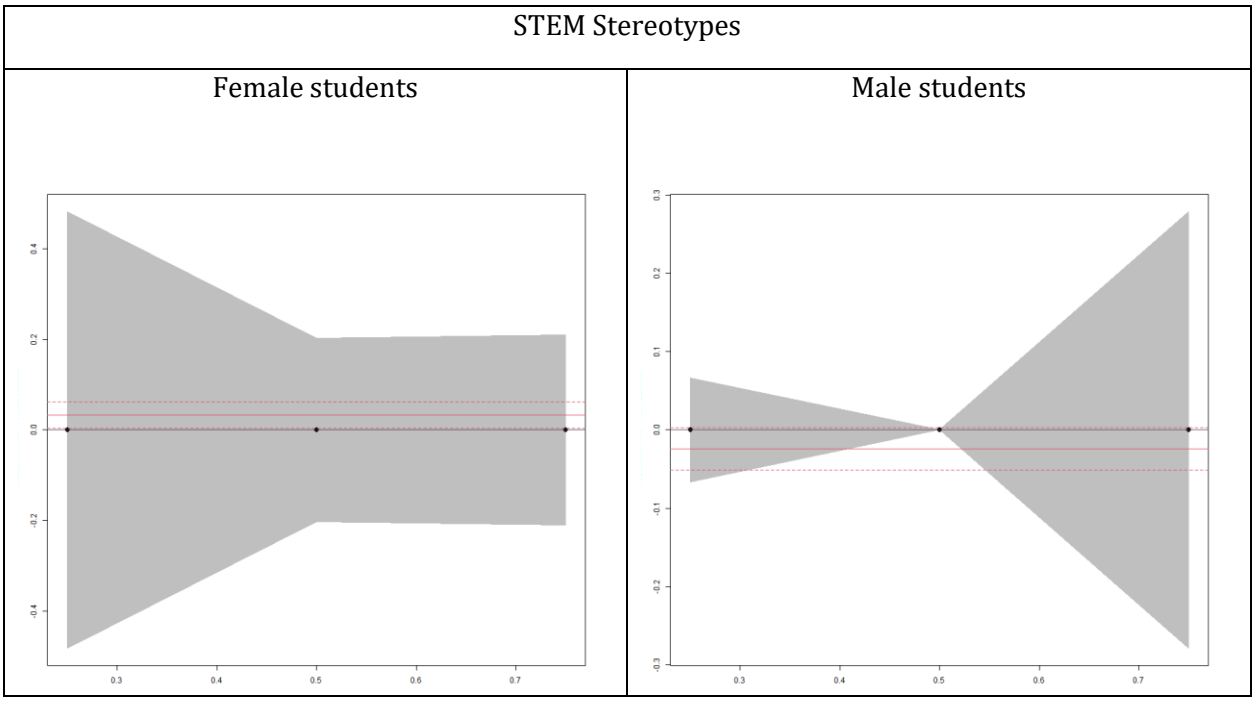
Figure D 3: Distributional effects for the STEM outcomes

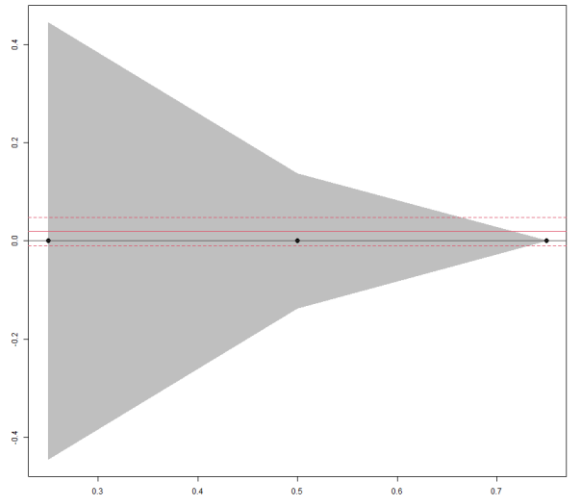
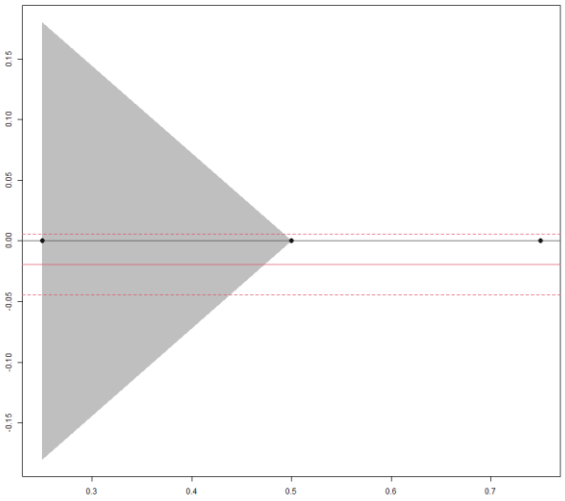
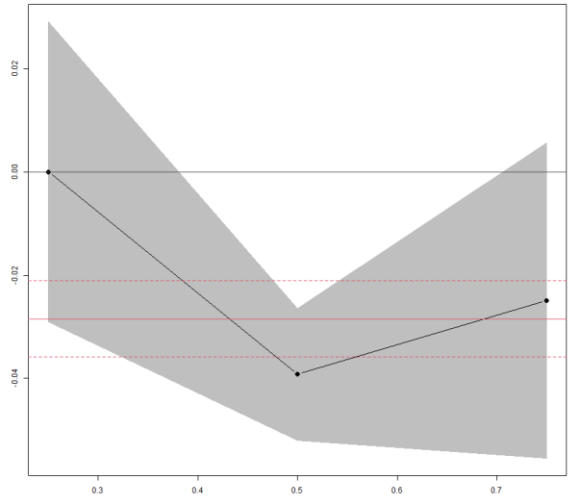
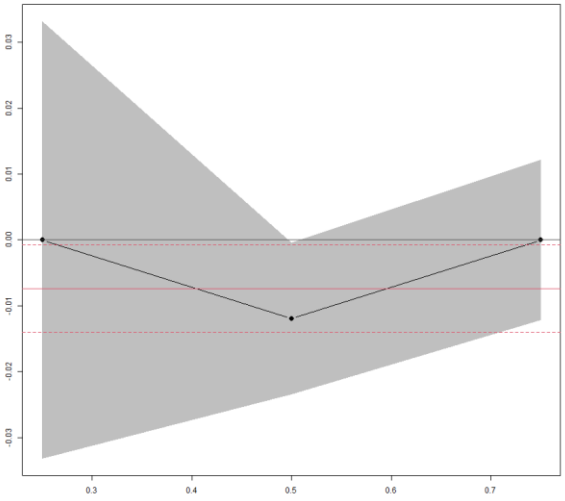




Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching Business and STEM role models, regardless of their gender composition. We collect self-efficacy data only for the Coast regime. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

Figure D 4: Distributional effects for the Gender Stereotypes



Entrepreneurial Stereotypes	
Female students	Male students
	
Stereotype Index	
Female students	Male students
	

Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching Business and STEM role models, regardless of their gender composition. First and second figures examine the endline stereotype index gathered from students at the Coast regime, and the third figure introduces the so-called stereotype index at the midline. Due to the

atypical organization of the country, we collect midline data between two (Highlands and Amazon region) to six weeks (Coast regime) after watching the treatment videos. Furthermore, we collected endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

4.4. Distributional treatment effects for matching role models and students by sex

We report results only for continuous outcomes since one cannot compute distributional effects for binary variables. We report results for the model without control variables to avoid singularity issues.

Figure D 5: Distributional effects for the Psychological Outcomes related to Entrepreneurship

