Review of Economic Analysis 14 (2022) 183-219 1973-3909/2022183

# Gender, Growth Mindset, and Covid-19: A Cluster Randomized Controlled Trial in Bangladesh

**JENNIFER SEAGER**
*George Washington University* *

**T.M. ASADUZZAMAN**
*The World Bank*

**SARAH BAIRD**
*George Washington University*

**SHWETLENA SABARWAL**
*The World Bank*

**SALAUDDIN TAUSEEF**
*University of Manchester*

School closures during the covid-19 pandemic disrupted learning among students globally, with concerns for long-term impacts on adolescent well-being and likely differential effects for boys versus girls. This study explores the gendered impacts of covid-19-related school closures on continued learning and motivation among secondary-school students in Bangladesh and presents short-term impacts of a cluster randomized intervention that offered students an innovative, virtually-delivered Growth Mindset curriculum. During the covid-19 pandemic, our analysis highlights that boys were significantly more likely to engage with media for continued learning, whereas girls were more likely to use books and paper assignments. Motivation for learning and aspirations for higher education fell during the covid-19 pandemic, particularly for girls. The randomized Growth Mindset

* Corresponding Author, Department of Global Health, 950 New Hampshire Ave NW, 4th floor, Washington DC 20052; phone: 202-994-4455; email: jseager@gwu.edu

We gratefully acknowledge funding for this project from UK Aid from the Foreign, Commonwealth, and Development Office in the UK government, the World Bank South Asia Gender Innovation Lab, and the Women's Work, Entrepreneurship, and Skilling Initiative at Innovation for Poverty Action (IPA). Thank you to IPA Bangladesh for data collection, and to Maxwell and Room to Read for implementing the Growth Mindset programming. Thank you also to our partners at the Ministry of Education for their collaboration.

intervention, which promoted the idea that individual characteristics, such as intelligence can be developed through practice, results in significant increases in adolescent motivation and aspirations across both genders. For boys, the effect sizes are large enough to compensate for negative covid-19 pandemic impacts; however, due to the larger negative impacts of the pandemic for girls, a covid-19 pandemic-related gender gap persists. Our findings suggest that a virtually-delivered Growth Mindset intervention mitigates the negative impacts of extended school closures, but that additional policies are needed to address gender differences in adolescent outcomes.

*Keywords:* Education; Adolescence; Covid-19, Growth Mindset; Aspirations; School Closures; Gender; Bangladesh

*JEL Classifications:* I21, I24, J16

## 1 Introduction

School closures due to the covid-19 pandemic have affected millions of students globally, with students in low- and middle-income countries (LMICs) disproportionately impacted due to longer school closures and lower access to distance learning modalities (World Bank 2020; Baird et al., 2021; Amin et al., 2021). The consequences of school closures are multifaceted, with documented impacts on social, emotional, and academic outcomes (Plan International, 2021; UNICEF, 2021a; Schwartz et al., 2021; Lee, 2020). While impacts of school closures on learning loss are only just emerging (Orlov et al., 2021; Lichand et al., 2021; Clark et al., 2021; Hevia et al., 2022; Moscoviz and Evans, 2022), evidence suggests that school closures have exacerbated pre-existing inequalities in learning along dimensions such as wealth, urbanicity, and gender (Asadullah, 2020; Amin et al., 2021; Wolf et al., 2021; Baird et al., 2021; Radhakrishnan et. al 2021; Hevia et al., 2022). In particular, gender norms that restrict girls' access to the internet (Jones et al., 2021; Grey et al., 2017; MMfD, 2021; UNICEF, 2021b) threaten to widen the already existing gender gap in educational outcomes, potentially undoing progress toward achieving Sustainable Development Goals target 4.1 that "all girls and boys have free, equitable, and quality primary and secondary education" (United Nations, 2015; UNESCO, 2020).

This study uses three rounds of panel data from 2,220 adolescents who were attending grades 7 and 8 in March 2020 in Bangladesh, where disruptions to education are among the largest globally, to explore the gendered impacts of covid-19-related school closures—and the efficacy of a potential intervention (discussed in more detail below) to mitigate these effects—on continued learning and student motivation. These data were collected as part of the Gender and Adolescence: Global Evidence (GAGE) Programme[1] in partnership with the World Bank

[1] GAGE is a nine-year longitudinal research program funded by UK aid by the UK government exploring the wellbeing of 20,000 adolescents across the course of adolescence (10-19 years) in six LMICs, including Bangladesh. GAGE is hosted by the Overseas Development Institute in London, with research partners in each focal country. For more details, see www.gage.odi.org.

under the Transforming Secondary Education for Results Operation (TSERO)[2]. Data collection occurred immediately prior to school closures, in-person, from February-March of 2020, as well as during school closures via phone from February-March 2021 and July-August 2021.[3]

Complete school closures that lasted 63 weeks from March 17 to September 12, 2021 (UNESCO, 2021; Amin et al., 2021) pose a significant threat to progress made by Bangladesh over recent decades, particularly for girls, in improving enrollment rates and learning outcomes (ASPR 2014; Ahmed et al., 2007; Shafiq, 2009; Asadullah and Chaudhury, 2009). Although the Government of Bangladesh quickly introduced television and radio programs broadcasting the national curriculum and some schools introduced online learning, evidence suggests that student engagement with these programs was low due to a lack of access to necessary devices and internet connectivity (Biswas et. al 2020; Baird et al., 2020; CAMPE, 2021; Asadullah, 2020). As a result, most adolescent learning was independently directed by the students themselves (Biswas et al., 2020; Asadullah, 2020; Baird et al., 2020; Baird et al., 2021). Early estimates during school closures suggested that a quarter of secondary-school-going children were at risk of learning and motivation losses, with parents more concerned about these losses than about their child contracting covid-19 (Rahman et al., 2021), and that the average student would suffer a loss of between 0.5 to 0.9 years of learning-adjusted schooling as a result of school closures (Rahman and Sharma, 2021).

Motivated by these potential losses, we implemented a cluster randomized controlled trial that offered an innovative, virtually-delivered Growth Mindset (GM) intervention [4] to adolescents in order to foster motivation for continued learning. GM programming promotes the belief that personal characteristics, such as intellectual abilities, can be nurtured and developed (Dweck 1999). Previous evaluations of GM interventions have found that this programming improves grades for lower-achieving students and retention in more difficult classes (e.g., Yeager [2019]; Zhu et al. [2019]; Rege et al. [2021]). Studies in both high-income countries (HICs) and LMICs also find that GM interventions result in higher motivation, effort, and increased educational attainment (e.g., Paunesku et. al. [2015] - USA; Yeager et. al. [2014] - USA; Claro et al [2016] – Chile; Outes-Leon, Sanchez and Vakis [2020] - Peru). We build on this previous literature on GM programming by providing evidence on the effectiveness of delivering a GM programming package that is typically delivered in-person via a virtual

[2] The objective of TSERO is to improve student outcomes in secondary education and bolster the effectiveness of the secondary education system. See https://documents1.worldbank.org/curated/en/194861607432878896/pdf/Disclosable-Version-of-the-ISR-Transforming-Secondary-Education-for-Results-Operation-P160943-Sequence-No-06.pdf.

[3] Phone penetration in this sample is high at 98%.

[4] Moving forward, we will refer to the intervention as GM and the concept as growth mindset.

modality (group phone calls and text messages) on student motivation in a low-income setting, as well as during an extremely disruptive event, the covid-19 pandemic.

In terms of the gendered impact of school closures, our findings point to strongly gendered impacts of the pandemic on learning related outcomes. Specifically, while boys and girls report learning support from schools and parents at similar rates, the types of support received differ by gender. Boys are more likely than girls to report receiving online learning support from both schools and parents, while girls are more likely than boys to report learning from assignments and that parents are helping with schoolwork. From February-March 2020 to February-March 2021 (one year into school closures and prior to the GM intervention), adolescent motivation fell: adolescents report 0.118 standard deviation (sd) reductions in measures of growth mindset, 0.183sd reductions in time spent studying (equivalent to 22 minutes per day), and a 14.3% reduction in aspirations for university education. Reductions in measures of growth mindset and aspirations are significantly larger for girls, with girls' aspirations falling by twice as much as boys.

Turning to the GM intervention, short-term results suggest that the programming mitigates the pandemic's negative impacts on adolescent motivation. Adolescents assigned to the GM intervention report 0.195sd higher measures of growth mindset and an 8.9% increase in adolescent aspirations compared to adolescents assigned to the control group. The impact of GM is sufficient to return boys' aspirations to pre-covid-19-parndemic levels. However, these impacts are common across gender so do not close the gender gaps that arose during covid-19-related school closures. In addition, the GM intervention increases the time boys spend studying by 0.208sd compared to the control group—returning time spent studying among boys to pre-covid-19-pandemic levels—but has no effect for girls. These findings indicate persistence in the pandemic-related gender gap.

Our findings contribute to a growing evidence-base on the impacts of epidemics and pandemics, including covid-19, on adolescent motivation, learning, and continued school enrollment. A recent review of the effects of health-related school closures on adolescent outcomes documents increases in child labor, adolescent pregnancies, early marriage, intimate partner violence and sexual exploitation, findings that point to strong gendered impacts on continued education (Villegas et al., 2021). The current paper's finding that girls have lesser access to digital distance learning modalities points toward an important mechanism that may drive gendered impacts of distance learning during the covid-19-related school closures. During the covid-19 pandemic, several studies in both HICS and LMICs on the impact of remote learning on student outcomes have pointed to social isolation (e.g., Vaillancourt et al. [2021] - Canada), increased risk of dropout (e.g., Lichand et al. [2021] - Brazil), decreased student engagement and motivation (e.g., Salta et al. [2022] - Greeze; Vaillancourt et al. [2021] – Canada; Biswas et al. [2020] - Bangladesh), and to learning losses (Lichand et al., 2021;

Donnelly and Patrinos, 2021; Hevia et al., 2022; Geven and Hasan, 2020; Moscoviz and Evans, 2022), with evidence that these impacts may be larger for girls (Lichand et al., 2021; Moscoviz and Evans, 2022). This paper adds to this literature by providing estimates of motivation loss during covid-19 distance learning in an LMIC.

This research also contributes to a small literature on randomized interventions for adolescents during the covid-19 pandemic that have primarily focused on mental health (e.g., Schleider et al. [2022], Ding and Yao [2020]; Xu et al. [2021]) and improving covid-19 knowledge (e.g., Mistree et al. [2021]; Bahety et al. [2021]). We provide evidence of the efficacy of a GM intervention during covid-19-related school closures on adolescent motivation for continued learning. We find that this programming is an effective tool to mitigate adverse education outcomes during an extreme event, such as the covid-19 pandemic, in addition to improving adolescent motivation during "normal" times, suggesting that GM programming may improve adolescent coping during hardship. Moreover, we contribute to the body of evidence around GM by implementing the curriculum in a new context, Bangladesh, and via a new, virtually-delivered modality. In delivering the GM intervention virtually via group phone calls and text messages, we additionally contribute to a nascent literature on the efficacy of virtually delivered programming more generally (e.g., Lan et al. [2019]; Mistree et al. [2021]; Schleider et al. [2022]). Delivering such interventions virtually via phone could be substantially more cost effective due to ability to train relatively fewer facilitators, as well as have the potential to reach a greater number of students than in-person delivery.

