

Hacking Gender Stereotypes

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ASSA 2022 Virtual Annual Meeting
January 8th, 2022

Motivation

- Employment opportunities and wage growth are rising more rapidly among occupations that require high level of both social and math skills (Deming, 2017; Fayer et al., 2017)
- The supply of those skills is insufficient also due to the limited participating of women in STEM and coding (Kahn and Ginther, 2017; Adams and Kirchmaier, 2016)
- Several initiatives around the world are trying to promote STEM education among female students or adult women → limited evidence on the self-selecting and impact of these interventions

Research questions

1. Who are the girls that self-select into coding clubs?
2. Which is the impact of coding clubs on girls?
3. Which is the impact of coding clubs on the formation of stereotypes in schools?

In this presentation, I will show evidence on the first question and some preliminary results on the second from the pilot data.

Outline

Data and Experimental Design

Program Sign-Up

Preliminary Results (from pilot)

Conclusions

Girls Code It Better

- **The idea:** from a private employment agency in Italy → firms wants to hire more women in STEM and coding
- **Participation in the coding clubs:**
 - 20 middle-school girls (11-14 years old), 1 trained teacher, 1 coach maker
 - voluntary, free of charge for girls
 - at school in the afternoon, 45 hours per school year
- **Project-based methodology:**
 - Coding and new technologies (automation, web and app design, 3D printing)
 - Team work and communication

Girls Code It Better



Data Collection

- **Survey Data from Students.** We collect survey data at the end of the school year from all students in the schools included in the randomization
 - Response rate and matching: 85%
- **Administrative Data and Standardized Test Score:** track choice, teachers' track recommendation, grades (to be obtained soon)

Experimental Design

Randomization: individual level randomization within each school, conditional on receiving more than 20 application.

- 16 schools with rationing

	(1) Control	(2) Treated	(3) Diff	(4) Norm. Diff.
Immigrant	0.061 (0.240)	0.165 (0.372)	0.099** (0.035)	0.237
Mum less than high-school	0.545 (0.500)	0.523 (0.500)	-0.075 (0.069)	-0.032
Mum has a university degree	0.455 (0.500)	0.477 (0.500)	0.075 (0.069)	0.032
Mum works in STEM	0.148 (0.357)	0.183 (0.387)	0.044 (0.055)	0.066
Mum has a high wage	0.717 (0.453)	0.665 (0.473)	-0.016 (0.054)	-0.079
Dad less than high-school	0.626 (0.486)	0.605 (0.490)	-0.051 (0.064)	-0.030
Dad has a university degree	0.374 (0.486)	0.395 (0.490)	0.051 (0.064)	0.030
Dad works in STEM	0.337 (0.475)	0.303 (0.461)	-0.002 (0.054)	-0.051
Dad has a high wage	0.576 (0.497)	0.583 (0.494)	0.018 (0.061)	0.010
Observations	99	266	365	

Gender Gaps

Variable	Boys	Girls	P-value
Panel A: Academic Interests			
Plans: University	0.543 (0.498)	0.700 (0.458)	0.000
Like Math	0.479 (0.500)	0.384 (0.486)	0.000
Like Italian	0.302 (0.459)	0.440 (0.496)	0.000
STEM High-School	0.415 (0.493)	0.372 (0.484)	0.004
Classic High-School	0.494 (0.500)	0.707 (0.455)	0.000
STEM Occupations	0.547 (0.498)	0.334 (0.472)	0.000
Non-STEM Occupations	0.436 (0.496)	0.460 (0.499)	0.091
Panel B: Barriers to achieve Educational Goals			
Barrier: Gender Unfit	0.410 (0.492)	0.535 (0.499)	0.000
Barrier: Ability Math	0.349 (0.477)	0.437 (0.496)	0.000
Observations	2244	2250	

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How do Girls Self-Select into Coding Clubs?

We may expect that girls who self-select into coding clubs are (Ertl et al., 2017):

- less prone to stereotypic influences;
- have stronger STEM interest;
- highly educated parents working in STEM (especially mothers).

Investigating the characteristics associated with take-up of these types of programs is of crucial importance for designing effective policies to address gender gaps in STEM.

How do Girls Self-Select into Coding Clubs?