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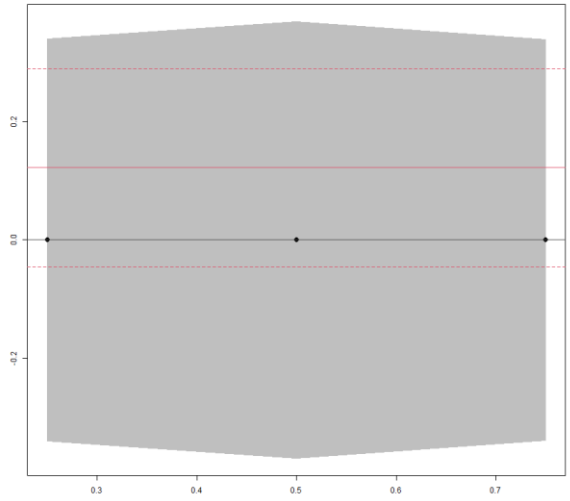
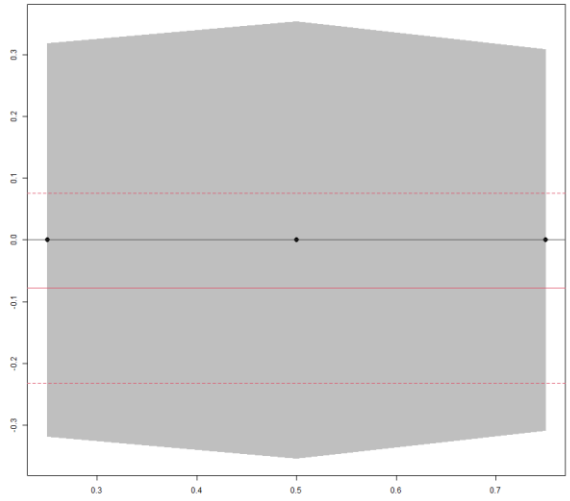
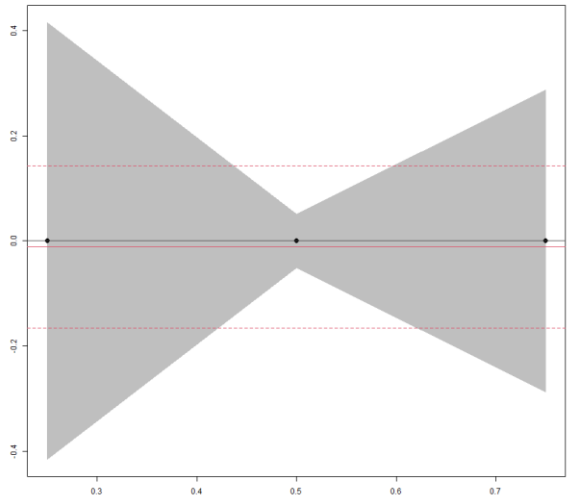
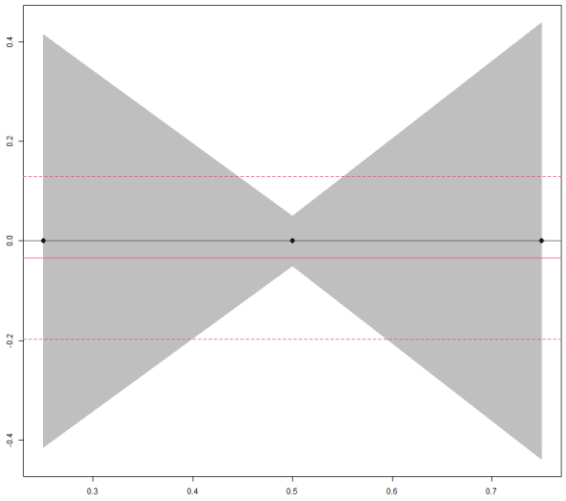
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Entrepreneurial Attitudes</td></tr>
<tr><td>Female students</td><td>Male students</td></tr>
</table>

