Pre-Analysis Plan:
Do role models increase student hope and effort? Evidence from India

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Contents

1 Introduction

The analysis plan describes the research design to capture the effect of a role-modelling intervention on a set of key outcomes: student hope and student effort. The randomised controlled trial aims to assess the impact of exposure to a set of three motivational video clips in primary school students in India.

A key issue with standard economic policy thinking has been the appreciation of people′s preferences but the ignorance of people′s motivation and other psychological factors that shape these preferences (Bertrand et al. 2005). 'Hope′ is one such powerful psychological factor that not only has the ability shape desires and aspirations, but also influence perseverance, grit and self-esteem.

Internal constraints deeply ingrain in children and strongly influence the feelings of hopelessness, lack of empowerment, low aspirations, reduced self-efficacy and low self-esteem (Glewwe et al., 2014). Benabou and Tirole (2003) argue that empowering and encouraging individuals can increase their self-esteem and it may in turn increase their achievement.

Belief in one′s personal efficacy is a statutory mechanism through which, people believe or disbelieve in what is attainable to them by their actions and have incentives or disincentives, respectively, to act accordingly (Bandura, 2015). These efficacy beliefs help individuals decide what goals to set; how much effort to invest; and how much perseverance to exhibit in the face of obstacles (Locke and Latham, 1990).

Snyder (2002) defines hope as the perceived capability to derive pathways to desired goals, and motivate oneself via agency thinking to use those pathways. Hopeful attitude can motivate individuals to look for relevant information or find means to a goal: invigorating pathways (Miceli and Castelfranchi, 2010). Hope can thereby be an instigator of higher goals and higher effort, creating a virtuous cycle of successful goal-attainment and attitudes that are more hopeful for the future.

Duflo (2012) argues that hopelessness is accompanied by low aspirations that foster low investments and consequentially poor outcomes. These low investments can be tangible (nutrition and immunization) and intangible (hard-work and perseverance). A depressed capacity to aspire, can stifle the process of attaining dreams, if not dreams themselves (Appadurai, 2004 and Ray, 2006). Dalton et al. (2015) argues that low levels of aspirations are associated with low levels of effort

resulting in a consequential aspiration-failure and poverty trap. Functioning as an enabling capability, hope can play a critical role in developing, strengthening and sustaining other capabilities like aspirations (Duflo, 2012) by higher goal-setting and increased effort.

There is a significant piece of literature that shows positive relationships between hopefulness and superior academic achievement or athletic performance in children and adults. However, there is a dearth of treatment interventions that assess any causal mechanisms at work (Snyder et al. 1997). The key objective of the research is to propose a cost-effective and scalable intervention that not only increases children's hope but also translates into higher effort and improved academic performance. The plan is structured in the following manner: section 2 explains the research design, section 3 discusses the empirical strategy, section 4 talks about the organisation of the research team along with key deliverables and time-line of the study.

2 Research Strategy

2.1 Research Questions

- Is hope malleable through exposure to role-models?
- Does exposure to motivational videos increase student effort?

2.2 Sampling

2.2.1 Sampling Frame

School identification is performed by the local partners, following detailed guidelines and consistency checks. Consent from school principals is sought in the beginning to ensure cooperation and support during the RCT. The schools are in different parts of the city, to ensure representativeness, and avoid outliers and spillovers.

The sample identification strategy ensures homogeneity across the sample of students, as the unit of randomisation is individuals. Six hundred class-4 students, aged 9-11 years, are identified from 6 private schools in Jaipur, Rajasthan. Information on school attendance, past academic records and curriculum is collected prior to school identification to maintain comparability across schools. No two schools are farther than 8 kms or closer than 3 kms to avoid compromises on comparability. School fixed effects are captured in the empirical strategy. The sample of students attending the

schools are from lower-middle income households of India that compose majority of the country's population.

2.2.2 Statistical Power

The average effect size of 1 point improvement in hope scale measures; and 2 percent increase in student effort are used for the power calculations for a two-sided test at 5 percent level of significance. The calculations indicate a desired sample of approximately 350 students. However, to overcome the potential threats of attrition and compliance, the sample size is taken to be 600.

As a general exercise and following a rather safe approach, the unexplained variation or noise is assumed to be 10-15 percent above or below the assumed mean values for all calculations. Information on student specific characteristics, like age, gender, religion, caste, along with information on parents, household and teachers will be collected during baseline.