The rest of the paper is structured as follows. Section 2 provides detail on the data collection and programming delivery; section 3 discusses the measures and sample; section 4 presents the methods and results; and section 5 concludes.

## 2 Data collection and programming delivery

### 2.1 Data collection

This study uses three rounds of data from 2,220 adolescents who were attending grades 7 and 8 at the onset of the covid-19 pandemic in March 2020, collected as part of the Gender and Adolescence: Global Evidence (GAGE) Programme in partnership with the World Bank under the Transforming Secondary Education for Results Operation (TSERO). The sample includes both boys and girls studying in government and semi-private (Monthly Pay Order [MPO])[5] schools in Chittagong and Sylhet Divisions. Chittagong and Sylhet are relatively vulnerable divisions in Bangladesh in terms of school completion, exhibiting the lowest completion rates among Bangladesh's eight divisions at every level of schooling (primary, lower secondary, and

[5] MPO schools are private schools that follow the government curriculum and in which teachers are on the government payroll.

higher secondary), with only 63% and 53% of adolescents completing lower secondary school in Chittagong and Sylhet, respectively (UNICEF Bangladesh, 2020).

The first round of surveys (baseline) was conducted from February-March of 2020 in-person at schools prior to the school closures with a random sample of 2,220 adolescents across 109 schools. In each school, six boys and six girls were randomly selected from school registration lists from each grade (7 and 8) to participate in the survey, totaling 24 adolescent surveys per school. In all-girls or all-boys schools, six adolescents of the respective gender were randomly drawn per grade, totaling 12 adolescents per school.[6] The baseline survey asked adolescents information about their education and learning history, as well as across the GAGE program's other five capability areas (health, nutrition, and sexual and reproductive health; bodily integrity; psychosocial well-being; voice and agency; and economic empowerment). Surveys were also conducted with female primary caregivers (or male caregiver if there was no female caregiver) to collect information on household characteristics, parenting, and caregiver outcomes across capability areas. This paper focuses on education and learning outcomes from the adolescent surveys and uses the caregiver surveys for household characteristics.

Additional rounds of data collection were conducted via phone in February-March 2021 (covid-19 round), one year into school closures, where 1,921 of the original sample was reached (86.5%), and in July-August 2021 (midline), where 1,958 of the original sample was reached (88%). Phone penetration among this sample is high at above 98%. In each round of phone surveys, enumerators attempted to reach all respondents from the baseline sample. The covid-19 round survey collected information on the impact of covid-19 on adolescents' lives across all capability areas while the midline survey focused on a smaller set of key outcomes around motivation for continued learning linked to the GM intervention.[7]

The analysis in this paper focuses on a panel of 1,809 adolescents who were interviewed at all three rounds of data collection. There is no evidence of differential attrition according to treatment assignment either overall or by baseline characteristics (Table A1).

## 2.2 Growth Mindset

A "growth mindset" is the belief that personal characteristics, such as intellectual abilities, can be nurtured and developed. This is in contrast to a "fixed mindset"—the belief that these characteristics are fixed and unchangeable (Dweck, 1999; Dweck and Leggett, 1988; Yeager and Dweck, 2012). Research on mindsets has found that people who hold more of a growth mindset are more likely to thrive in the face of difficulty and continue to improve, while those who hold more of a fixed mindset may shy away from challenges or fail to meet their potential

6 There are 9 all-boy schools, 24 all-girls schools, and 76 co-education schools.

7 Survey instruments will be posted at gage.odi.org and are currently available from the authors by request.

(see Dweck and Yeager, 2019). Typically, GM interventions come in one of four packages: (1) computerized training; (2) reading mindset materials only; (3) in-person training via structured discussion or lecture, where facilitators are generally teachers and/or researchers; and (4) a combination of 1 and 4 (Sisk et al., 2018).

We implemented a virtual adaptation of a GM intervention of the third type, where we engaged a random sub-set of students in the GM framework with facilitators via phone calls and text messages. We randomly assigned students to the GM intervention or a control group based on their school of attendance in March 2020, prior to covid-19-pandemic related school closures. Of the 109 schools in our sample, 73 were randomly assigned to receive the GM intervention, covering 1,475 students from our baseline sample, and the remaining 36 schools serve as the control group. School randomization was stratified by rural or urban status and school type (government or MPO).

The GM intervention was implemented over the course of eight weeks between April 5 and June 3, 2021. There was a one week break between weeks five and six to account for Eid al-Fitr, which fell on May 12-13, 2021. In the first week of the intervention, students were engaged in a phone call with a group of three students from their school, where facilitators, who were hired and trained by a partner NGO, read an essay titled "Did you know you can grow your intelligence?" This reading was followed by a short discussion to check for understanding, and students were assigned to write an essay on malleable intelligence, addressed to a friend. In the second week, the students submitted their essays and received feedback from facilitators via another group phone call. In weeks three through seven, students responded to text messages with true/false statements based on GM theory. See Table A2 for the list of true/false statements. Week eight of the intervention concluded with a group phone call to review the GM content one final time. Students received a certificate of completion at the end of the intervention.

Across the 8 weeks of intervention, weekly participation ranged between 1,123 in week one (76%) and 1,022 (69%) in week six (which followed the Eid al-Fitr holiday), and 988 adolescents participated in all activities across the eight weeks (66%).[8] Participation was similar for girls and boys and across the two grades. In terms of performance on the five true/false questions, on average, 96% of students responded correctly to the statements, ranging from 88% correct in week one to 99.5% correct in week 3, indicating a high level of internalization of the GM material.

[8] Of the 1,475 students assigned to the GM intervention, facilitators were able to reach and speak with 1,283 adolescents. The main reason for the inability to reach adolescents was due to numbers being switched off. Of the 1,283 adolescents reached, 1,268 adolescents (98.8%) consented to participate and 1,123 adolescents eventually participated in the week one call. The main reasons for the additional reduction in participation were the adolescent not being available at the time of the call, parents declining adolescent participation at the time of the call for personal reasons such as sickness of a household member, and the participant declining to move forward with participation.

# 3 Outcomes and sample characteristics

## 3.1 Measures

We focus on two sets of outcome measures related to (i) continued learning during covid-19-related school closures and (ii) motivation for continued learning.

### 3.1.1 Continued learning during covid-19-related school closures

To understand continued learning among adolescents during covid-19-related school closures, we asked adolescents about support they received from their school, support they received from their family, and the modes of learning activities they were engaging in while schools were closed.

To measure the extent of learning support adolescents received, we first asked whether they received support from schools and from families separately, and then we asked the modes of support they received from each. For modes of school support, we asked adolescents whether schools provided learning support in the form of online resources, provision of textbooks, or written assignments. We grouped the latter two categories together to generate two indicators: (1) receipt of online resources and (2) receipt of traditional schooling support (textbooks and written assignments). For modes of family support, we asked adolescents to identify support in the form of access to media (TV, radio, internet devices, mobile learning apps), homeschooling, helping with schoolwork, providing a space to study, purchasing learning materials, organizing study groups, reducing household chores, or any other form of support. Students selected all types of support that they received, and we generated indicators for each category.

With respect to learning methods, we asked adolescents to identify the main method they used to continue learning while school is closed: school-based assignments, self-study (i.e., spending time studying with own books), using online resources (e.g., watching educational videos online, using mobile learning apps, other online learning), using TV/radio programs (e.g., watching Ministry of Education TV/radio-based classes), taking private lessons with tutors, or doing nothing. We generated indicators for each method.

### 3.1.2 Adolescent Motivation for continued learning

The second set of measures we focus on allows us to explore the impact of the covid-19 pandemic on motivation for continued learning and future trajectories.

**Growth Mindset.** Our measures of growth mindset utilize a set of 17 items eliciting beliefs regarding attitudes and behaviors related to grit and perseverance and belief in the malleability of ability. Thirteen items are adapted from Alan, Boneva and Ertac (2019), which includes the seven items from the Duckworth and Quinn (2009) Grit Scale and six items measuring malleability of abilities from Dweck (2006). We additionally include four items measuring

growth mindset from the World Bank (WB) STEP survey (World Bank, 2014). Appendix Table A3 presents all items, as well as indicates which items are used to generate each scale. We generate four indexes from these items: (1) a grit scale of seven items (Grit Index); (2) a malleability scale of six items (Malleability Index); and (3) a growth mindset scale of four items (WB Growth Mindset Index); and (4) an overall growth mindset scale that encompasses the three previous scales (Overall Growth Mindset Index). Each item has the response set strongly agree, agree, disagree, strongly disagree, which are scored from 1-4 according to their degree of alignment with a GM. For the three sub-scales, the item scores (1-4) are summed across items and the total sum is divided by the number of items, for a total score range of 1-4. The overall GM scale is the sum of the three sub-scales.

**Other outcomes.** We measure the average time spent in self-directed study in hours on a typical weekday during the seven days prior to the survey as reported by the adolescent. To elicit educational aspiration of the adolescents, we asked adolescents the level of education they would like to ultimately achieve if there were no constraints. We generated an indicator equal to one if the adolescent aspires to university education or higher and an indicator equal to one if the adolescent agrees or partially agrees they will not be able to return to school when it reopens. We also construct an indicator equal to one if the adolescent reported having a friend he or she can trust. We include having a trusted friend due to increased social isolation during distance learning, with previous research arguing that social isolation is associated with academic achievement (Bester and Budhal, 2001; Vaillancourt et al., 2021), and the potential of the GM intervention to foster these connections via the group phone call. Finally, we generate an indicator for currently engaged in paid work. We include the paid work indicator due to concerns that adolescents may transition into paid work during the school closures, limiting their ability to continue learning or return to school when schools reopen (Asadullah et al., 2021).

### 3.1.3 Baseline Characteristics

We account for the following baseline characteristics in our analysis: household head has at least secondary school certificate (SSC) degree, household size, household wealth, household location in an urban area, age and gender of the adolescent, whether the adolescent was attending grade 7 or 8 at the onset of covid-19, and attendance at a government or MPO school. We measure household wealth as having an above-median score on an asset index constructed following the methods of Filmer and Pritchett (2001). We control for these characteristics either because they were part of the randomization (urban or rural location, attendance of an MPO or government school) or they are predictive of the outcomes of interest (Bruhn and McKenzie, 2009).

Table 1 presents summary statistics of baseline measures of individual characteristics. On average, adolescents were 12.8 years old at the time of baseline. The sample is 57.9% female, and 49.8% of the adolescents were attending grade 8 at the time of school closures. Nearly 40% of household heads had attended at least some secondary school, households have 5.7 household members on average, and 57.8% of households are in urban areas. In general, boys and girls have similar profiles in terms of age, grade, and household wealth, though household heads of boys' households are more educated on average. Table 1 also shows that there are no differences in adolescent characteristics according to treatment assignment to the GM intervention in columns 5-6.

## 4 Methods and Results

We will first present the methods and results of the association of covid-19 on continued learning activities and adolescent motivation for continued learning in section 4.1, and then turn to the impacts of the randomized GM intervention in section 4.2, again first presenting methods and then moving into results.

