

Influencing youths' aspirations and gender attitudes through role models: Evidence from Somali schools*

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Abstract

We test whether a role model intervention could impact the educational aspirations and gender attitudes of youths in Somalia. We randomly selected elementary schools to receive a role model treatment, consisting of a college student visiting target classrooms. Within each treatment school, we randomly selected some grades to receive a visit from a female role model and some grades to receive a visit from a male role model. The college students talked about their study journeys, their challenges and their strategies to overcome such challenges. Data collected six months after the intervention show a significant and large impact of (only) female role models on boys' and girls' attitudes toward gender equality but no impact on students' aspirations to attend college. Data collected two years after the intervention only for the oldest, graduating cohort of students, who were grade 6 at the time of the intervention, produce comparable though imprecisely estimated treatment effect sizes.

JEL classification codes: J16, O12, I25, C93.

Keywords: Education aspirations, gender attitudes, role models, experiment, Somalia.

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1 Introduction

Achieving an education in the poorest countries is extremely challenging. A huge barrier to education is lack of infrastructure, including school buildings, well-functioning classrooms and sanitation facilities (Burde and Linden, 2013; Duflo, 2001; Kazianga et al., 2013). The unavailability of qualified teachers is an additional supply-side constraint to education provision (Mulkeen et al., 2007). Several studies have shown that the demand for education may also play an important role in the observed low-take up of educational services. This may be due to a failure to recognize the returns of education (Jensen, 2010; Nguyen, 2008), or to low aspirations of parents and/or children (Appadurai, 2004; Genicot and Ray, 2017; Ray, 2006). Moreover, the prevailing gender norms within traditional communities may dictate that it is less important for women than for men to get an education. This, in turns, leads to girls facing additional and bigger obstacles in their quest for an education, which results in their inability to access higher-return jobs in adulthood (Dhar et al., 2019; Heath and Jayachandran, 2016; Jayachandran, 2019).

We investigate whether exposure to male or female role models could significantly impact children’s aspirations to continue with their education as well as their attitudes toward gender equality in education and labor market participation. We conduct a field experiment in Somalia, a very low income and fragile context. Literacy rates are among the lowest in the world; very few children are enrolled in school and even fewer complete their education (UNICEF, 2017). The study was rolled out in collaboration with Save the Children International, which was already involved in the implementation of an intervention aimed at improving infrastructures and facilities in 46 primary schools in two regions. We randomly assigned schools to either be visited by role models, who were current college students, or to act as control schools. Within each treatment school, we randomly selected grades to be visited by either a male or a female role model. The role model visits took place between April and May 2018.

In a survey conducted six months after the intervention, we asked questions about desired levels of education and plans to attend college, as well as a set of questions aimed at measuring attitudes toward male and female education and labor market participation. Two years after the intervention, we collected further survey data on the oldest student cohort who were in grade six at the time of the role model visits, and who were about to graduate from school in Spring 2020. We test whether the intervention influenced boys’ and girls’ aspirations concerning future enrolment in college and whether the role model visits, and in particular the visits from female college students, impacted male and/or female students’ gender attitudes.

We find evidence of large and significant positive effects of female role models on both

boys and girls' attitudes toward gender equality six months after the intervention. The effect is large, i.e., 0.36 standard deviations, and is able to close any pre-existing gender gap in attitudes. In contrast, we find no effect of either male or female role models on aspirations to go to college, and no effect of male role models on either gender attitudes or college aspirations. Two years after the intervention, when estimating the role models' effect on the aspirations and gender attitudes of the graduating class only, i.e., students who were in grade 6 at the time of the intervention, we find suggestive evidence that the impact of female role models may have persisted over time. However, when conducting regression analysis and clustering the standard errors at the school level, the estimated impacts, albeit comparable in sign to those obtained for the same cohort in 2018, lose statistical significance, most likely due to the smaller sample size and a large inter-cluster correlation, which make us underpowered to detect the impact.

We contribute to a small but growing literature that investigates role model effects by testing the impact of movies and TV shows on education outcomes (Riley, 2017), women's empowerment (Jensen and Oster, 2009; La Ferrara et al., 2012), entrepreneurial aspirations (Bernard et al., 2014; Bjorvatn et al., 2019) and teens' behavior (Kearney and Levine, 2015). Other related studies have examined the impact that female teachers may have on women's performance in math (Muralidharan and Sheth, 2016) and their field of study in higher education (Carrell et al., 2010; Lim and Meer, 2019). Finally, Beaman et al. (2012) and Porter and Serra (2020) have shown that exposing young women to successful and inspiring women may impact their aspirations and educational choices. Similarly to Porter and Serra (2020), our experimental design relies on the direct interaction between the target sample (primary school students) and real-life role models who come from a similar background and have experienced similar challenges in life. Our work is also related to the study by Nguyen (2008), which exposed pupils in schools in Madagascar to educated individuals from the same school districts.¹ Contrary to Porter and Serra (2020) and Nguyen (2008), we randomized the gender of the role model students were exposed to. This way, we were able to assess gender-specific impacts on the aspirations and gender attitudes of both male and female students.

Our study also contributes to the literature on gender norms and women's participation in the labor market. Existing investigations have highlighted the impact of family and societal characteristics on female labor force participation (Fernández et al., 2004; Olivetti et al., 2018). Studies that focus specifically on the formation of and possible change in individual attitudes toward gender equality are scarce. A recent field experiment conducted in the

¹Nguyen (2008) employed a total of 72 role models chosen by a local committee consisting of the school district head, a local NGO leader, and community leaders.

military in Norway (Dahl et al., 2018) shows that being assigned to live and work with female recruits changed men’s gender attitudes. In India, an intervention targeting secondary school students and focused on classroom discussions on gender roles and gender equality significantly impacted adolescents’ gender attitudes and behaviors, with the effect being larger for boys (Dhar et al., 2018). The program in India was much more intensive with a two-and-a-half year weekly treatment, whereas the role model visits we implemented were relatively short and cheap - costing approximately \$53 per role model per school, with each role model visiting two classrooms.²

In the next section we outline the Somalia context, then describe the role model intervention and our empirical strategy. Section 4 presents our main findings and Section 5 concludes.

