Essays on Hope and Economic Development

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Abstract

This thesis aims to introduce the economics of hope in an attempt to study the role of hope in economic development. It pertains to offering experimental evidence on the measurement, malleability and significance of hope in the process of improving academic achievement of primary school students in India. The thesis comprises of six chapters.

Chapter 1 introduces the concept of hope in the context of aspirations, internal constraints and education. Chapter 2 is a broad literature review underlining the need for treatment interventions that foster hope.

Chapter 3 and 4 focus on the experimental set-up. Starting with the relationship between hope, effort and achievement, chapter 3 provides a theory of change and a proposition in which, hope increases effort. It also includes an exhaustive research protocol deviced to explain the data collection plan in the field.

After discussing the theoretical underpinnings, Chapter 4 describes the research design and the empirical strategy employed to make causal inferences. In the process, I elaborate the survey instruments used to capture information on the various outcome variables, whilst stating the main hypothesis.

Chapter 5 presents the main results of the Randomised Controlled Trial (RCT). Along with the available heterogeneity in the findings, pre-meditated robustness checks are also incorporated in this chapter.

The results from chapter 5, their cost-effectiveness and implications on developmental policies are discussed in detail in Chapter 6. Potential extensions and the avenues of future research are also included in this chapter. It concludes by revisiting the main findings of the RCT and its contribution towards future developmental policy-making.

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Lastly, I thank my research topic: **Hope**. With hope, I came to Glasgow, with hope I shall move ahead.

Hope is Real.

Declaration

I declare that, except where explicit reference is made to the contribution of others, this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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Signature:

1 Introduction

1.1 Motivation and main objectives of the thesis

People's self-beliefs: their beliefs about their abilities, capacities, locus of control, self-esteem and their overall sense of worthiness are related closely to their own self-efficacy and ability to achieve specific outcomes (Bandura, 1977). 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.

Much of the recently proliferating literature in Economics has focused an undivided attention on Aspirations. While, hope has received little attention with the volume of empirical studies amounting to a thin evidence base on its predictive powers and developmental implications. The motivation for this thesis is twofold. Firstly, I wish to expand on the conception of hope in behavioral economics, adding to its measurability and analysing its malleability. Secondly, it caters to introduce the role of hope in development economics.

Internal constraints of the poor 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., 2018). Benabou and Tirole (2003) argue that empowering and encouraging individuals can increase their self-esteem and it may in turn increase their achievement. A significant body of literature has focused on understanding and ascertaining the role of internal constraints in the poor, and how low aspirations can lead to development of poverty traps (Dalton, Ghosal, and Mani, 2016) and inequality (Genicot and Ray, 2017); or how poverty and failed aspirations can create a self-sustaining trap (Ray, 2006).

Galiani et al. (2018) argue that even though aspirations (much alike hope) do not influence hedonic adaptation, a causal chain may run in the opposite direction, i.e.

higher aspirations do not reduce happiness necessarily, but higher levels of happiness could make aspirations more sustainable over time, such that unhappier people would be less capable to sustain their aspirations over time. In such a scenario, the mechanism behind aspiration adaptation would not be a lack of external means, but rather a shortage of internal resources, like life satisfaction or optimism and hope (Galiani et al., 2018).

Golman and Loewstein (2012), like Ray (2006), argue that formulation of intermediate aspiration levels will lead to higher marginal utility compared to extreme aspiration levels. Hope can be a mechanism that offers a continuing motivation for fulfilling these progressive intermediate aspirations, invigorated by pathways and agentic thinking.

Duflo (2012), asserted the role of hope, operating as a capability in Sen's terms of capability and recognition, and it can fuel aspirations in the poor and sustain them, leading to future-oriented behaviour and developmental outcomes. This forms an important research question whether hope can sustain increased aspirations longer even with resource constraints. Nevertheless, the literature in psychology and economics still lacks substantial empirical evidence of possible implications of hope in terms of economic betterment of life outcomes of the poor in particular and development in general (Galiani et al. 2018).

Poor individuals, according to the rational expectation theory, had for long believed to be able to anticipate what is achievable and what is not, just like anyone else. On the contrary, the recent developments in the literature indicate that poor often suffer from behavioural biases or internal constraints such as myopia, lack of willpower and lack of aspirations; or as argued by Appadurai (2004), they lack the capacity to aspire. Policies that help them strengthen this capacity could help them to contest and alter the conditions of their poverty (Appadurai, 2004).

The objective of development should be to expand people's freedom or capabilities (Sen, 1999). The capability set jointly reflecting both poverty-related freedom and wider freedoms is

"the persons freedom to lead one type of life or another . . . to choose from possible livings"

Sen (1992, 1999)

Mostly, the poor are unable to alter the contexts that are tailored to deny or diminish their voices, and the process of context change is certainly important to identify (Appadurai, 2015). Hope, aspirations and belief in self-efficacy are imperative in strengthening people's voice and their own faith in breaking the chains of poverty, without succumbing to internal constraints that eschew them from reaching their potential.

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). Efficacy beliefs help individuals decide what goals to set; what challenges to face, how much effort to invest, and how much perseverance to exhibit in the face of obstacles (Locke and Latham, 1990).

People who doubt their capabilities, often, in the face of difficulties slacken their efforts, give up early or settle for poorer outcomes (Bandura, 2015). Contrastingly, people with strong beliefs, increase their efforts and strive to attain the optimal solutions whilst mastering the challenges (ibid.). Lent, Brown and Hackett (1994) found a critical link between higher perceived self-efficacy, education and career:

"The higher the peoples perceived efficacy to fulfil educational requirements and occupational roles, the wider the career options they seriously consider pursuing, the greater the interest they have in them, the better they prepare themselves educationally for different occupational careers, and the greater their staying power in challenging career pursuits"

Hopeful individuals having strong efficacy beliefs about setting and achieving a par-

ticular goal, may exert a higher amount of effort vis-a-vis less hopeful ones. Hope can be a determinant of effort - hope can influence people to set different goals and ascertain different levels of effort towards the same or different goals.

1.2 Outline of the thesis

This thesis offers the first piece of evidence on the malleability of hope in children. Furthermore, it presents experimental evidence from an RCT[1] on the powerful complementary effects that such an attempt to foster hope in children can have on other psychological factors[2], effort and academic performance.

In Snyder (2002), higher levels of hope are associated with higher self-efficacy and learned optimism, and better academic or athletic outcomes. Chapter 2, reviews the literature in these lines across behavioural economics, psychology, sociology and education.

In this thesis, I limit my attention to hope, self-efficacy (SE) or optimism, effort (inside and outside of the class-room) and academic performance on Mathematics and English in primary school children in India as the main parameters of interest. Premising on the predictive capabilities of hope, this study hypothesises that a role modelling intervention can increase hope exogenously. Alongside, an elevation in student effort and performance is expected. Chapter 3 presents a theory of change along with an experimental set-up.

As detailed in chapter 4, data collection was conducted in 2019, in a methodical and meticulous manner. Using survey instruments and a baseline survey questionnaire, information on the key outcome variables and confounding factors (gender, age, religion, etc.) was collected. Four hundred and fifty two students were randomised

[1]The RCT was conducted in Rajasthan, India. The sample consisted of 452 class 4 primary school students in six private schools of Jaipur. Details on the sample and study location are presented later in chapter 4.

[2]These factors include optimism/self-efficacy and happiness.

and treated at an individual level[3]. The intervention preceded three rounds of follow up data collection[4].

As shown in Chapter 5, I find that exposure to a 30-minute treatment increased student hope, optimism and effort in a substitution period by 0.17 sd, 0.27 sd and 0.25 sd, respectively. These effects[5] are reported immediately after the intervention in the endline phase. While the effects on SE/optimism became stronger after 6-weeks, I do not find any significant effects on student hope in the medium-run.

There is an increase in English scores by 0.16 sd after 6-weeks. This improvement is expected to be an outcome of higher hope and effort. However, given the experimental design, I cannot rule out the role of potentially overlapping factors like confidence, aspirations or self-image (Ghosal et al., 2020), among several others.

The overall treatment effect on student effort in a remedial class is 0.17 sd significant at 1 percent. Also, student happiness started improving after a week (0.2 sd) and the effect persisted even after 6-weeks, although significant at only 10 percent.

Upon exploring the underlying heterogeneities, I find that lowest quantile students (measured at baseline) are the primary drivers of the effect on hope scores. While I find no heterogeneity across past performance; age and gender both have differential effects. Younger kids[6], reported being significantly more optimistic at 0.49 sd.

Before discussing these findings at length in Chapter 6, I run a set of robustness checks. Starting with controlling for individual fixed effects and time-invariant con-

[3]Each student watching a film - irrespective of their treatment assignment - had access to a functional pair of monitor and earphones, mounted by a card-board box.

[4]These are referred to as the endline, follow-up survey 1 and follow-up survey 2.

[5]With all of these effects being significant at 5 percent, it is safe to posit that the short treatment was highly effective.

[6]Especially younger girls within the group of below median age kids, had a higher effect on optimism.

founding factors; I winsorize my sample at 1 (and 99) and 5 (and 95) percent[7]. My findings are unchanged after winsorising, with little loss of significance at 5 percent. Alike Anderson (2008), I compare my observed p-values with family-wise error rate (FWER) adjusted p-values that are slightly higher, yet significant. Furthermore, I conducted verification interviews[8] with the school teachers. The intention for conducting these interviews was to collect qualitative information from teachers that are still unaware of treatment assignments or the study design. The collected information validates and complements my empirical results. Lastly, I perform a 2SLS analysis to check for the robustness of the mechanisms.

In chapter 6, I discuss the relevance of this RCT and cost-effectiveness of my intervention in the light of several comparable studies. In the fashion of Kremer et al. (2013), for each 100 USD spent, the intervention improved English performance by 3.5 sd (and hope scores by 3.6 sd). These are comparable to Duflo et al. (2011), Baird et al. (2011, 2016) or Glewwe et al. (2018). Furthermore, in terms of immediacy, my findings are similar to Riley (2017). These are hinting towards the strong policy potential that role modelling interventions behold, if designed with prudence and executed with an appreciation for culture and context.

As a concluding remark, I argue that a small push in hope from exposure to a short video had positive effects on other psychological traits, including effort and achievement. Two strands of causal and suggestive evidences from this study ought to be understood in caution with regards to their policy implications. Firstly, the treatment video directly impacted hope, effort and achievement in primary school children in India. This contends vast policy potential in edutainment. Secondly, it is important to be discreet about the suggestive evidence from this thesis that hope can be an instigator of effort and later on higher performance. There can be a host

[7]This ensures that the results are not driven by outliers if the findings are still more or less of the same level of significance.

[8]These interviews were conducted after the completion of the RCT on teachers that are till now unaware of the survey instruments and the outcome variables.

of factors that may be influenced directly[9] or indirectly[10] leading to these improvements in student performance. This in turn demands further research to understand these channels and predict the extent of their role in having developmental consequences.

[9] from the intervention but are unmeasured as a part of this study

[10] because of changes in hope or SE/optimism or their interactions with other psychological facets

2 Literature Review

2.1 Understanding behaviour

Individual or at times, group behaviour, is influenced by mental models, presence of frames and comparable relevant others. Social preferences, social networks, social identities, and norms influence individuals: most people care about the behaviours and attitudes of others and imitate (or reciprocate to) them almost automatically (World Development Report, 2015). For instance, people have social preferences for fairness and reciprocity - possessing a cooperative spirit - which can play a role in both good (high in trust) and bad (high in corruption) collective outcomes (World Development Report, 2015).

People generally use mental models, that is: instead of drawing conceptions that they have invented themselves; they use concepts or worldviews drawn from the community that affect what individuals perceive and how they interpret it (WDR, 2015). There are mental models for many things, like, how much to speak to children, how to behave in front of parents, how to behave within cohorts in school etc.

In addition to mental models, individual choices are affected by the presence of frame, which includes observable information that is at times irrelevant to the rational assessment of alternatives in the decision-making process (Salant and Rubinstein, 2008). For example, voter choices can be affected by the sequencing of candidate names on the ballots, or the choice of a vacation package can be determined by the presence of a casino table on the travel agency brochures (Salant and Rubinstein, 2008). Such frames are almost inadvertently dependent on contexts influencing both human emotions and actions. As per Jones et al. (2011), mental models help people in interpreting information and making decisions; but they can also lead to a cognitive bias leading to a neglect of relevant information and consequentially underinvestment (Hoff and Stiglitz, 2010; Gilovich, Griffin, and Kahneman, 2002; Benabou,

2015; Hanna, Mullainathan, and Schwartzstein, 2012).

Economic development is influenced by economic desires and perception of economic opportunities that determine how people and communities behave (Walton and Rao, 2004). According to Hoff and Pandey (2005), opportunity is not everything and a group's history of vast inequality can contribute to the ability of the society to maintain a certain group marginalized and stereotype their future beliefs and behaviours as well. Paying attention to the thought processes of humans (processes of mind), the significance of history in shaping thinking (influences from the society) and other factors pertaining to individual motivation, can substantially contribute towards the effective redesigning and implementation of development policies and interventions (WDR, 2015).

2.2 Hopelessness and poverty

According to Schultz (1975), the poor just like any other individual were presumed to grab opportunities and make optimal decisions conditional on the constraints they face; indicating that poverty reduction strategies should only aim to increase that opportunity set. However, decisions by the poor are not governed and predicted by the standard models and may at times even perpetuate poverty: borrowing a lot; saving too little; underinvestment in health, hygiene and education; and not diversifying income and revenue sources (Banerjee and Duflo, 2011, 191). Moreover, the same interventions more schools, hospitals, and ration shops - may not be enough; and a better understanding of how poor make their decisions is statutory to eradicate poverty (Bernard et al. 2014).

Bernheim et al. (2015) argue that poverty can perpetuate and reinforce itself by undermining the capability of the poor to control themselves: under credit-constraints and situations of poverty, individuals exhibit hyperbolic discounting tendencies, and low initial assets limit self-control, creating a poverty-trap.

Laajaj (2012) analyses the impact of economic prospects on time preferences and how individuals modify their preferences when confronted by cognitive dissonance –the uncomfortable state of mind and tension felt when having conflicting thoughts. Poor people experience such situations often: caring about their future socioeconomic prospects whilst having gloomy status quo in the present.

Raeva et al. (2010) find that experienced regret and rejoicing among the participants in an experimental study influenced them to not wait (impatience) and be more patient, respectively, when facing an intertemporal choice. Anxiety arising from future poverty can lead individuals to be short-sighted to avoid that anxiety, although they are aware of its detrimental economic consequences (Laajaj, 2012).

Banerjee and Mullainathan (2005), in their model of time-inconsistent preferences, where individuals ought to resist immediate temptations, show that impatient behaviours may arise because of the dynamic social contexts. Poverty is one such situation. Poverty causes an increase in discount rates, and such an effect can perpetuate poverty giving rise to imprudent intertemporal decisions (Haushofer et al. 2013) producing a poverty trap situation.

Emotions and the desire for immediate gratification often win against foresight (WDR, 2015). Financial decision-making is difficult, especially for the poor, involving a great degree of uncertainty, loss aversion, time inconsistency, and temptation for present consumption (WDR, 2015). Poverty can also generate an internal frame, where poor people feel incompetent and disrespected, without hope that their lives can improve. If such frames prevent them from taking advantage of economic opportunities, then poor can miss chances to escape poverty due to a lack of aspirations (Appadurai 2004; Ray 2006; Duflo 2012).