Table 1. Baseline Sample Characteristics (February-March 2020)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | **Overall** | **By gender** | | | **By treatment status** | | |
| | | **Male** | **Female** | ***p-value*** | **GM** | **Control** | ***p-value*** |
| Adolescent age (10-18) | 12.8 | 12.8 | 12.7 | *.217* | 12.8 | 12.8 | *.794* |
| Adolescent is female | 0.579 | 0.000 | 1.00 | -- | 0.570 | 0.598 | *.720* |
| Adolescent is in grade 8 | 0.498 | 0.482 | 0.509 | *.025* | 0.499 | 0.496 | *.821* |
| Adolescent attends government school | 0.283 | 0.337 | 0.244 | *.243* | 0.266 | 0.324 | *.600* |
| Household head has at least secondary education | 0.370 | 0.435 | 0.323 | *.065* | 0.397 | 0.309 | *.174* |
| Number of household members (2-25) | 5.68 | 5.55 | 5.78 | *.153* | 5.66 | 5.75 | *.639* |
| Household wealth above median | 0.546 | 0.575 | 0.524 | *.180* | 0.570 | 0.492 | *.105* |
| Household in urban location | 0.578 | 0.556 | 0.594 | *.574* | 0.564 | 0.609 | *.689* |
| Number of observations | 1,809 | 841 | 968 | | 1,197 | 612 | |

Notes. All statistics are calculated using survey weights to make estimates representative of adolescents in the relevant grades in the schools in the sample. Household wealth is measured as having an above-median score on an asset index constructed following the methods of Filmer and Pritchett (2001). In columns 4 and 7, p-values are from t-tests of equality of means by gender and treatment status, respectively, clustering standard errors at the school level.

Data source. Baseline data.

## 4.1 Covid-19, continued learning, and adolescent motivation for continued learning

### 4.1.1 Methods: Covid-19, continued learning, and adolescent motivation for continued learning

We begin with descriptive analysis of learning support and method of learning during covid-19, overall and by gender, using data from the covid-19 round of data collection only. In addition to descriptive analysis, we estimate gender differences in learning support and learning method during covid-19, controlling for baseline characteristics—household head education, number of household members, household wealth, urban vs. rural location, and adolescent age, grade, and school type—according to the following specification:

$$Y_{i,covid-19} = \alpha + \beta_1 Female_i + X'_{iBL}\delta + \varepsilon_{i,covid-19} \quad (1)$$

where $Y_{i,covid-19}$ is the outcome of interest for individual $i$ during the covid-19 round of data collection, $Female_i$ is a binary indicator that the adolescent is female, and $X'_{iBL}$ is the vector of previously described baseline characteristics.

We then explore changes in adolescent motivation over time between the baseline survey and the covid-19 round survey:

$$Y_{it} = \alpha + \beta_1 COVID_t + X'_{iBL}\delta + \varepsilon_{it} \quad (2)$$

where $Y_{it}$ is the outcome of interest for individual $i$ at time $t$, $COVID_t$ equals to 1 for data collected during covid-19-related school closures, and $X_{iBL}$ is a vector of baseline controls noted above, including a binary indicator for female. $\beta_1$ is the coefficient of interest. We estimate equation 2 for the whole sample and for boys and girls separately in order to examine gender differences. To test for gender differences, we additionally include an interaction term between $COVID_t$ and $Female_i$ in equation 2. For the regression analysis, the growth mindset indices and average hours of study in a typical day are standardized to the mean and standard deviation in the sample at baseline. Standard errors are clustered at the school level to account for sampling design and individual survey weights are incorporated in order to make estimates representative of adolescents in the relevant grades in the schools in the sample.

### 4.1.2 Results: Covid-19, continued learning, and adolescent motivation for continued learning

#### Continued learning

Table 2 summarizes the types of continued learning support that adolescents received during school closures.

Table 2. Continued Learning during covid-19 (February-March 2021)

| | (1) | (2) | (3) |
|---|---|---|---|
| | **Overall** | **By gender** | |
| | | **Male** | **Female** |
| **A. School providing learning support** | **0.402** | **0.437** | **0.376** |
| *Among those receiving support…* | | | |
| Online support | 0.700 | 0.854 | 0.569 |
| Traditional support | 0.367 | 0.255 | 0.462 |
| **B. Family provided support** | **0.906** | **0.907** | **0.905** |
| *Among those receiving support…* | | | |
| Access to media (TV, radio, internet) | 0.340 | 0.400 | 0.296 |
| Homeschooling | 0.314 | 0.336 | 0.298 |
| Helping with schoolwork | 0.702 | 0.607 | 0.772 |
| Space to study | 0.694 | 0.721 | 0.674 |
| Purchasing learning materials | 0.400 | 0.427 | 0.380 |
| Organize group study | 0.032 | 0.019 | 0.041 |
| Reducing household chores | 0.412 | 0.445 | 0.389 |
| Other support | 0.026 | 0.025 | 0.026 |
| **C. Learning method while schools closed** | | | |
| Not doing anything | 0.007 | 0.009 | 0.006 |
| School-based assignments | 0.226 | 0.205 | 0.241 |
| Books (Self-study) | 0.545 | 0.515 | 0.567 |
| Online resources | 0.104 | 0.122 | 0.091 |
| TV programs | 0.078 | 0.099 | 0.062 |
| Private lessons | 0.028 | 0.040 | 0.020 |
| Other | 0.012 | 0.010 | 0.013 |

*Notes*. All statistics are calculated using individual survey weights to make estimates representative of adolescents in the relevant grades in the schools in the sample.

*Data source*. covid-19 round data

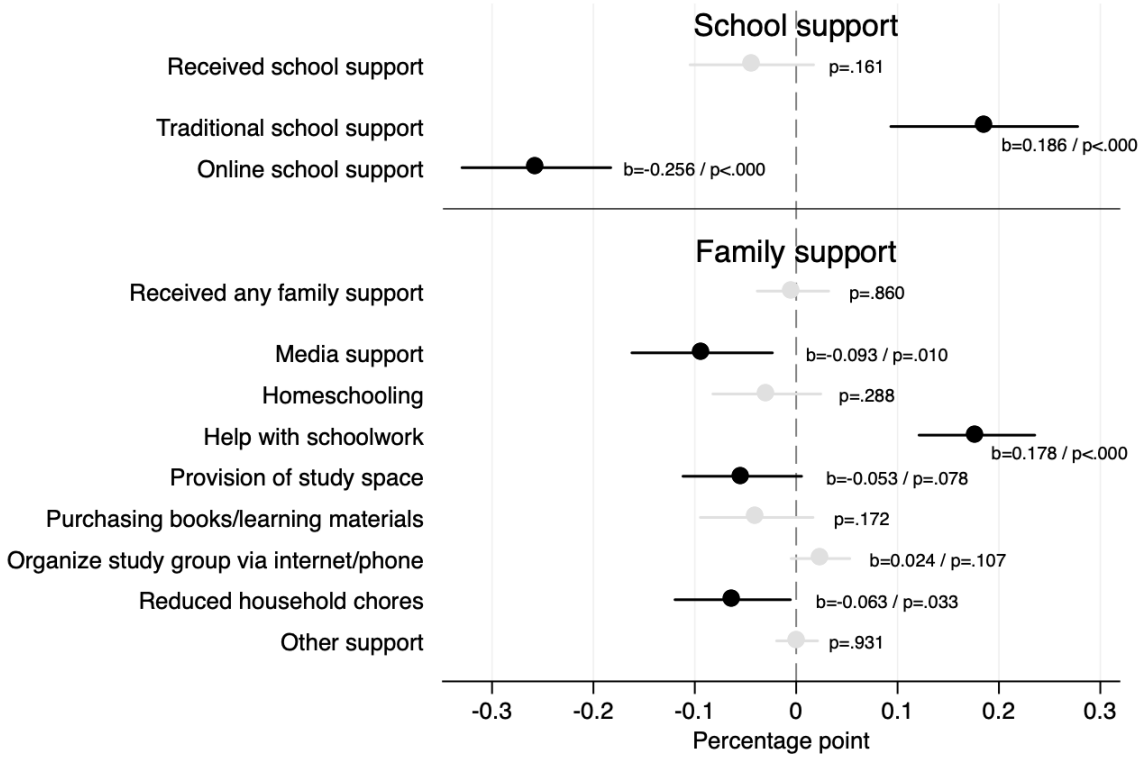
Forty percent of adolescents report receiving support from their schools during the closures and 90% report receiving support from their families. Among students receiving support from schools, 70% of students report receiving online support. The most common types of support from families that adolescents report is families helping with schoolwork (70.2%) and providing a space to study (69.4%).

There are no gender differences in receipt of support overall. However, when looking into the types of support that adolescents report, gender differences arise. Figure 1 summarizes these differences, presenting estimates of the difference in learning support between girls and boys after controlling for baseline characteristic, showing that differences in learning support are not being driven by differences in household socioeconomic status or types of schools that the adolescent is attending. Boys are more likely to report receiving online resources from schools (85.4% of boys compared to 56.9% of girls), while girls are more likely to report receiving traditional learning materials from schools (46.2% of girls compared to 25.5% of boys). Likewise, boys are more likely to report family support in the form of access to media (40% of boys compared to 29.6% of girls), while girls are more likely to report parents providing support in the form of helping with schoolwork (77.2% of girls compared to 60.7% of boys) and organizing study groups (4.1% of girls compared to 1.9% of boys). Boys are also moderately more likely than girls to report that families are providing them a space to study (72.1% vs. 67.4%) and reducing their chores to allow time for studying (44.5% vs 38.9%). Taken together, these patterns point to boys receiving learning supports that are more conducive to distance learning modalities, as well as being provided more time by families to devote to learning activities.

Table 2, Panel C, shows how the type of support received translates into the main methods of learning reported by adolescents. First, nearly all adolescents are reporting doing something to continue learning, with less than 1% reporting doing nothing to continue learning. The majority of adolescents report that their main method of learning is through books (54.5%), followed by school-based assignments (22.6%), and online resources (10.4%). Notably, less than 10% of adolescents report that TV programs are their main method of continued learning, although the Ministry of Education (MOE) televised the national curriculum via *Shangsad* TV for this purpose. While not as stark as differences in reported learning support, there are gender differences in reported learning modalities congruent with the type of support boys and girls receive, summarized in Figure 2.