2 Context

Ever since the devastating civil war of 1988-91, the vast majority of school age children in Somalia have had very limited access to basic services in general and basic education in particular. Conflict mixed with recurring drought, flood and climate change and food insecurity, has been daily life for communities and their children. Over 1.5 million people have been living as Internally Displaced Persons (IDPs) for decades across the three regions of Somaliland, Puntland and South Central Somalia (SCS). The government of Somalia faces serious challenges in governing and financing public education due to a lack of financial, human and managerial resources. Parents are required to pay fees to enrol their kids in public schools, which contributes to the marginalization of children from poor and rural families. Moreover, capacity constraints have caused most education services, including curriculum development, examinations and certification, to be provided by private Education Umbrellas rather than the public education system, resulting in lack of regulation and standardization.

Unsurprisingly, literacy rates in Somalia are among the lowest in the world. The World Bank (2019) estimated that in 2018 only half of the adult population was able to read and write, and that the (net) school enrollment rate is 33% (40-48% amongst those aged 10-19). Although primary education (grades 1 to 8) has been mandatory since 1975, only just over 30% of children are enrolled in primary schools. Girls are equally likely to be enrolled in primary school, however a significant gap emerges at secondary level (World Bank, 2019). Gender norms are severely biased against women (UNDP, 2019). The 2012 UNDP

²This was the cost of lunch and travel for each role model visiting a school. It also covers the per person cost of implementing a coaching day with all the role models. This implies that the cost of conducting the intervention in a school, with two role models - one man and one woman - each visiting two classes, was about \$106.

Gender Inequality index, a composite score that assesses the status of women’s reproductive health, empowerment and labor market participation, ranked Somalia at the bottom of the global country distribution, due to extreme gender inequality (UNDP, 2012). While the index was not calculated for Somalia in more recent years due to incomplete data, the 2019 reported maternal mortality rate is one of the highest, and female labour force participation at 19% amongst the lowest in the world. Entrenched traditional views assign women and girls secondary status in Somali society. This perpetuates narrow gender-based roles and inequalities. Participation of women and girls in decision-making spheres is limited. Female teachers are unlikely to serve as role models for young women, as only 14% of teachers in primary and 4% in secondary schools are women (Ministry of Education, Culture and Higher Education, 2017).

Our paper is one of the few research studies conducted in Somalia. A search of econlit for example, shows that no papers have been published in economics journals using Somali data in the past 5 years, most likely due to the difficulties of working in the country. A recent review of economics research on African countries in the past 20 years by Porteous (2020) shows that over 40% of published papers are about 5 countries accounting for less than 20% of the African population.³ Somalia is one of the “scarce 7” countries,⁴ which have equivalent population as the “frequent 5” but are rarely studied and account for less than 5% of economics publications. This makes our data collection efforts in Somalia particularly relevant.

3 The role model intervention

We conducted the study in partnership with Save the Children International (SCI). SCI was already implementing a set of education programs in 46 primary schools in two Somali regions, Puntland and South-Central, in collaboration with the Ministry of Education. The programs focused on increasing access to education for marginalised children (girls, boys, pastoralists, minority groups and children with mild disabilities) in targeted areas. The target regions and schools were chosen based on three criteria: a) the needs of children and the extent to which their rights are violated in the region; b) the absence or limited interventions by other NGOs or agencies in addressing the plights and rights of children in a holistic and integrated manner; c) operational and technical capacity of SCI and its partners to successfully implement similar intervention in the region. The program included upgrades and rehabilitation of classrooms and school facilities with the aim of creating safe and child-friendly learning environments.

³The most commonly studied African are Ghana, Kenya, Malawi, South Africa and Uganda

⁴The other countries are Angola, Chad, D.R. Congo, Guinea, South Sudan and Sudan

It also assisted schools in developing and implementing School Improvement Plans, training teachers in basic pedagogy and code of conduct and enhancing school governance, and student literacy boost among others (Save the Children, 2018).

We randomly selected 22 of the 46 primary schools in which SCI was active to receive a role model intervention using pairwise randomization.⁵ We sorted schools by region, number of grades, and size (number of enrolled students), created pairs and randomly allocated one school per pair to the treatment.⁶ The randomization was successful with no significant differences at the school level according to: number of classrooms, number enrolled (and boy/girl ratio), number of grades, school fees, length of time operational, girl friendly space availability, number of female teachers (see Table I in Section 4).⁷

Each of the treated schools received a visit from one male college student and one female college student (our role models) on the *same day*. Each role model visited 2 grades, for a total of 4 treated grades per treated school. Schools had differing number of grades; in the schools with grades 1-4 (17 percent) all grades were treated, and in the schools with 8 grades, we treated grades 2, 4, 6, 8. We randomly selected the grades to be visited by male or female role models.

We had a total of 15 role models, of which 9 were women and 6 men, with the most common fields of study being medicine and economics. Each role model visited between one and four schools.

3.1 Implementation

The most critical aspect of the field experiment was the identification of appropriate role models, who were college students with similar backgrounds and who had experienced similar challenges as the primary school children being visited. To recruit them, we worked with head teachers from the SCI schools to identify former students who were currently attending universities in Somalia. From the long list of potential role models, we worked with the SCI program staff to short-list those college students whose life story was especially inspiring, i.e., students who had achieved academic excellence and managed to pursue university education despite having faced personal difficulties. These role models were then invited by SCI program staff to a briefing session in March 2018 to inform them about the role model intervention and asked them for their willingness to collaborate with us on the project. A total of 15 role models (9 female and 6 male) agreed to participate in the intervention.