In addition to bounded rationality, poor suffer from the psychological stresses of poverty and deprivation, reducing their cognitive capacities, exacerbating biases

and poverty persisting bad decisions (Mani et al., 2013). Poverty is not merely a shortage of money, but the constant, day-to-day hard choices associated with it, inflicting a tax on individual's mental resources (WDR, 2015). Such a cognitive tax can in turn lead to poor economic decisions that perpetuate poverty.

Chemin et al. (2013) find that negative income shocks and poverty affect the psychological well-being of individuals by increasing their stress levels. Farmers in Kenya reported having higher stress levels after a year of poor rainfall, indicative of a causal linkage between negative shocks and stress levels (Chemin et al. 2013). Lund et al. (2010) in a meta-analysis of 115 studies find that high level of depression is more prevalent among poor than wealthy, with a negative association between poverty indicators and good mental health outcomes.

Low income environments are associated more frequently with greater exposure to stressful circumstances and bereft of mechanisms to deal with such stress over time (Baum et al. 1999; Steptoe et al. 2002; Brunner 1997; Kristenson et al. 2004). Chemin et al. (2013), building on the conventional idea of poverty leading to stress, argue that it is possible that stressed individuals may end up in poverty, due to their depressed capacity to make prudent judgements or by underperforming in school or workspace. This depressed capacity resulting due to poverty and stress is much alike hopelessness, wherein the underperformance or slack in making an effort can be the consequences of hopelessness rather than a cause.

Ong et al. (2006) argue that daily hope provides protective benefits by keeping negative emotions low, while also playing a contributory role to adaptive recovery from stress. Aspirations do not have any such role to play. Hope shapes the unfolding of stressful experiences and adaptive strategies among individuals (Ong et al., 2006). Daily hope mediates the relationship between stress and the next days negative emotion: upon including daily hope in the analysis of emotional recovery, the relationship between stress and the next days negative emotion reduces to

non-significance (0.12) (which is significant without hope with a coefficient of 0.34) (Ibid.).

Moya and Carter (2014) posit that depression and psychological trauma compose channels through which, pessimistic expectations become self-confirming. Stress is just one example of the many internal constraints (lack of aspirations, hopelessness etc.) faced by the poor leading them to imprudent decisions worsening their future prospects and perpetuating deprivation.

Hopelessness can influence the decision-making ability in the sense, that a depressed individual is more likely to be deprived of this ability and sees bad events, as a result of their faults (Peterson, 2000). Moya and Carter (2014) suggest that there is a need to formulate development strategies that acknowledge the presence of psychological poverty traps and aim to assist the economic recovery of individuals that suffered such circumstances.

Poor people have two reasons to put in low effort: low benefits, and low aspiration levels that in turn reduce the net benefits. Poverty, thereby, tends to lower the aspiration level of a poor person, relative to what he could optimally aim for, leading to aspiration failure (Dalton et al., 2016). Poverty stifles the process of attaining dreams if not dreams themselves (Ray, 2006) curtailing a poor person's capacity to aspire (Appadurai, 2004)[11]. Assessing the role of hope in such a domain poses to be an area for further research.

2.3 Role of motivation: Hope, Aspirations and Effort

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).

[11] In this study, these aspirations are synonymous to forward-looking goals themselves and hope plays a critical role in this goal-setting.

2.3.1 Hope

According to Snyder (2002), hope being a motivational state is different from aspirations that are goals themselves shaped by people's beliefs (Locke and Latham, 2002). Within the scope of this study, I will focus only on aspirational hope[12].

According to Snyder, Irving and Anderson (1991):

"*Hope is a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed agency), and (b) pathways (planning to meet goals)*"

Or,

$$\text{Hope} = f(\text{Agency, Pathways})$$

Goals can be of two types in hope theory. First is, positive or approach goals (i) envisioned for the first time like buying a car, (ii) sustaining a present goal like keeping retirement savings intact, or (iii) desire to further a positive goal via progress (Snyder, 2002). Secondly, forestalling a negative goal outcome is another type involving stopping something before it even happens like delaying being laid off from work (Ibid.).

Lazarus (1999) argues that unsatisfactory life circumstances in the present (involving deprivation or damage) are a fundamental pre-condition for hope. However, such a repair definition of hope precludes two important categories of hope: (i) maintenance goals from everyday life, and (ii) enhancement goals that involve hoping to achieve grand targets in life for people having satisfactory life conditions (Snyder, 2002). Furthermore, contrary to popular opinion, hope plays a key role not only for intermediate goal attainment (Averill, Catlin, and Chon, 1990) but also for very high or very low probability goals[13] (Snyder, 2002).

Snyder (2002) critically underlines the significance of **pathways** by positing goals as

[12] In the next sections I will use hope for aspirational hope.

[13] Akin to the certainty and possibility effect in chapter 29 of Kahneman (2011).

unanswered calls without these critical means to reach them. High-hope individuals are flexible thinkers, more abled to finding and/or generating alternate routes, opposite to low-hope people, especially in situations with impediments. Moreover, **agency** thinking, described as the perceived capacity to use ones pathways to attain desired goals, is the motivational component in hope theory and involves mental energy usage to begin and continue using a chosen pathway throughout the process of goal pursuit (Snyder, 2002).

Miceli and Castelfranchi (2010) analyse the cognitive and motivational components of hope and critically highlight the **distinction between hope and positive expectation**. The literature often overlaps hope on positive expectations. Snyder's hope theory (Snyder, 2002; Snyder et al. 1991) posits hope as a twofold positive expectation: agency (one's ability to obtain a desired outcome) and pathways (one's capability to identify and use routes to the desired goal), which encompasses both self-efficacy beliefs (Bandura, 1977) and positive outcome expectations.

Miceli and Castelfranchi (2010) suggest that hope is akin to positive expectation because it implies a wish that an anticipated event of goal-attainment or an otherwise general outcome comes true, with the goals playing a key role. However, it is important to stress that hope is less than an expectation in the sense that it does not imply any forecast and an event's perceived likelihood does not reach a degree of certainty that it can be ascribed a probability required for a forecast to take place (ibid.). Moreover, in addition to positive ones, a negative expectation may also coexist with hope, like, someone expecting but still hoping that a particular person does not show up to her/his birthday party. Nevertheless, it is also plausible to argue that hope is stronger than positive expectations, in a sense that unlike the latter, hope does not require forecastability, and even a mere possibility is enough to hope (Miceli and Castelfranchi, 2010).

Since, positive expectations are grounded on a relatively solid underpinning of a

belief that the anticipated event will and should happen, hope is stronger as it is not sustained by any such beliefs of probability: '*It is more difficult to disappoint a hope than an expectation*' (Ibid.). Hope is also stronger than positive expectations because the negative consequences of a disappointed hope seem less severe than those produced by disappointed positive expectations; making it much easily restorable (Ibid.).

Hope is often more likely operative with high probability goals that are seemingly attainable to high-hope people, who usually thrive and challenge themselves to inject extra uncertainty into their goal situations that would hitherto appear to be very certain (Snyder, 2002). Such high-hope individuals irrespective of the apparent probability of success to a particular goal envision steps along a given pathway, whilst also preparing alternative routes and use the details of these other pathways as a basis of their confidence (Snyder, 2002). In difficult times, high-hope individuals formulate and assess several of these potential pathways that improve the probability of their success vis-a-vis their low-hope counterparts, who seldom make it and remain constrained (Snyder et al., 1998).

2.3.2 Aspirations

In lines with the definitions used by many psychologists, aspirations are seen as goals which are shaped by people's beliefs about objective constraints, available resources, their past performance, and their own capabilities (Locke and Latham, 2002; Bandura and Locke, (2003). Just like any aspect of human behaviour, individual's peer network affect their aspirations: individuals tend to model their aspirations on the experience of others in the immediate environment whom they can observe and identify (Ray, 2006).

According to Stutzer (2004), human beings, unable and unwilling to make absolute judgements, constantly draw comparisons from their environment, past experiences or future expectations, to notice and react to deviations from aspiration levels. The

processes of social comparison and hedonic adaptation complement each other and motivate people to strive for higher aspirations (Irwin, 1944; Lewin et al., 1944).

Golman and Loewstein (2012) posit that in addition to expectations, aspirations also influence reference point with diverse and significant behavioural implications. A key **distinction between expectations and aspirations** arises from the idea that one can expect to attain a positive outcome without really aspiring for it, and can aspire for a positive outcome with little, if any, chance of actually attaining it (unrealistic aspirations) (Golman and Loewstein, 2012). Traditional models posit that raising the reference point increases an individual's motivation with a simultaneous abrupt decrease in present utility. Raising one's aspiration level doesn't necessarily affect present utility but it does influence the utility of alternative levels of consumption (Ibid.).

Aspiration formation and development

Gutman and Garland (2008) study the process of aspiration formation and development (education and career aspirations in particular) and find that aspirations are formed and shaped early in life, modified by life experiences and the environment; and usually tend to decline as children mature, in response to increased understanding of the world and subject to external and internal constraints.

Young people's opportunities can often be determined early, often subject to the pathways that they have taken. However, individuals that rely more on diligence than fate, believe in their ability to achieve and have higher aspirations than that of their peers (Gutman and Garland, 2008).

Aspirations can mean different things to different people, they are flexible and adapt in light of new experiences, choices and information (Gutman and Garland, 2008). Ojeda and Flores (2008) find that perceived barriers in education influence educa-

tional aspirations. Mexican American junior high school students reported their understanding of the significance of education with 50% of them aspiring to attend graduate school (Ojeda and Flores, 2008). However, merely 30% of the students reach this level, and despite recognizing the importance of education, only 57% graduate from high school (Stoops, 2004).

Kao and Tienda (1998) analyse the formation and maintenance of educational aspirations for a single cohort of youth from eighth to twelfth grades. Highlighting the role of culture and context, ethnic groups differ in the extent to which such aspirations are maintained: Black and Hispanic youth have less stable aspirations. Kao and Tienda (1998) find that at different grade levels Asian youth have the highest and Hispanic youth have the lowest educational aspirations, and the decline in these aspirations can be explained by the increasing awareness of the realities about competing college preparatory curriculum.

The diversity in educational aspiration formation and maintenance across race, gender and ethnic lines, are a root cause of differential educational attainment outcomes across these diverse groups (Kao and Tienda, 1998). Structural barriers to social resources, and cultural beliefs and practices play a key role in diversifying educational aspirations across race and ethnic lines, over and above factors associated with family background and access to material resources (Ibid.)[14]. Blocked opportunities can be a cause of underperformance in education if a racial or ethnic group gets skeptical about the value of education and loses "hope" in it being a mechanism for upward mobility (Fordham and Ogbu 1986).

Aspiration failure and poverty

According to Locke and Latham (2002), aspirations are forward-looking goals and

[14]Guyon and Huillery (2014) found that students care about peer opinions, and that peer pressure can make them less ambitious, lowering their aspirations, when parents and teachers have a weak preference for ambitious options.

targets, which once formed can function like mental models. There are three critical studies performed recently that theorise the different aspects and dynamics of aspirations and their failure.

Genicot and Ray (2017), develop a theory of socially determined aspirations, defining aspirations as income or wealth thresholds that enter individual utility as reference points. These reference points are dependent on both individual achievement and society-wide economic outcomes.

Ray (2002) introduced the idea of aspirations window, which is composed of an individual's cognitive world, wherein individual draws her aspirations from the lives, achievements, or ideals of those who exist in her aspirations window. Individuals use peers (or near-peers) for comparisons but not people that are far off from themselves in socioeconomic standards; with restrictions on aspirations appearing due to lack of communication and information flow (Ray, 2002). Additionally, people may perceive the returns from aspirations differently and it depends on how mobile people are within the society: the greater the mobility, the broader the aspirations window (Ray, 2002).

In a way, aspirations window create aspirations gap. According to Ray (2002), aspiration gap is the difference between the aspired standard of living and the apparent standard, and it is this gap not aspirations or standard of living per se that affect future-oriented behaviours of individuals. A similar analogy does not run for hope.

Economic development requires aspirations window to be opened, but not too wide, as it can lead to frustrated aspirations if not met (Ray, 2002)[15]. Genicot and Ray (2017) study the interaction of socially determined aspirations with growth and inequality: aspirations, income and distribution of income evolve jointly.

[15] A similar argument can be imagined between high hopes that can be motivators of greater effort; and false hopes that can arise from lofty goals that can result in frustration.

Aspirations that are slightly above the individual's current standard of living tend to encourage investment, while further higher aspirations may cause frustration (Ibid.). Genicot and Ray (2017), argue that the best set of aspirations are the ones that lie at a moderate distance from the individual's current situation, large enough to incentivise but not so large enough to frustrate the individual. This argument helps explain the aspiration-based theory of poverty-traps. Aspirations, as per Ray (1998, 2006), that are reachable serve to inspire, while still higher aspirations can generate frustration.

In accord with Kahneman and Tversky's (1993) idea of having consistency between reference points and actions, Dalton et al. (2016) posited within their model that individual aspirations and efforts are mutually consistent (self-fulfilling): individuals observe aspirations as given, when in fact they are co-determined with effort. Therefore, higher aspirations are motivators of greater effort. People with high goals exert higher effort and persist more (high perseverance) in different physical and cognitive tasks than individuals who are exposed to low goals (Heath et al., 1999).

Dalton et al. (2016) show that external constrains make the poor more susceptible to aspiration failure: they are more likely to choose a low level of aspiration and associated effort levels vis-a-vis the optimal outcomes they could have achieved. In the words of Adam Smith:

"*The real tragedy of the poor is the poverty of their aspiration*"

Poor people have two reasons to put in low effort: low benefits, and low aspiration levels that in turn reduce the net benefits. Poverty, thereby, tends to lower the aspiration level of a poor person, relative to what he could optimally aim for, leading to aspiration failure (Dalton et al., 2016).

According to Dalton et al. (2016), there are two types of poverty traps: the standard

poverty traps driven by external constraints and the behavioural poverty traps, arising due to low effort and low aspirations. While external constrains exacerbate the internal constraints, the latter becomes an independent source of disadvantage in behavioural poverty traps as poverty can exacerbate the effects of behavioural bias leading to aspiration failure and thereby, a behavioural poverty trap (Dalton et al., 2016). Therefore, aspiration failure is a consequence of poverty and not its cause.

As a third strand to the literature, Besley (2016) studies yet another aspect of aspiration formation, wherein parents can deliberatively affect and influence the aspirations of their children, which is in line with the research of Bisin and Verdier (2000).

Besley (2016) recognises that family background shapes life chances across generations by affecting financial endowments, human capital and the effort levels, which are influenced by aspirations. Children of aspirational parents are usually economically successful because the parents shape the preferences and aspirations of the children and not just because of strategic material investments of the parents (Besley, 2016).

There is a direct relationship between inter-generational transfers of aspiration formation[16]. Besley (2016) explains a possibility for aspirational poverty trap in countries where a low aspiration culture flowing across generations inhibits development. This could occur due to the interaction between aspiration preferences and the political economy of a country that creates a feedback mechanism affecting its equilibrium growth trajectory, income distribution and inequality levels (Besley, 2016). Besley (2016) articulates the aggregate aspiration trap as low aspiration levels leading to low payoffs, which fosters a further decline in aspirations over time.