2.2.3 Assignment to Treatment

Randomisation will be performed using excel and each student will be assigned to a treatment or control group. The treatment group will watch the documentaries on fictional role-models that succeeded in life using a hopeful attitude, while the control/placebo group will watch an entertainment television series for kids, namely, Malgudi Days.

The students will be allotted a treatment or control group in the baseline. Subject to the group they are assigned to, they will be taken to their schools computer lab by the relevant school teacher and each student will watch the video assigned to her/him individually. As each class of students will have some assigned to the treatment and control groups, it is essential that each student watches the videos on an individual screen.

Balancing checks based on the gender, age, religion and past performance of students will be performed during the baseline to indicate a balanced composition across the two groups. This exercise ensures that the two groups are homogeneous and comparable. By construct, the students will not have the occasion to interact between intervention and endline. However, spillovers between endline and post-tests will be estimated using social network data collected during the baseline.

Attrition is estimated based on the existing literature in education. While differential attrition is a cause of concern, most of the information is collected as a continuous classroom exercise based on carefully devised indicators to minimize the potential threats from attrition. Based on aforementioned power calculations, the desired sample size to detect the minimum effect with a 5 percent level of significance is 350 students. To pursue a rather safe exercise, data is collected on 600 students.

2.3 Fieldwork

2.3.1 Instruments

Snyder's Children's Hope Scale (CHS) and Adult Trait Hope Scale (ATHS) will be employed to capture information on the hopes of children and their parents, respectively. CHS is a 6-question likert style scale and AHS has 8 likert-scale style questions. A self-portrait psychometric analysis technique in lines with Glewwe et al. (2018) will be used as a robustness check on the hope scale measures of the CHS. Information on effort will be captured using two indicators: (i) attendance at an optional after-school remedial class (0 or 1) and (ii) third party observations in a substitution class (0 - 3). Information on student performance will be measured using an ASER-style test (Banerjee et al. 2008) and past academic performance in school examinations. All of these indicators are fairly simple to administer, logistically convenient and clean measures.

Following the detailed survey questionnaires in the baseline, the hope scale is administered to the students in both English and Hindi. An example of the 6 items is: 'I think I am doing pretty well' with six response options that are scored 1 to 6 - 'None of the time, A little of the time, Some of the time, A lot of the time, Most of the time, and All of the time'. The children are then asked to draw a portrait of themselves on an average day. The students are then asked to take the ASER-style test. The exam is administered for 25 minutes, with two sections on mathematics and English having equal weights (50 marks). The students resume to the school activities. The class immediately after is a substitution class in which information on student effort is collected through third-party observation. The students are later informed about the optional after-school remedial class, which takes the next day, after school hours. No extra provisions are offered for transport or food for the students who decide to stay back and attend the class. Attendance is monitored in the class as an indicator of objective effort.

2.3.2 Data Collection

The data collection will last for four months from baseline to two follow-up survey phases. An average student can fill the CHS in ten minutes. It takes fifteen minutes for the children to draw a portrait of themselves. A substitution class will last for forty minutes of regular class period. The third party observer (field-worker) observes each child thrice every ten minutes and gives a score 1 or 0 if the student is observed to be working or not. The optional after-school remedial class will be one-hour long, right after the school hours. Student attendance in this case, is a clear indicator of objective effort. The ASER-style test of English and Mathematics is a time-bound task for twenty five minutes, after which each student receives a score of 0-100.

The role-modelling video or television series will be for 1 hour, immediately after which the students have to fill in the CHS, draw a self-portrait and complete the ASER style test. The students are then taken back to their respective classrooms. Immediately after, the following period in the school will be a substitution class, after which the announcement of the remedial class will be made. The remedial class will be held after school hours, one day after the announcement, to maintain consistency across different schools and groups of students. This sequence of administering different indicators will be maintained throughout the different phases of the experiment. For instance, a class of 40 students in one of the six schools will have baseline in week 1 and the intervention and endline in week 2. The same group will have the follow-up surveys in week 5 (after 2 weeks) and week 9 (after six weeks). This protocol is followed for all the students to avoid staggering across time-periods.