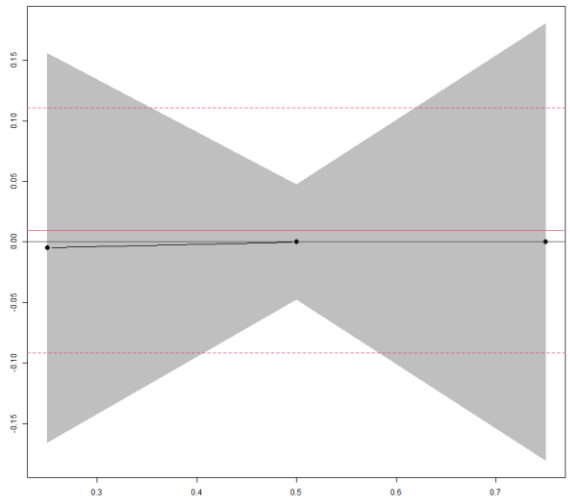


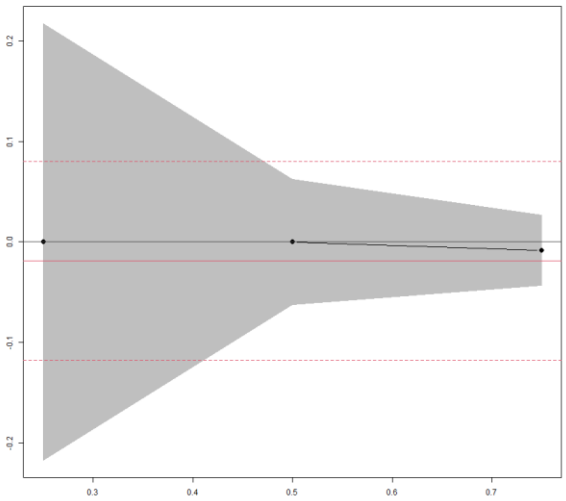


Entrepreneurial Positive Attitudes

Female students

Male students

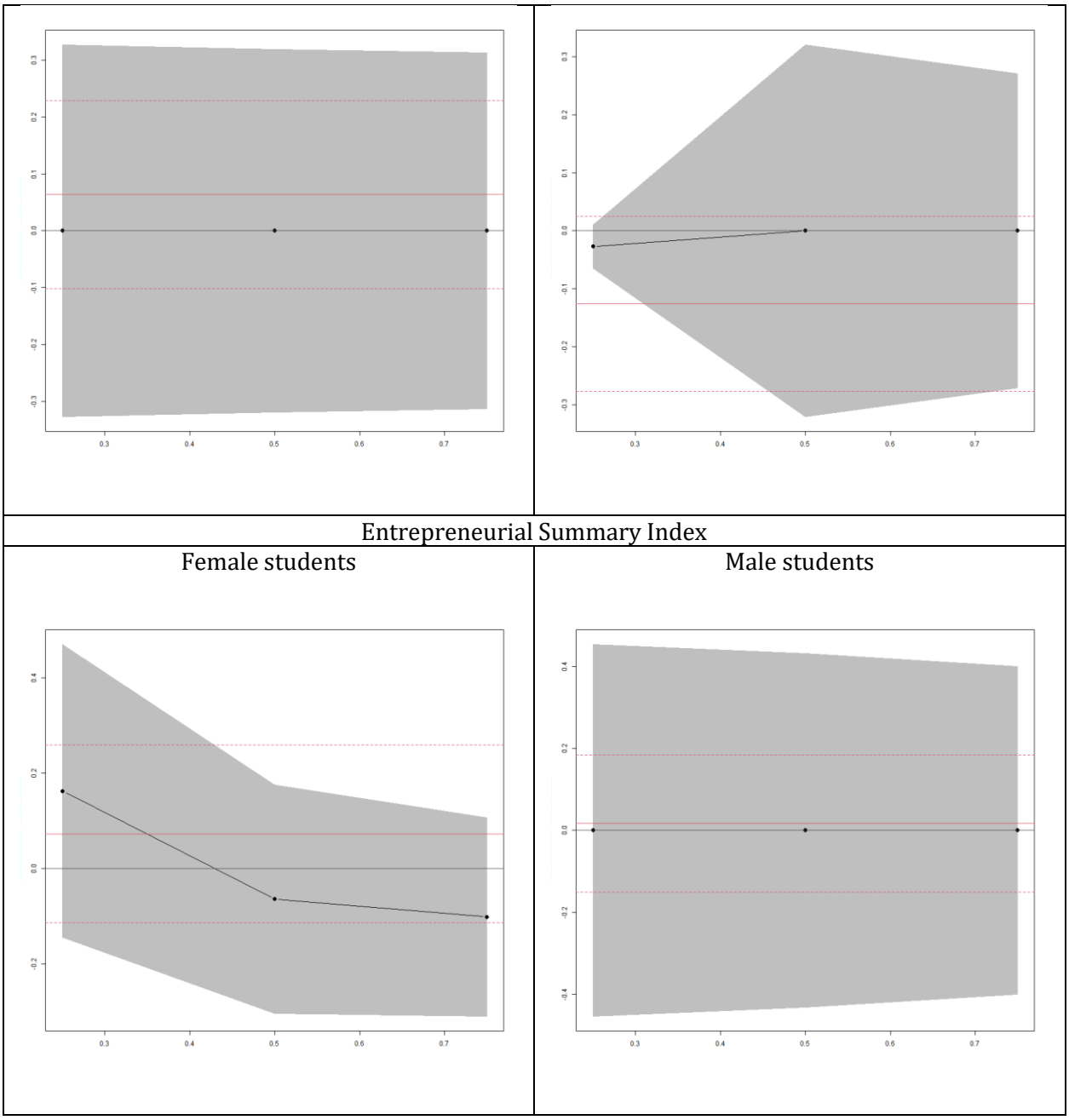




Entrepreneurial Interest

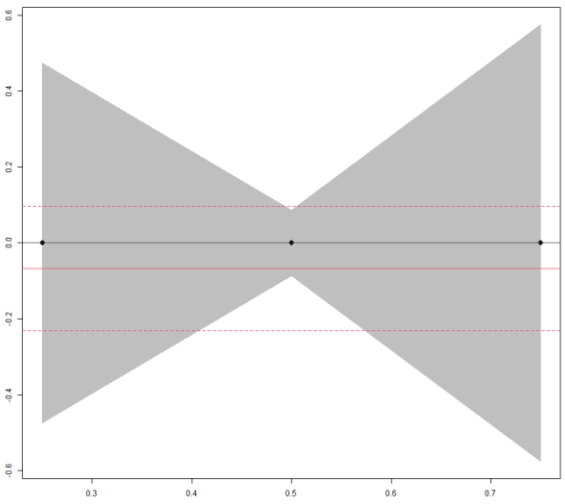
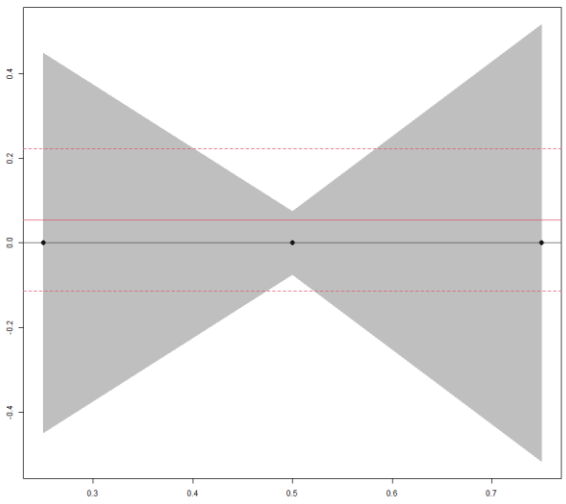
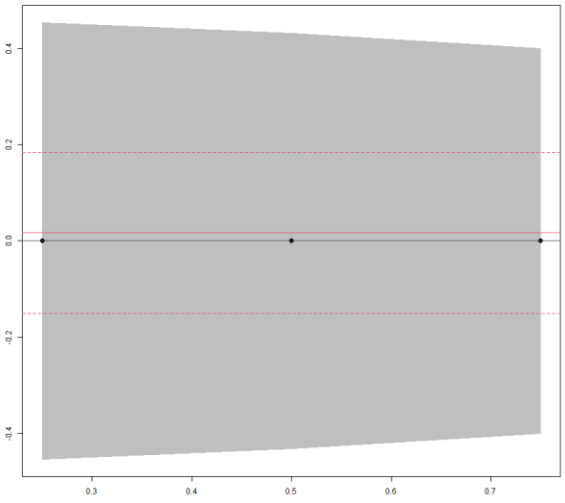
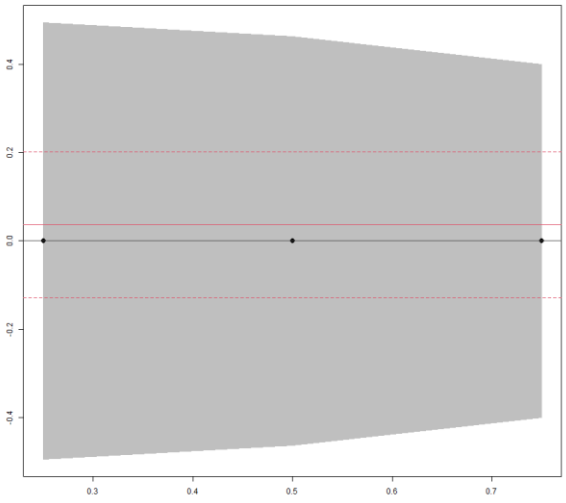
Female students

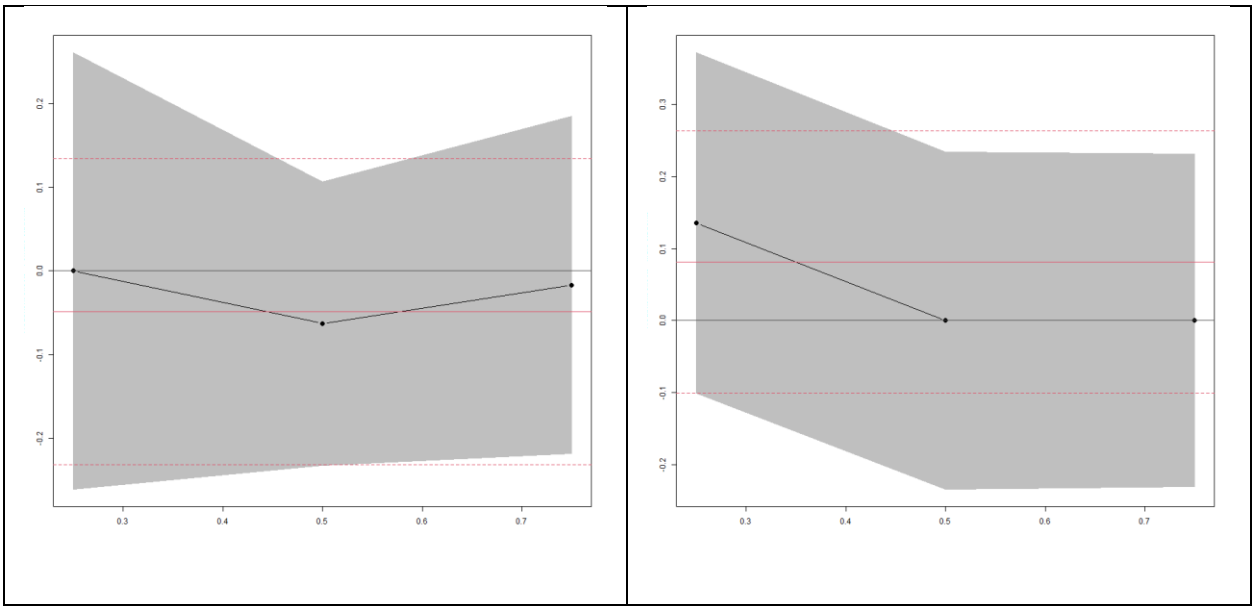
Male students



Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching same-sex Business and STEM role models. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

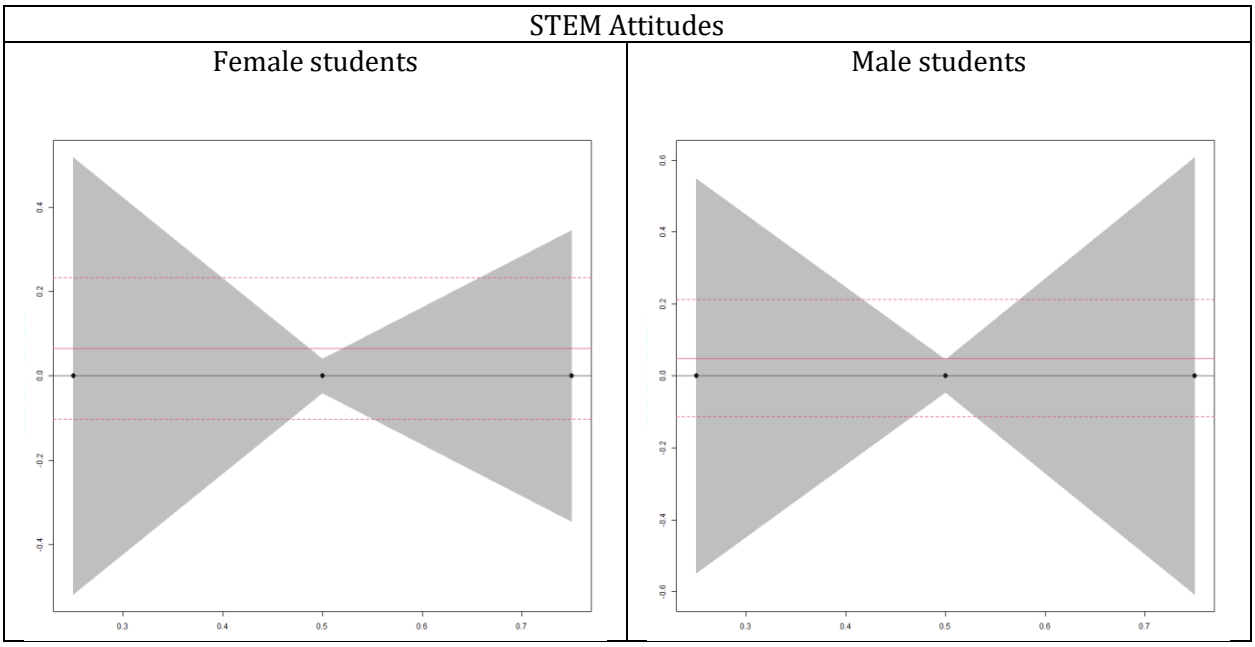
Figure D 6: Distributional effects for the Entrepreneurial Intentions and Opportunities Identification

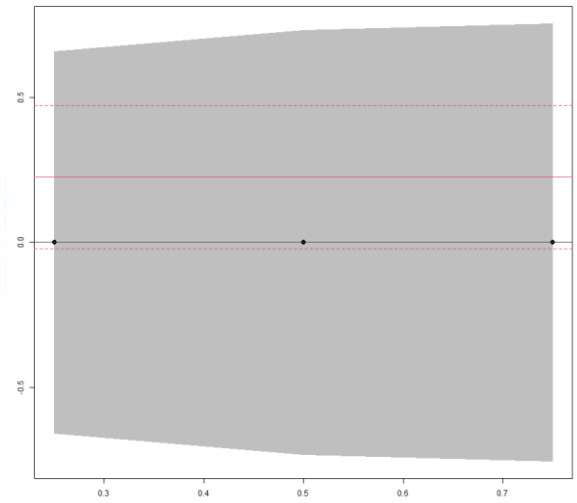
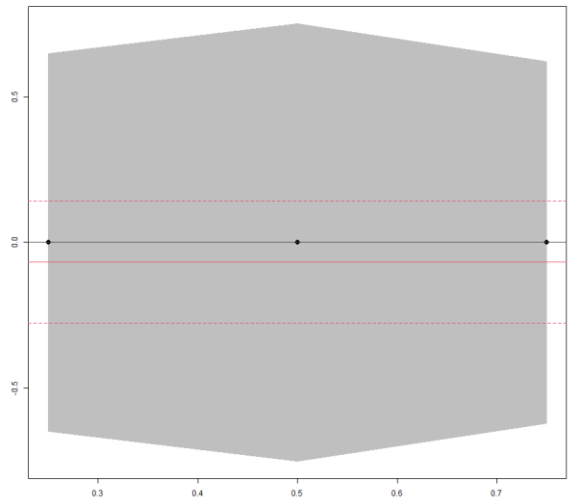
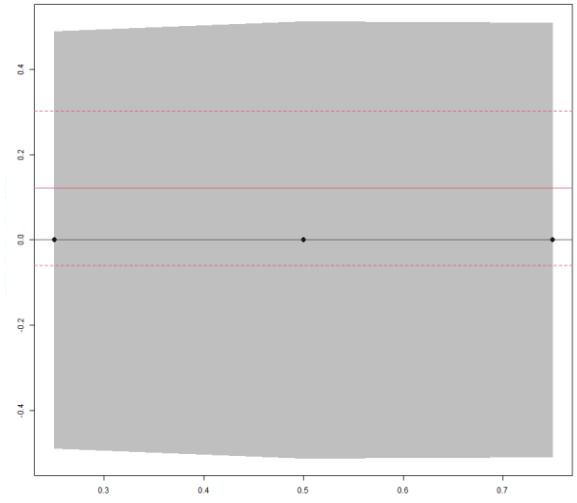
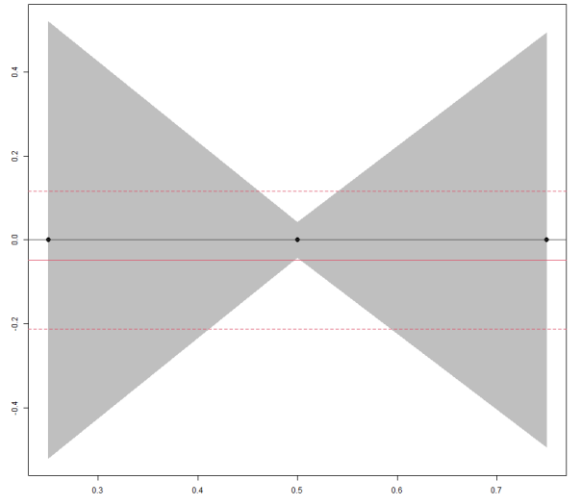
Entrepreneurial Intentions	
Female students	Male students
	