⁵We originally had 47 schools, but one school was excluded as it was an all girls school.

⁶Figure A1 in the Appendix provides a map depicting the locations of the treatment and control schools.

⁷All the schools in this study were supported by Save the Children through the Norad program. The majority (37) of the schools were located in urban areas. Of these schools, 14 mostly catered children from displacement camps, which are located in the periphery of urban centres.

We then invited the role models to a day-long coaching session where we informed them of the structure of the school visits, and we assisted them in preparing a 30-40 minute speech targeted at for primary school students. The role models were invited to include the following items in their speeches: 1) introduction (names, how old they are, which schools they went to including the current university); 2) what challenges they experienced while in school, how did they overcome them; 3) whether they experienced failures and what they would do differently if they could go back in time; 4) future plans and job prospects. At the end of the coaching session, the role models chose the schools that they would visit (out of those in the treatment group) based on proximity to their place of origin.

The intervention took place between April and May 2018. Each role model visited one school per day and gave two speeches, mostly in the morning hours. In all occasions, two role models visited the school. This ensured that they delivered their speeches to all the four classes selected to receive the intervention. Each role model was provided with 50 USD per school visit to cover lunch and transport costs.

In all treated schools, the SCI Norad program staff sought permission for the role model visits from the school administration at least one week prior to the scheduled visit day. The speeches lasted between 40 and 60 minutes and were delivered in the selected classrooms in the presence of the class teacher. The last 5 to 10 minutes of the role model visits were left for students' questions and role models' answers, facilitated by the class teacher. Since the speeches were done during normal class time, there was no contamination of students in control classes within treated schools.

The endline data collection took place six months after the intervention, between October and November 2018. We collected survey data in 41 control and treated schools for all students who, at the time, were enrolled in grades 5 to 8 and were present the day of the survey.⁸ The data collection relied on a short self-administered short questionnaire (two pages only). We collected information on students' family background, aspirations concerning education and future occupation and answers to a set of questions aimed at measuring gender attitudes. Note that, due to budget and logistical constraints, we did not survey the students before the intervention took place. Therefore, at baseline, we only have school-level data provided by Save The Children (Table I). An indirect advantage of not asking students the same questions before and after the role model visits is the lower risk of social desirability bias in the survey answers that generate our outcome variables.

We conducted a second, lower-scale, follow-up data collection in early April 2020, i.e.,

⁸Because the survey was self-administered we received mostly blank forms from three schools. Two other schools were part of another education technology evaluation within the wider program, thus were excluded from the 2018 data collection.

about two years after the intervention. This time, we were able to only survey the student cohort who was enrolled in grade 6 at the time of the role model visits, and was therefore enrolled in grade 8 and about to graduate in Spring 2020.⁹

From the first more comprehensive follow-up survey, we have just under 1700 respondents enrolled in grades 5 to 8 (who were in grades 4 to 7 at the time of the intervention); 56 percent from treated schools and 44 percent from control schools. From the second follow-up survey, restricted to the original grade 6 cohort, we have approximately 800 respondents, 57 percent from treated schools and 43 percent from control schools.

3.2 Ethical Considerations

This study was subject to ethical approval from Southern Methodist University and Texas A&M University Ethics Review Boards. As part of the wider Norad Framework evaluation, administrative approval was sought from Ministry of Education in Puntland State and South-Central Somalia State of Somalia. Data collection in that programme was supervised by local Ministry of Education administration staff, respective school administrators, and SCI Norad programme staff.

All data collectors were trained on SCI’s Child Safeguarding Policy and were required to append their signatures indicating understanding of the policy as well as commitment to abide by it during data collection. Informed consent and assent was obtained in-line with SCI precedents. First was consent from parents whereby a week to data collection, as part of mobilization and preparation, headteachers of respective schools were mandated to inform the parents of the data collection (purpose and what information will be collected and whether there would be any benefit or risk by participating in data collection). Here the head teacher with the help of school Community Education Committees (CECs), sent out oral communication to parents. The parents would then inform the head teacher or CECs their position consenting or dissenting his/her child from the data collection exercise. Additionally, student written assent was sought during the actual day of data collection. Students were first informed by their class teachers of the purpose and benefits or risks of the data collection, and the information to be collected. Since the consent form was attached to the main survey tool, students who dissented to the study were asked to return the questionnaire without filling it. Any identifying information collected as part of the whole exercise has been delinked from the datasets used for analysis.

⁹Due to the imminent thread of COVID-19, we restricted the data collection to the graduating class only. An advantage of focusing on this student cohort is that grade 6 students were always treated in treatment schools, either by a male or a female role model.

3.3 Randomization and Empirical Strategy

Given the small number of SCI schools (46), we used pairwise randomisation to select the schools that would receive the role model intervention. We first stratified schools by region and sorted based on number of grades and total enrolled students. We then conducted pairwise matching (Imbens and Ruben, 2017). Within each pair, we randomly selected one school to be treated.

Abadie and Imbens (2011) show that matched-pairs randomization (and stratified randomization) can increase power in small samples. Simulation evidence presented in Bruhn and McKenzie (2009) supports these findings, though they note for large samples there is little gain from different methods of randomization over a pure single draw. Imai et al. (2009) also derive properties of matched-pair cluster randomization estimators and demonstrate large efficiency gains relative to pure simple cluster randomization.