[16]Duru-Bellat (1988), using data on French 7^{th} grade students in 1980s, finds that children of white-collar professionals were more likely to continue to junior high school despite having similar scores to other children of blue-collar workers. Hoxby and Avery (2012) find that most of the high achieving students from low-income backgrounds do not apply to selective colleges or universities. Students with low educated parents are 11 percent less likely to report that they want to attend high school, and 16 percent less likely to declare a desire to attend 3-year college (Hoxby and Avery, 2012). These are all indicative of the role of parental influence on their children's academic aspirations, pursuits and achievements.

In contrast to Dalton et al. (2016) and Genicot and Ray (2017), where, aspiration levels affect effort, and income level playing an internal role in creating aspirational poverty traps, Besley (2016) proposes the role of externalities due to cultural influences transmitted via family background. According to Besley (2016), aspirational preferences that channel through aspirational parents are a device to overcome the short-sightedness of children and motivating them to exert more effort.

Students have differential educational aspirations depending upon their parents education status, type of neighbourhood they live in: low background students have limited option sets in their mind, fear peer sanctions, and underestimate their academic talents (Guyon and Huillery, 2014). Besley (2016) finds that a child having two non-aspirational parents have poor life chances as the parents' aspirational preferences trickle down into the aspirations of the offspring, making them non-aspirational too. There is a need for interventions to aid the escape of children with two non-aspirational parents to prevent them from inheriting such aspiration levels.

Social backgrounds influence educational aspirations and students with low educated parents or living in marginalised neighbourhoods aspire less compared to other students, despite having similar academic proficiencies (Guyon and Huillery, 2014). This underlines the significance of early childhood interventions affecting non-cognitive skills, like teaching motivational skills or the importance of patience and perseverance in schools (Besley, 2016).

Having bleak hope for their future, children invest less effort in the present further undermining their chances of success and a better life in the years to come. It can be argued that low levels of hope, lead to lower aspirational levels, which together undermine the amount of effort exerted in the present in school, personal life, skill-development, etc. Altogether, it creates a chain of events leading to an inconsequential behavioural hopelessness based trap, discussed later.

2.3.3 Influencing effort

According to Sen (1999):

> "*People have to be seen as being actively involved in shaping their own destiny, and not just as passive recipients of the fruits of cunning development programs.*"

Banerjee and Duflo (2011), in accord with Sen's framework, propose hope to be a fundamental capability, akin to health, good nutrition, and education, highlighting the significance of the role of hope in the lives and behaviour of poor.

Duflo (2012) argued that hopelessness among the poor is accompanied by low aspirations that foster low investments[17] and consequentially poor outcomes. A lack of hope can be associated with lower aspirations and goals, leading to less investment in terms of effort, time and other physical resources. Contrarily, a 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.

Hope can affect rational decision-making, assuming that decisions, but not decision-making ability are influenced by hopelessness (Duflo, 2012). Pessimism triggers depression, further causing lower resilience, eventually making the negative expectations about the future prospects come pass easily, as these depressed individuals are less likely to adopt pathways to step out of a difficult/challenging situation (Duflo, 2012). In a way, the more negative shocks a person suffers, the more prone they are to seeing the future as gloomy, increasing their susceptibility to more negative shocks (Ibid.). A lack of hope can also explain conservative behaviours, linking hopelessness to inaction: a person may believe that s/he would be incapable to follow his plans in the future, which may hinder her or his willingness to start upon a pathway leading to the desired goal (Ibid.). It is useful to think of clever interven-

[17] In this case, investments in fertilizers for maize crops.

tions that can ameliorate this inaction by increasing hope.

Poor, who feel that they will have opportunities in the future to realise their aspirations, tend to cut on frivolous consumptions and myopic temptations, in order to invest in the future (Duflo, 2012). Hope and optimism can make all the difference in such a situation. Hope and reassurance that an individual's objectives are within reach can act as strong incentives, while hopelessness can stress the will and resource availability of an individual (Ibid.).

Dalton et al. (2016) argue that policy interventions aimed at addressing material deprivation can be made more effective if they stimulate the aspiration levels of individuals too; and policies that simply raise aspiration levels can enhance material outcomes even if they do not relax material constraints, specifically, in cases wherein resource constraints are not binding. In such cases, the individuals can sustain their higher aspirations, which they otherwise cannot. Nevertheless, in cases where, material constraints are binding, such high aspirations have to undergo a downward adjustment to relieve the resultant frustration among the poor (Selten 1998, and Karandikar et al., 1998). Galiani et al. (2018) critically posit that in a resource-constrained environment, it is insufficient to foster higher aspirations among the poor, if the aim is to develop a forward-looking behaviour among them.

Galiani et al. (2018) use multi-country experimental data to assess the effects of a natural experiment in the form of slum-housing interventions on the housing aspirations of the non-beneficiary neighbours. The slum-housing interventions in El Salvador, Mexico and Uruguay provided randomly chosen households in the slums new houses, with the randomly introduced housing intervention serving as an exogenous shock to the gap in the material circumstances between treated and untreated households. The housing aspirations substantially increase among the non-beneficiary neighbours immediately after the intervention, suggesting an aspiration to keep up with the treatment Joneses, however, no investments are made to meet

this end (Galiani, et al. 2018). Furthermore, eight months after the intervention the aspirational effect disappears completely, with a decay rate of 38% per month predicted by a structural model of aspiration adaptation (Ibid.). In accord with Selten (1998), the aspirational effect totally disappears explained completely by the adaptation in the control group, as treatment groups housing aspirations remain invariant throughout (Galiani et al., 2018).

If the poor do not have the means to satisfy their increased aspirations, they may adjust their unsatisfied aspirations downward to maintain sanity and avoid frustrations due to incapability to attaining these aspirations due to resource-constraints (Galiani, et al. 2018). If the poor are trapped in an aspiration failure equilibria, it is not because they lack the capacity to aspire (Appadurai, 2004) but because they are unable to sustain that higher level of aspiration due to material constraints, which adapt downward overtime (Galiani et al. 2018)[18]. This is indicative of a non-convex relationship between aspirations gap and aspirations formation, dependent on the size of aspirations gap (Ray, 1998, 2006; Genicot and Ray, 2017). It can be very interesting to analyse the role hope can play in sustaining these increased aspirations, with and without resource constraints[19].

Due to their flexible nature, higher aspirations standalone are not a sufficient condition for forward-looking behaviour among the poor. Goal-setting in itself may not be enough, but if aided with appropriate fostering of hopefulness and relaxing of external constraints, it may bring drastic improvements. Perhaps, hope can help sustain these higher aspirations, but the extent to which it can do so is still a matter of further investigation, especially with material-constraints.

[18]Galiani et al. (2018) compare the treatment-control housing gap between the rural and urban cohorts, and find that the gap was significantly smaller for the latter than the former. Such a moderate gap encouraged the urban control group to aspire to achieve the housing conditions of the urban treatment group neighbours, but the seemingly insurmountable difference between the rural treatment-control groups thwarted the aspirations of the rural non-beneficiaries (Galiani et al. 2018).

[19]Like Bhan et al. (2020). PAP available at: `https://www.socialscienceregistry.org/trials/6520`

Banerjee and Duflo (2007) rightly argue that without having a deeper understanding of the internal constrains faced by the poor; interventions may only address the symptoms rather than the cause of poverty, limiting their capacity to generate a life changing economic trajectory. Effective developmental interventions should encompass structural changes that address the psychological causes behind myopic economic behaviours of the poor and help them escape the behavioural poverty trap (Laajaj, 2012), by making them more patient and aspirational in the present and hopeful about the future.

2.4 Measuring Hope

Snyder et al. (1997) posit that thoughts of children (who are assumed to be goal-oriented) have two critical components: agency and pathways. The former reflects the perceptions and thoughts with which children can create and sustain action towards a goal; and the latter reflects the perceived capability of children to produce routes to these goals (Snyder et al., 1997).

After comparing with theories of learned optimism, optimism, and self-esteem, Snyder (2002) finds higher hope to be consistently correlated to better outcomes in academics, athletics and physical health, amongst others. High-hope persons tend to challenge and stretch their skills (having shorter deadlines, finding new pathways), injecting uncertainty in the seemingly certain goal-attainment situations (Snyder, 2002)[20].

Snyder (1994) argues that impediments to goal pursuits produce negative emotions, while, successful pursuit of goals, especially in spite of impediments, results in positive emotions; and a key feature of high-hope children is to stay energized despite these impediments to attain their goals. Moreover, hopeful children having a strong

[20]For instance, Jones (1973) and Snyder and Fromkin (1980), find some skilled basketball players, valuing to get the baskets with flair and uniqueness more than simply putting it through the hoop. An eight-item Likert-style, adult trait hope scale is used as a tool to measure and quantify the hope scores of adults, much alike to the childrens hope scale that is explained next.

feeling about their likelihood of goal attainability feel more positively about themselves (Snyder et al., 1997).

Two distinct measures of children's hope and optimism that exist in the literature possessing internal consistency and external validity are used in this study[21]. These are Snyder's Childrens' Hope Scale and a psychometric analysis of Childrens' drawings.

Childrens' hope scale (age 8-16; Snyder, Hoza, et al., 1997)[22] is composed of three agency and three pathway items. Agency items focus on tapping the content pertaining to an active, doing orientation for the present and future, while the pathways items capture the content relating to finding ways to reach goals under ordinary as well as challenging circumstances (Snyder et al., 1997).

Koppitz (1968) suggests that childrens' drawings reveal subtle and insightful information about their mental health, which is difficult to obtain by asking straight questions. Glewwe et al. (2018) performed a quantified analysis of self-portraits of Indonesian Children to assess the impact of international child sponsorship program on their psychology and to identify causal relationships, if any[23]. In an examination result of drawings made by Swiss children, it was found that among the children who drew good pictures, the proportion of intellectually superior children was higher than the inferior ones (Farokhi and Hashemi, 2011).

Childrens' self-portraits used to elicit psychological information have been reported to have strong correlations with their respective psychological attributes. Glewwe et

[21]These are explained in greater detail over the next sections.

[22]Included in appendix.

[23]Glewwe et al. (2018), in addition to the 20 self-portrait characteristics, included five survey questions in the factor analysis to aid in the identification of factors, which were agreements or disagreements to the following questions: (i) Self-esteem (I feel I do not have much to be proud of, At times I think I am no good at all); and (ii) Hope (I believe that the future holds good things for me, I feel that when I am older, I will have a good job and good income, and I feel that when I am older my life as an adult will be better for me than it was for my parents).

al. (2018) find a strong positive impact of the Compassion program on self-esteem by 0.094 standard deviations, years of expected education by 0.28 years, and aspiration index by 0.113 standard deviations, after controlling for age, gender, and village/community fixed effects. Glewwe et al. (2018) discover a strong correlation between the self-portraits and the developed indices, like, factors correlated with hope strongly correlated with features of missing legs or poor integration of body parts; or for optimism/self-efficacy the non-use of dark colours or non-use of a single colour strongly related to the hope index too. There is a causal linkage between child sponsorship and increases in educational and vocational aspirations among children in Kenya and higher levels of happiness, self-efficacy, and hopefulness in Indonesia (Glewwe et al., 2018).

Children's drawings have been used for subjectivity and clinical practice. Objectively coding and analysing large samples of such drawings offers a new type of data with multifaceted applicability in numerous different evaluations of the impact of interventions on psychology of children, especially in education programs (Glewwe et al., 2018). Children's self-portraits can be useful tools for revealing information on their psychological traits.

Snyder (2002) posits that children's capacities to form goals and use pathways effectively to pursue goals should facilitate their learning outcomes in school and school information. Nevertheless, an avenue that is yet to receive much attention is the role of hope in related treatment interventions for children on their learning outcomes (Snyder 2002).

2.5 Hope and Achievement

The education system is of utmost importance to the economic prospects of developing countries, due to two reasons: (i) significance of education in economic growth, and (ii) the limited ability of most parents in developing countries due to their own low education levels to provide home inputs to education (Mbiti, 2016).

Snyder et al. (1991) posit hope to be not just an emotion but rather a dynamic cognitive motivational system, which can be considered as a cross-situational construct correlating positively with self-esteem, perceived problem-solving capabilities, perceptions of control, optimism, positive affectivity, and positive outcome expectations. Curry et al. (1997) find that hope is related to superior classroom and athletic performance by student athletes with hope-based projections being strongly correlated with psychological aspects of self-esteem, mood, confidence, talent and amount of time spent practising.

Snyder, Cheavens, and Michael (1999), find a strong correlation between hope and superior academic performance, with hope correlating positively to high test scores in subsequent achievement tests for grade-school students; higher GPAs for high school students and college students. Curry et al. (1997) use trait and state hope scales to analyse the role of hope in the performance and achievements of college student athletes and find: (i) male and female athletes are higher than non-athletes in trait hope and (ii) hope significantly predicts the semester and cumulative GPA, confidence and self-worth.

Based on the hope theory and hope scale, Snyder et al. (2002), in a 6-year longitudinal study, assess hope scale scores of entering college freshmen, and find that they predicted better over all Grade Point Averages (GPAs) even after controlling for variance related to entrance exams. High-hope students are more likely to graduate and not to be dismissed over the 6-year period compared to the low-hope students (Snyder et al., 2002). Perceiving the greater likelihood of positive outcomes, high-hope students focus on success and, therefore, experience less distress and a greater positive effect (Snyder et al., 1991). Contrarily, low-hope people give-up when they encounter impediments leading to a loss of confidence, lowered self-esteem and frustration. Snyder et al. (2002) suggest that increased performance results based on internally determined, rather than externally set goals is more energizing.

This study aims to find empirical evidences for this association between hope and outcome attainment. The focus of the empirical study is to assess the effect of a treatment intervention on hope and eventually learning outcomes, of children in primary schools in a developing country[24]. Additionally, a reduced-form theoretical model is presented that draws on these associations and postulates that hope can be an instigator of effort, and together they can lead to successful attainment of developmental outcomes. The theoretical model is included in complementarity to the empirical findings.

2.6 State of education and learning in developing countries

The real education expenditure, as expressed in the total education budget in India doubled between 2004 and 2009 (Muralidharan, Das, Holla, and Mophal 2016), constituting 3.3 percent of the country's GDP (UNESCO report, 2011). Most of it focused on improving schooling access and inputs. The Sarva Shiksha Abhiyan (SSA) started in 2001-2002 and by 2011; over 350 thousand schools were constructed covering 99 percent of rural habitations within a radius of 1 km, significantly expanding access to education (Mukherjee, 2015). Nearly 1.2 million teachers were recruited to bring down the pupil teacher ratio (PTR) to accepted norms (Mukherjee, 2015).

Ironically, although the global proportion of primary students who were out of schools dropped from 19 to 11 percent between 1999 and 2013 (UNESCO Institute of Statistical Database), roughly 50 percent of the fifth-grade students could not read a second grade text in rural India, and only 45 percent could correctly compute a two-digit second grade subtraction problem (Pratham 2014). Low learning levels are persistent, especially in rural areas, in addition to high rates of teacher absenteeism, corruption, ineffective school monitoring systems, and poor parental engagements (World Bank, 2003).