Variable	Not Apply	Apply	P-value
Panel A: Family Background			
Immigrant	0.190 (0.392)	0.061 (0.240)	0.006
Mum less than high-school	0.582 (-0.493)	0.545 (-0.500)	0.396
Mum has a university degree	0.418 (0.493)	0.455 (0.500)	0.391
Mum works in STEM	0.133 (0.340)	0.148 (0.357)	0.756
Mum has a medium-high wage	0.648 (0.478)	0.717 (0.453)	0.143
Dad less than high-school	0.614 (0.487)	0.626 (0.486)	0.913
Dad has a university degree	0.386 (0.487)	0.374 (0.486)	0.919
Dad works in STEM	0.282 (0.450)	0.337 (0.475)	0.246
Dad has a medium-high wage	0.582 (0.493)	0.576 (0.497)	0.945

How do Girls Self-Select into Coding Clubs?

Variable	Not Apply	Apply	P-value
Panel B: Academic Interests			
Plans: University	0.691 (0.462)	0.707 (0.457)	0.454
Like Math	0.365 (0.482)	0.434 (0.498)	0.128
Like Italian	0.439 (0.496)	0.404 (0.493)	0.293
STEM High-School	0.354 (0.478)	0.444 (0.499)	0.042
Classic High-School	0.708 (0.455)	0.758 (0.431)	0.366
STEM Occupations	0.308 (0.462)	0.374 (0.486)	0.079
Non-STEM Occupations	0.468 (0.499)	0.404 (0.493)	0.261
Panel C: Barriers to achieve Educational Goals			
Barrier: Gender Unfit	0.533 (0.499)	0.657 (0.477)	0.018
Barrier: Ability Math	0.444 (0.497)	0.434 (0.498)	0.687
Explicit gender stereotypes	0.351 (0.477)	0.354 (0.480)	0.725
Observations	1885	99	

Outline

Data and Experimental Design

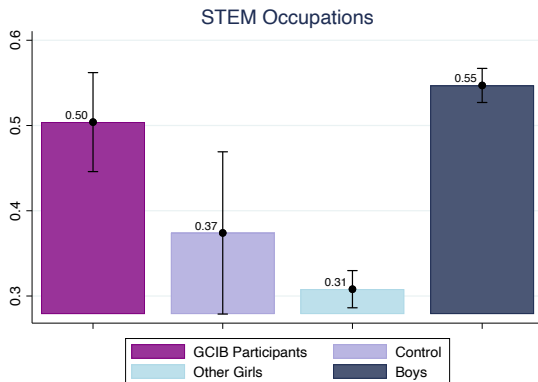
Program Sign-Up

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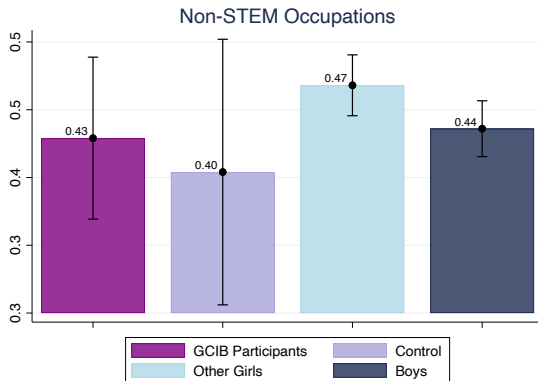
The Impact of Coding Clubs

Share of students interested in STEM Occupations

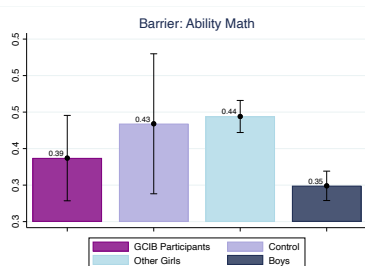
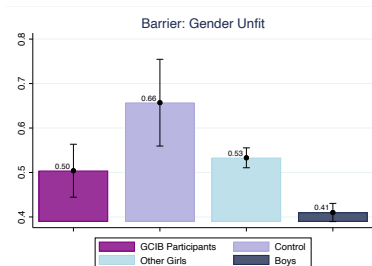


The Impact of Coding Clubs

Placebo



Mechanisms: Barrier to Achieve Educational Goals



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Summary and Conclusions

- We show that girls who self-select to participate in coding clubs have:
 - slightly more educated mothers (but not statistically significant);
 - high interest in STEM occupations;
 - BUT they perceive their gender unfit to achieve her goals.
- Participation in coding clubs is a promising venue to increase interest in STEM occupations for women and mitigate the perception that own gender is unfit to achieve their goal

THANK YOU!

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