We estimate the following:

$$Y_{igs} = \alpha + \beta_1 RM_{sg,j} + \delta \mathbf{X}_i + \lambda_j + \zeta_g + \epsilon_{gs} \quad (1)$$

Our main results focus on the different effect of role models by gender, on male and female students:

$$\begin{aligned} Y_{igs} = & \alpha + \beta_1 FemaleRM_{gs,j} + \beta_2 MaleRM_{gs,j} + \gamma F_i \\ & + \beta_3 F_i * FemaleRM_{gs,j} + \beta_4 F_i * MaleRM_{gs,j} \\ & + \delta \mathbf{X}_i + \lambda_j + \zeta_g + \epsilon_{gs} \end{aligned} \quad (2)$$

where Y_{igs} represents the outcome of child i in grade g in school s in pair j ; $RM_{sg,j}$ is the Role Model treatment assignment of grade g in school s in pair j . Recall that grades could be allocated to a Male role model, Female role model or untreated grade (in treated school); comparison schools are completely untreated. We include a dummy for female student (F_i) and interact with the two Role model treatment dummies to test whether there are different effects by gender. In Table II we also report the Wald test of $\beta_1 + \beta_3 = 0$ and $\beta_2 + \beta_4 = 0$.

We control for child characteristics X (including household background) that may also affect their aspirations and gender attitudes. Due to the pair matching method we include pair fixed effects λ_j , as well as grade fixed effects ζ_g . Standard errors are clustered at the unit of randomization, which is the grade-school level. In Table A1 we present separate regressions by gender, and confidence intervals for p-values based on randomization inference (Heß, 2017).

For the analysis of treatment effects on the grade 6 cohort, based on the 2018 data and

the 2020 follow-up, we estimate a similar model with some modifications. Every grade six cohort was treated in treatment schools in Spring 2018 (so $g=6$ in all cases), yet the gender of the role model was randomized across grades within each school. Note that in 2020 the sample size is reduced to the 32 schools that offered the full set of grades 1 to 8. Of these, 16 are control schools and 16 treated schools (8 with a male role model and 8 with a female role model). The smaller sample size and the availability of data for students in one grade prevent us from exploiting grade-school variation in the empirical analysis. We cannot include pair fixed effects either, as some of the schools were initially paired, in the randomization process, with schools that did not offer grade 8, and therefore do not appear in the restricted sample. We still include school and student controls in the specification.

4 Results

4.1 Balance Tests

In the top panel of Table I we report descriptive statistics of baseline school characteristics for control and treatment groups. Tests of equality of means show no significant differences in any of the available school characteristics, including the number of students, the ratio of boys to girls, student-teacher ratio and the number of female teachers as well as whether the school charges fees and whether it has girl friendly spaces. Note that the number of available grades vary by school, with the majority but not all offering grades 1 to 8.

In the middle panel of Table I we report data on students' characteristics as generated by our 2018 survey data. Recall that the survey was conducted only on students enrolled in grades 5 and up (i.e., grades 4 and up at the time of the intervention). We have information on a total of 1690 students with non-missing data for any of the variables in the sample, of which 751 were in control schools and 939 in treated schools. Of the surveyed students we find significantly fewer missed school due to poverty (needed to work for pay or did not have money to pay for fees, books or other school costs) in the treated schools, and also more who had a close female relative (mother or sister) attend college. We control for the imbalanced students' characteristics in our main regression specifications.¹⁰

¹⁰We collected information on father and mother education in 2018, and these are balanced across control and treatment groups.

Table I: Balance Tests

	Control	Treatment	Difference
<hr/> Baseline School Characteristics - Spring 2018 <hr/>			
School fees?	0.421	0.318	-0.103
Age of school	9.895	7.864	-2.031
Girl friendly space?	0.211	0.182	-0.029
Number classrooms	8.632	7.727	-0.904
Number female teachers	1.842	1.364	-0.478
Total students enrolled	231.737	238.727	6.990
Boys enrolled	120.211	128.955	8.744
Girls enrolled	111.526	109.773	-1.754
Student-teacher ratio	29.213	35.112	5.899
Number of grades	7.000	6.455	-0.545
<i>Number of Schools</i>	<i>19</i>	<i>22</i>	<i>41</i>
<hr/> Student Characteristics - Full sample - Fall 2018 <hr/>			
Female student	0.503	0.474	-0.029
Age	14.618	14.597	-0.020
Missed school due to poverty	0.130	0.085	-0.045***
Close female relative went to college	0.044	0.076	0.032***
Grade 5	0.340	0.335	-0.004
Grade 6	0.314	0.280	-0.034
Grade 7	0.282	0.292	0.010
<i>Observations</i>	<i>751</i>	<i>939</i>	<i>1,690</i>
<hr/> Student Characteristics - Grade 6 cohort - Spring 2020 <hr/>			
Female student	0.471	0.364	-0.107***
Age	15.348	15.044	-0.304***
Missed school due to poverty	0.164	0.222	0.059**
Close female relative went to college	0.253	0.249	-0.003
<i>Observations</i>	<i>348</i>	<i>481</i>	<i>829</i>

Source for baseline school characteristics: Save the Children. T-test of differences in means between control and treatment schools. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In the bottom panel of Table I we report data on the characteristics of the grade 6 cohort, as surveyed in Spring 2020, when they were about to graduate from elementary school. The sample of 829 grade eight students is somewhat less balanced than the 2018 sample. In particular, there are 10 percent fewer girls in the treated schools than control schools, more treatment school students missed school because they had to work (the opposite of the 2018 imbalance), and age is slightly lower in treatment schools. We control for the same student level characteristics in the analysis.

4.2 Short-term treatment effects on gender attitudes and college aspirations

As discussed above, gender norms in Somalia are severely biased against women. One of our objectives is to test whether exposing students to role models - and especially visits from young women who had successfully finished secondary school and were pursuing a college degree despite facing many challenges - could affect girls' and boys' attitudes toward gender equality in education and job participation. To measure gender attitudes, we asked the following set of agree/disagree questions: ¹¹

1. "More encouragement in a family should be given to sons than daughters to go to college."
2. "It is more important for boys than girls to do well in school."
3. "Boys are better leaders than girls."
4. "Girls should be more concerned with becoming good wives and mothers than desiring a professional or business career."