Opportunities Identification	
Female students	Male students
	
Entrepreneurial Summary Index	
Female students	Male students



Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching same-sex Business and STEM role models. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

Figure D 7: Distributional effects for the STEM outcomes

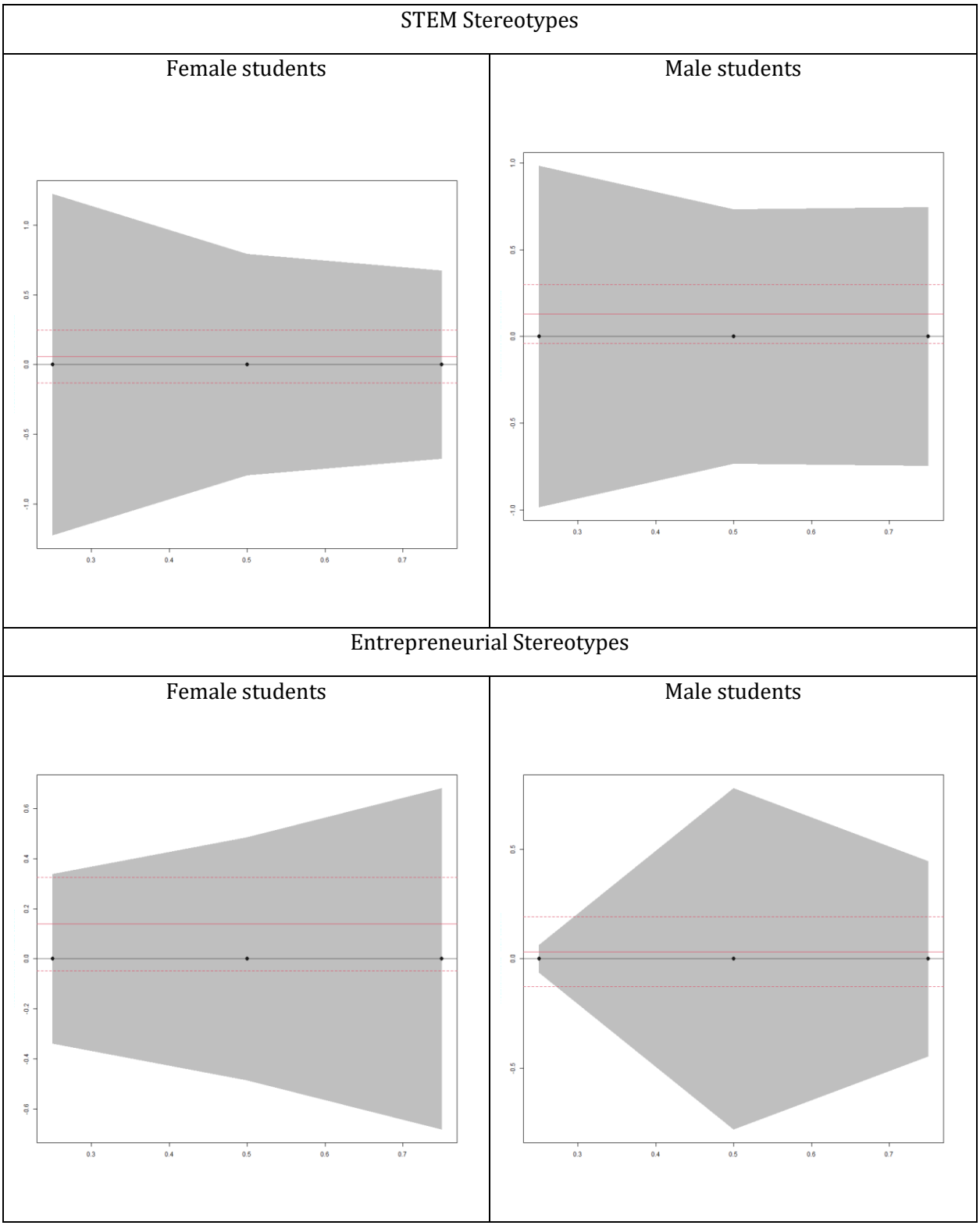


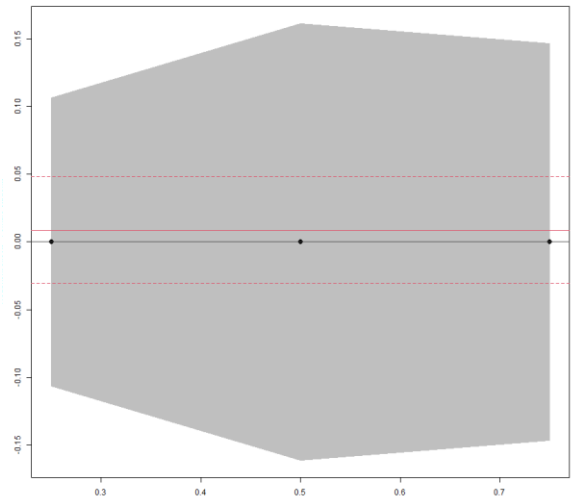
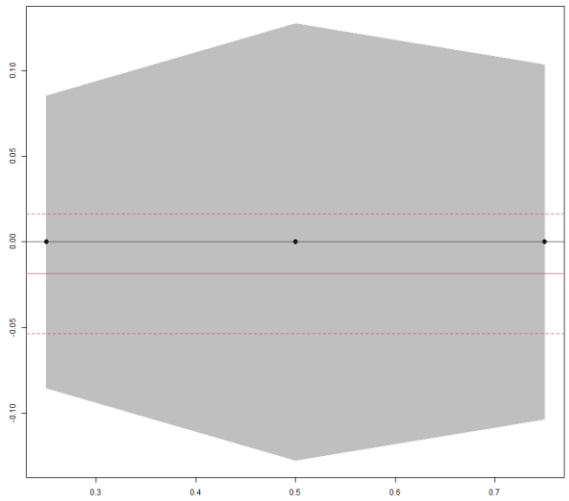
STEM Self-Efficacy	
Female students	Male students
	
STEM Intentions	
Female students	Male students
	

Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching same-sex Business and STEM role models,. We collect self-efficacy data only for the Coast regime. Due to the atypical organization of the country, we collect endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. The survey instrument was embedded in the e-learning platform that hosts the treatment and placebo videos. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in

black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

Figure D 8: Distributional effects for the Gender Stereotypes



Stereotype Index	
Female students	Male students
	

Note: The Figures report distributional treatment effects of a nationwide sample of students from the Coast, Highlands, and Amazon regions. Each regression includes strata dummies. The treatment is watching same-sex Business and STEM role models. First and second figures examine the endline stereotype index gathered from students at the Coast regime, and the third figure introduces the so-called stereotype index at the midline. Due to the atypical organization of the country, we collect midline data between two (Highlands and Amazon region) to six weeks (Coast regime) after watching the treatment videos. Furthermore, we collected endline data six weeks (Highlands and Amazon region) and 12 weeks (Coast regime) after being exposed to the treatment. Each figure represents an outcome variable separated by male and female students. The quantile coefficients appear in black dots, one per quantile (0.25, 0.50, 0.75). The shade illustrates the confidence bounds. The figures also feature the Intention-to-Treat effect in the solid red line and the confidence bounds with the red dashed lines.

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7. Appendix A

a. Baseline Measures

At the beginning of the experiment students fill out a baseline survey. It collects information about a set of characteristics and the treatment indicators pre-intervention. The main families of treatment indicators are Psychological Outcomes related to Entrepreneurship, Entrepreneurial Intentions and opportunity identifications, STEM Attitudes, STEM Intentions, Academic Performance, Stereotypes, and Academic Choices.