Boys are more likely to report that their main method of study involves media—9.9% of boys report that MOE TV is their main method of study compared to 6.2% girls and 12.2% of boys report learning by online resources compared to 9.1% of girls, though the latter differences is not statistically significant. Boys are also more likely than girls to report learning via private lessons (4% of boys vs. 2% of girls), suggesting greater household resources being allocated to boys' continued learning. On the other hand, girls are more likely to report continued learning through assignments (24.1% girls vs. 20.5% boys) and books (56.7% girls vs. 51.5% boys). Again, these patterns suggest that, while girls are more likely to be left to continue their studies independently, boys are more likely to be engaging in supported study activities, via both media and private tutoring

Figure 1. Gender differences in support for continued learning (Female-Male)



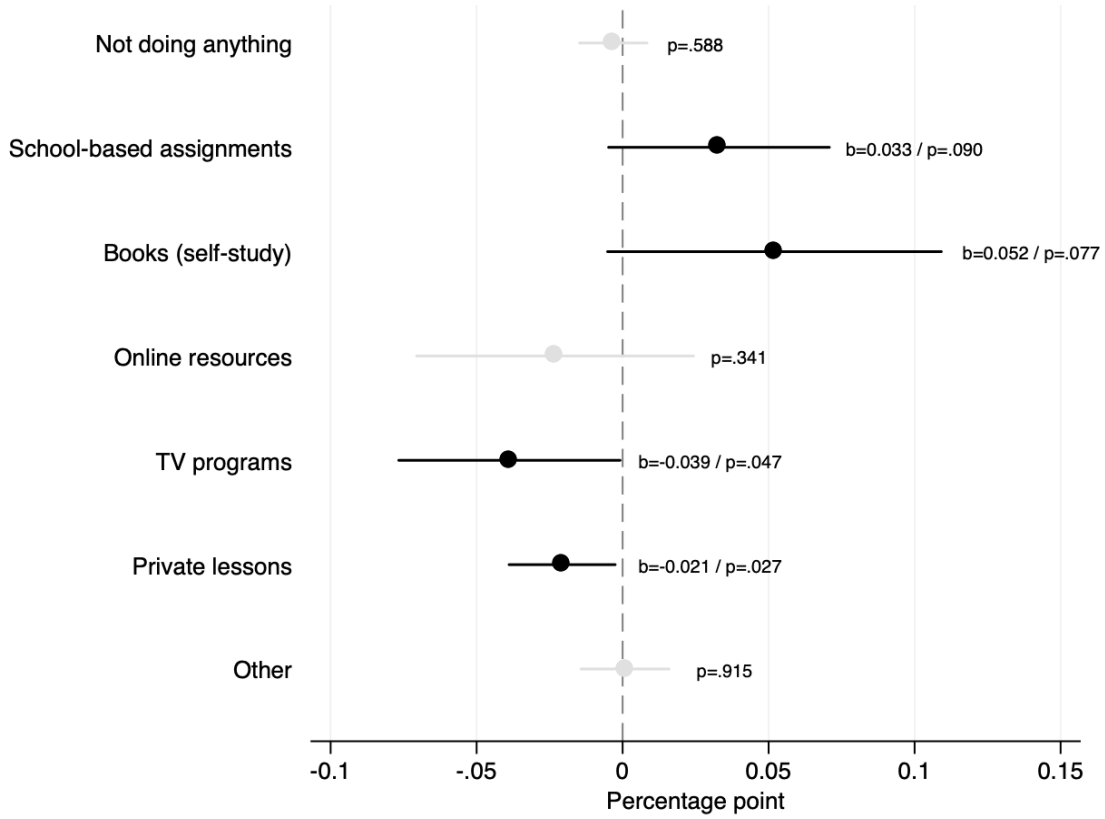

*Notes.* This figure presents coefficient estimates on an indicator for being female from a model regressing the outcomes listed on the left side of the figure on an indicator for female and a set of baseline characteristics: adolescent age, grade of adolescent enrollment, attendance of a government or MPO school, household head having at least secondary school education, household size, household wealth, and rural or urban location. Standard errors are clustered at the school level and models are adjusted for individual sampling weights to make estimates representative of adolescents in the relevant grades in the schools in the sample.

*Data source.* covid-19 round data.

## Adolescent motivation for continued learning

In light of gender differences in engagement with modern technologies for virtual learning, a natural question arises regarding whether covid-19-related school closures had differential impacts on motivation for continued learning among boys and girls. Table 3 presents summary statistics of adolescent motivation for continued learning during baseline and during covid-19 and highlights stark changes in outcomes between baseline and the covid-19 round survey.

Figure 2. Gender differences in main method of learning (Female-Male)




*Notes.* This figure presents coefficient estimates on an indicator for being female from a model regressing the outcomes listed on the left side of the figure on an indicator for female and a set of baseline characteristics: adolescent age, grade of adolescent enrollment, attendance of a government or MPO school, household head having at least secondary school education, household size, household wealth, and rural or urban location. Standard errors are clustered at the school level and models are adjusted for individual sampling weights to make estimates representative of adolescents in the relevant grades in the schools in the sample.

*Data source.* covid-19 round data.

In terms of baseline measures of student motivation (Table 3, columns 2-4), we do not observe substantive differences by gender across outcomes. For the few items where differences are statistically significant, differences are small. On average, scores on the Overall Growth Mindset Index are 8.5 out of 12, with adolescents exhibiting the highest scores on the Malleability Index at an average score of 3 out of 4. On average, students reported spending 4.7 hours in self-directed study on a typical day at baseline and 87% reported aspiring to

university education. Ninety percent of adolescents report having a trusted friend and less than 5% reported currently working.

During the covid-19 round of data collection (Table 3, Panel B), there are reductions in student motivation for continued learning across all measures from baseline and substantive, and statistically significant gender differences emerge. Although changes in the growth mindset measures over time are small overall, disaggregating by gender reveals that, while boys' growth mindset scores during covid-19 are largely the same as—if not higher than—at baseline, girls' scores are consistently lower across all indices. Similarly, average reported time spent studying during covid-19-related school closures is 4.38 hours, approximately 30 minutes less per day than prior to closures, with girls reporting less time studying than boys. Note that time spent studying at baseline does not include time spent at school. Including time spent at school, adolescents spent an average of 10.8 hours a day in school and self-directed study prior to school closures. Thus, the decrease in time spent studying between baseline and the covid-19 round of data collection reflects changes in self-directed schooling effort, and reductions in overall time spent in learning activities are significantly larger at 6.5 hours per day.

Further, while 87% of adolescents aspired to university education at baseline, only 74% of adolescents reported aspiring to university education during the covid-19 round of data collection, and only 67% report having a trusted friend at the covid-19 round compared to 90% of adolescents reporting so at baseline. Whereas there were no baseline differences in aspirations for university education or having a trusted friend by gender, Table 3, Panel B shows that boys were 10 percentage points (pp) more likely to aspire to university education than girls during the covid-19 round of data collection (80% vs. 70%) and girls are 11pp more likely to report having a trusted friend than boys (71.6% vs. 60.2%). While rates are low in general, girls are nearly four times more likely to agree they will not be able to return to school when schools reopen (4.2% of girls compared to 1.4% of boys). It does not appear that there is an increase in adolescents engaging in paid work in our sample, perhaps due to a dearth of opportunities for adolescents (Asaduzzaman et al., 2021).

Figure 3 presents regression estimates of $\beta_1$ from equation 2 to examine changes in adolescent motivation for continued learning from baseline to one year later during covid-19. We plot the estimates of $\beta_1$ from equation 2 over the whole sample (Overall) and after restricting the sample to boys only (Male) and girls only (Female). Figure 3, Panel A, presents coefficients for the growth mindset measures and the measure of time spent studying in standard deviation units. Figure 3, Panel B, presents coefficients for binary outcomes. Table A4 in the appendix presents the full set of results as well as the p-value from a test of equality of the association of covid-19-related school closures with boys' and girls' outcomes.

Table 3. Adolescent motivation, by gender and treatment status

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | **Overall** | **By gender** | | | **By treatment status** | | |
| | | **Male** | **Female** | ***p-value*** | **GM** | **Control** | ***p-value*** |
| **A. Baseline data (February-March 2020)** | | | | | | | |
| Overall Growth Mindset Index (3-12) | 8.49 | 8.53 | 8.46 | *.218* | 8.509 | 8.443 | *.490* |
| Grit Index (1-4) | 2.74 | 2.77 | 2.72 | *.010* | 2.748 | 2.717 | *.286* |
| Malleability Index (1-4) | 3.02 | 2.98 | 3.05 | *.110* | 3.018 | 3.017 | *.822* |
| WB Growth Mindset (1-4) | 2.73 | 2.78 | 2.69 | *.601* | 2.741 | 2.707 | *.566* |
| Time spent studying in a typical day (hours) | 4.73 | 4.83 | 4.66 | *.445* | 4.743 | 4.706 | *.506* |
| Aspire to university education | 0.870 | 0.881 | 0.861 | *.055* | 0.874 | 0.860 | *.479* |
| Adolescent has trusted friend | 0.900 | 0.918 | 0.887 | *.119* | 0.907 | 0.885 | *.290* |
| Adolescent currently working | 0.041 | 0.052 | 0.032 | *.218* | 0.043 | 0.034 | *.622* |
| *Chi-squared p-value on joint test* | | | | | | | *.702* |
| **B. Covid-19 round data (February-March 2021)** | | | | | | | |
| Overall Growth Mindset Index (3-12) | 8.35 | 8.51 | 8.24 | *p<.000* | 8.338 | 8.382 | *.781* |
| Grit Index (1-4) | 2.73 | 2.79 | 2.69 | *p<.000* | 2.727 | 2.734 | *.949* |
| Malleability Index (1-4) | 2.90 | 2.91 | 2.90 | *.905* | 2.906 | 2.902 | *.625* |
| WB Growth Mindset (1-4) | 2.72 | 2.81 | 2.65 | *p<.000* | 2.706 | 2.744 | *.299* |
| Time spent studying in a typical day (hours) | 4.38 | 4.50 | 4.28 | *.294* | 4.480 | 4.171 | *.080* |
| Aspire to university education | 0.744 | 0.801 | 0.702 | *.001* | 0.750 | 0.731 | *.519* |
| Adolescent has trusted friend | 0.669 | 0.602 | 0.716 | *p<.000* | 0.668 | 0.673 | *.893* |
| Adolescent currently working | 0.014 | 0.020 | 0.009 | *.090* | 0.015 | 0.012 | *.891* |
| Fears cannot return to school | 0.029 | 0.014 | 0.042 | *.012* | 0.026 | 0.037 | *.325* |
| *Chi-squared p-value on joint test* | | | | | | | *.757* |
| Number of Observations | 1,809 | 841 | 968 | | 1,197 | 612 | |

*Notes*: All statistics are calculated using survey weights to make estimates representative of adolescents in the relevant grades at the schools in our sample. In column 4, p-values are generated from regression models that test for gender differences, controlling for baseline adolescent characteristics: adolescent age, grade of enrollment, attendance of a government or MPO school, household head having at least secondary school education, household size, household wealth, and rural or urban location. In column 7, p-values are generated from regression models that test for treatment differences, controlling for randomization strata. The chi-squared p-value comes from a logistic model that predicts treatment status using pre-intervention outcomes, controlling for randomization strata. Standard errors are clustered at the school level in all models.