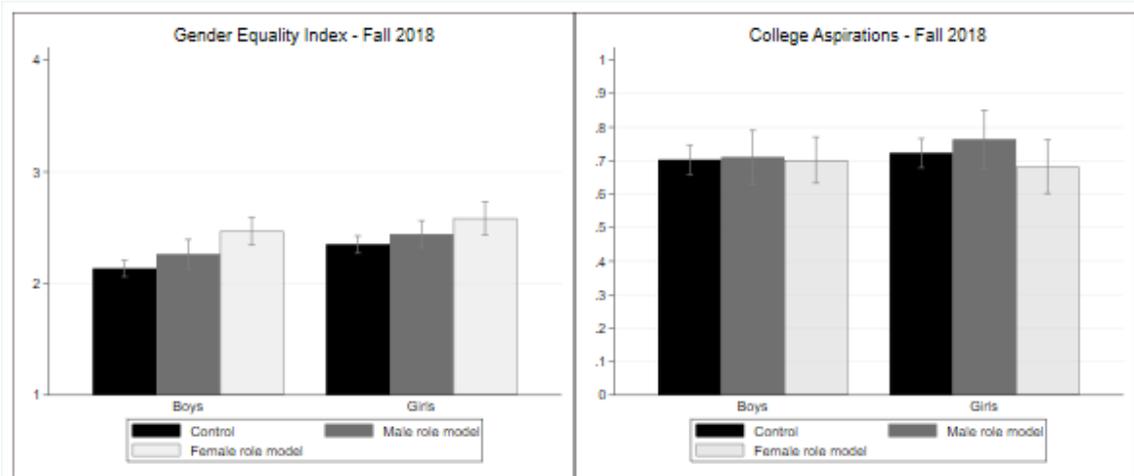
We average individual answers to the four questions into an index of attitudes toward gender equality, which is measured on a scale from 1 to 4, where a higher number indicates attitudes more strongly in favor of gender equality.

The left panel of Figure I displays descriptive statistics of the gender gender attitudes of boys and girls in control and treatment schools, as measured six months after the intervention. The figure suggests that visits by female role models affected gender attitudes positively, and this is true for both both boys and girls. Moreover, the female role model visits seem to have closed the gender gap in gender attitudes that we see in control schools.

Regression analysis, displayed in columns 1 and 2 of Table II, confirms these findings. Results are reported in standard deviations from the control mean. The estimates reveal that the visits by female college students increased gender attitudes toward equality by about 0.36 standard deviations, with no significant difference in the effects on male and female students.

¹¹We administered a fifth question "girls are as smart as boys", but this question had a positive item-rest correlation (when negative was expected) and lower item test-retest reliability. We therefore dropped it from the index, which resulted in Chronbach's alpha for the scale of 0.66 (previously 0.61).

Figure I: Aspirations and Gender Attitudes, Fall 2018



Note: The figure reports the outcome variables, by student gender and treatment group as measured in Fall 2018, 6 months after the intervention (Spring 2018). The Gender Equality Index aggregates four survey questions, and ranges between 1 and 4, with higher numbers indicating preferences for more gender equality. College Aspirations refer to the percentage of students who stated that the highest level of education they would like to achieve, if nothing would stop them, is college.

The gender gap observed in control schools, whereby female students hold attitudes that are about 0.28 standard deviations more toward equality as compared to male students, vanishes as a result of the female role model intervention (p-value = 0.251, Wald test for the sum of coefficients on Female and its interaction with Female RM). The results are robust to controlling for school and student characteristics, and to including school-pair fixed effects, which exploits the randomization method we used to allocate schools to the treatment or the control group.

Our other primary outcome variable is students’ educational aspirations. In the survey, we asked students to report the highest level of education that they would like to complete “if nothing could stop them.” We find that the vast majority of students (about 72% with no significant differences across genders) aspire to pursue a college education. Both the right panel of Figure I and the estimates in Columns 3 and 4 of Table II show that we do not find any significant treatment effects on aspirations to pursue higher education, either for boys or girls.

The p-values using randomization inference (Heß, 2017) are displayed in Table A1, and confirm that a visit from a role-model had a significant impact on the gender attitudes of both boys [p-value 95% confidence interval=0.0259-0.035] and girls [p-value 95% confidence interval=0.059-0.073] but no impact on college aspirations.

Table II: Short-term impacts on gender attitudes and aspirations

	Gender attitude (1)	Gender attitude (2)	College aspirations (3)	College aspirations (4)
Female Role Model	0.357** (0.166)	0.363*** (0.129)	0.022 (0.060)	0.027 (0.064)
Male Role Model	0.031 (0.136)	0.062 (0.165)	0.034 (0.111)	0.047 (0.109)
Female	0.277*** (0.080)	0.288*** (0.086)	-0.003 (0.026)	-0.008 (0.027)
Female*Female Role Model	-0.024 (0.221)	-0.036 (0.233)	-0.040 (0.046)	-0.064 (0.047)
Female*Male Role Model	-0.052 (0.167)	-0.008 (0.168)	0.027 (0.105)	0.047 (0.100)
Female RM + Female*Female RM=0	0.050**	0.038**	0.752	0.538
Male RM + Female* Male RM=0	0.880	0.695	0.265	0.282
Grade fixed-effects	yes	yes	yes	yes
Pair fixed-effects	no	yes	no	yes
School controls	yes	no	yes	no
Student controls	yes	yes	yes	yes
Observations	1690	1690	1690	1690