Psychological Outcomes related to Entrepreneurship – we evaluate a set of variables to identify variations in pupils' psychological outcomes. The concept clusters the following variables:

- **Entrepreneurial self-efficacy** – Students are asked to rate how **confident** they are to do the following on a scale from 1 to 7:
    - Start a company.
    - Work on your own.
    - Detect business opportunities.
    - Overcome any problems you might have in the beginning of your business.
    - Negotiate appropriately with another entrepreneur.
    - Maintain an appropriate overview of financial affairs.
    - Prepare an adequate business plan.
    - Get the financial capital to start the business.

Average of standardized z-scores of Entrepreneurial Self-Efficacy measure from 3_1_B1_E to 3_1_B8_E

- **Positive entrepreneurial attitudes** – Students rate how much they agree with the following statements on a scale from 1 to 5: Starting a business…
    - is a good opportunity to make a living.
    - is financially attractive.
    - is a safe and stable source of income.
    - means to have control.
    - means to have authority.
    - involves a lot of work **(reverse coded)**
    - means less time available to do other things. **(reverse coded)**
    - Is very exciting.
    - is an opportunity to make your dreams come true.
    - means freedom.

- means you obtain respect from others.
- means you obtain admiration from others

Average of standardized z-scores of positive entrepreneurial attitudes measure from X3_3_1_Bus_Attitudes to X3_3_12_Bus_Attitudes, where X3_3_6_Bus_Attitudes, X3_3_7_Bus_Attitudes are reverse coded.

- **Entrepreneurship Attitudes** – students are asked to rate on a scale from 1 to 7 whether they consider starting their own business:
  - Worthless/Worthwhile. II_Worthy_emp;
  - Boring/Fun. II_Bored_emp;
  - Negative/Positive. II_Negative_emp;
  - Need/opportunity. II_Need_emp.

Average of standardized z-scores of the items assess generally how positive is the student's outlook on entrepreneurship.

- **Entrepreneurial interest** – Students are asked to rate how **interested** they are in doing the following on a scale from 1 to 7:
  - Start a company.
  - Work on your own.
  - Detect business opportunities.
  - Overcome any problems you might have in the beginning of your business.
  - Negotiate appropriately with another entrepreneur.
  - Maintain an appropriate overview of financial affairs.
  - Prepare an adequate business plan.
  - Get the financial capital to start the business.

Average of standardized z-scores of Entrepreneurial interest measure from 3_1_A1_E to 3_1_A8_E

- ***Entrepreneurial psychological index*** **-** Average of standardized z-scores of the outcomes in this category.

Entrepreneurial Intentions and opportunity identifications - we evaluate the following variables:

- **Entrepreneurial Intentions** – students are asked to rate how much they agree with 3 statements on a scale from 1 to 7:
  - I often think about starting a business - II_Start_emp;
  - I have business ideas I am going to implement - II_Ideas_emp;
  - My goal is to become my own boss - II_Own_boss.

Average of standardized z-scores of the items assess in general how motivated the student is to start their own business.

- **Opportunity identification** – Average of the number of opportunities mentioned in three opportunity identification variables, recoded to achieve a normal distribution:
    - How many opportunities to create a company have you detected in the last three months? - 3_2_1_E
    - Of all those opportunities, in your opinion how many of them were promising to create profitable business? . - 3_2_2_E
    - How many opportunities to create a company you have started, that you compromise time and resources in the last three months? - 3_2_3_E

  Average of standardized z-scores of the answers on business opportunity identification questions

Entrepreneurial intentions index - Average of standardized z-scores of outcomes the outcomes in this category.

STEM Attitudes – students are asked to take on a scale from 1 to 7 whether they consider having a career in STEM:

- Worthless/Worthwhile - "II_Worthy_stem";
- Boring/Fun - "II_Bored_stem";
- Negative/Positive - "II_Negative_stem";

Average of standardized z-scores of the items assess generally how positive is the student's outlook on STEM careers.

STEM Intentions – students are asked to rate how much they agree with 3 statements on a scale from 1 to 7:

- I often think about starting career in STEM - "II_Study_stem";
- I have ideas in STEM I am going to implement - "II_Ideas_stem";
- My goal is to become a professional in STEM - "II_Profesional_stem";

Average of standardized z-scores of the items assess in general how motivated the student is to start a career in STEM.

Stereotype Index. We compute a baseline stereotype index "Stereotype index ST" following Favara (2012) that is based on preferred areas of study. In the baseline survey, high school student i is asked to declare her preferred subject to study at the university. The index evaluates her decision

contingent on the choices of the remaining students j. The gender stereotype index ST is computed in the following way:

$$ST_i = \left(\frac{\sum_{j=1}^{J} 1(N_{1j}^{M} = N_{1i})}{\sum_{J=1}^{J} 1(N_{1j} = N_{1i})} \right) (3.1)$$

Where j=1..,J index student in class J; and 1(.) is the indicator function, equal to 1 if the condition in the small brackets is true or 0 otherwise. The N accounts for the group of subjects, and the super index M refers to male students. We classify students' choices based on the International Standard Classification of Education (ISCED). The numerator indicates the number of boys in class j declaring the same preference as student i. Conversely, the denominator is the total number of students in class j (male and female) who select a career in the same group (N). If student i declares Architecture, we classify her decision in Engineering, manufacturing, and construction group (N). Assume that 12 boys in class j declared subjects in the same group, and overall 20 students declare similar careers. The stereotype index will be 0.6, which is the 12 boys divided by the 20 students (boys and girls) that selected university programs in the same group.

b. Endline Survey Measures

All baseline measures are repeated in an endline survey. In addition, in the endline survey we also add questions regarding:

Gender stereotype-endline – we ask students to express their attitudes towards gender stereotypes in the fields of entrepreneurship and STEM. We introduce a scale from 1 (definitely false) to 5 (definitely true).

a) Gender stereotype entrepreneurship: we collect the following questions:
   - Men have a natural predisposition/ capacity to be entrepreneurs (reverse-coded)
   - If a girl wanted to, she could be as successful in business as men.

b) Gender stereotype STEM: we collect the following questions:
   - Men are more gifted in math (reverse-coded)
   - If a girl wanted to, she could be as successful in the field of Science, Technology, Engineering, Mathematics as men.

Average of standardized z-scores of the items identify the attitudes towards gender stereotypes in STEM. Similarly, we define "Stereotype index E" - z-scores of the average of entrepreneurship-related questions- to address the attitudes towards gender stereotypes in entrepreneurship.

We introduce the same set of questions at the baseline for students in the Coastal region. Hence, we can track changes in gender perceptions from baseline to endline in half of the sample[5].

STEM Self-efficacy. For STEM-related behavior, we measured students' self-efficacy towards confidence with scientific and mathematic subjects:

- How confident are you that you could...? (Likert scale from 1 to 5)
    - Be accepted to university in a STEM field.
    - Learn complicated concepts.
    - Overcome any problems you might have while studying/working in a STEM field.
    - Become a professional in a STEM field.
- Please rate how true or false each statement was for them on a scale from 1 (definitely false) to 5(definitely true)
    - Seeing kids do better than me in math pushes me to do better
    - When I see how another student solves a math problem, I can see myself solving the problem in the same way
    - I imagine myself working through challenging math problems successfully
    - I compete with myself in math

College education choice: we measure students' higher education decision. We are interested on learning if they choose programs in STEM or Entrepreneurship as a direct effect of the intervention. Approximately 60% of students later enrolled at university or college apply for a position as soon as they finish high school. Since our endline survey was performed after students have completed high school many choices should have been made. We record two choices.

- STEM_college. Is your main area of study a STEM subject (science, technology, engineering or mathematics)?
- Entrepreneurship_college. Is your main area of study entrepreneurship and business?

We will assign 1 if students report one of the options above, and 0 otherwise in our main analysis. To explore the impact on the extensive versus intensive margins we will analyze choices conditional on enrolling excluding the non-enrolled, and the probability to enroll.

c. Role model outcomes measured as part of treatments

[5] For the Highlands/Amazon regime schools, we have collected the answers on the Gender Stereotype questions on the phone survey in November 2020- January 2021, whereas for the Coastal educational regime they were collected through online platform in November 2020.

Career selection - just after watching the videos, we asked **all students** (control and placebo) to select their desired occupation from a list. It intends to capture the immediate effect of watching the role model videos on the intention to pursue a given occupation. Students selected their occupation from a list of ISCO-08 two-digit occupations.

STEM occupation – we follow the classifications by the Inter-American Development Bank to define STEM occupations. They classify STEM occupations as (López-Bassols et al. 2018):

- 21 Profesionales de las ciencias y de la ingeniería [A_CarreraEspecif_2]
- 22 Profesionales de la salud [A_CarreraEspecif_2]
- 25 Profesionales de tecnología de la información y las comunicaciones [A_CarreraEspecif_2]
- 31 Profesionales de las ciencias y la ingeniería de nivel medio [A_CarreraEspecif_3]
- 32 Profesionales de nivel medio de la salud [A_CarreraEspecif_3]
- 35 Técnicos de la tecnología de la información y las comunicaciones [A_CarreraEspecif_3]

We assign 1 if the student selects one of these careers, and 0 otherwise. Variables A_CarreraEspecif_2 and A_CarreraEspecif_3 cluster all STEM occupations.

STEM-oriented programs - we classify the student-reported program according to the International Standard Classification of Education (ISCED). STEM education or Science education is the "*field that study and apply teaching and learning process to create thinking citizens through science knowledge* (Francislê Neri de Souza 2016). The subjects included in science education are physical, life, earth, and space sciences. For consistency, we use the Inter-American Development Bank methodology to classify the STEM-oriented program (López-Bassols et al. 2018). We validate the categorization with information from the European Parliament and the Organisation for Economic Co-operation and Development (OECD 2017; Caprile et al. 2015). We select the following items as STEM education:

- 05 Natural sciences, mathematics and statistics
- 06 Information and Communication Technologies (ICTs)
- 07 Engineering, manufacturing and construction

We assign 1 if a student chooses any of the programs above and 0 otherwise.