[24] discussed in the next chapters

Banerjee et al. (2007) conducted two randomized experiments in schools in India. Firstly, in a remedial education program in Mumbai and Vadodara that hired young women to teach lagging students basic literacy and numeracy skills (Balsakhi Program), the authors find an increase in average test scores of all children in treatment schools by 0.28 s.d.. Secondly, in a computer-assisted math learning (CAL) program in Vadodara, Banerjee et al. (2007) find an increase of 0.47 s.d. in the math scores, with the scores remaining significant but fading to 0.10 s.d., a year after the program ended.

These two programs worked well in India due to two reasons. Firstly, teachers, despite being better trained do not spend extra time towards reducing the learning gaps of the students that are lagging behind, which was the case with Balsakhis. Secondly, students could easily relate with Balsakhis due to similarity of backgrounds but that was not the case with teachers, wherein social attitudes and community prejudices could have been an impediment in teacher effectiveness (Ramachandran et al., 2005).

Banerjee et al. (2007) rightly argue that policies that aim to increase school enrolment may not necessarily increase learning outcomes of the students: as per a 2005 nation-wide survey in India, 44 percent of the children aged 7-12 couldn't read a basic paragraph, 50 percent couldn't do basic subtraction. Therefore, efforts to increase enrolment should be accompanied by efforts to improve educational quality.

In developing countries, parents are mostly uninformed or ill-informed about their child's performance in schools. Furthermore, parent participation is usually very low. In a study of 280 villages in Uttar Pradesh, India, Banerjee et al. (2010) find only 6, 8 and 28 percent of the households donating to school, volunteering at school and visiting the school to make a complaint or for monitoring purpose, respectively. Mbiti (2016) argues that increased parental involvement in school management via a cost-effective approach like informative report card circulation can improve ac-

countability. However, Banerjee et al. (2010) and Lieberman et al. (2014) find limited evidence in support of this argument from their studies of similar interventions in India and Kenya. Contrarily, Reinikka and Svensson (2005), studied the impact of a newspaper campaign in Uganda, and found improved learning outcomes and student attendance because of the information provided to parents about monitoring school and local officials.

Randomised experiments from India and Kenya show that short-term contractual teachers lower pupil-teacher ratio and increase student test score results (Duflo, Dupas and Kremer 2011; Muralidharan and Sundararaman 2013). Moderate teacher incentives like bonus payments increase students' learning outcomes, as was found in an experimental study in Andhra Pradesh, India (Muralidharan and Sundararaman 2013). However, Mbiti (2016) argues that as a standalone intervention, teacher-incentive programs fall short of achieving improvements in the learning outcomes of the children. Even though training, empowering and funding school committees comprising of teachers and parents can be a potential strategy to improve school management practice, most of the evaluation studies have found them to be ineffective, seldom having positive outcomes on student learnings (Mbiti, 2016).

Misperception in education can be critical (Banerjee and Duflo, 2011). As per the empirical literature, returns to education are seemingly proportional to the years of schooling, with the exception of higher education and professional degrees. Although the benefits from learning how to read, write and do arithmetic are manifold, parents associate relatively marginal weight to these benefits for few years of education compared to the benefits from subsequent years (Dulfo, 2012)[25].

Manski (1993) pointed out that returns perceived by students and/or their parents influence schooling decisions, but these decisions are more often than not based on

[25]For instance, in Madagascar parents perceived that education would increase a childs future income by 6, 12 and 20 % for primary, junior high and senior secondary education, respectively (Nguyen, 2008).

imperfect information, making the decision less likely to be individually or socially efficient[26]. Poverty, credit constraints, high discount rates, or simply mismeasured returns can be some of the many arguable reasons for it.

According to Banerjee and Duflo (2011), a key issue is unique in education: the peculiar way in which expectations about what education is supposed to deliver distort what parents demand, what both public and private schools deliver, and what children achieve and the colossal waste that ensues. There can be illusionary s-shaped poverty traps in education because of the parents beliefs that the benefits of education are s-shaped leading them to behave as if there were a trap (and inadvertently creating one) (Banerjee and Duflo, 2011). These beliefs can be transferred to children as well, wherein; they may put less emphasis on working hard in the early stages: generating a vicious cycle of poor learning outcomes over the years. Poor performance in the early years can reduce the aspirations and hope of these children, and may even lead to a hopelessness based poverty trap, as discussed earlier.

2.6.1 Changing perception and psychological cues

School children in developing countries tend to lack critical attention and motivation from their parents and teachers, especially if they belong to a marginalized section of the society. Banerjee and Duflo (2011), found an interesting case in Indian Himalayas, wherein a school-going child of seven years (apprehensive of his performance) refused to take a test, despite persuasions from his mother. Pondering on the comments of local farmers, Banerjee and Duflo (2011) suggested that people in such marginalised sections had internalized the feeling that not much can be expected from them or their children. Such hopelessness needs to be questioned and

[26]Jensen (2010) argues that in addition to the market returns to education, the perceived returns to education determine schooling decision, and these perceptions can be erroneous. For instance, in Dominican Republic, 80 –90 % of the youth reportedly completes primary schooling but only 25 –30 % complete secondary schooling (Jensen, 2010). Using survey data from eight-grade boys in the Dominican Republic, Jensen (2010) finds that the perceived returns to secondary school are extremely low, despite evident measurable returns. The relative skill-set desired by labour market is not transmitted through to the students in terms of greater perceived returns. Following an intervention giving information about these measured return, the average secondary school completion increased on average by 0.20-0.35 more years of schooling over the next four years (Jensen, 2010).

addressed[27]. This can create a vicious cycle, where low aspirations can lead to underachievement –aspiration failure –which, can synthesise aspirations trap. Aspiration failure contributes to persistent poverty and persistently low future aspirations.

According to Flechtner (2014), education is an important factor for social mobility: with higher levels of education people can get better jobs and pay scales, are well-informed about health care practices, and financial decision-making, making education a good way to improve family well-being and future prospects. However, despite the pronounced knowledge of the direct and indirect benefits of education, Flechtner (2014) argues that psychological barriers –low aspirations and less ambitious goals –can contribute to underachievement (Locke and Latham, 2002) and may act as self-fulfilling prophecies (Dalton et al., 2016).

Poverty and social disadvantage promote low aspirations, and aspiration traps are specifically harmful in such sections of the society as they can easily aggravate situations of aspiration failure and poverty traps (Flechtner, 2014). The knowledge (or perceived belief) of belonging to a poverty trap can be reinforcing (Duflo, 2012). Particularly in education, such a logic of expectations creates an adverse hopelessness-based poverty trap.

If these perceptions about the intellectual and academic potential influence goal-setting among children and their parents, then teachers and also parents, who underestimate the children's potential can undermine their hope regarding future goals and aspirations (Ferguson, 2003). Such self-fulfilling prophecies[28] that are set inside the classroom or at home, can lead to stigma amongst the children and a reduced incentive to exert effort, as they internalize lower goals.

[27]Even teacher counsellors of parents, often express pessimism about higher educational potential of students from poor backgrounds, which transmits to the parents reducing their expectations and attention paid to their children's learning outcomes (El-Mafaalani, 2012).

[28]especially, amongst the disadvantaged

Aspirations and hope can potentially play a key role in increasing academic achievements, in terms of enrolment, attainment and learning outcomes. Whilst there is evidence on the former (Riley, 2017), there is no study that looks at the latter[29].

2.7 Effective strategies: Experimenting with role models

One of the most important decisions that an individual faces is about the type of person to be in the socio-economic sphere (Akerlof and Kranton, 2000). Identity is indispensable in economic consequences in multifaceted ways (Ibid.) but within the scope of this review, I will focus on the role of identity on psychological (hopefulness, aspirations, among others) and educational outcomes. Role modelling interventions can change the expectations of people about their future, affecting their own aspirations, leading to a change in their behaviour.

Role modelling: what works and why?

Chong and La Ferrara (2009), showed that exposure to TV programs with strong female protagonists and smaller families in Brazil reduced fertility. Jensen and Oster (2009) find that such shows in India reduced fertility and domestic violence whilst altering beliefs about women's autonomy.

Individuals largely form aspirations by observing the behaviours and the associated outcomes of these behaviours of people they can identify themselves with (Appadurai, 2004 and Ray, 2006). Poor people tend to have low aspirations and they do not make investments[30] even when the returns are high (Bernard et al. 2014).

Using an experimental design, Bernard et al. (2014) argue that exposure to motivating documentaries can change the aspirations and behaviour of people; taking into

[29]In this study, as a starting point, I will focus primarily on children from lower-middle income households in India. After gathering evidence on the malleability of hope and the consequences of increasing it, further research can be organised in disadvantaged and marginalised societies.

[30]These investments can be in the form of time, effort or physical resources, but the critical issue is to identify a tool for interventions that can facilitate such investments.

consideration the indirect role of exposure through friends and village networks too. The intervention significantly indicated towards an increased extent of an internal locus of control people had and in which, they believed that rather than fate or chance, they controlled their own life outcomes (Bernard et al. 2014). The treatment group had parents with an increased aspiration for their children's education by between 0.18 and 0.33 years of schooling, 68 per cent higher total savings than the control and placebo groups, and took 22 per cent more credit than the control group (Bernard et al. 2014).

Cable and satellite televisions amongst other media sources expose viewers to new information about the world, in it to different attitudes and behaviours of different people (Jensen and Oster, 2009). Using a three-year individual-level panel dataset from five Indian states, Jensen and Oster (2009), discover that an introduction to cable television in rural Indian women is associated with a significant decrease in the reported acceptability of domestic violence towards women and son preference, increase in women's autonomy and decline in fertility. In addition, women participation in household decision-making increased, potentially leading to an observed increase in school enrolment of younger children (Jensen and Oster, 2009). Significant improvement in the status of women is associated with an increase in investments in children (World Bank 2003, 2005; Qian, 2008). Using data from 1000 villages in Tamil Nadu, Jensen and Oster (2009) find that it is the introduction of cable that leads to this increase in enrolment.

Beaman et al. (2012) use a randomized natural experiment in India, to show that female leadership influence adolescent girls' (aged 11-15) career aspirations and educational attainment significantly. Beaman et al. (2012) collect survey data from adolescents and their parents in 495 villages (8453 surveys) and find that in comparison to villages that never got reservations, the gender gap in aspirations closed by 25% in parents and 32% in adolescents for villages having female leadership for 2 consecutive election cycles. Relative to girls, adolescent boys in unreserved councils

are six percent more likely to attend schools and have a four percent more likelihood to be capable of reading and writing, with adolescent girls spending more time in domestic chores, much alike everywhere in the developing world (Beaman et al., 2012). The presence of female leadership improved the time-usage and educational attainment of adolescent girls without any impact on boys, with the gender gap being completely erased by the second electoral cycle (Ibid.).

Hope interventions via role modelling techniques among 601 microfinance borrowers in Mexico raised aspiration levels by a quarter of a standard deviation, and raised the hope index significantly amongst the treatment group (Lybbert and Wydick, 2016). Nguyen (2008) found a 0.17 sd increase in test scores from exposure to role models that were relatable in terms of the socio-economic status in Madagascar. Riley (2017) found a similar effect in Uganda, where exposure to a motivational film 'Queen of Katwe' in local cinema increased student performance on Math test scores by 0.11-0.13 sd.

Glewwe et al. (2018) analyse the impact and efficacy of early development of positive psychological attributes on socioeconomic outcomes. Glewwe et al. (2018) find that international sponsorship program significantly increased the sponsored children's level of happiness (0.40 s.d.), self efficacy (0.68 s.d.), and hope (0.32 s.d.).

Glewwe et al. (2018) demonstrate the potential of a developmental intervention to significantly raise happiness, optimism, self-efficacy, and hope among a population of impoverished children and the existent link between these developments getting translated into successful adult outcomes (Wydick, Glewwe and Rutledge, 2013). Glewwe et al. (2018) argue that if the causal linkage between the holistic nature of impoverished children and later adulthood outcomes can be clearly identified, it can have significant implications for policy designing that can simultaneously address both internal and external constraints.

3 Role modelling with hope and effort

According to Lybbert and Wydick (2016), hope plays a seminal role in the realisation of positive effects from developmental interventions. While emotion is reactive, thinking can be proactive (Snyder, 2002). Given that hope plays a statutory role in both realising and sustaining the effect of these developmental interventions, it is important to study the impact that a psychological intervention can have on hope itself.

3.1 Hope, effort and achievement: Theory

After discussing the role of hope (and effort) in goal-attainability, this sub-section presents a theoretical model to describe the relation between hope, effort and achievement. In a single agent model, the agent's utility function is defined below:

$$U(e,\delta) = \bar{\theta}\ p(e,\delta) + [1 -\ p(e,\delta)]\underline{\theta} -\ c(e) \tag{1}$$

where $\bar{\theta}$ and $\underline{\theta}$ are the high and low outcome, respectively. p is probability and c is the cost. The agent is endowed with some level of hope 'δ' and chooses a level of effort 'e' to maximize her/his utility. The outcome space is binary in this model, i.e. $\{\bar{\theta}, \underline{\theta}\}$.

Achievement being stochastic, depends on hope and effort. The agent faces a trade off. Increasing effort raises the chances of achieving the high outcome but it also simultaneously results in an increase in cost. Agent's intrinsic hope is taken into consideration in this decision process.

Three assumptions are introduced, before stating the proposition:

Assumption 1. The cost function is increasing linearly in effort but hope is costless[31].

$$c(e) = \alpha e$$

The cost associated with effort can be in terms of physical effort, mental stress or time investment.

Assumption 2. The probability associated to the successful realisation of the higher outcome $\bar{\theta}$ is increasing in effort, i.e.

$$\frac{\partial\, p}{\partial\, e} > 0 \tag{2}$$

In this case, equation (2) can be perceived as being the agency of the agent.

Assumption 3. Higher hope (or agentic motivation) is associated with a higher perceived marginal benefit of effort (invigorating pathways). In other words, the marginal subjective probability of goal attainment with respect to effort is increasing in hope, i.e.

$$\frac{\partial^2\, p(e,\delta)}{\partial e \partial \delta} > 0 \tag{3}$$

Proposition 1. Hope increases effort for a given goal and subjective probabilistic beliefs.

The proposition states that if hope is exogenously increased (as studied in Bernard et al., 2014 and La Ferrara, 2019), then, that increase in hope acts as an enabler or facilitator of higher effort[32] for an individual with a specific goal.