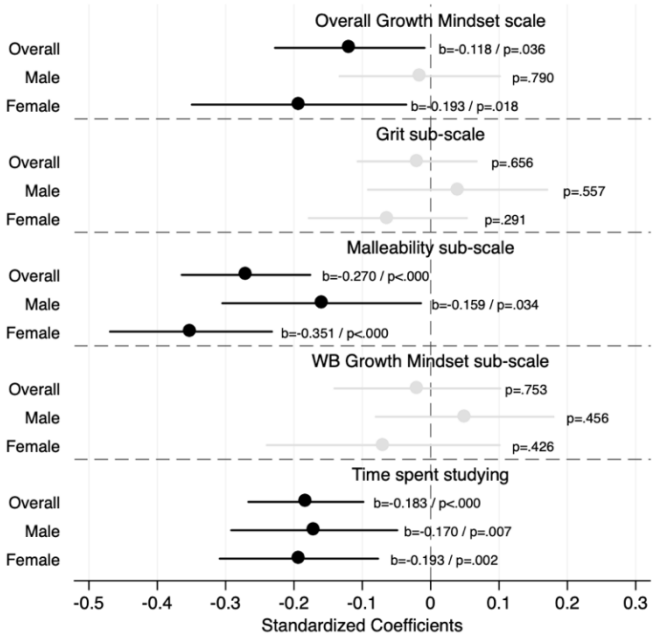
*Data source*. Baseline and covid-19 round data.

Figure 3 shows a reduction in the Malleability Index score of 0.270 standard deviations (sd) overall and that this reduction was twice as large for girls (0.351sd reduction) than for boys (0.159sd), p=.046. The Malleability Index includes items such as "If I study hard enough, I could be the most successful student in the class" and "Music or drawing talent can be learned by anyone" (see Table A3). A reduction in this scale could be a signal that adolescents are feeling discouraged by self-driven study during school closures. The reported average hours in self-directed study reduces by 0.183sd for all adolescents, which translates to a reduction in studying of about 22 minutes per day.

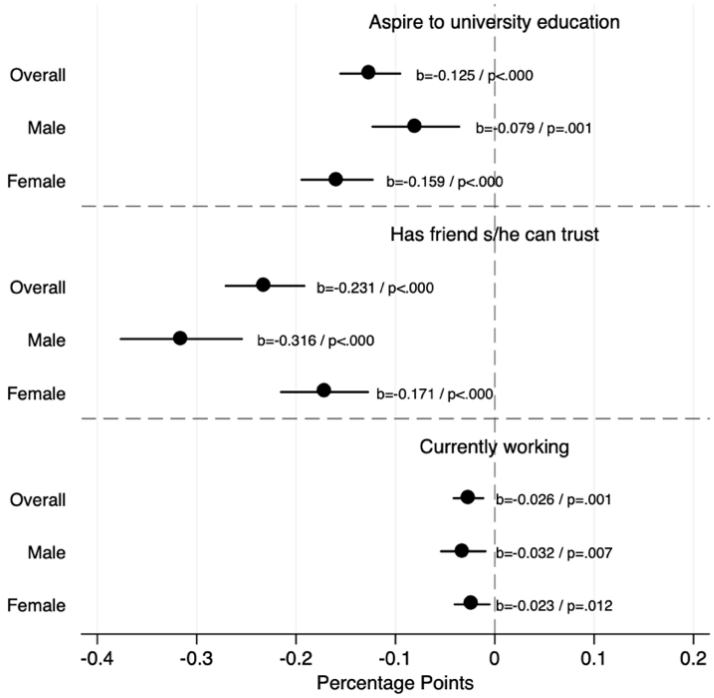
We also find significant decreases in aspirations for university education of 12.5pp (a 14% reduction), which are significantly larger for girls (15.9pp) compared to boys (7.9pp), p=.005. Interestingly, while having a trusted friend reduces for both genders by 23.1pp (a 26% reduction), boys are more likely to report reductions (31.6pp) compared to girls (17.1pp), p<.000, suggesting that social isolation is greater for boys than for girls. This could be partially due to parents being more likely to organize study groups for girls (see Table 2, Panel C); however, the share of adolescents reporting this is too small (3.2%) to fully explain this gap in friendships. Boys and girls are equally less likely to be engaged in paid work.

Figure 3. Dynamic Effects of covid-19 on Adolescent Motivation

Panel A. Standardized outcomes



Panel B. Binary Outcomes




*Notes.* This figure presents estimates of $\beta_1$ from equation 2. Outcomes in Panel A are standardized to the mean and standard deviation at baseline and the scale is in standard deviations. Outcomes in Panel B are binary and the scale is in percentage points. Outcomes are indicated at the top-center in each sub-panel. For each outcome, equation 2 is estimated over the whole sample (Overall), for boys only (Male), and for girls only (Female), labeled on the left-side of the figure. All regressions include controls for household head having secondary school certificate degree, household size, household has above median wealth, urban location, age and gender of the adolescent, and adolescent grade and school type. Standard errors are clustered at the school level to account for sampling design and sampling weights are used to make estimates representative of adolescents in the relevant grades in the schools in the sample.

*Data Source.* Baseline and covid-19 round data.

Overall, Figure 3 suggests that school closures due to the covid-19 pandemic are associated with lower socioemotional skills in terms of malleability of intelligence, reductions in time spent studying, and reductions in aspirations for university education—all of which point to feelings of discouragement during extended school closures. Moreover, these negative impacts are broadly larger for girls than for boys, suggesting that school closures may generate or exacerbate already-existing gender disparities in education outcomes

## 4.2 Impact of the GM intervention

We now turn to evaluate early impacts of the randomized GM intervention and its potential to mitigate the negative, gendered trends in education outcomes documented in section 4.1. Importantly, while Table 3 shows emerging gender differences over time during covid-19, no differences in outcomes emerge across assignment to the GM intervention (Table 3, columns 5-7).

### 4.1.1 Methods: Impact of the GM intervention

To estimate the impact of the GM intervention on our outcomes of interest, we now incorporate data from the midline survey round collected after GM was implemented. Taking advantage of the covid-19 round of data collected one to two months prior to the GM intervention and following Mckenzie (2012), we estimate the intent-to-treat (ITT) estimate using ANCOVA, as follows

$$Y_{i,1} = \alpha + \beta_1 GM_i + X'_{iBL}\delta + \theta Y_{i,0} + \varepsilon_i \quad (3)$$

where $Y_{i,1}$ is our outcome of interest for individual $i$ at midline and $Y_{i,0}$ is the pre-intervention outcome measured during the covid-19 round. $GM_i$ is an indicator for whether individual $i$ was assigned to the GM intervention, and $X_{ibl}$ is a vector of baseline controls as described previously for equation 2. $\beta_1$is the coefficient of interest. We estimate equation 3 for the whole sample and for boys and girls separately in order to examine gender differences. Again, to test for treatment differences between boys and girls, we include an interaction between the $GM_i$ treatment indicators and an indicator for female in equation 3. The growth mindset indices and average hours studied are standardized to the mean and standard deviation in control schools at each survey round (covid-19 round and midline). Standard errors are clustered at the school level to account for sampling design and the unit of treatment assignment, and individual survey weights are incorporated to make estimates representative of the schools in our sample.

### 5.1.2 Results: Impact of the GM intervention

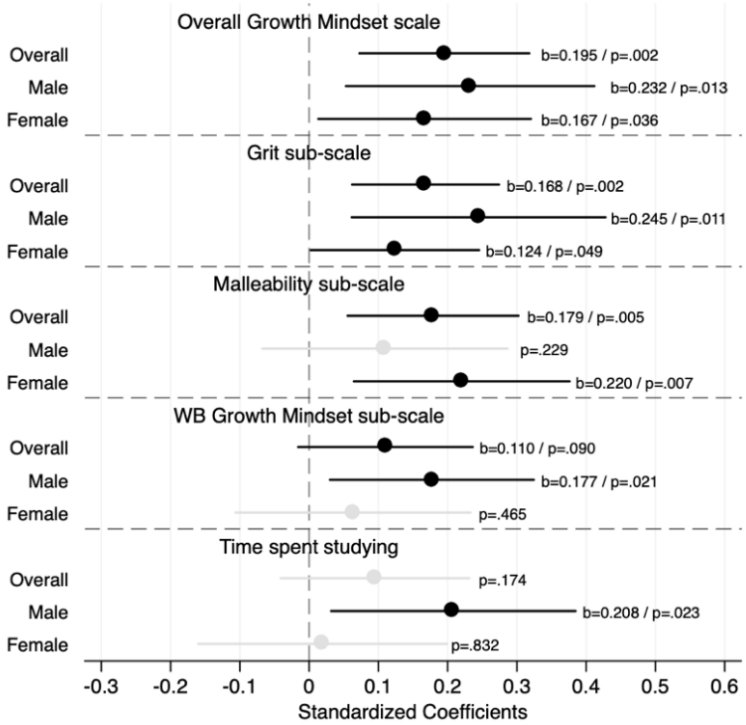
Figure 4 presents the ITT estimates of $\beta_1$ from equation 3 across our outcomes over the whole sample (Overall) and disaggregated for boys only (Male) and girls only (Female). As in Figure 3, Panel A, presents coefficients for the GM outcomes and the measure of time spent studying in standard deviation units, and Panel B presents coefficients for binary outcomes. Table A5 in the appendix presents the full set of results as well as the p-value from a test of equality of the impact of GM on boys' and girls' outcomes.

Panel A of Figure 4 shows that the GM intervention is strongly associated with increases in measures of growth mindset across all indices. The GM intervention (compared to control) increases the Overall Growth Mindset Index by 0.195sd (p=.002), the Grit Index by 0.168sd (p=.002), the Malleability Index by 0.179sd (p=.005), and the WB Growth Mindset Index by 0.110sd (p=.090). Treatment effects are generally larger for boys than for girls—except for the Malleability Index—but we cannot reject that the ITT effect is equal for boys and girls in all cases (see appendix Table A5).

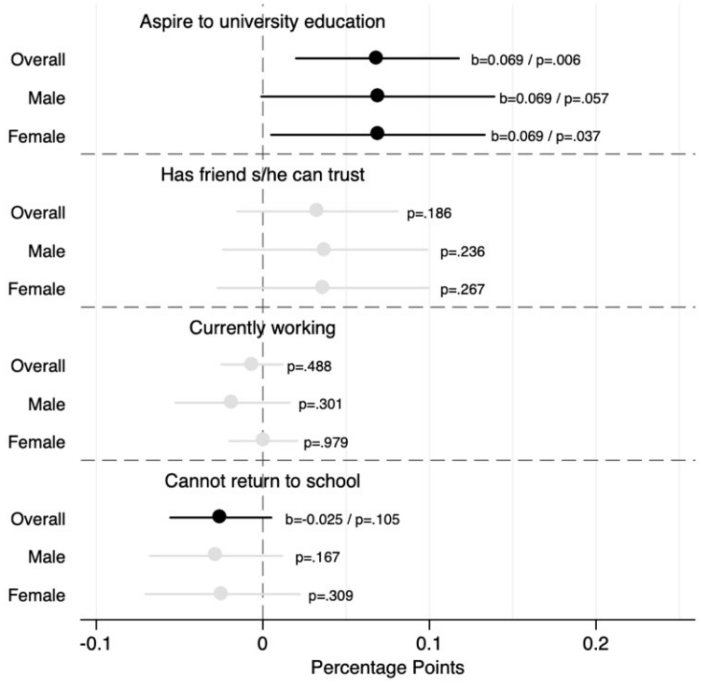
The GM intervention does not appear to have an impact on time spent studying overall; however, when the sample is split by gender, it reveals that the intervention increases boys' study time by 0.208sd (equivalent to 22 minutes), while it has no impact for girls. This treatment effect for boys compensates for the reduction in time spent in self-directed study between the baseline and the covid-19 round surveys—but still leaves total time spent in learning activities significantly below levels prior to school closures when considering time spent at school.