Entrepreneurship oriented programs - we will classify the student-reported program according to the International Standard Classification of Education (ISCE). Although the literature suggests that entrepreneurial education refer to a broader concept than only business, the general agreement is that business and management education groups the core characteristics of education for entrepreneurship (EC 2008; Kokic, Heder, and Ljubić 2013; Martin Lackéus 2015). Regional

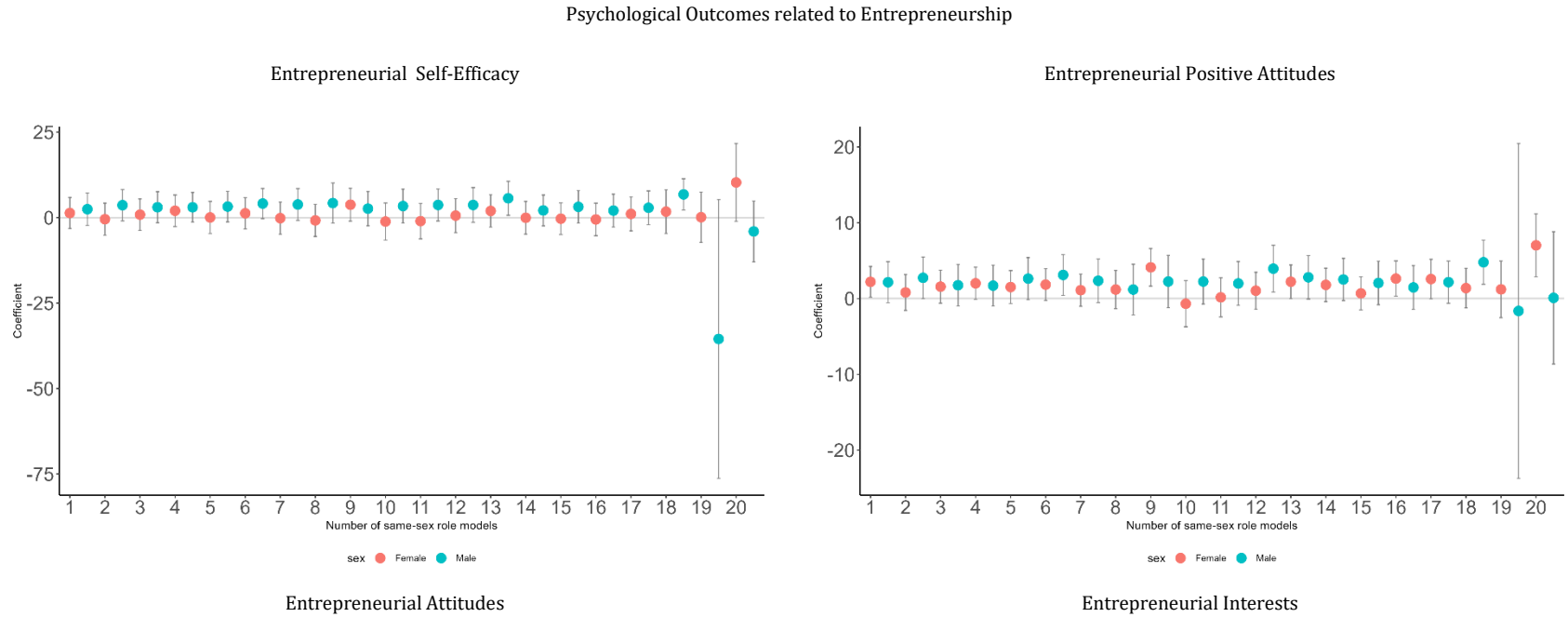
organizations are exerting effort to improve that situation by introducing entrepreneurial education to non-business fields (Wilson 2008; EC 2008; Kokic, Heder, and Ljubić 2013). Nevertheless, this introduction is still at an early stage and in Ecuador there is very little entrepreneurial orientation or teaching in non-business programs (Gómez, Sánchez, and Mancilla 2019; Vásquez 2017). Therefore, we plan to use the traditional approach and label business education as an entrepreneurial program(George Solomon 2008; Kokic, Heder, and Ljubić 2013). To do so, we will assess the next items:

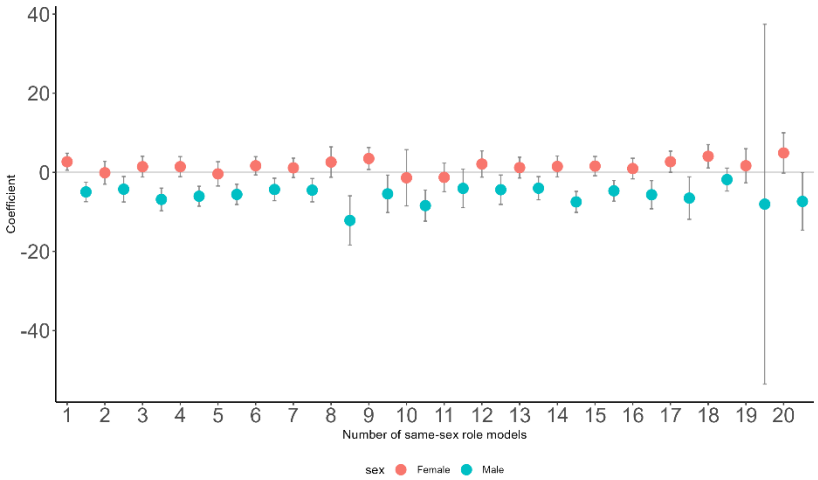
- 04 Business, administration and Law (except 042 Law)
- 0311 Economics

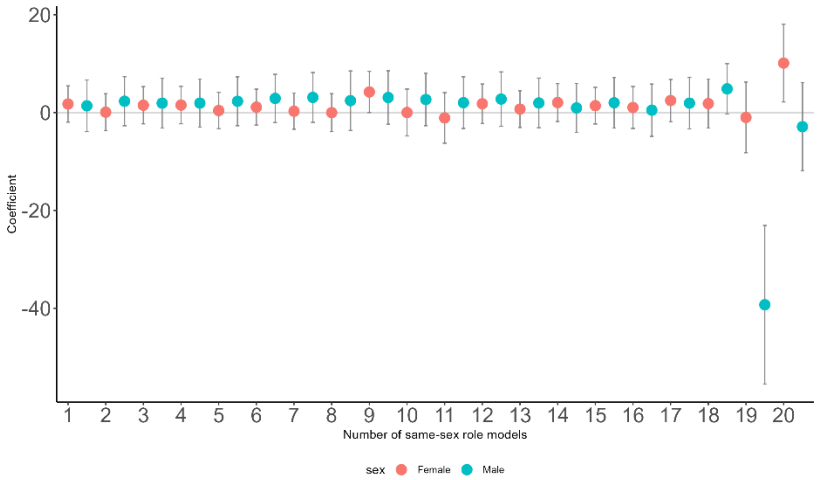
We will assign 1 if the student report one of the programs above, and 0 otherwise.

8. Appendix B

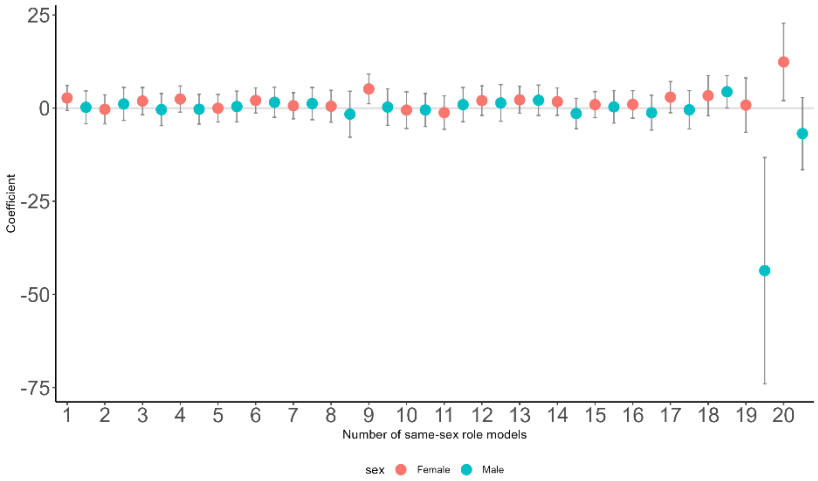
Figure S 1: Treatment effects of matching students and role models by sex – main hypothesis