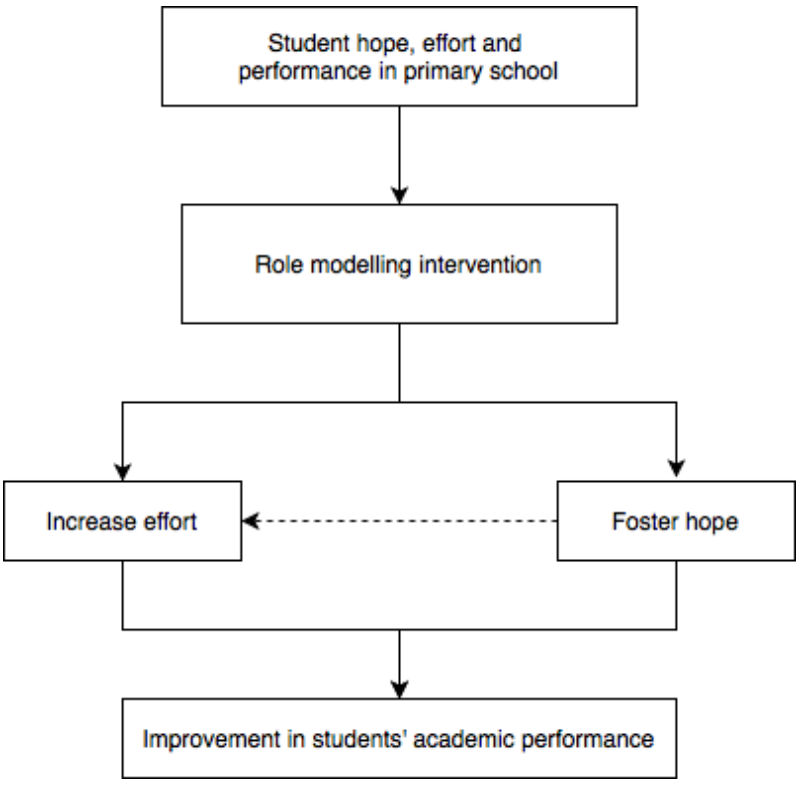
[31] It does not cost at all to hope.
[32] Proof is in the appendix A.1

3.2 Theory of change

Figure 1 encapsulates the framework of this study, within which, I posit that exposure to motivating videos, can foster hope in students and influence the amount of effort they exert. The role modelling treatment that is randomly assigned to individuals, has a direct effect on two outcome variables: (i) hope and (ii) effort. It is then expected that the effect of the video on academic performance, is due to changes in effort and hope[33].

I propose that hope increases effort. Together, hope and effort, can increase academic performance. Using a role modelling intervention, I assess the treatment effects on a host of psychological factors (like hope, happiness and self-efficacy), effort and academic achievement of students.

Figure 1: Directed Acyclic Graph (DAG)



[33]While I have suggestive evidence for this; in the study I do not claim that the entire treatment effect is attributed to just the two measured variables of interest. Instead, I propose that any effect observed as a direct outcome of the treatment on performance should be through those outcomes and any other unmeasured factor.

The DAG in figure 1, shows the causal directions of impact (Cunningham, 2021). A direct effect is predicted[34] on hope and effort (in- and out-of-class), along with academic performance. The study is set on the premise that any such improvements in performance will be mediated through the elevations in psychological outcomes and hard-work. Additionally, motivation in itself is postulated to influence effort[35]. Role models inspire (motivation) to aspire that is co-determined with effort (hard-work). Together they hold strong predictive capabilities for achievement.

3.3 Experimental set-up

The below mentioned pre-analysis plan (PAP)[36] - registered at the American Economic Association's (AEA) RCT registry - contains information about the research design and the main research questions. Alongside, I present a research protocol document that pertains to the background information on the study location and data collection methods. In complementarity, these documents were shared with the field partners and fieldworkers.

The protocol document[37] was prepared with the pre-analysis plan, in lines with the current literature and tool-kits prepared by experienced researchers (Glennerster and Takavarasha, 2013; Duflo, Glennester and Kremer, 2007; Karlan and Appel 2016; and Angrist and Pischke, 2008, 2014).

3.3.1 Pre-analysis plan

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 into three sections.

[34] and evident in chapter 5

[35] The dashed line, because that captures an indirect effect of the treatment.

[36] In my thesis, I include a reduced version of the PAP in appendix A.2 for brevity. The original version is available at: `https://doi.org/10.1257/rct.4454-1.1`

[37] The document is included in the next subsection.

The first section explains the research design: research questions, sampling frame, statistical power and treatment assignment. Furthermore, it gives a brief introduction to the field work and data collection plan.

The second section discusses the empirical strategy, detailing the main outcome variables and instruments used to capture information on them. It also provides the estimation strategy and the hypothesis being tested. Besides, it also includes the robustness checks that are discussed comprehensively in chapter 5.

The last section talks about the organisation of the research team along with key deliverables and the time-line of the study. These details are consistent and elaborated in the next subsection on the experimental research protocol. The concise version of the PAP (as recorded in AEA) is in the appendix.

3.3.2 Research protocol

The objective of a protocol document[38] is to ensure that all the stakeholders are in synchrony at the field. The document presented below spells-out each and every detail of the data collection process, while presenting an overview of the research design to the field-workers.

The objective of this protocol document is to illustrate the significance of a meticulous approach towards executing the RCT, whilst explaining what an RCT is. The document is comprehensive, in so far that it explains the possible threats to an RCT and how to avoid them, besides offering to be a preamble for the 6-months in the field. The next sections and subsections entail the crucial parts of the protocol that

[38] Although initially prepared as a guiding tool-kit for all the data collectors, the protocol document was of immense use to track progress and monitor the implementation of the research design - critical to any RCT. I would like to thank Dr. Patricio Dalton for his suggestion to prepare one and Dr. Tanya Wilson for her detailed comments as an examiner in my second year Annual Progress Review in 2019. It is noteworthy that the primary objective of the protocol was to explain each and every detail of the RCT including a basic understanding of their purpose. The protocol was complemented with other material and suggested readings for the fieldworks available at: `http://prateekchandrabhan.com`

are not repeated elsewhere in the study[39].

3.3.2.1 What is a Randomised Controlled Trial (RCT)?

In the simplest words, an RCT is comparing likes with likes after having intervened with some monitored and measurable aspects. Imagine that you want to test the effect of having a vaccination program on the attendance of school kids[40]. For that you need to measure the attendance of kids both, before and after, the introduction of the vaccine. However, there can be other factors that may improve the attendance over and above the introduction of the vaccine. Perhaps, there is also an information campaign or the introduction to a free mid-day meals program at the same time that motivates kids to go to school.

Another way is to have two different group of kids (that are similar if not identical) and compare them before and after, such that one group experiences everything and the vaccines, while the other experiences every change like the other group; except the vaccines. Therefore, it is important to check for the difference in differences (DiD).

To carefully assess the impact of only the vaccine –our hypothetical intervention –we need to divide all the students into two groups randomly. It needs to be random so that the treatment group –receiving the vaccine, is comparable to the control group –not receiving anything. Then we compare the attendance of the two groups before the intervention and measure the difference between the two (say +0.2). Similarly, we measure the differences in the attendance between the two groups, after the intervention (say +0.5). Hence, the actual effect of the vaccination program is the increase in student attendance by 0.3 points in our hypothetical example. This is how RCTs work. We can now, with confidence, ascertain that the improvement in attendance of 0.3 points is due to the vaccines, after having compared two similar

[39] As there is a lot of overlapping content between the PAP and the protocol document.
[40] A hypothetical example inspired by some studies included in Glennester and Takavarshi (2010).

group of students and having gotten rid of any other factors.

To capture information in a similar fashion we will proceed with the study in different steps and phases. These steps and all the phases are explained in detail in the following sections. The same analogy follows as indicated above. We will have two randomized groups of students, with a hope intervention instead of the vaccines. The treatment group will watch a set of motivational videos, which is the intervention; while the control group will watch a set of videos from malgudi days that does not have any effect on their behaviour. We will measure information on kid's hope and effort, instead of attendance, as these are our variables of interest.

It is also important to know that there are some threats in the process of executing an RCT and data collection that need to be paid careful attention to and safeguarded for. These are explained in detail later.

The role of a field-worker [41] is essential in the proper execution of an RCT. Some of the things that need to be carefully adhered to are:

- Following the protocol at all times.
- There is no room for improvising. Should you have any questions please refer to the field-manager[42] or the PI.
- Maintaining the authenticity of survey data.
- Ensure that the data is stored carefully after each round of data collection.
- No data should be collected in any rush, and every instrument and questionnaire should be completed in its due course.
- The sequence of activities is to be maintained at all times.
- The heart and soul of an RCT is the intervention and endline phase. That been

[41] Also referred to as data collector or surveyor here upon.

[42] An experienced member of Muskaan staff was recruited to oversee the data collection, supervise the surveyors and to assist the PI.

said, the same attentiveness in the data collection process is expected at all stages.

- The participant information sheet and the consent form should be signed in the beginning of the RCT by all participants (week 0). As a part of the research ethics code of conduct, no data can be collected on the participants until they have signed the consent form.
- The instruments have small consent forms in the front page that should be signed in the beginning of the exercise in every phase. Should a participant doesn't have a signature, they can simply write their name and date it.
- There are in-built checks in the surveys and instruments, that can reveal any false or improper conduct on behalf of the field-workers that will lead to an immediate termination.
- Above all, the data collection is to be executed with utmost care and concern for the physical and psychological safety of the participants.

3.3.2.2 Survey Questionnaires

There will be three main survey questionnaires[43] for children, their teachers and parents. As we are capturing data on kids across six different schools, we have to follow the protocol at all times, to avoid any threats.

The survey questionnaires are designed to capture information on kids, their parents and teachers to account for characteristics like age, gender, past academic performance, and household characteristics, amongst others. These are called confounding factors that can lead to heterogeneous effects. An average survey will take 5-15 minutes. The questionnaires for kids and teachers will be conducted in the school premises in the beginning of the baseline phase. The information on parents will be collected during the parent teacher meetings (PTMs) conducted by the schools[44].

[43]Refer appendix A.3.

[44]Unfortunately, less than 30 percent of the parents attended these PTMs. Even amongst those that did attend, most were unwilling to partake in a survey in that occasion. Due to this, no data

While we collect this information we cannot disclose the objective of the study. For instance, we cannot tell the respondents that we are going to collect information on hope and effort. Instead, we simply state that we collect information on students as part of a study on primary schools in India. The participant information sheets are designed in the same fashion and getting a signed consent from every individual is essential before starting with the survey.

3.3.2.3 Indicators

Information will be collected on three main indicators. For each indicator, two instruments will be used to elicit revealed information[45].

Hope

- Children's hope scale (CHS): Every child will be asked to fill the CHS, which is renamed as 'information about yourself'. It is renamed to avoid respondent bias - a person cannot lie about a thing that they do not even know is being measured. It can be performed in a classroom in 20 minutes.
- Self-portrait analysis: Every child will be asked to draw a portrait of themselves in a commonplace scenario. Different aspects of the sketch will be coded and analysed. This instrument will be used in every stage and can be performed in a classroom. Each exercise will take 15 minutes.

Note: The surveyor will have to announce and explain the guidelines for both of the instruments. These guidelines are mentioned in the instrument sheets themselves[46]. However, when the students are filling these, the surveyor should not intervene at all. They should just administer and answer any doubts or questions that may arise during the process.

on parents is analysed in detail due to an insufficiency of the sample observations. Nevertheless, as recorded in the PAP, undertaking such an analysis was not the intent of the study and does not hamper the research design or bias the findings.

[45]Refer appendix A.3

[46]Using a script for each indicator helped ensure SUTVA too.

Effort

- Remedial class: An optional after-school remedial class (RC) will be offered to the students to attend. The class-teacher will make an announcement on day 1 for a 1-hour remedial class to be held on day 3, which is completely optional for the students to attend. The indicator of objective effort is the attendance in the remedial class. The surveyor has to be present throughout the remedial class (outside the classroom) and has to collect the attendance sheet from the teacher taking the class.
- Substitution period: A proxy (fake) substitution class (SC) will take place during which, the surveyor has to go to the class and conduct a substitution period. During that period the surveyor has to observe the students every 10 minutes and note down if they are observed to be engaging in a productive activity (code = 1) or not (code = 0). At the end, there will be 3 observations for each student and the sum will be between 0 and 3. This is our instrument to capture in-class effort.

Academic Performance

- ASER-style Test: It is a test of Mathematics and English. Students will have to complete the test in 25 minutes and the surveyor has to administer it. Each student will then be marked for the correct answers and it will produce a score between 0 and 100 (50 for each subject). This step will take place during the data entry phase and will be performed by the surveyors, following the guidelines of the PI.
- Past performance: Secondary data has to be collected from schools regarding the past academic performance of students during the baseline period.

3.3.2.4 Variables of Interest and Intervention

The three variables of interest in the RCT are hope, effort and performance. Information on these will be collected through the aforementioned instruments. The study entails studying the impact of the intervention (motivational videos) on them. The intervention is designed to make the students more hopeful and hard working. Together, hope and effort, can lead to improved academic performance. Therefore, it is important to collect this information very carefully, diligently and sincerely.

The intervention will be conducted in a computer lab of the school. Depending on the number of functioning computers available, a class of students will be taken to the computer laboratory and card-board pieces will be placed between two screens so that one student focuses on only one screen. While the students assigned to the treatment group will be watching the motivational videos, the control group[47] students will watch 'malgudi days'. The role of the data collector is to make sure a few days in advance that the computers and videos are working on each screen[48]. Also, the surveyors should ensure that treatment assignment is abided (only treatment group students watch the motivational videos and vice-versa).

3.3.2.5 Threats

Following threats to an RCT should be carefully safeguarded for:

Attrition

- When we start with a group of students (452), there will be half in each group (226 = T and 226 = C). It is essential to maintain comparability between the two groups. Imagine a case in which we start with 300 students in each group but after the experiment we are left with only 200 in the control and 300 in treat-

[47] For simplicity, the placebo or active control group of this study is referred to as 'control group'. The results when presented revisit this point.

[48] It is also the role of the data collector to delete the videos from these computers at the end of each intervention day to avoid any spillover effects.

ment. Such situations can skew the results and should be carefully managed. Thus, the data collection timeline should be strictly adhered to without any room for improvisation.

Spillovers

- When working with a DiD approach we also have to make sure that no two students across different groups interact. Otherwise the effect of the intervention can be underestimated or overestimated. This can be avoided by a data collection strategy that avoids it ex-ante.
- Example: The average hope of control group is 26 in the baseline and 27 in the endline (because the kids of treatment group discussed the intervention with them). However, in the treatment group the hope increased from 25 to 29. The baseline difference between treatment and control is -1 and in endline it is +2, which gives a DiD estimate of +3. Now, in a situation of no spillover, the students did not interact and the hope of control group kids remained 26 at the endline. In this case, the actual DiD estimate would be (+ 4 -0) = +4 and not +3. In this scenario, the spillovers lead to an underestimation of the effect of the intervention.