Data-collection will proceed in the following step-wise manner:

- **Baseline:** Survey questionnaire for students, parents and teachers for covariates and social network analysis are administered along with indicators for the three variables of interest: hope, effort and performance. It will last for three weeks.
- **Endline:** The intervention is followed immediately with the endline information being collected using the formerly mentioned indicators on hope, effort and performance to avoid spillovers, over a two week period.
- **Follow-up Survey 1:** Information is collected two weeks after endline on all three variables of interest. The exercise will last for one week.

- **Follow-up Survey 2:** Information is collected six weeks after endline, over a week long period.
- **Data entry:** Data entry will take place during the two weeks between endline and follow-up survey 1 and after the follow-up survey 1 and 2. Entered data on excel will be exported on to Stata and analysed in Glasgow.

3 Empirical Analysis

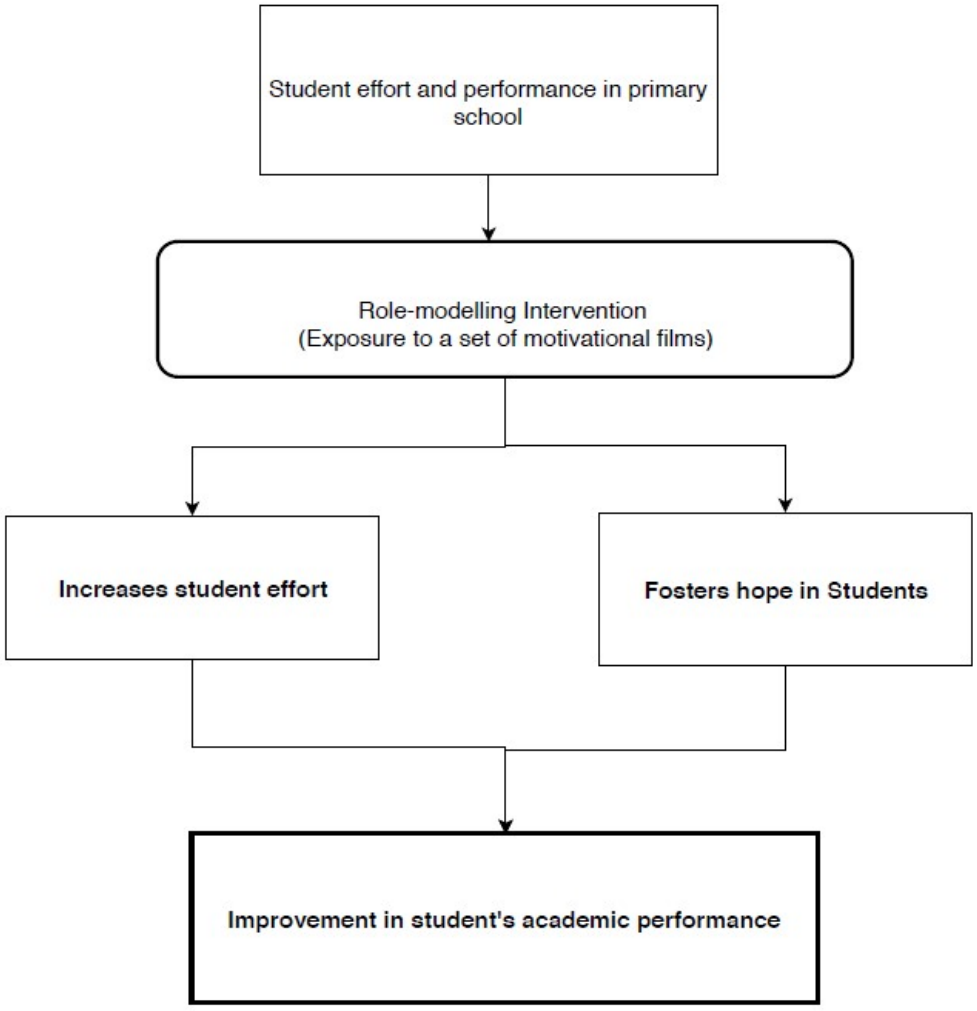
3.1 Variables

There will be two key outcome variables of interest in the study:

- **Hope:** CHS produces a measure for children's hope on a scale 0 - 36. The 6-item likert-style scale is administered to the respondents as 'information about yourself' with an extra 10 items to overcome memory effects. These 10 items have no priming effects. The 6 items include questions on agency and pathways - the two constituents of hope - and for each item the student has to select an option from 'none of the time' to 'all of the time', scored 1 to 6, respectively. The sum of responses on these 6 items results in a score from 1 to 36 for each student. To overcome experimenter-demand effects, the CHS is complemented with a self-portrait that children draw on a mundane subject, like, 'draw yourself on an average sunny Sunday'. Psychometric analysis techniques are used to find correlations between the two measures.
- **Effort:** Effort will be measured as an aggregate score of two different activities: (i) Optional Remedial Class, and (ii) Substitution Class. Effort will be measured using two indicators. For the optional after-school remedial class, a student receives a score 1 if s/he attends the class and 0 otherwise. For the substitution period, a student is observed thrice in equal intervals and receives a score 1 for each observation if s/he is found to be engaged in a productive activity and 0 otherwise. The sum of three observational scores, ascribes an aggregate score of 0-3 to each student.

Although we do treat performance as a variable of interest, the primary research questions do to pertain to measuring any impact of the intervention on student performance. Hence, unlike hope and effort, it is not a key outcome variable.

3.2 Theory of Change



3.3 Treatment Effects

We have two time periods (before and after) and two groups of students:

$$T = \begin{cases} 0, & \text{Baseline} \\ 1, & \text{Endline} \end{cases} \qquad \textit{and} \qquad D = \begin{cases} 0, & \text{Control/Placebo} \\ 1, & \text{Treatment} \end{cases}$$

The equation for hope is:

$$\delta_{it} = \alpha_1 + \beta_1 X_{it}^{'} + \lambda_1 T_t + \gamma_1 D_i + \phi_1 (D_i T_t) + \mu_s + \epsilon_{it} \tag{1}$$

where:

$\delta_{it} \rightarrow$ hope for individual 'i' at time-period 't'
$X_{it}^{'} \rightarrow$ vector of covariates and confounding factors
$D_i \rightarrow$ Dummy for individual treatment
$T_t \rightarrow$ Dummy for time
$\phi_1 \rightarrow$ Captures the change in hope through treatment
$\mu_s \rightarrow$ School-fixed effects
$E(\epsilon_{it}|T) = 0 \rightarrow$ Error term

And the equation for effort is:

$$\tilde{E}_{it} = \alpha_2 + \beta_2 X_{it}^{'} + \lambda_2 T_t + \gamma_2 D_i + \rho_1 (D_i T_t) + \mu_s + u_{it} \tag{2}$$

where:

$$E(\ u_{it}|T) = 0$$

$\rho_1 \rightarrow$ Captures the change in effort through treatment

As a standard intent to treat measure, equations 1 and 2 estimate the changes in hope and effort due to treatment (D = 1 and T = 1), respectively. This effect is captured in the coefficients of interest, ϕ_1 and ρ_1, for hope and effort, respectively. School fixed effects are captured in μ_s along with a host of student specific characteristics being controlled for by the covariate $X_{it}^{'}$, which is a vector of characteristics like age, gender, past performance and household income.

I aim to test for two main hypothesis:

- $H_o(1)$: The motivational videos have no effect on CHS, $\phi_1 = 0$.
- $H_o(2)$: The motivational videos have no effect on student effort, $\rho_1 = 0$.

3.4 Heterogeneous Effects

Heterogeneous effects can be expected across gender and the strata of low or high hope students. Based on the baseline data, the above and below average hope

students can be stratified for differential treatment effects. Moreover, parent's hope may have an influence on the hopes of the children and the amount of effort they exert. The differential sustainability of treatment effects based on baseline hope levels is another avenue for heterogeneity analysis. Well-defined variables and indicators capture the relevant information on these aspects in the baseline survey questionnaire.

It is useful to note that the analysis plan is suggestive, insofar that there may be some changes that may occur during the execution of the RCT. Nevertheless, it will be possible to explore their effect once the data collection is completed.

3.5 Robustness Checks

- Clustering is avoided by experimental design, as the treatment is offered at individual level [1].
- Equations 1 and 2 will be estimated without controls (X_{it}).
- An estimation at baseline will be performed to predict before-test relationships across the variables of interest.
- A reduced form estimation of equation 1 and 2 will be run with only the interaction term ($D_i T_t$).

4 Oraginsation and Deliverables

4.1 Research Team

The research will be conducted by the author under the supervision of Prof. Sayantan Ghosal, Dr. Theodore Koutmeridis and Prof. Michele Schweisfurth at the University of Glasgow. The research is facilitated and implemented at the field by Muskaan, an NGO based in Jaipur.