Figure 4. Impact of Growth Mindset on Adolescent Motivation

Panel A. Standardized outcomes



Panel B. Binary outcomes




*Notes.* This figure presents estimates of $\beta_1$ from equation 3. Outcomes in Panel A are standardized to the mean and standard deviation in the control group and the scale is in standard deviations. Outcomes in Panel B are binary and the scale is in percentage points. Outcomes are indicated at the top-center in each sub-panel. For each outcome, equation 3 is estimated over the whole sample (Overall), for boys only (Male), and for girls only (Female), labeled on the left-side of the figure. All regressions include controls for household head having secondary school certificate degree, household size, household has above median wealth, age and gender of the adolescent, adolescent grade, and randomization strata (urban or rural status and government or MPO school). Standard errors are clustered at the school level to account for sampling design and sampling weights are used to make estimates representative of adolescents in the relevant grades in the schools in the sample.

*Data source.* Midline data for outcomes; baseline data for baseline controls; covid-19 round data for pre-intervention outcome controls.

Turning to aspirations for university education in Panel B of Figure 4, the GM intervention causes a 6.9pp increase in aspirations, and this effect is the same for boys and girls. For boys, this increase in aspirations nearly returns aspirations for university education to their baseline levels, while for girls, who suffered larger reductions in university aspirations of 15.9pp, this compensates for less than half of the reduction. The GM intervention does not have a statistically significant or meaningful effect on the likelihood of having a trusted friend or that

the adolescent is currently working; however, there is evidence that the intervention reduces the belief that the adolescent will not be able to return to school by 2.5pp (p=.105), which amounts to a 30% reduction, with no difference by gender.

Overall, Figure 4 shows that the GM intervention had positive impacts on adolescent motivation for continued learning, with positive impacts on measures of growth mindset and aspirations for university education for both boys and girls. The GM intervention also increases time spent studying among boys, but not for girls. The intervention does not close gender gaps in motivation associated with covid-19-related school closures.

## 5. Discussion and Conclusion

We present evidence of gender differences in both the impact of covid-19-related school closures on continued learning for boys and girls and the impact of a GM intervention delivered virtually during the covid-19 pandemic on motivation for continued learning. Our findings show that, while boys and girls report support for learning at similar rates, girls are significantly less likely to engage with virtual learning modalities, which suggests that they are at a disadvantage in keeping pace with their male classmates. Moreover, our research highlights that school closures are associated with larger negative impacts on motivation and aspirations for university education among girls as compared to boys, pointing to growing gender gaps in motivation for continued learning. On the other hand, boys appear to be suffering larger impacts in terms of social isolation. Time spent in learning activities significantly decreased for all adolescents. Findings from the randomized GM intervention suggest that, promisingly, the intervention may be successful at improving adolescent education outcomes upon return to school by increasing adolescent motivation. However, there is no evidence that the intervention can close gender gaps that have manifested during the pandemic. These findings have implications for learning losses upon return to school, consistent with a nascent but growing evidence of significant learning losses during the covid-19 pandemic in both HICs and LMICs (Moscoviz and Evans, 2022; Donnelly and Patrinos, 2021).

A strength of this study is the use of panel data on adolescents, collected in-person immediately prior to school closures in February and March 2020 and virtually via phone calls 12 months and 16 months later in February and March 2021 and July and August 2021, which allows for comparisons in adolescent outcomes before and after the onset of the covid-19 pandemic. However, other factors may be changing over time, such as shifting gender norms and expectations around paid and domestic work as adolescents age—factors that could be driving changes in outcomes between 2020 and 2021. Results should be interpreted with this in mind. In addition, both the covid-19 and midline rounds of data collection were conducted

via phone, which may have affected adolescent understanding of survey questions and continuity of the interview due to mobile connection issues. Finally, the causal impacts of the GM intervention are short-term, measured one to two months after the completion of the GM intervention. Thus, observed impacts may not persist over a longer period of time. Moreover, due to continued school closures at the time of the midline data collection and the phone-based survey, we are not able to measure impacts of the GM intervention learning outcomes or school enrollment, which are of primary interest in understanding learning impacts of the covid-19 pandemic. This is an avenue for future research as schools reopen.

These findings point toward potential priority areas for the Government of Bangladesh (GoB) to better support adolescent education outcomes. Specifically, findings suggest that despite gender parity in secondary education enrollment, gender gaps in educational support and engagement persist within households and schools. This suggests that GoB could consider outreach to parents and students to foster gender-equitable behaviors, for example in terms of access to media and expectations for domestic and care work. More broadly, this study contributes knowledge on the nature of gendered impacts of disruptive events and highlights the importance of gender disaggregated data not only on superficial experiences—e.g., receipt of support for schooling—but also on the underlying mechanisms for those experiences—e.g., the *type* of support being provided. These data are critical to understanding sources of inequities and resulting gender disparities in outcomes. Furthermore, our findings that GM programming improved adolescent outcomes overall without closing gender gaps in adolescent motivation suggest a need to better target adolescent support and programming to the specific gendered constraints faced by girls and boys. Ultimately, our findings highlight that direct phone-based outreach to adolescents and their parents may be a low-cost way to improve engagement in learning for both boys and girls with implications for expanding the reach of adolescent educational programming beyond the classroom to both in- and out-of-school adolescents on a broader global scale.

## References

Ahmed, M., Ahmed, K. S., Khan, N. I., and Ahmed, R. (2007). *Access to Education in Bangladesh: Country Analytic Review of Primary and Secondary School*. BRAC University Institute of Educational Development

Alan, S., Boneva, T., and Ertac, S. (2019) Ever Failed, Try Again, Succeed Better: Results from a Randomized Educational Intervention on Grit, *The Quarterly Journal of Economics*, 134(3), 1121–1162. **Error! Hyperlink reference not valid.**

Amin S, Hossain MI, and Ainul S. (2021). Learning loss among adolescent girls during the

COVID-19 pandemic in rural Bangladesh. New York: Population Council.

Asadullah, M. N. and Chaudhury, N. (2009). Reverse gender gap in schooling in Bangladesh: insights from urban and rural households. *Journal of Development Studies*, 45(8), 1360-1380.

Asadullah, N., Bhattacharjee, A., Tasnim, M., and Mumtahena, F. (2020). COVID-19, schooling and learning [Presentation Slides]. BRAC Institute of Governance and Development. https://bigd.bracu.ac.bd/wpcontent/uploads/2020/06/COVID-19-Schooling-and-Learning_June-25-2020.pdf

Asaduzzaman, TM, Baird, S., Jones, N, Sabarwal, S, Seager, J, and Tauseef, S. (2021). The Gendered Impact of COVID-19 on Adolescents' Education and School-to-Work Transitions in Bangladesh. Innovations for Poverty Action: Women's Work, Entrepreneurship, and Skilling Initiative. https://www.poverty-action.org/printpdf/48316

ASPR (2014). *Bangladesh Primary Education Annual Sector Performance Report – 2014*. Monitoring and Evaluation Division, Directorate of Primary Education, Government of the People's Republic of Bangladesh.

Bahety, G., Bauhoff, S., Patel, S., Potter, J. (2021). Texts don't nudge: An adaptive trial to prevent the spread of COVID-19 in India. *Journal of Development Economics* 153: 102747.

Baird S., Jones N., Goel N., Dutton R., Oakley E., Presler-Marshall E., et al. (2021). Adolescent well-being in the time of COVID-19. Adolescent Well-being: Background Papers for Multi-stakeholder Consultations.

Baird S., Seager J., Sabarwal S., Guglielmi, S., Sultan M. (2020). Adolescence in the Time of COVID-19: Evidence from Bangladesh. World Bank, Washington, DC. World Bank. https://openknowledge.worldbank.org/handle/10986/34801 License: CC BY 3.0 IGO

Bester, G. and Budhal, R.S. (2001). Social Isolation: a learning obstacle in primary school. *South African Journal of Education*, 21(4), 331-336.

Biswas, K., Asaduzzaman, T. M., Evans, D.K., Fehrler, S., Ramachandran, D., and Sabarwal, S. (2020). July 16 2020. TV-Based Learning in Bangladesh: Is it Reaching Students? World Bank: Washington, D.C. (https://openknowledge.worldbank.org/ bitstream /handle /10986/34138/TV-Based-Learning-in-Bangladesh-Is-it-Reaching-Students.pdf?sequence=4andisAllowed=y.)

Bruhn, M. and McKenzie, D. (2009). In Pursuit of Balance: Randomization in Practice in Development Field Experiments. *American Economic Journal: Applied Economics*, 1(4), 200-232.

Campaign for Popular Education (CAMPE) (2021). Education Watch Study 2020-2021 (Phase 1): Interim Report: Reopening Schools – when and how. Online dissemination presentation.

Clark, A. E., Nong, H., Zhu, H., and Zhu, R. (2021). Compensating for academic loss: Online

learning and student performance during the COVID-19 pandemic. *China Economic Review*, 68, 101629.

Claro, S., Paunesku, D., and Dweck, C. S. (2016). Growth mindset tempers the effects of poverty on academic achievement. *Proceedings of the National Academy of Sciences of the United States of America, 113*(31), 8664–8668. **Error! Hyperlink reference not valid.**

Ding, X. and Yao, J. (2020). Peer Education Intervention on Adolescents' Anxiety, Depression, and Sleep Disorder during the COVID-19 Pandemic. *Psychiatria Danubina* 32(3-4):527-535. doi: hhtps://doi.org/10.24869/psyd.2020.527. PMID: 33370763.

Donnelly, R., and Patrinos, H. A. (2021). Learning loss during Covid-19: An early systematic review. *PROSPECTS*. https://doi.org/10.1007/s11125-021-09582-6

Duckworth, A. L., and Quinn, P. D. (2009). Development and validation of the Short Grit Scale (GRIT–S). *Journal of personality assessment*, 91(2), 166-174.

Dweck, C. (1999). *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Psychology Press.

Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House Digital, Inc..

Dweck, C. S., and Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256–273.