Partial or no-compliance

- Compliance issues arise when treatment assignment is not followed.
- Partial compliance occurs when some students of the treatment do not take the treatment (or vice-versa). It can happen due to multiple reasons like being absent on the day of intervention or simply not paying attention to the motivational films. Alternatively, it can happen when some kids in the control group watch the motivational films (but as per the design, they are not supposed to).
- Another manifestation of the compliance problem; much alike the case presented in the former example, if some students of the control group felt left-out of having not watched anything (perhaps after having a discussion with their

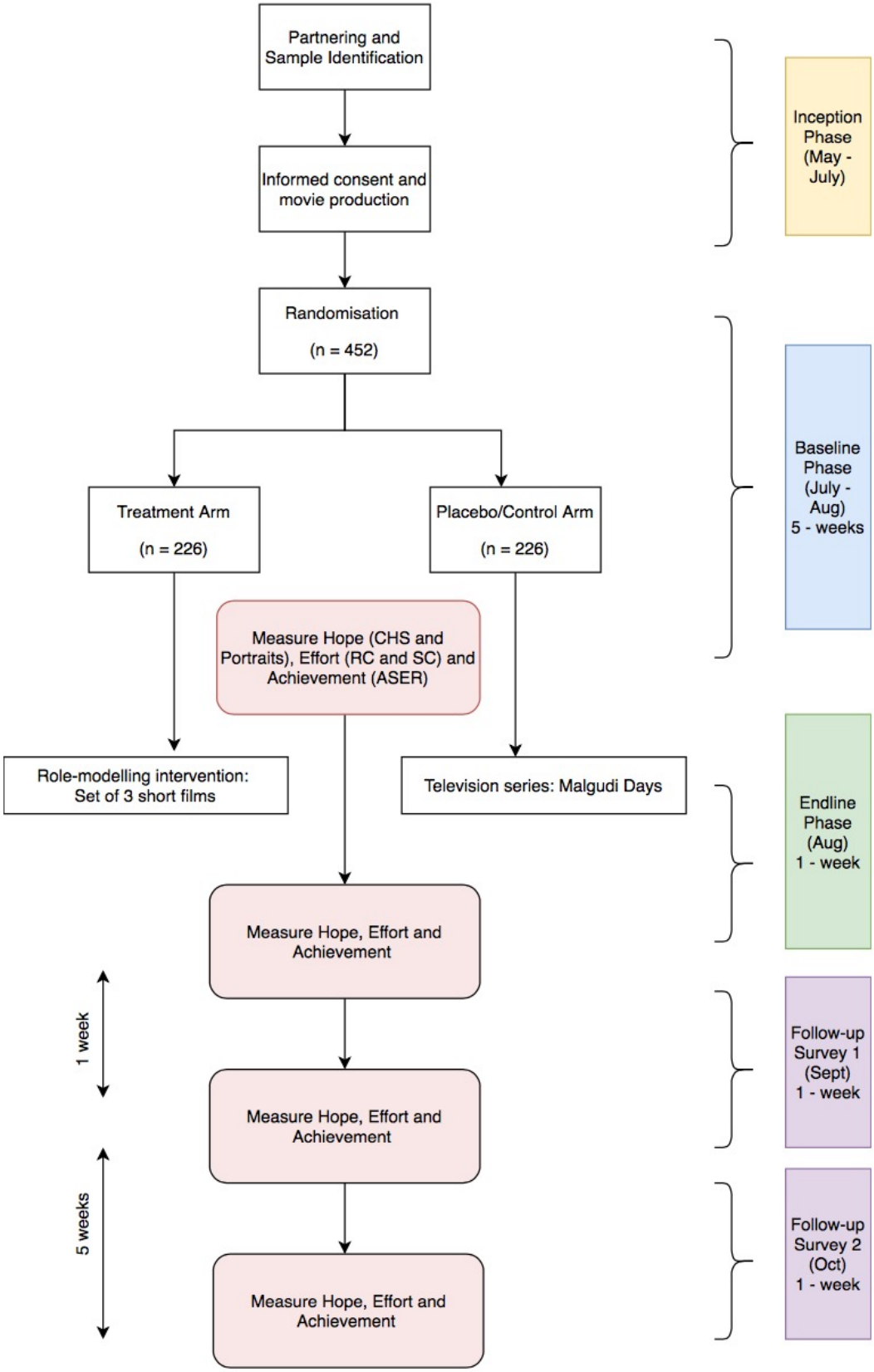
friends), they may report an even lower hope score of 24. In this case the DiD will overestimate the effect to be +6 instead of +4. Nevertheless, this problem is overcome by having a placebo/active-control group in which, the students are still engaged in watching 'malgudi days'.

It is because of these preposterous implications that the RCT should be carefully planned in advance and meticulously executed. The surveyors will play a key role in the execution and should at all stages, make sure that the threats are safeguarded against. The two groups should not be allowed to contact between baseline and endline. Moreover, sticking strictly to the timeline should check issues of attrition.

The design and the implementation plan follow a strict timeline that is presented in the next subsection. Randomisation and the collection of baseline information will take place in July and August, 2019. These are followed immediately with the intervention and endline. The two rounds of follow-up surveys are conducted in September and October, respectively. As planned, the execution phase of the RCT should complete by November, 2019.

3.3.2.6 Time-line

Figure 2: Time-line of data collection



The data collection will last for four months from pretest to two follow-up survey phases. It will proceed in the following step-wise manner from baseline till follow-up survey 2:

Baseline: The baseline phase should last for 3 weeks and entails the following exercises.

- **Survey Questionnaire** for students, parents and teachers are administered in the beginning. Randomisation takes place simultaneously to have two comparable and homogeneous groups of children. Then, information is collected on the three variables of interest using the following instruments.
- **CHS:** On an average it should take no more than 20 minutes for the students to complete the hope scale. A data collector has to enter a class and announce that they would like to collect some information about the students. Then distribute the CHS and explain for 5 minutes how to fill it. The surveyor has to make sure that the students do not look at each-others scripts during the process, and fill the CHS independently and thoughtfully. The surveyor should also make sure that the children take the task seriously and in no way realize that information on their hope is being measured. Once all the children have completed their entries, the surveyor should collect the filled CHS. The surveyor should later add the scores and write the final score on the front page of the CHS. They should only add the scores for the original hope scale items i.e. statements 1, 4, 7, 10, 13 and 16.
- **Self-portrait:** The children are then asked to draw a picture of themselves. Useful resources should be made available to each student (a sheet of paper and 24 colouring pencils). The surveyor should then explain the task to the students and ask them to start. This is a time-bound task and the children should be asked to complete the drawing in 15 minutes. The surveyor then collects the drawings.
- **ASER test:** The surveyor should then distribute the ASER test to the students

and explain how to fill it. Immediately after, the students should be asked to start the test and stop after 25 minutes. It is a time-bound task. When the test is over, the surveyor should collect the scripts and mark them, writing down the total on the front page of the test for both Mathematics and English, and the grand total.

- **Substitution Class:** This indicator of in-class effort is also called third (3^{rd}) party observations. The students should be asked to sit as per their roll calls and the surveyor should have a list of the seating plans of the kids. When the surveyor enters the class they announce that the students are free to do anything they want. S/he is the substitution teacher because the teacher could not be available for this class and it is a free-period for them. Then, the surveyor should mark three intervals of time and observe every student one by one, marking a score of 1 or 0 in the observation sheet if they are working or otherwise, respectively. This exercise is followed for every student, three times in the same sequence every ten minutes. At the end of 30 minutes, the surveyor will have filled the observation sheet and should total the scores, leading to each child having a score between 0 and 3. Towards the end of the class, the surveyor waits for the next teacher and quietly leaves the class.

- **Remedial Class:** The remedial class is the instrument that captures objective effort and it is measured by attendance in an optional after school remedial class. A student that attends the class receives a score 1 and 0 otherwise. The surveyor has to be available during the class and collect the attendance sheet filled by the teacher who took the remedial class. The students should have a day in between the announcement by the teacher and the event of the remedial class.

Intervention: The role modelling video and the television series will be for approximately 30 minutes, immediately after which the endline phase starts. The intervention will be carried out in the following step-wise manner.

- Two surveyors take a class/section of students to the computer lab, where

they have already uploaded the videos on the computer screens and kept them ready to play.

- The students are seated on individual screens as per their school roll numbers.
- At the beginning the surveyor explains what is going to happen and requests the students to pay attention.
- Cardboard pieces should be kept between two screens to avoid any compliance issues, such that, no student can see the screen of another student. This way each student watches the video that they are supposed to see.
- The students watch the video and the surveyor monitors them and answers any questions that they may have.
- The whole procedure should take no more than 45 minutes, the time of an average school period.
- When the videos are completed the surveyor ensures that the students remain seated in silence. There should be no interaction between the students.
- It is also the responsibility of the surveyor to ensure that all the intervention material is stored and deleted from each individual computer screen before and after the intervention, respectively.

Endline: The intervention is followed immediately with the endline information being collected using the formerly mentioned indicators on hope, effort and performance. This is done to avoid spillovers. In this way no two students from different groups can interact with each other, thereby avoiding possible spillovers. The endline does not include any survey questionnaires. Information is collected on the five instruments. It should last for a week and it is performed in the following step-wise manner:

- As soon as the intervention is completed, the surveyor has to announce that the students should not interact with each other.
- The surveyor should distribute the CHS (proceed with everything like in base-

line) and collect it after 20 minutes.

- The surveyor should distribute the sheet for self-portraits and collect the completed sheets after 15 minutes.
- The surveyor should then distribute the ASER test to the kids and collect it after 25 minutes.
- After incorporating any additional time for administration, end of the ASER test will mark the completion of another 2 school periods (or a close approximation of it).
- The students are then taken to their respective classrooms and seated as per their roll number orders.
- Immediately afterwards, we will conduct a substitution period. A new surveyor enters the classroom and collects information on students' in-class effort by 3^{rd} party observation.
- A teacher then makes an announcement of a forthcoming optional remedial class that is to take place the day after. The surveyor has to be available for the class to take the attendance sheet from the respective teacher after the completion of the class.
- This will mark the completion of the endline phase, which is followed by a data entry workshop and data entry that goes on for 1 week.

Follow-up survey 1: The follow-up survey takes place 1 week after the endline. Information is collected on the three outcome variables (hope, effort and performance) using the five instruments over a week's time in the following manner:

- CHS
- Self-portrait
- ASER-test
- Substitution Class

- Remedial class
- The follow-up survey 1 will be followed by another workshop on data entry and data management. The collected data will be entered on excel and collated with the previous entries. The 5-week long exercise will also include robustness checks on the formerly entered data. This exercise is usually performed to address any discrepancies that may arise due to incorrectly entered data. It will be cross-checked during the same period.

Follow-up survey 2: Information is collected six weeks after the endline on the three outcome variables, over a one-week long period, much in lines with the follow-up survey 1. The final round of data entry takes place after this and lasts for three weeks, including two rounds of cross-checking. Around the same time, incentives should be disbursed to all the participants of the RCT (children) and the teacher co-ordinators of the schools [49].

Data entry: The data will be collected on paper throughout the RCT. It will have to be carefully entered on to Excel. The data entry entails imputing all the information collected on to excel spreadsheets with a round of cross-checking. It is a tedious exercise and will last for several weeks after the endline and the follow-up surveys.

3.3.2.7 Data collection plan

The number of participants will be 452 children in class four, aged 7-12 years, their parents (800-1300) and their class teachers (40-50). It is essential to collect as much data as possible because attrition, no matter how much controlled for, will happen eventually.

[49]The students do not know about the incentives as it may drive the results. A student may work harder in the hope of getting nicer incentives. Hence, this information is not revealed to anybody until the completion of the study.

Data collection over-time and across schools

Data will be collected by the field-workers/surveyors within the school premises. It is thereby, imperative to establish a good rapport with the school committee members, teachers, teacher-coordinators of the study[50], the children and their parents. We cannot have a situation in which, anybody is discontented or discomforted by the RCT. While we do need a lot of support from the school, students' willingness to participate is very important too.

Two surveyors in cooperation with the teacher coordinators will be responsible for each school and since we have six schools, each surveyor will share the responsibility of two schools with another surveyor. The surveyor should be thorough with the proceedings, curriculum and schedule of these two schools that they are responsible for. Nevertheless, the surveyor should always expect to work in another school at some stage of the RCT as well.

The data collection over schools will proceed in a systematic manner as described[51]:

- The surveyors should meet the teacher coordinators and establish good connections with them and explain them some parts of the study without revealing the essence that we are collecting information on hope and effort.
- The surveyors should also speak with operators of the computer lab and class-teachers of the relevant sections without disclosing their identity to the students until the start of the survey questionnaires.

Week 0

- When the baseline phase starts, two groups of four surveyors each, go to two schools to conduct survey questionnaires on children and their teachers. The

[50]Every school will have two teacher coordinators, who are familiar with the design and will support the RCT throughout. However, even these teachers will be unaware of the intent of the RCT and will not know the main outcome variables. This confidentiality has to be maintained throughout the implementation of the RCT and afterwards.

[51]See figure 3 for an illustration.

same procedure follows on the next two days, i.e. **Day 1, 2 and 3 of Week 0** (as we have six schools).

- Each group of four surveyors will be supported by either the PI or the field manager.
- Simultaneously the PI will perform randomization[52] in this week to produce two comparable treatment and control groups **(Day 4 and Day 5 of Week 0)**. This information will be communicated to the surveyors and nobody else, as the students cannot know their treatment status.
- Information on parents will be collected during the RCT in a more flexible manner on the days of Parent Teacher Meetings (PTMs) organised by the school (This will happen at any day during the RCT. On the day of PTM, the entire team will go to the school to collect information on parents as we will have only 2-3 hours to collect the data).
- By the end of **week 0**, we will have the survey information on children and teachers.
- All surveyors fill the monthly surveyor report.
- The next week will be the first week of collecting information on the variables of interest.

Week 1 (Baseline)

- **On day 1 of week 1**:
  - A group of four data collectors go to School 1 and another group goes to School 2.
  - The same activities follow through in each school and in the same sequence.
  - There should be at least 1 surveyor in each class section.

[52]Randomisation is performed on Day 1 or on the weekend right before

- In the first period, the surveyor collects information on CHS and Self-portraits. The CHS precedes the self-portrait task.
- In the second period, the surveyor administers the ASER test and the announcement by the class teacher is made regarding the remedial class. The remedial class is to be held on Day 3.
- The following period is a substitution period in which, the surveyors should switch classes so that the students do not know if the surveyor is an actual teacher or not. The surveyor then fills the 3^{rd} party observation sheet for in-class effort.
- The same activities are performed in School 2.
- This way, information on all the variables of interest, except the remedial class, is collected for two schools by the end of Day 1.

- **On day 2 of week 1**:
  - The same exercise as in Day 1 is followed for School 3 and School 4.
- **On day 3 of week 1**:
  - The same exercise as in Day 1 is followed for School 5 and School 6.
  - On the same day, the remedial class is held after school hours in School 1 and School 2.
  - One of the two surveyors responsible for the school should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyor should be present throughout the entire duration of the remedial class.
- **On day 4 of week 1**:
  - The surveyors should go to their schools and monitor the computer labs and upload the material (videos for treatment and control) for the intervention.
  - The surveyors should mark the ASER tests.

  - On the same day, the remedial class is held after school hours in School 3 and School 4.
  - One of the two surveyors responsible for the school should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyor should be present throughout the entire duration of the remedial class.

- **On day 5 of week 1**:
  - The surveyors should go to their schools and monitor the computer labs and upload the material (videos for treatment and control) for the intervention. They should also prepare and install the cardboard pieces to separate the monitors.
  - On the same day, the remedial class is held after school hours in School 5 and School 6.
  - One of the two surveyors responsible for the school should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyor should be present throughout the entire duration of the remedial class.

- This marks the completion of the baseline phase.
- Right after the baseline, next will be the week of intervention and endline. The endline phase has to follow the intervention without a delay to avoid any systemic spillovers and attrition. To have the endline on the same day of intervention guarantees that whoever received the treatment will also be available for the endline data collection round.
- This will be the second week of collecting information on the variables of interest, after having the intervention.
- For the intervention, the surveyor should take the students to the respective computer lab with cardboard separations in place and video already saved on the desktop. The surveyor should make sure that all the students sit where

they are supposed to be, determined by their treatment group assignment.