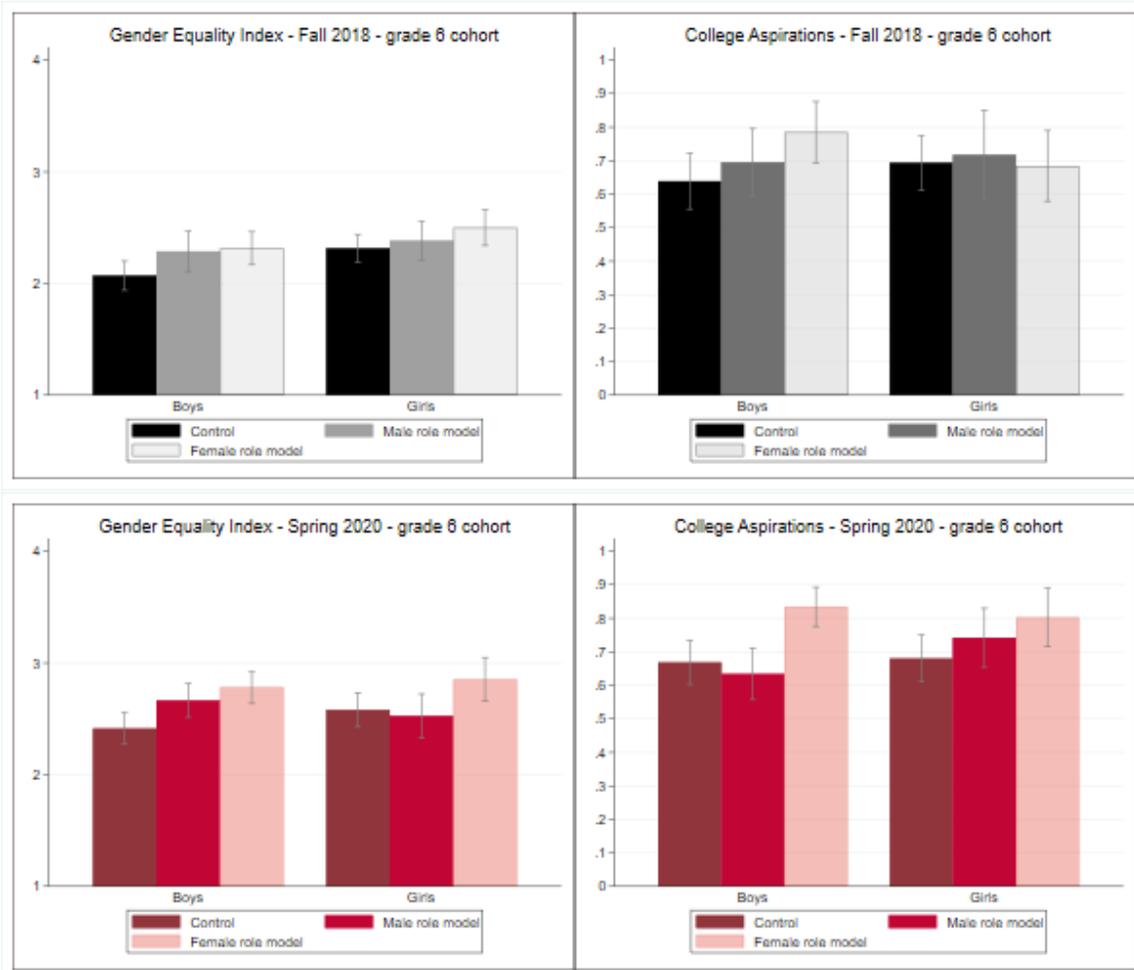
Note: The Gender Attitude index averages 4 survey questions and is standardized around the Control mean. The estimates in Columns 1 and 2 are expressed in standard deviations from the Control mean. College Aspirations are measured through a dummy variable, which is equal to 1 if the highest level of education that a student would like to complete “if nothing could stop them” is college. Robust standard errors in parentheses, clustered at school-grade level (column 1, 3) and school level (column 2,4). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.3 Short- and longer-term effects on the grade 6 student cohort

In this section, we restrict the analysis to the students who were enrolled in grade 6 at the time of the intervention, in April 2018. This is because: 1) grade 6 students were treated in all treatment schools; 2) we were able to return to the schools in March and early April 2020 to re-survey this cohort just before they graduated from grade 8 and transitioned to secondary school.

Figure II displays descriptive statistics generated by the 2018 data (top) and the 2020 data (bottom) for this student cohort. In Fall 2018, about six months after the intervention, and when the students were enrolled in grade 7, we see a similar pattern as that observed in Figure I for the full student cohort. In particular, there seems to be a positive effect of female role models on the gender attitudes of both boys and girls. Moreover, for this cohort, the female role model visits seem to have affected also the college aspirations of boys only. This is confirmed by regression analysis, displayed in columns 1 and 2 of Table III.

Figure II: 2018 and 2020 results - Grade 6 cohort



Note: The figure reports the outcome variables, by student gender and treatment group, for the students who were in grade 6 at the time of the intervention (Spring 2018). The top left and right figures show the outcome variables measured in Fall 2018. The bottom left and right figures show the outcome variables measured in Spring 2020. The Gender Equality Index aggregates four survey questions, and ranges between 1 and 4, with higher numbers indicating preferences for more gender equality. College Aspirations refer to the percentage of students who stated that the highest level of education they would like to achieve, if nothing would stop them, is college.

The size of the effect of female role models on gender attitudes is the same as that observed for the full student sample in Table II, albeit significant only at the 10 percent level, which is not surprising given the smaller sample size. The effect of female role models on the college aspirations of boys is sizable (a 14 percentage point increase) and significant at the 5 percent level. No such impact is present for girls. The bottom panel of Figure II seems to suggest that the effect of female role models on male and female students' gender attitudes persisted over time. Indeed, simple tests of equality of means show evidence of significant treatment effects.