Dweck, C. S., and Yeager, D. S. (2019). Mindsets: A view from two eras. *Perspectives on Psychological Science*, 14, 481–496. https://doi.org/10.1177/1745691618804166

Filmer, D. and Pritchett, L.H. (2001). Estimating wealth effects without expenditure data—or tears: an application to educational enrollments in states of India. *Demography* 38, 115-132. doi: 10.1353/dem.2001.0003

Geven, K., and Hasan, A. (2020). *Learning Losses in Pakistan Due to COVID-19 School Closures*. World Bank, Washington, DC. https://doi.org/10.1596/34659

Hevia, F. J., Vergara-Lope, S., Velásquez-Durán, A., and Calderón, D. (2022). Estimation of the fundamental learning loss and learning poverty related to COVID-19 pandemic in Mexico. *International Journal of Educational Development*, 88, 102515. https://doi.org/10.1016/j.ijedudev.2021.102515

Jones, N., Tapia, I. S., Baird, S., Guglielmi, S., Oakley, E., Yadete, W. A., Sultan, M., and Pincock, K. (2021). Intersecting barriers to adolescents' educational access during COVID-19: Exploring the role of gender, disability and poverty. *International Journal of Educational Development*, 85, 102428. https://doi.org/10.1016/j.ijedudev.2021.102428

Lan, C., Lightfoot, A., Gere, D., Taboada, A., Meyer, K., Harwood, J., and Milburn, N.G. (2019). Live or Virtual? Comparing Two Versions of AMP!, A Theater-Based Sexual Health Intervention for Adolescents. *American Journal of Sexuality Education*, 14:3, 292-

314. https://doi.org/10.1080/15546128.2019.1586270

Lee, J. (2020). Mental health effects of school closures during COVID-19. *The Lancet Child and Adolescent Health*, 4(6), 421. https://doi.org/10.1016/S2352-4642(20)30109-7

Lichand, G., Doria, C. A., Neto, O. L., and Cossi, J. (2021). *The Impacts of Remote Learning in Secondary Education during the Pandemic in Brazil (October 14, 2021)*. Available at SSRN: https://ssrn.com/abstract=3841775 or http://dx.doi.org/10.2139/ssrn.3841775

McKenzie, D. (2012). 'Beyond baseline and follow-up: The Case for More T in Experiments', *Journal of Development Economics*, 99, 210–221. https://doi.org/10.1016/j.jdeveco.2012.01.002

Media Matters for Democracy (MMfD). (2021). Women Disconnected: Feminist Case Studies on the Gender Digital Divide Amidst Covid-19. https://www.digitalrightsmonitor.pk/wp-content/uploads/2021/01/Women-Disconnected-Gender-Digital-Divide-in-Pakistan.pdf

Mistree D, Loyalka P, Fairlie R, Bhuradia A, Angrish M, Lin J, Karoshi A, Yen SJ, Mistri J, Bayat V. (2021). Instructional interventions for improving COVID-19 knowledge, attitudes, behaviors: Evidence from a large-scale RCT in India. *Social Science and Medicine* 276:113846. doi: 10.1016/j.socscimed.2021.113846. Epub 2021 Mar 17. PMID: 33773476; PMCID: PMC7963523.

Moscoviz, L. and Evans, D.K. (2022). Learning Loss and Student Dropouts during the COVID-19 Pandemic: A Review of the Evidence Two Years After Schools Shut Down. Center for Global Development, Working Paper 609. https://www.cgdev.org/sites/default/files/learning-loss-and-student-dropouts-during-covid-19-pandemic-review-evidence-two-years.pdf

Orlov, G., McKee, D., Berry, J., Boyle, A., DiCiccio, T., Ransom, T., Rees-Jones, A. and Stoye, J. (2021). Learning during the COVID-19 pandemic: It is not who you teach, but how you teach. *Economics Letters*, 202, 109812.

Outes-Leon, I., Sanchez, A. and Vakis, R. (2020). "The Power of Believing You Can Get Smarter: The Impact of a Growth-Mindset Intervention on Academic Achievement in Peru." Policy Research Working Paper Series. doi:10.1596/1813-9450-9141.

Paunesku, D., Walton, G. M., Romero, C., Smith, E. N., Yeager, D. S., and Dweck, C. S. (2015). Mind-set interventions are a scalable treatment for academic underachievement. *Psychological Science*, 26(6), 784–793. https://doi.org/10.1177/0956797615571017

Plan International (2021). Impact of COVID-19 on Adolescents' Education: Evidence briefing. https://plan-uk.org/file/covid-19-and-adolescents-education-g7-evidence-briefpdf/download?token=4mfk0C_I

Radhakrishnan, K., Angrist, N., Bergman, P., Cullen, C., Matsheng, M., Ramakrishnan, A., Sabarwal, S. and Sharma, U. (2021). Learning in the Time of COVID-19. Insights from

Nepal. World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/35384/Learning-in-the-Time-of-COVID-19-Insights-from-Nepal.pdf?sequence=1andisAllowed=y

Rahman, H. Z., Matin, I., Zillur, U., Rahman, A., Hossain, B., and Islam, S. (2021). PPRC-BIGD rapid response research phase III: Part 2 – COVID-19 impact on education life of children [Presentation Slides]. BRAC Institute of Governance and Development. https://bigd.bracu.ac.bd/wp-content/uploads/2021/05/Final_PPRC-BIGD3rd-Round-Part-2_Human-Capital_10-may.pdf

Rahman, T. and Sharma, U. (2021). A Simulation of COVID-19 school closure impact on student learning in Bangladesh. The World Bank. (**Error! Hyperlink reference not valid.**)

Rege, M., Hanselman, P., Solli, I. F., Dweck, C. S., Ludvigsen, S., Bettinger, E., Crosnoe, R., Muller, C., Walton, G., Duckworth, A., and Yeager, D. S. (2021). How can we inspire nations of learners? An investigation of growth mindset and challenge-seeking in two countries. *American Psychologist,* 76(5), 755–767. https://doi.org/10.1037/amp0000647

Salta, K., Paschalidou, K., Tsetseri, M. et al. (2022). Shift From a Traditional to a Distance Learning Environment during the COVID-19 Pandemic. *Science and Education,* 31, 93–122. https://doi.org/10.1007/s11191-021-00234-x

Schleider, J.L., Mullarkey, M.C., Fox, K.R. et al. (2022). A randomized trial of online single-session interventions for adolescent depression during COVID-19. *Nature Human Behavior* 6, 258–268. https://doi.org/10.1038/s41562-021-01235-0

Schwartz, K. D., Exner-Cortens, D., McMorris, C. A., Makarenko, E., Arnold, P., Van Bavel, M., Williams, S., and Canfield, R. (2021). COVID-19 and Student Well-Being: Stress and Mental Health during Return-to-School. *Canadian Journal of School Psychology*, 36(2), 166–185. https://doi.org/10.1177/08295735211001653

Shafiq, M. N. (2009). A reversal of educational fortune? Educational gender gaps in Bangladesh. *Journal of International Development: The Journal of the Development Studies Association*, 21(1), 137-155.

Sisk, V. F. et al. (2018) 'To What Extent and Under Which Circumstances Are Growth Mind-Sets Important to Academic Achievement? Two Meta-Analyses', *Psychological Science,* 29(4), 549–571. doi: 10.1177/0956797617739704.

UNESCO Institute for Statistics (2021). UNESCO map on school closures: Country dashboard.

UNESCO. (2020). 2020 Global Education Meeting. Extraordinary Session on Education post-COVID-19 (online). Concept Note. https://en.unesco.org/sites/default/files/gem2020-extraordinarysession-concept-note-en.pdf

UNICEF (2021a). COVID-19 and school closures: One year of education disruption. https://data.unicef.org/resources/one-year-of-covid-19-and-school-closures/

UNICEF (2021b). What we know about the gender digital divide for girls: A literature review. https://www.unicef.org/eap/reports/innovation-and-technology-gender-equality-0

UNICEF Bangladesh (2020). Bangladesh Education Fact Sheets 2020: Analysis for learning and equity using Bangladesh MICS. https://data.unicef.org/wp-content/uploads/2021/05/Bangladesh-Education-Fact-Sheets_V7.pdf

United Nations General Assembly (2015). *Transforming our world: the 2030 Agenda for Sustainable Development.* A/RES/70/1.

Vaillancourt, T., McDougall, P., Comeau, J., and Finn, C. (2021) COVID-19 school closures and social isolation in children and youth: prioritizing relationships in education. *FACETS,* 6, 1795-1813. https://doi.org/10.1139/facets-2021-0080

Villegas, C.C., Peirolo, S., Rocca, M., Ipince, A., and Bakrania, S. (2021). Impacts of health-related school closures on child protection outcomes: A review of evidence from past pandemics and epidemics and lessons learned for COVID-19. *International Journal of Educational Development*, 84, 102431. https://doi.org/10.1016/j.ijedudev.2021.102431

Wolf, S., Aurino, E., Suntheimer, N., Avornyo, E., Tsinigo, E., Jordan, J., Samanhyia, S., Aber, J.L. and Behrman, J.R. (2021). Learning in the Time of a Pandemic and Implications for Returning to School: Effects of COVID-19 in Ghana. CPRE Working Paper 8-2021. https://repository.upenn.edu/cpre_workingpapers/28/

World Bank (2014). *STEP skills measurement surveys: innovative tools for assessing skills (English).* Social protection and labor discussion paper; no. 1421 Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/516741468178736065/STEP-skills-measurement-surveys-innovative-tools-for-assessing-skills

World Bank. (2020). *The COVID-19 pandemic: Shocks to education and policy responses*. World Bank. Washington, D.C. : World Bank Group. **Error! Hyperlink reference not valid.**

Zu, W., Shen, W., and Wang, S. (2021). Intervention of adolescent' mental health during the outbreak of COVID-19 using aerobic exercise combined with acceptance and commitment therapy. *Children and Youth Services Review* 124: 105960. https://doi.org/10.1016/j.childyouth.2021.105960

Yeager, D. S., and Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist,* 47*,* 302–314. https://doi:10.1080/00461520.2012 722805

Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., ... and Dweck, C. S. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*, 573, 364-369.

Yeager, D. S., Johnson, R., Spitzer, B. J., Trzesniewski, K. H., Powers, J., and Dweck, C. S.

(2014). The far-reaching effects of believing people can change: Implicit theories of personality shape stress, health, and achievement during adolescence. *Journal of Personality and Social Psychology,* 106, 867–884. http://dx.doi.org/10.1037/a0036335

Zhu, P., Garcia, I., and Alonzo, E. (2019). An Independent Evaluation of the Growth Mindset Intervention. Issue Focus. *MDRC* ED594493. https://eric.ed.gov/?id=ED594493

## Appendix

Table A1. Analysis of Sample Selection

| | (1) | (2) |
|---|---|---|
| | **Outcome: =1 if surveyed all three rounds** | |
| | x GM Treatment | Level |
| Growth Mindset (GM) treatment | -0.035 | -0.073 |
| | (0.050) | (0.302) |
| Household head has at least secondary education | -0.000 | 0.048 |
| | (0.010) | (0.032) |
| Number of household members | 0.052 | 0.002 |
| | (0.041) | (0.008) |
| Household wealth above median | 0.009 | -0.021 |
| | (0.023) | (0.029) |
| Age of adolescent at baseline | -0.032 | -0.016 |
| | (0.034) | (0.015) |
| Adolescent is female | -0.004 | -0.002 |
| | (0.044) | (0.027) |
| Adolescent is in grade 8 | 0.067 | 0.024 |
| | (0.066) | (0.036) |
| Indicator for rural, government school | -0.062 | -0.028 |
| | (0.062) | (0.035) |
| Indicator for urban MPO school | -0.074 | 0.065 |
| | (0.049) | (0.046) |
| Indicator for urban, government school | -0.035 | 0.123*** |
| | (0.050) | (0.039) |
| Observations | 2,214 | |

Notes. This table presents estimates from a linear probability model, regressing an indicator of appearing in the analysis sample on a set of individual and household characteristics. Standard errors clustered at the school level and sampling weights are used to make estimates representative of adolescents in the relevant grades in the schools in the sample. Although 2,220 adolescents were surveyed at baseline, we were unable to survey six of their female primary caregivers and are missing information on household characteristics, so they are dropped from this analysis. * p<.1; ** p<.05; *** p<.01

Data source. Baseline data.