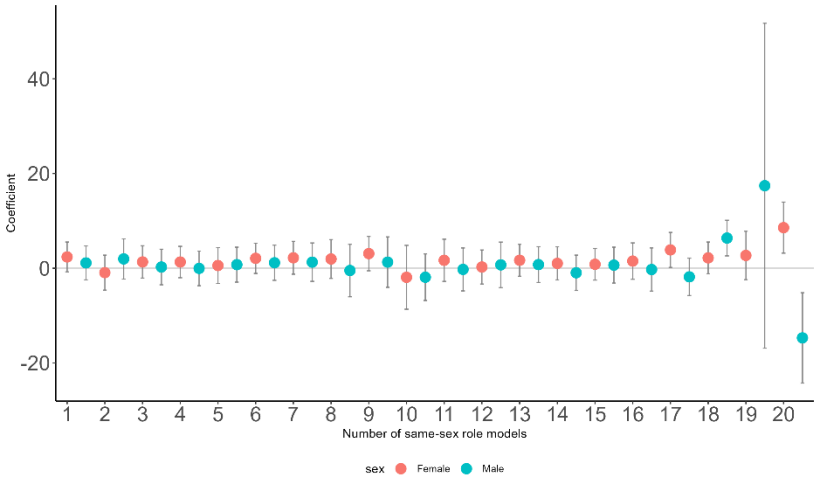


Entrepreneurial Index

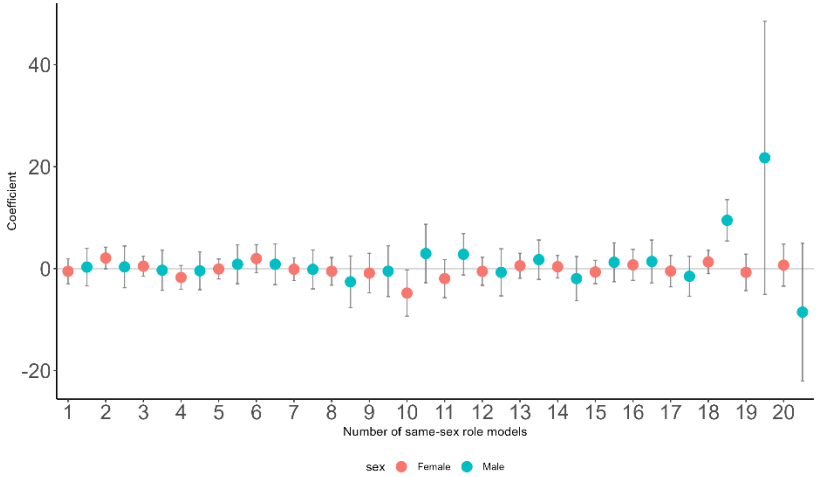


Entrepreneurial Intentions and Opportunity Identification

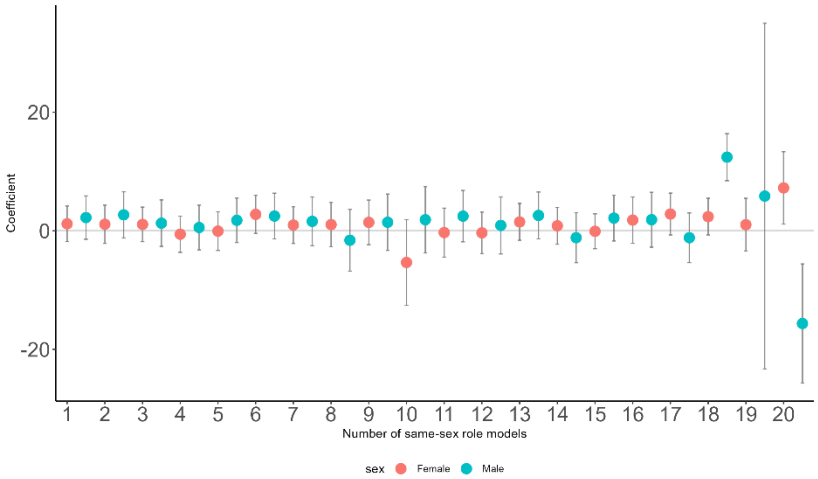
Entrepreneurial Intentions



Opportunities Identification

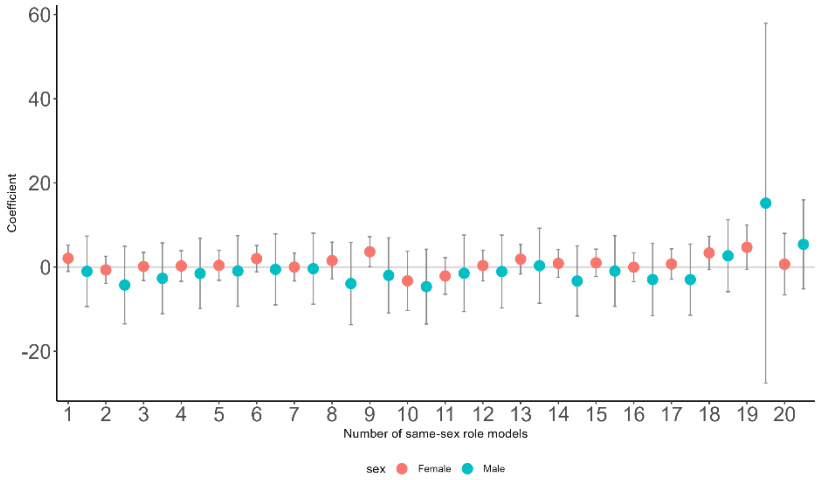


Entrepreneurial Summary Index

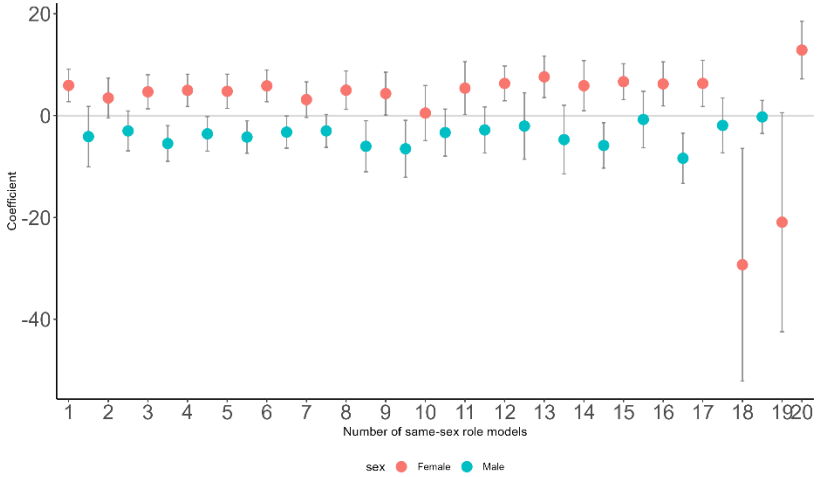


STEM Outcomes

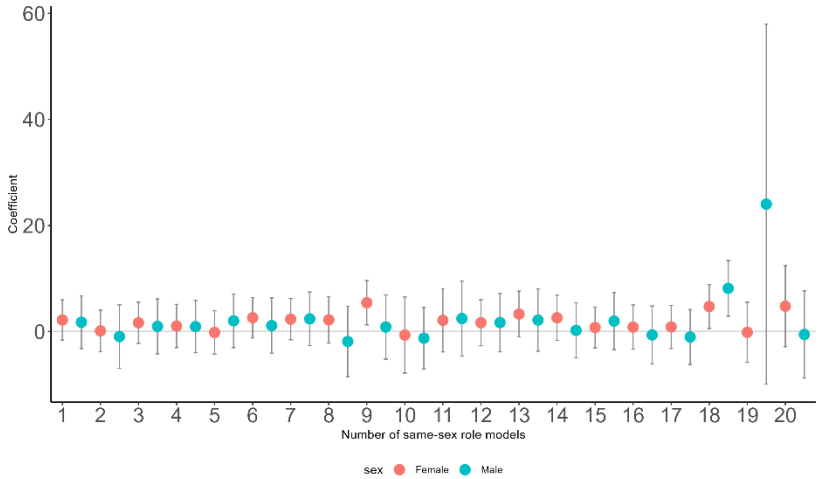
STEM Attitudes



STEM Self-Efficacy

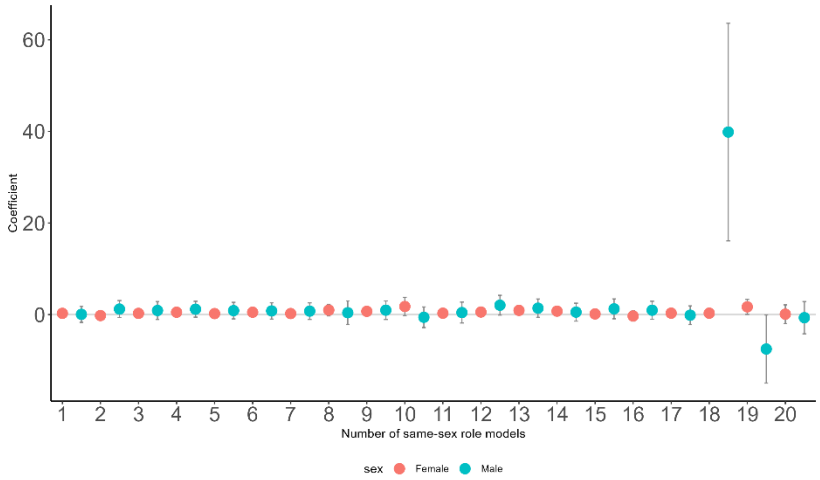


STEM Intentions

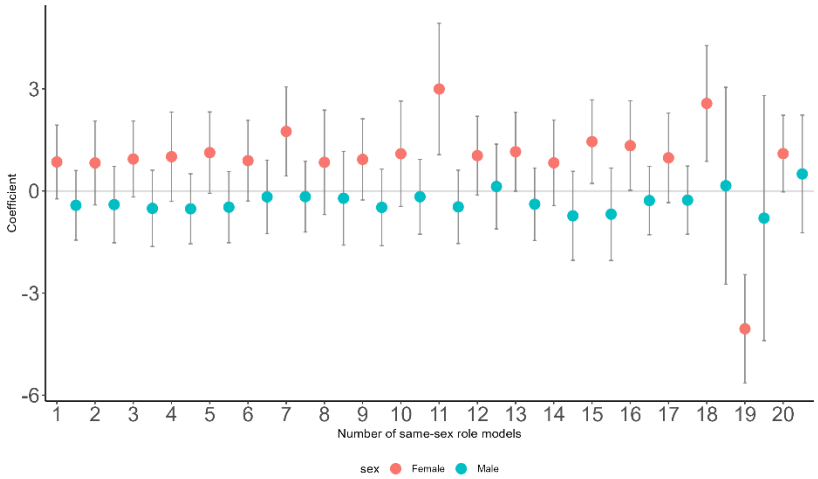


Study and Occupation Preferences

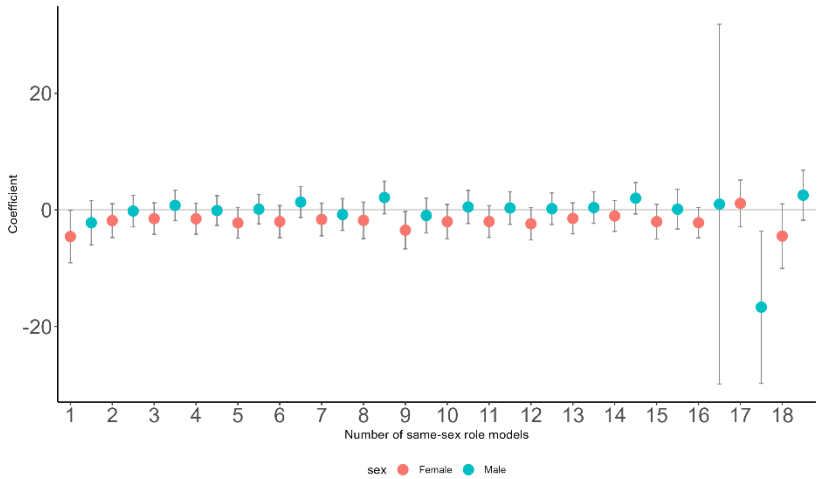
Study a STEM program



Study a Business Program

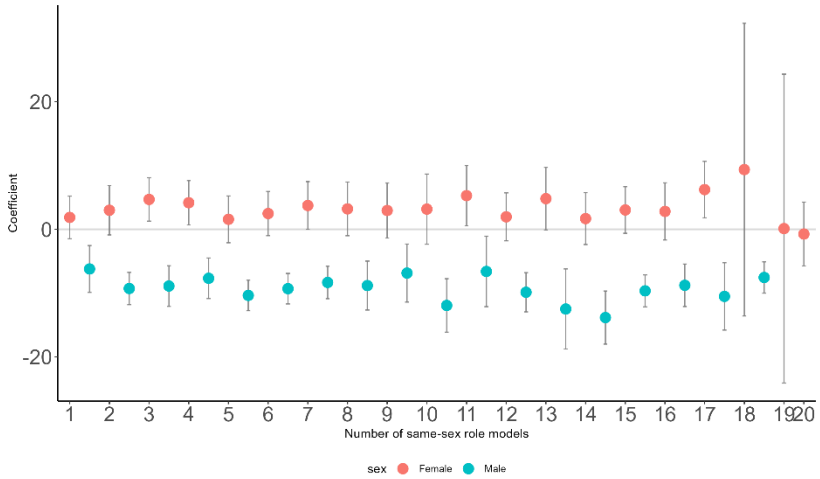


STEM Occupation Preferences

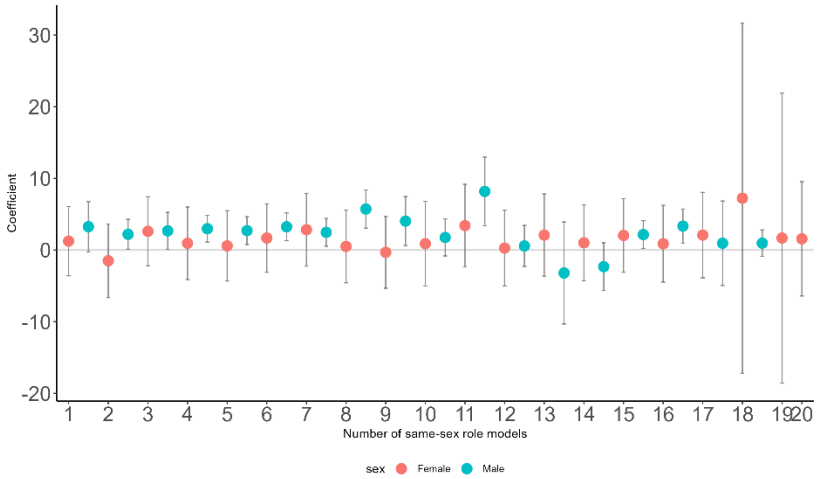


Gender stereotypes

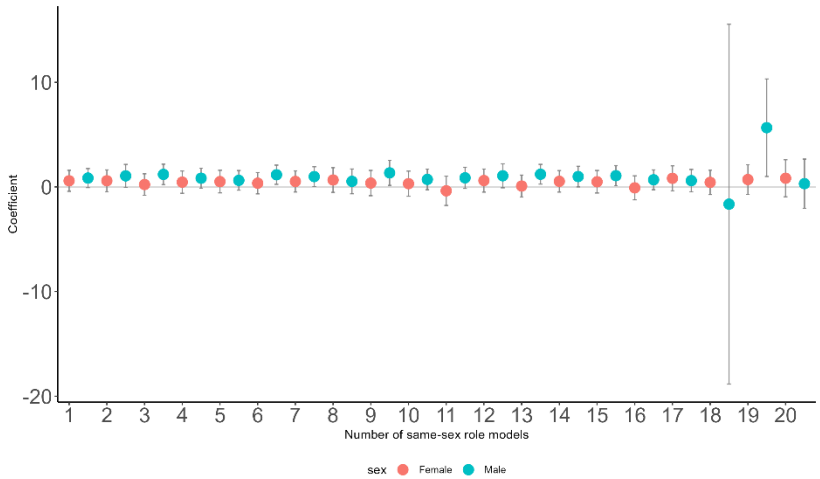
STEM Stereotypes