4.2 Deliverables

The research aims to contribute in the growing literature of aspirations and the relatively new stream of economics of hope. The study aims to produce useful

[1] Cardboard pieces are used to separate all the monitors in the computer labs.

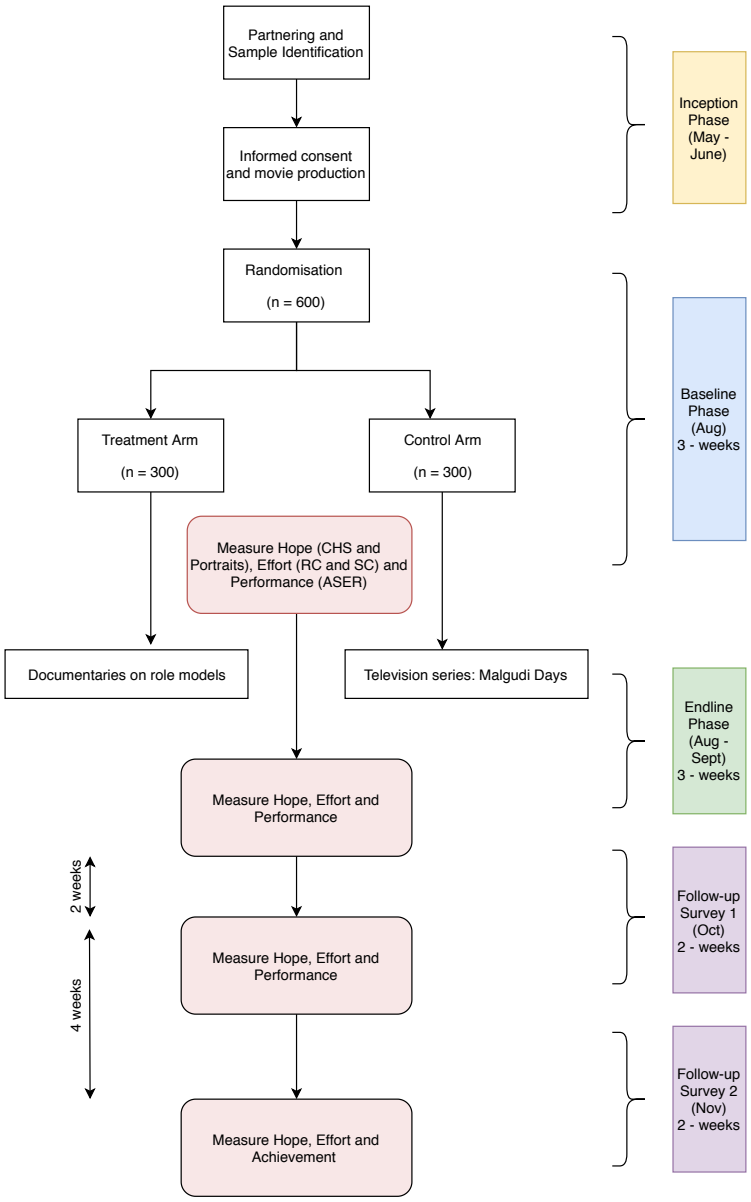
empirical evidences to answer the formerly mentioned research questions and lay seedbed for avenues of future research.

Offering a cheap scalable hope intervention to: (i) foster student hope, (ii) enhance student effort, and (iii) improve students' academic performance is the primary deliverable of the RCT. Moreover, the study will produce a rich dataset for future use. The objective of the RCT is to produce academic papers for publication and policy briefs.

4.3 Budget

A comprehensive budget predicts a total cost of £ 9000. The budget is tailored to produce a back-of-the-envelope estimate of the cost-effectiveness of the intervention.

4.4 Time-line


Partnering and Sample Identification
Informed consent and movie production
Randomisation (n = 600)
Treatment Arm (n = 300)
Control Arm (n = 300)
Measure Hope (CHS and Portraits), Effort (RC and SC) and Performance (ASER)
Documentaries on role models
Television series: Malgudi Days
Measure Hope, Effort and Performance
2 weeks
Measure Hope, Effort and Performance
4 weeks
Measure Hope, Effort and Achievement
Inception Phase (May - June)
Baseline Phase (Aug) 3 - weeks
Endline Phase (Aug - Sept) 3 - weeks
Follow-up Survey 1 (Oct) 2 - weeks
Follow-up Survey 2 (Nov) 2 - weeks

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