Table A2. Growth Mindset True/False Statements

| **True or False:** | **Answer** | **Response: Right! /Incorrect!:** |
|---|---|---|
| **Week 3:** You are either smart or dumb and it cannot be changed | True | Your brain is a muscle that can be exercised. When you learn new things, there are tiny connections in the brain that actually multiply and get stronger. The more that you challenge your mind to learn, the more your brain cells grow. |
| **Week 4:** If Samira is not good at maths in 8$^{th}$ Standard, she will never be good at maths | True | If Samira is not good at maths now, she can keep practicing and growing her brain which is a muscle. If she keeps practicing, she will become great at Maths! |
| **Week 5:** You can learn anything if you put in the effort and believe in yourself | True | You CAN do anything if you put in the effort and believe in yourself. Our intelligence and brain are NOT fixed. We can expand it if we put in the effort and see failures and opportunities to learn and grow. |
| **Week 6:** If something is challenging, you should not even try it. You should give up. | False | Since our brain can grow, it means that we can learn things even if we find it challenging. So, it is always good to put in the effort because you will learn. |
| **Week 7:** Sariya is the best at science because she was born with the talent | False | No one is born with intelligence that is different from you. Sariya is good at science because she loves it, studies a lot, and wants to be the best at it. |

Table A3. Growth Mindset Measures

| Item | Full Scale | Grit Scale | Mallea-bility Scale | WB Growth Mindset Scale |
|---|---|---|---|---|
| 1. I like schoolwork best which makes me think hard, even if I make a lot of mistakes. | × | × | | |
| 2. Setbacks discourage me. | × | × | | |
| 3. If I think I will lose in a game, I do not want to continue playing. | × | × | | |
| 4. When I receive a bad result on a test, I spend less time on this subject and focus on other subjects that I'm actually good at. | × | × | | |
| 5. I work hard in tasks. | × | × | | |
| 6. I prefer easy homework where I can easily answer all questions correctly. | × | × | | |
| 7. If I'm having difficulty in a task, it is a waste of time to keep trying. I move on to things which I am better at doing. | × | × | | |
| 8. Your intelligence is something very basic about you that you can't change very much. | × | | × | |
| 9. Music or drawing talent can be learned by anyone. | × | | × | |
| 10. No matter how intelligent you are, you can always change it quite a bit. | × | | × | |
| 11. Truly smart people do not need to try hard. | × | | × | |
| 12. If you're not good at a subject, working hard won't make you good at it. | × | | × | |
| 13. If I study hard enough, I could be the most successful student in the class. | × | | × | |
| 14. You have a certain amount of intelligence, and you really can't do much to change it. | × | | | × |
| 15. You can do things differently, but you can't really change the fundamental parts of who you are. | × | | | × |
| 16. You are a certain kind of person, and you really can't do much to change that. | × | | | × |
| 17. You can learn new things, but you can't really change your basic intelligence | | | | × |

*Notes.* Response options for each item are Strongly Agree, Agree, Disagree, Strongly Disagree.

Table A4. Association between covid-19 and education outcomes, overall and by gender

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | **Overall Growth Mindset Index** | **Grit Index** | **Malleability Index** | **WB Growth Mindset Index** | **Time spent studying** | **Aspire to university education** | **Has friends can trust** | **Currently working** |
| | *Standard deviations* | | | | | *Percentage point change* | | |
| **A. Overall** | | | | | | | | |
| covid-19 | -0.118** | -0.020 | -0.270*** | -0.020 | -0.183*** | -0.125*** | -0.231*** | -0.026*** |
| | (0.056) | (0.044) | (0.048) | (0.062) | (0.043) | (0.015) | (0.020) | (0.008) |
| | [.036] | [.656] | [<.000] | [.753] | [<.000] | [<.000] | [<.000] | [.001] |
| Number of observations | 3,591 | 3,603 | 3,600 | 3,603 | 3,175 | 3,592 | 3,554 | 3,554 |
| Baseline mean | -- | -- | -- | -- | -- | 0.870 | 0.900 | 0.041 |
| Baseline sd | 1.13 | 0.418 | 0.419 | 0.619 | 1.96 | -- | -- | -- |
| **B. Males only** | | | | | | | | |
| covid-19 | -0.016 | 0.039 | -0.159** | 0.050 | -0.170*** | -0.079*** | -0.316*** | -0.032*** |
| | (0.060) | (0.067) | (0.074) | (0.066) | (0.062) | (0.022) | (0.031) | (0.011) |
| | [.790] | [.557] | [.034] | [.456] | [.007] | [.001] | [<.000] | [.007] |
| Number of observations | 1,670 | 1,674 | 1,674 | 1,672 | 1,519 | 1,669 | 1,631 | 1,632 |
| Baseline mean | -- | -- | -- | -- | -- | 0.881 | 0.918 | 0.052 |
| Baseline sd | 1.06 | 0.391 | 0.395 | 0.589 | 2.05 | -- | -- | -- |

Table 4A continued

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Overall Growth Mindset Index | Grit Index | Malleability Index | WB Growth Mindset Index | Time spent studying | Aspire to university education | Has friends can trust | Currently working |
| | *Standard deviations* | | | | | *Percentage point change* | | |
| **C. Females only** | | | | | | | | |
| covid-19 | -0.193** | -0.063 | -0.351*** | -0.070 | -0.193*** | -0.159*** | -0.171*** | -0.023** |
| | (0.080) | (0.059) | (0.060) | (0.087) | (0.059) | (0.018) | (0.022) | (0.009) |
| | [.018] | [.291] | [<.000] | [.426] | [.002] | [<.000] | [<.000] | [.012] |
| Number of observations | 1,921 | 1,929 | 1,926 | 1,931 | 1,656 | 1,923 | 1,923 | 1,922 |
| Baseline mean | -- | -- | -- | -- | -- | 0.861 | 0.887 | 0.032 |
| Baseline sd | 1.19 | 0.435 | 0.434 | 0.638 | 1.90 | -- | -- | -- |
| Male=Female (p-value) | .058 | .246 | .046 | .226 | .777 | .005 | <.000 | .507 |

*Notes.* All regressions include baseline controls and individual survey weights. Columns 1—5 are outcome indicators standardized using the baseline mean and standard deviation. Baseline means are not provided in columns 1—5 because the outcomes are standardized to the mean and standard deviation in the sample at baseline, so the mean is zero in all cases; instead, standard deviations from the unstandardized outcomes at baseline are shown. Baseline controls include household head has secondary school certificate (SSC) degree, household size, household has above median wealth household is located in urban area, age and gender of adolescent, adolescent is in Grade 8, adolescent goes to government school. Standard errors are clustered at the school level and sampling weights are used to make estimates representative of adolescents in the relevant grades in the schools in the sample. * p<.1; ** p<.05; *** p<.01

*Data source.* Baseline and covid-19 round data.

Table A5. Impact of Growth Mindset intervention on education outcomes, overall and by gender

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | **Overall Growth Mindset Index** | **Grit Index** | **Malleability Index** | **WB Growth Mindset Index** | **Time spent studying** | **Aspire to university education** | **Has friends can trust** | **Currently working** | **Cannot return to school** |
| | *Standard Deviations* | | | | | *Percentage point change* | | | |
| **A. Overall** | | | | | | | | | |
| Growth Mindset | | | | | | | | | |
| Treatment | 0.195*** | 0.168*** | 0.179*** | 0.110* | 0.095 | 0.069*** | 0.033 | -0.007 | -0.025 |
| | (0.063) | (0.054) | (0.063) | (0.064) | (0.069) | (0.025) | (0.025) | (0.009) | (0.015) |
| | [.002] | [.002] | [.005] | [.090] | [.174] | [.007] | [.186] | [.488] | [.105] |
| Number of observations | 1,788 | 1,795 | 1,793 | 1,793 | 1,385 | 1,794 | 1,741 | 1,741 | 1,383 |
| Control mean at midline | -- | -- | -- | -- | -- | 0.775 | 0.723 | 0.043 | 0.084 |
| Control sd at midline | 0.970 | 0.417 | 0.355 | 0.508 | 1.74 | -- | -- | -- | -- |
| **B. Males only** | | | | | | | | | |
| Growth Mindset | | | | | | | | | |
| Treatment | 0.232** | 0.245** | 0.109 | 0.177** | 0.208** | 0.069* | 0.037 | -0.018 | -0.028 |
| | (0.092) | (0.094) | (0.090) | (0.075) | (0.090) | (0.036) | (0.031) | (0.017) | (0.020) |
| | [.013] | [.011] | [.229] | [.021] | [.023] | [.057] | [.236] | [.301] | [.167] |
| Number of observations | 829 | 832 | 833 | 831 | 687 | 831 | 788 | 789 | 686 |
| Control mean at midline | -- | -- | -- | -- | -- | 0.788 | 0.742 | 0.073 | 0.081 |
| Control sd at midline | 0.917 | 0.442 | 0.343 | 0.504 | 1.75 | -- | -- | -- | -- |

Table A5 continued

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | **Overall Growth Mindset Index** | **Grit Index** | **Malleability Index** | **WB Growth Mindset Index** | **Time spent studying** | **Aspire to university education** | **Has friends can trust** | **Currently working** | **Cannot return to school** |
| | *Standard Deviations* | | | | | *Percentage point change* | | | |
| **C. Females only** | | | | | | | | | |
| Growth Mindset | | | | | | | | | |
| Treatment | 0.167** | 0.124** | 0.220*** | 0.063 | 0.020 | 0.069** | 0.036 | 0.000 | -0.024 |
| | (0.078) | (0.062) | (0.080) | (0.086) | (0.092) | (0.033) | (0.032) | (0.010) | (0.024) |
| | [.036] | [.049] | [.007] | [.465] | [.832] | [.037] | [.267] | [.979] | [.309] |
| Number of observations | 959 | 963 | 960 | 962 | 698 | 963 | 953 | 952 | 697 |
| Control mean at midline | -- | -- | -- | -- | -- | 0.766 | 0.710 | 0.022 | 0.086 |
| Control sd at midline | 1.00 | 0.400 | 0.363 | 0.511 | 1.74 | -- | -- | -- | -- |
| Male=Female (p-value) | 0.611 | 0.433 | 0.366 | 0.308 | 0.170 | 0.994 | 0.809 | 0.436 | 0.896 |

*Notes.* All regressions include baseline controls and individual survey weights. Columns 1—5 are outcome indicators standardized using the baseline mean and standard deviation. Control means are not provided in columns 1—5 because the outcomes are standardized to the mean and standard deviation in the control group, so the mean is zero in all cases; instead, standard deviations from the unstandardized outcomes in the control group are shown. Baseline controls include household head has secondary school certificate (SSC) degree, household size, household has above median level of asset, household is located in urban area, age of adolescent, adolescent is in Grade 8, and the adolescent goes to government school. Standard errors are clustered at the school level and sampling weights are used to make estimates representative of adolescents in sample schools. * p<.1; ** p<.05; *** p<.01

*Data source.* Midline data for outcomes; baseline data for baseline controls; covid-19 round data for pre-intervention outcome control