When turning to regression analysis, in columns 3 and 4 of Table III, we find the estimated

Table III: Short- and longer-term impacts on attitudes and aspirations of the grade 6 cohort

	Gender attitude (Fall 2018)	College aspirations (Fall 2018)	Gender attitude (Spring 2020)	College aspirations (Spring 2020)
	(1)	(2)	(3)	(4)
Female Role Model	0.363* (0.206)	0.145** (0.066)	0.191 (0.270)	0.142 (0.084)
Male Role Model	0.126 (0.199)	0.059 (0.166)	0.119 (0.249)	-0.021 (0.094)
Female	0.318** (0.149)	0.053 (0.050)	0.158 (0.154)	0.009 (0.046)
Female * Female Role Model	0.004 (0.206)	-0.147** (0.065)	-0.040 (0.249)	-0.053 (0.104)
Female * Male Role Model	-0.170 (0.260)	-0.090 (0.148)	-0.141 (0.215)	0.106 (0.069)
Female RL + Female*Female RL=0	0.078*	0.973	0.484	0.478
Male RL + Female* Male RL=0	0.774	0.670	0.932	0.389
School controls	yes	yes	yes	yes
Student controls	yes	yes	yes	yes
Observations	490	490	829	829

Note: Data in column 1-2 from October-November 2018 and column 3-4 from March-April 2020. The analysis is restricted to students enrolled in grade 6 at the time of the intervention, in Spring 2018. The Gender Attitude index averages 4 survey questions and is standardized around the Control mean. Therefore, the estimates in Columns 1 and 3 are expressed in standard deviations from the Control Mean. College Aspirations are measured through a dummy variable, which is equal to 1 if the highest level of education that a student would like to complete “if nothing could stop them” is college. Robust standard errors in parentheses, clustered at school level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

treatment effects to be comparable in magnitude to those observed in 2018, yet statistically insignificant.¹² The estimates in Table III also show that for the grade 6 cohort, visits from female college students increased male students’ (but not female students’) aspirations to attend college in the short term by about 14.5 percentage points (over a baseline of about 60 percent). The estimated impact of the role model visits on male students’ aspirations is remarkably similar in the longer term (see column 4), but not statistically significant. A possible explanation is that seeing that a woman could successfully enrol in and attend college positively impacted male students’ beliefs that they could do the same (i.e., “if a woman can do this, I can certainly do it.”)

In the next section, we discuss our overall findings and the possible reasons behind the

¹²For the graduating class in 2020, we were also able to obtain grades obtained in the centrally administered exit exam. We do not find any significant impact of the role model intervention on exam results. Estimates are not disclosed here but available from the authors upon request.

null effects observed for the grade 6 cohort two years after the intervention.¹³

4.4 Discussion

Classroom visits by female college students led to a significant positive shift in boy’s and girls’ attitudes toward gender equality in education and labor market participation six months after the intervention. The effect is robust to restricting the analysis to students in one grade only, i.e., grade 6 at the time of the intervention. These students were always treated - either by a male or a female role model - in treatment schools. For this cohort, visits by female role models also impacted boys’ aspirations to go to college. The data collected on the same student cohort (grade 6) two years after the intervention produce comparable point estimates for both gender equality and college aspirations, although both are statistically insignificant.

The likely culprit for the lack of statistical significance in 2020 is the smaller sample size (one grade only in 32 schools) and the inability to exploit grade-school variation in students’ attitudes. The clustering of the standard errors at the school level when using data from one grade only, in particular, is problematic due to a large intra-cluster correlation, which in 2020 is equal to 0.37 for the gender index and 0.24 for college aspirations.¹⁴ This makes us underpowered to detect an impact of 0.2 (0.14) standard deviations on the gender equality index (college aspirations). In contrast, the intra-cluster correlations in 2018 for the gender index and college aspirations were both 0.08 at the school level, and 0.15 and 0.13, respectively, when restricting the analysis to the grade 6 cohort.¹⁵

An additional potential cause for the lack of significance observed in 2020 for the grade 6 cohort is the possibility that the larger sample size reflects the addition of students who did not usually attend class, or were in a different grade, hence were absent at the time of the first follow-up survey and likely absent also the day of the role model visits in spring 2018.¹⁶

¹³While the table reports estimates on the same student cohort surveyed in different years, the bigger number of survey respondents in 2020 is likely caused by the fact that at the time of the survey in spring 2020 the students were preparing for the mandatory state exam, which would take place in May. We believe that this led to a higher school attendance rate than in fall 2018, when the students were starting grade 7. It is also possible that some students from the previous cohort (grade 5 at the time of the intervention) were also in attendance in spring 2020, with the aim of repeating the exit exam. Due to fieldwork difficulties, which prevented us from assigning unique identifies to the 2018 survey respondents, which that would allow us tracing over time, we are unable to merge the 2018 and the 2020 data by subject and conduct the analysis on a restricted panel.

¹⁴Note for example that in the aspirations model the p-value for the coefficient on female role model is 0.103 with clustered standard errors and 0.002 with robust (unclustered) standard errors.

¹⁵The increase in the intra-cluster correlation in 2020 implies that when clustered at the school level, our standard errors are 3.25 times higher than if we had individual-level randomization, leading us to have much lower power to detect an effect.

¹⁶Due to logistical problems connected to the implementation of the data collection, we cannot match the 2018 and 2020 data, as we miss individual identifiers other than self-reported names. Matching the 2018 and

5 Conclusions

We implemented a role model intervention in primary schools in a fragile country: Somalia. Students enrolled in selected grades in treated schools were visited by a young adult who grew up in the same geographical area and had a similar background, and was currently enrolled in college. Within the treated schools, we randomly selected grades who would receive either a male or a female role model. Six months after the intervention, we surveyed all students enrolled in grades 5 and above in control and treatment schools, and attending class the day of the survey. We found strong evidence that visits from female college students significantly impacted both boys' and girls' attitudes toward gender equality in education and labor market participation. The effect is large and robust. Female role models had no impact on college aspirations, and male role models had no impact on either gender attitudes or aspirations.