Week 2 (Intervention and Endline)

- **On day 1 of week 2**:
  - A group of data collectors go to School 1 and another group goes to School 2.
  - The first period of the day will mark the intervention, which is for 45 minutes.
  - The students are then asked to fill the CHS and then draw the self-portraits, while they are still in the same room of the computer lab.
  - In the third period, the surveyor administers the ASER-style test and collects the completed scripts after 25 minutes.
  - An announcement of remedial class is also made during this period by the class teacher, who then takes all the students to their classrooms. The class is scheduled for day 3 of this week. It is essential to maintain the same gap period of 1 day between the announcement and the inception of the remedial class. So if the announcement is made on Monday, the class will happen on Wednesday, after the school, for one hour.
  - The following period is a substitution period in which, the surveyors should switch classes so that the students do not know if the surveyor is an actual teacher or not. The surveyor then fills the 3^{rd} party observation sheet for in-class effort.
  - The same activities are to take place in School 2, in the same fashion and sequence.
  - This way, information on all the variables of interest, except the remedial class, is collected for two schools by the end of Day 1, after having conducted the intervention.
  - The idea is that after having seen the motivational videos, the students

should be more hopeful and this should be reflected in the information being collected on that day.

  - The surveyor should also delete any intervention material that may remain on the desktops towards the end of the school day.

- **On day 2 of week 2**:
  - The same exercise as in Day 1 is followed for School 3 and School 4.
- **On day 3 of week 2**:
  - The same exercise as in Day 1 is followed for School 5 and School 6.
  - On the same day, the remedial class is held after school hours in School 1 and School 2.
  - The two surveyors responsible for the school, should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyors should be present throughout the entire duration of the remedial class.
- **On day 4 of week 2**:
  - On the same day, the remedial class is held after school hours in School 3 and School 4.
  - The surveyors should start marking the ASER tests.
  - The relevant responsible data collectors should go to their respective schools and ensure that all the material for intervention is properly deleted. It may otherwise, lead to issues with compliance.
- **On day 5 of week 2**:
  - On the same day, the remedial class is held after school hours in School 5 and School 6.
  - The surveyors should start marking the ASER tests.
  - The two surveyors responsible for the school should be available to go

and collect the attendance sheets from the relevant teacher. Moreover, the surveyors should be present throughout the entire duration of the remedial class.

  - All the surveyors fill the monthly surveyor report.

- This marks the completion of the intervention and endline phase.
- As for the next step in the research design, there is a break period for the students for 1 week **(week 3)**, until the follow-up survey 1. It is a one-week exercise in which, information is collected on the three variables of interest.
- During the one-week period, the data collectors will be engaged in an intensive data entry exercise. The survey data will have to be entered on Microsoft Excel. A training workshop will be organised during this period for the same[53].

Week 4 (Follow-up Survey 1)

- **On day 1 of week 4**:
  - A group of data collectors go to School 1 and another group goes to School 2.
  - The same activities follow through in each school and in the same sequence.
  - There should be at least 1 surveyor in each class section.
  - In the first period, the surveyor collects the information on CHS and Self-portraits.
  - In the second period, the surveyor administers the ASER test and the announcement by the class teacher is made regarding the remedial class. The remedial class is to be held on Day 3. The class teacher also ensures that all the students sit as per their roll numbers.

[53]See appendix A.6 panel (c).

  - The following period is a substitution period in which, the surveyors should switch classes so that the students do not know if the surveyor is an actual teacher or not. The surveyor then fills the 3^{rd} party observation sheet for in-class effort.
  - The same activities are performed in School 2.
  - This way, information on all the variables of interest, except the remedial class, is collected for two schools by the end of Day 1.

- **On day 2 of week 4**:
  - The same exercise as in Day 1 is followed for School 3 and School 4.

- **On day 3 of week 4**:
  - The same exercise as in Day 1 is followed for School 5 and School 6.
  - On the same day, the remedial class is held after school hours in School 1 and School 2.
  - The two surveyors responsible for the school should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyors should be present throughout the entire duration of the remedial class.

- **On day 4 of week 4**:
  - The remedial class is held after school hours in School 3 and School 4.

- **On day 5 of week 4**:
  - The remedial class is held after school hours in School 5 and School 6.
  - All the surveyors fill the monthly surveyor report.

- This marks the completion of the follow-up survey 1.
- As for the next step in the research design, there is a break period of four weeks **(week 5, 6, 7 and 8)** for the students, until the follow-up survey 2. It is a one-week exercise in which, information is collected on the three variables of

interest.

- An intensive data entry exercise will take place during **week 5, 6 and 7**. There will be a training workshop during the same time for robustness checks to ensure that the data is entered correctly on Excel. Careful checks have been embedded in the survey questionnaires to prevent any manipulations, and incorrectly entered data will be reported instantaneously during this period. It is the sole responsibility of the field-worker to carefully enter data with utmost precision, maintaining the authenticity of the data collection strategy.
- **Week 8** is a break period for the data collectors. However, the research team will be engaged in procuring the incentives for students and the teacher coordinators.

Week 9 (Follow-up Survey 2)

- **On day 1 of week 9**:
  - A group of data collectors go to School 1 and another group goes to School 2.
  - The same activities follow through in each school and in the same sequence.
  - There should be at least 1 surveyor in each class section.
  - In the first period, the surveyor collects the information on CHS and Self-portraits.
  - In the second period, the surveyor administers the ASER test and the announcement by the class teacher is made regarding the remedial class. The remedial class is to be held on Day 3. The class teacher also ensures that all the students sit as per their roll numbers in the beginning of the day.
  - The following period is a substitution period in which, the surveyors should switch classes so that the students do not know if the surveyor

is an actual teacher or not. The surveyor then fills the 3^{rd} party observation sheet for in-class effort.

  - The same activities are performed in School 2.
  - This way, information on all the variables of interest, except the remedial class, is collected for two schools by the end of Day 1.

- **On day 2 of week 9**:
  - The same exercise as in Day 1 is followed for School 3 and School 4.
- **On day 3 of week 9**:
  - The same exercise as in Day 1 is followed for School 5 and School 6.
  - On the same day, the remedial class is held after school hours in School 1 and School 2.
  - The two surveyors responsible for the school should be available to go and collect the attendance sheets from the relevant teacher. Moreover, the surveyors should be present throughout the entire duration of the remedial class.
- **On day 4 of week 9**:
  - The remedial class is held after school hours in School 3 and School 4.
- **On day 5 of week 9**:
  - The remedial class is held after school hours in School 5 and School 6.
  - All the surveyors fill the monthly surveyor report.
- This marks the completion of the follow-up survey 2.
- An intensive data entry exercise will take place in **Week 10**. In lines with the former rounds of data entry and cross-checking, this phase will last for one week. By the end of this week, all the data that has been collected must be entered on to Excel and stored in two formats: (i) hard copy (paper version), and (ii) soft copy (Microsoft Excel).

- During the same week, the research team will be involved with the disbursement of incentives to the participants (children) and the teacher coordinators.

Week 10 will mark the completion of the data collection phase of the RCT.

3.3.2.8 Depiction of an average week of data collection

The four weeks of data collection (baseline, endline[54], follow-up survey 1 and 2) require careful planning and consistent administration of the data collection tools. To assist a successful implementation of the data collection strategy, figure 3 will be used to guide all field endeavours.

Figure 3: Data collection plan for week 1, 2, 4 and 9

Data collection week (1, 2, 4 and 9)					
S.No.	Monday	Tuesday	Wednesday	Thursday	Friday
1	CHS	CHS	CHS		
2	Portrait	Portrait	Portrait		
3	ASER	ASER	ASER		
4	Announce: RC	Announce: RC	Announce: RC		
5	Sub Class	Sub Class	Sub Class		
6			After-school RC	After-school RC	After-school RC
7	CHS	CHS	CHS		
8	Portrait	Portrait	Portrait		
9	ASER	ASER	ASER		
10	Announce: RC	Announce: RC	Announce: RC		
11	Sub Class	Sub Class	Sub Class		
12			After-school RC	After-school RC	After-school RC
School codes					
School 1	School 2	School 3	School 4	School 5	School 6

3.3.2.9 Incentives

All the participants of the experiment including the teacher-coordinators will be rewarded at the completion of the RCT for their time. Each student will receive a stationery goody bag worth £1.50 and each teacher will receive a sipper bottle worth £3.40. Parents of the children are not incentivised to partake in the baseline survey questionnaire as an average survey questionnaire will last for 10 minutes approximately, which is a small amount of time in their everyday life and need not be

[54]The only addition in this wave of data collection will be to conduct the intervention right before the CHS.

compensated for.

The distribution of the incentives will take place after the end of follow-up survey 2, during the final phase of data entry. This activity will be taken care of by the research team with some support from the surveyors. It is statutory to the research design that no information about the incentives is communicated to any of the participants as it can bias the results. The distribution of incentives will mark the final step towards the successful completion of field-activity.

3.3.2.10 Data Storage and Research Ethics

The data –collected in paper –will be entered on excel and stored with the principal investigator (PI). Data analysis will take place in Scotland. It is essential to follow the protocol and abide the data collection and data entry protocols as they have been agreed to with the Research Ethics committee[55] in The University of Glasgow.

[55]The application and the ethics approval certificate is available in appendix A.3.

4 Data and Methodology

The RCT was conducted in Jaipur, Rajasthan. With the help of the local partnering institution (Muskaan[56]), six schools were selected based on a selection strategy[57]. The selection strategy ensured that each of these schools were in urban Jaipur, with at least 40 students in class 4.

The process of data collection lasted for four months (August-November 2019)[58]. A team of trained data collectors[59] from Muskaan facilitated the roll out of baseline in August 2019[60]. Data on covariates was collected as a part of an extensive simple-language survey questionnaire for children. A part of this information was later triangulated and validated using similar surveys and interviews with their teachers and parents.

Data collection on the outcome variables proceeded in the step-wise fashion as illustrated in table 1[61]. All the instruments were identical in all the follow-ups with the exception of CHS and ASER-tests that were tweaked slightly in each round[62].

The same exercise was followed consistently in each school and in each phase of data collection. Data collection was carried out in the school premises[63]. Moreover, I followed Zizzo's (2010) non-deceptive obfuscation when explaining the nature of the experiment to the school authorities and teachers. The RCT was proposed with

[56] Albeit working on road safety, Muskaan has a small wing that focuses on education and awareness generation. Information about the NGO partner is available at: `http://www.muskaanforroadsafety.com/index.php`

[57] These are mapped in figure 4.

[58] A video summary of the data collection process in English with subtitles can be found at: `https://www.youtube.com/watch?v=1z0BCaZ-VEQ&feature=emb_title`

[59] Unaware about the treatment assignments of the students.

[60] Information on the monitoring and data collection team is available in the appendix A.4. In each school, one teacher coordinator (blind with respect to the intent of the study) offered assistance and logistical support to the data collectors in the process.

[61] All the survey instruments and questionnaires are available in appendix A.3. I include the baseline indicators that are similar to the subsequent rounds.

[62] The four waves of CHS and ASER are available upon request through access to dropbox.

[63] Abiding to the CoSS Research Ethics protocol, this ensured that the students were not exposed to any additional activity or risk over and above their otherwise daily routine.

an objective to study the educational practices in private schools in India. This further avoids the risk of any experimenter demand effects.

Table 1: Indicators - data collection strategy

Outcome variable	Instrument	Frequency (time in minutes)	Explanation
Hope	Children's Hope Scale	4 (15-20)	A 6-item likert scale offering a score between 0-36
SE/Optimism and Happiness	Self-portraits	4 (15)	Students are asked to draw themselves on last Sunday
Achievement	ASER test	4 (25)	Standardised test for English and Mathematics (0-100)
Effort	Substitution Class (SC)	4 (30-40)	Third party observations in a free period scoring between 0-3
Effort	Remedial Class (RC)	4 (60)	Attendance in an optional after-school remedial class (0-1)
Achievement	Past performance	1	Percentage scored in class 3 examinations
Covariates	Survey Questionnaires	1 (15-20)	Information is collected from students, teachers and parents

4.1 Sample

The selection strategy ensured homogeneity across the sample of students. Based on the power calculations recorded in the pre-analysis plan (PAP)[64], four hundred and fifty-two class-4 students, aged 9-11 years, were identified from 6 private schools in Jaipur, Rajasthan. Summary statistics for these students are presented at the end of this chapter in table 2.

Information on school attendance, past academic records and curriculum was collected prior to school identification to maintain comparability across schools. To en-

[64]Any departures from the PAP are recorded in the RCT registry and mentioned explicitly in the following chapters.

sure comparability and reduce threats from spillovers, no two schools were closer than 3 kms or farther than 8 kms from one-another. A schematic representation of the selection criteria is in table 17 in appendix A.7.

The study focused on class 4 students with majority of students being in the age group of 9-11 years for three main reasons. First of all, students in this age bracket are capable of comprehending the treatment content. Secondly, CHS is a valid instrument for childred between 7 and 15 years (Snyder et al. 1991, and Snyder et al., 1997). Hence, it was imperative to not measure student hope with CHS for children that are outside this bracket. Furthermore, studies undertaken to add to its external validity as an instrument focus on students in similar age groups[65]. Lastly, intervening at an early age can have significant benefits, measurable in short and long run, on both soft and hard skills (Heckman et al., 2013).

In order to capture any treatment effects, I randomised the sample of students at an individual level. This step enables me to overcome any differences across different schools[66]. The randomisation process along with the sample balance are discussed at length in this chapter.

4.2 Intervention

The intervention consisted of a treatment video that was a combination of three short films. These shorts films[67], were produced in Jaipur (the study location), paying a lot of attention to the culture and context of the study group. For the students allocated to the control (placebo) group, a short film was edited to be devoid of any positive or negative emotional content. This was done to ensure an absolutely neutral content to which, the 226 placebo group students were exposed to, while their

[65]Bloem et al. (2018), Guse et al. (2016) and Pulido-Martos (2014) employ CHS in Myanmar, South Africa and Spain, respectively.

[66]On an average, across the two groups, I should then have more or less similar students. This comparability is illustrated in the later presented balancing checks.

[67]The treatment video in English with subtitles is available at: `https://www.youtube.com/watch?v=-VTpyX5LZ5A&feature=emb_title`

treatment group counterparts saw the treatment films. Scripts for these short films and the placebo video are included in appendix A.5.

In the treatment group video, the first story is about a girl that aspires to (and eventually does) become a world-renowned badminton player. However, due to certain material constraints[68], she cannot practice. She discovers hope in the form of her best friend who offers her a racket to practice and improve. Similarly, a coach who offers to train the prodigy. In the second story, a young boy –aimless about his future aspirations –draws inspiration in a guest lecture at his school to become an air-force pilot. He works very hard to improve in academics and with a hope to realise his dreams, makes a plan to meet his goals. Eventually, he does succeed in getting commissioned as an air-force pilot. The last story is about a girl from a financially marginalised household. In spite of being an excellent student, she is at the brinks of dropping out of her school due to unavoidable financial constraints. Nevertheless, when an opportunity in the face of a scholarship test arises, she is filled with hope. She works tirelessly to grasp it and to win the scholarship. Eventually, she does succeed in winning the competition that creates a virtuous cycle of future optimism and hard work. Later on, she is acknowledged as a successful doctor that she always dreamed to be.