Entrepreneurial Stereotypes

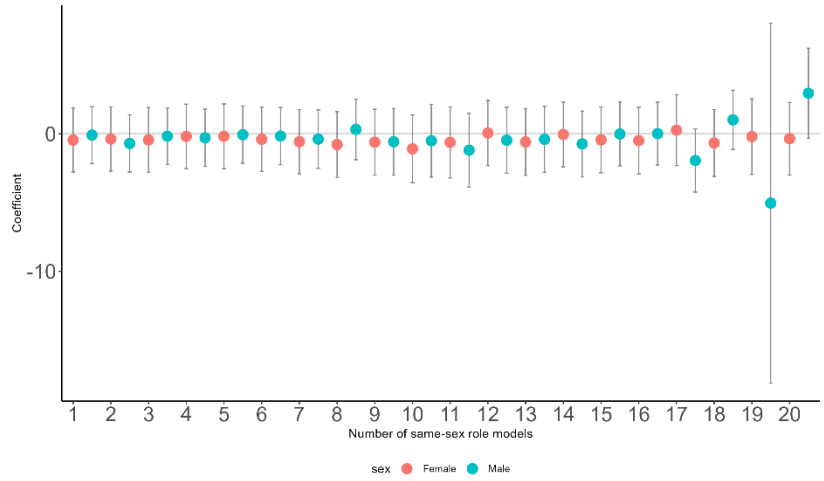


Stereotype Index

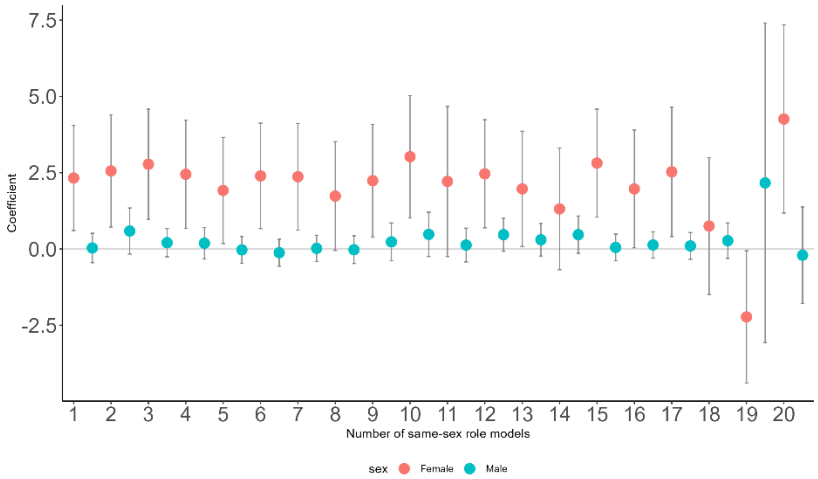


Academic Choices

Probability of choosing a STEM major



Probability of choosing a Business major



Note: The graph reports the effect of watching same-sex role models for the subset of boys (blue dots) and girls (red dots). The x-axis indicates the number of same sex role models that students watched across the two lessons. Moreover, the y-axis introduces treatment effects. The black vertical lines illustrate 95% confidence intervals. Moreover, the black horizontal line shows the origin (null effects). One should notice that due to the distribution of the treatment (see PAP), extreme results show effects for a small fraction of the sample. Hence, the results might suffer from outliers. One should be careful when interpreting these treatment effects.