Two years after the intervention, in spring 2020, we were able to resurvey students in only one grade, those who were in grade 6 at the time of the intervention and were about to graduate from elementary school. The analysis of the raw data suggests that the female role model effect on gender attitudes persisted over time. However, regression analysis with standard errors clustered at the school level produce estimated coefficients that, although comparable in magnitude to those obtained in 2018, are statistically insignificant. The smaller sample and the high inter-cluster correlation observed for the grade 6 cohort in 2020 are the likely causes for the loss in statistical significance. Future work will aim to conduct further endline surveys in control and treatment schools, whenever possible, and to follow the student cohorts over time to examine whether the role model visits had long-run effects on male and female students' gender attitudes, as well as their likelihood to stay in school, attend college and pursue their desired occupation.

We conclude that despite the logistical difficulties of working in a challenging context, the intervention, given its relative cheapness, may be a useful add-on to education programs in fragile contexts.

2020 grade 6 cohort data by name restricts the sample to 215 students only.

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6 APPENDIX

Figure A1: Map Showing Study Schools

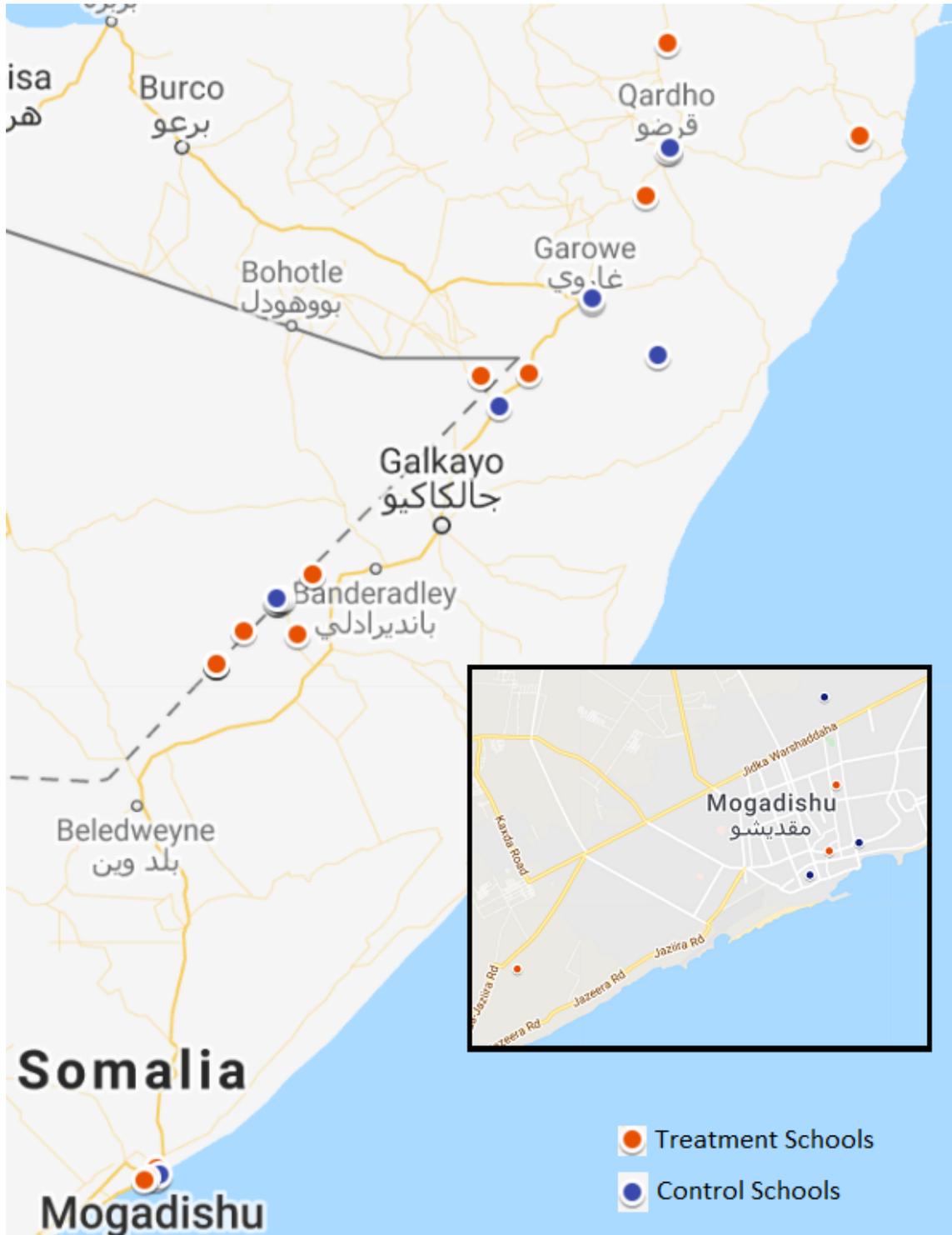


Table A1: Randomization Inference

	(1)	(2)	(3)	(4)	(5)	(6)
	Gender	Gender	Gender	Aspire	Aspire	Aspire
	Attitude	Attitude	Attitude	College	College	College
	(All)	(Girls)	(Boys)	(All)	(Girls)	(Boys)
Female RM	0.346 (0.089) [.0002, .0004]	0.346 (0.136) [.059, .073]	0.352 (0.130) [.025, .035]	-0.003 (0.060) [.960, .970]	-0.0407 (0.069) [.633, .660]	0.017 (0.065) [.803, .825]
Male RM	0.225 (0.117) [.671, .697]	0.093 (0.158) [.580, .608]	0.242 (0.146) [.927, .941]	0.066 (0.084) [.398, .425]	0.129 (0.075) [.099, .116]	0.021 (0.104) [.828, .848]
Female	0.281 (0.066)			-0.012 (0.022)		
Observations	1690	823	867	1690	823	867

Female RM indicates the Female Role Model treatment. Male RM indicates the Male Role Model treatment. All regressions include pair and class fixed effects. Standard errors clustered at the school level in parentheses. In square brackets we report 95% confidence interval of p-value for treatment effect coefficient based on randomization inference using `ritest` in Stata 16 (Heß, 2017).