The films were produced, bearing in mind the age-associated attention spans and comprehension skills of the kids in the sample. Themes of hope and hard work were carefully fielded in the stories. As per Lockwood and Kunda, (1997), the treatment was produced with caution, to ensure relatability of the sample with the protagonists and the relevance of goal attainability. The treatment video consisted of two female and a male role model. Lockwood (2006) argues that females respond better to female role models, with sex playing no such role for male viewers.

The placebo group video was edited from a television show for kids named '*Malgudi*

[68]Some of these are, lack of a proper badminton racket, dearth of finances to purchase a new one or repair a broken one.

Days'. It is set in a fictional Indian town. The video revolves around a small group of kids that try to (and overtime do) build a local cricket team. An episode[69] was carefully crafted without having any motivating or de-motivating elements from the original show. The two videos were equal in length and almost equally entertaining.

Benefiting heavily from the school facilities, I conducted the intervention in the computer laboratories in the presence of a teacher and surveyors[70]. The surveyors ensured compliance by physically monitoring the screen allocation to the students on the basis of their treatment assignment. Any unforeseen technical difficulties were overcome by the presence of these surveyors too. Each screen had a set of ear phone pieces connected to it. Each set of these computer screens and earphones were mounted by cardboard pieces on either sides and on the top. This step pre-empts the possibility of spillovers by design[71] between baseline and endline[72]. The endline preceded two additional rounds of follow-up surveys that took place in the next weeks.

4.3 Outcome variables

Table 1 shows that the key outcome variables are hope, effort and achievement. To capture information on children's psychological traits, I employ CHS (for hope) and a novel psychometric analysis of children's self-portraits (for SE/optimism and happiness)[73]. A substitution and remedial class elicit information on student effort. Achievement is measured using a version of floor-based (ASER) tests on English and Mathematics. Administrative data on student performance and effort is col-

[69]The placebo video is available in Hindi with subtitles (in English) at: `https://www.youtube.com/watch?v=noNEijycj1c`

[70]Data collectors from Muskaan were recruited and trained over the course of three workshops by the PI from July, 2019. The first workshop focused on the design of the RCT and the research protocol. The second and third workshops were held in September and October, 2019, respectively. They focused on data consolidation and data entry.

[71]Photographs from the field are presented in appendix A.6. Furthermore, the video documentation of the process illustrates all the key aspects of the design and the successful implementation of the RCT.

[72]Data was collected immediately after the intervention whilst the students were still seated in the laboratory

[73]Like Glewwe et al. (2018).

lected from the schools. For the former, I rely on student's performance on school examinations, while for the latter, I analyse their attendance.

4.3.1 Psychological outcomes

Hope

CHS is a 6-item likert-style scale that reports a hope score from 0 to 36. It is administered to the respondents as 'information about yourself', with 10 extra priming-free statements to subdue memory efforts. The 6 items include statements on agency and pathways, with students having to respond to each of them by selecting an option from 'none of the time' to 'all of the time', scored 1 to 6, in ascending order. These individual scores are then summed to report the hope score for an individual. A surveyor, present at all times during the administration of the CHS in the classroom, ensures that students do not cheat. They are meant to fill the scripts in an independent and thoughtful fashion.

Self-efficacy/Optimism and Happiness

A self-portrait task was given to the children right after CHS. On the footsteps of Glewwe et al. (2018)[74], I collected data on children's portraits of themselves. A clean sheet of paper titled 'draw yourself on last Sunday' and 24 colouring pencils were made available to each student.

Based on the literature, 30 pre-identified characteristics were used to collect information on children's psychology [75]. Table 3 reports these characteristics and their descriptive statistics. Table 4 reports their empirical correlations.

I perform an exploratory factor analysis (EFA) (Costello and Osborne, 2005) to evaluate these drawings. After this step, I rotate the factor loadings orthogonally using

[74]To assess the impact of the international child sponsorship program, the authors performed a quantitative analysis of the self-portraits of Indonesian children.

[75]Glewwe et al. (2018) used 20 such characteristics. I added 10 additional characteristics based on the literature.

varimax rotation. Orthogonal rotations enable the computation of meaningful factors with independent latent component loadings. This results in two meaningful factors, with uncorrelated component loadings (Osborne, 2015). Following the literature (in table 4), I label these two factors[76] as optimism or self-efficacy and happiness. Table 18 (appendix A.7) presents the rotated factor loadings, with the factor compositions being presented in table 19 (a) and (b).

Although overlapping; hope, self-efficacy and optimism are distinct. Hope can be about events both controllable and uncontrollable. Much unlike, self-efficacy or optimism[77], it does not come with a predisposition to harbour any positive expectations (Micheli and Castelfranchi, 2010).

4.3.2 Effort

As a measure of in- and out-of-class effort, I look at the scores received by students in a (i) Substitution Class and an (ii) Optional Remedial Class. In the substitution period, students that were observed to engage in a productive activity received a score '1', and '0' otherwise. Each student was observed thrice by a surveyor in equal intervals of 10-minutes using third-party observations. The surveyor (pretending to be a substitution-class teacher) had a seating plan of the classroom. Students were told that the period was free as the relevant teacher could not make it to take the class for some reason. These scores were later added to give a score between 0 and 3 to each student in the class.

In the optional after-school remedial class, student attendance was monitored ('1' if s/he attended the class and '0' otherwise.) as an indicator of objective effort. An announcement was made by a school teacher (after the substitution class), a day in advance of the actual event of the remedial class. Such announcements were

[76] All indices are generated and presented in a single direction of positive impact.

[77] Self-efficacy or optimism imply a forecastability of a probable event of successful goal-attainment, which may or may not be the case for hope (Magaletta and Oliver, 1999, and Scheier and Carver, 1985).

accompanied by a circular by the school authorities, clearly indicating the optional nature of the class and mentioning all other details. Students were unaware of the fact that they were being observed or of their treatment assignments to avoid any experimenter demand effects.

4.3.3 Achievement

I use Pratham's Annual Status of Education Report (ASER) tests for Mathematics and English (Banerjee et al., 2015; and Pratham, 2014) to collect information on academic performance. These tests were tweaked to report a score out of 50 for each subject. Written instructions about the test were available on the front sheet of the test. Much alike the self-portraits, it was a time-bound task. Moreover, using administrative data from the schools, I track student's examination results from Class 3 to Class 4[78].

In English, there were 4 sets of questions. Each set had a choice of answering five out of six sub-questions. Set 1 asked the students to fill in the blanks with correct alphabets, set 2 asked for opposites, set 3 and 4 were tests of comprehension based on a short and a longer passage by filling in blanks and answering questions, respectively.

In Mathematics, alike English, there were 4 sets of questions in which, the students had a choice to answer 5 out of 6 questions. The sets progressed in difficulty and marking weight[79] from one-digit and two-digit number identification (set 1 and 2, respectively), to two digit subtraction (set 3) and division problems (in set 4).

The tests in each wave of data-collection were identical in difficulty levels and marking weights. Set one offered 1 mark for each correct answer (totalling a maximum

[78] As the exams scheduled for March, 2020 were not conducted, I report results only on student attendance till February 2020.

[79] Same applies for English.

attainable score of 5 marks[80]), set 2 offered 2 points for each correct answer (total = 10 marks), set 3 offered 3 points (total = 15 marks) and for each correct answer in set 4, the students received 4 marks (total = 20 marks)[81].

The test had to be completed in 25 minutes, and was administered as a classroom test-exercise. Through the process, at least one fieldworker was available to address any questions and to ensure that nobody cheated. The test had written instructions on the front sheet to further appease any ambiguity amongst the students.

4.4 Summary statistics

As per table 2, average age of students was 9 years with approximately 61 percent of the sample comprising of boys. The majority of the students were Hindu and native to the study location. The students reported studying for 6-7 hours per week with huge variations ranging from 0 to 28 hours, and the median sample studying for 7 hours per week. 45 percent of the students reported taking private tuition.

The average hope of the students in the sample was 27, which is in range of the global average[82]. Some students scored as low as 11 and as high as 36. On an average, each student was observed to engage in a productive activity once out of the three observations made during baseline. The attendance in the optional remedial class, was around 35 percent at baseline. The standard deviations for both these measures of effort are very high. The average scores on Mathematics and English were 32 and 31, respectively, with an overall average score of 63 out of 100 (with a standard deviation of 34). ASER scores correlated positively with the exam performance in class 3.

The measures of hope and effort, as expected, correlate positively with student per-

[80]The maximum total attainable score for each set was available in brackets with the question.

[81]The marking guide was identical for both Mathematics and English offering a total of maximum 50 scores for each subject.

[82]As per Snyder et al. (1998), it is between 24-28.

formance. Table 20 presents the baseline relationships between the different parameters of interest and the survey covariates[83]. Past performance is a significant predictor of future performance, as seen in column (1) and (2). Achievement (ASER-style test scores), is positively related to optimism and effort. Hope and effort (measured by both substitution and remedial class) are also strongly positively related with achievement.

Table 2: Summary statistics

Variable	Label	N	Mean	sd	Min	Max	Median
Age	# years	452	9.05	0.74	7	12	9
Gender	0 - female, 1 - male	452	0.61	0.49	0	1	1
Past performance	% in class 3	444	77.35	15.04	34.40	98.80	80.25
Private tuition	1 - yes, 0 - otherwise	451	0.44	0.50	0	1	0
Tuition hours	# hours/week	200	11.01	4.06	3	28	12
Religion	1 - Hindu, 0 - otherwise	451	0.88	0.33	0	1	1
Native	1 - yes, 0 - otherwise	451	0.91	0.28	0	1	1
Household size	# people	449	8.59	4.71	2	30	8
Study time	# hours/week	451	6.48	4.46	0	28	7
Best friend in class	1 - yes, 0 - otherwise	451	0.75	0.44	0	1	1
July attendance	#days attended/ open	452	0.92	0.11	0	1	0.96
Hope (chs)	0 - 36	444	27.33	5.41	11	36	28
Effort (rc)	1 - present, 0 - absent	432	0.35	0.48	0	1	0
Effort (sc)	0 - 3	432	1.11	1.07	0	3	1
Achievement (Maths)	0 - 50 (ASER scores)	432	32.29	11.78	0	50	31
Achievement (English)	0 - 50 (ASER scores)	432	31.02	15.58	0	50	36
ASER Score	0 - 100 (ASER scores)	432	63.25	24.45	0	100	68
Father's hope	0 - 64 (AHS)	190	51.79	8.21	20	64	53
Mother's hope	0 - 64 (AHS)	197	50.35	8.60	18	64	53
English teacher's hope	0 - 64 (AHS)	11	56.64	2.83	52	60	56
Math teacher's hope	0 - 64 (AHS)	8	54.13	8.17	36	61	57

Notes: This table displays, observations, means, standard deviations (s.d.), range and median. These statistics are presented for all the confounding factors and outcome variables.

[83]It is interesting to note that gender or household size, like a few other confounding variables do not relate strongly to the variables of interest.

Table 3: Summary statistics - portraits

Variable	Label	Obs	Mean	Std. dev.	Min	Max
v_1	Huge figure (>15 cm)	414	0.031	0.175	0	1
v_2	Tiny figure (<5 cm)	414	0.222	0.416	0	1
v_3	Monster, grotesque, genitals	414	0.039	0.193	0	1
v_4	Shading of face or body	414	0.019	0.138	0	1
v_5	Missing mouth	414	0.068	0.251	0	1
v_6	Missing nose	414	0.198	0.399	0	1
v_7	No neck	414	0.258	0.438	0	1
v_8	No eyes	414	0.056	0.229	0	1
v_9	Frowning, sad or crying	414	0.002	0.049	0	1
v_10	Disproportionate body parts	414	0.319	0.467	0	1
v_11	Poor integration of body parts	414	0.034	0.181	0	1
v_12	Tiny head (<$1/6^{th}$ body size)	414	0.022	0.146	0	1
v_13	Drawn in dark colours	414	0.058	0.234	0	1
v_14	Drawn in single colour	414	0.068	0.251	0	1
v_15	Drawn in light /cheery colours	414	0.901	0.299	0	1
v_16	Bad weather	414	0.007	0.085	0	1
v_17	Good weather	414	0.338	0.474	0	1
v_18	Smiling	414	0.901	0.299	0	1
v_19	Missing arms or hands	414	0.152	0.360	0	1
v_20	Missing legs	414	0.133	0.340	0	1
v_21	Erasure marks or scribbles	414	0.510	0.501	0	1
v_22	Positive accessorisation	414	0.705	0.456	0	1
v_23	Negative accessorisation	414	0.007	0.085	0	1
v_24	Positive body language	414	0.949	0.220	0	1
v_25	Negative body language	414	0.027	0.161	0	1
v_26	Slanting figures	414	0.135	0.342	0	1
v_27	Three or more figures	414	0.031	0.175	0	1
v_28	Proper and clean alignment	414	0.821	0.384	0	1
v_29	Long arms	414	0.051	0.220	0	1
v_30	Legs pressed together	414	0.014	0.120	0	1

Notes: This table displays observations, means, standard deviations (s.d.) and range. These statistics are presented for all the codes of the portraits mentioned in section 3.3.1.

Table 4: Empirical correlations

Characteristics	Potential indication	Category	Reference
Huge figure (>15 cm)	Aggressive or high self-esteem	HA	Farokhi and Hashemi (2011), Koppitz (1968)
Tiny figure (<5 cm)	Shy, timid, low self-esteem	SE	Farokhi and Hashemi (2011), di Leo (1983), Koppitz (1968)
Monster, grotesque, genitals	Aggressive	HA	Peterson and Hardin (1997), Koppitz (1968)
Shading of face or body	Anxiety, depression, insecurity	O	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Missing mouth	Anxiety, depression, insecurity	O	Klepsch and Logie (1982), di Leo (1983)
Missing nose	Anxiety, depression, insecurity	O	Klepsch and Logie (1982), di Leo (1983), Koppitz (1968)
No neck	Anxiety, depression, insecurity	O	Klepsch and Logie (1982), di Leo (1983), Koppitz (1968)
No eyes	Anxiety, depression, insecurity	O	Koppitz (1968)
Frowning, sad or crying	Anxiety, depression, insecurity	HA	Furth (2002)
Disproportionate body parts	Shy, timid, low self-esteem	SE	Farokhi and Hashemi (2011), di Leo (1983), Koppitz (1968)
Poor integration of body parts	Shy, timid, low self-esteem	SE	Koppitz (1968)
Tiny head (<$1/6^{th}$ of the body size in cms)	Low self-efficacy	SE	Farokhi and Hashemi (2011), di Leo (1983)
Drawn in dark colours	Anxiety, depression, insecurity	O	Wadeson (1971)
Drawn in single colour	Anxiety, depression, insecurity	O	Wadeson (1971)
Drawn in light or cheery colours	Low anxiety, happy	HA	Wadeson (1971)
Bad weather	Anxiety, depression, insecurity	O	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Good weather	Anxiety, depression, insecurity	O	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Smiling	Low anxiety, happy	HA	Furth (2002)
Missing arms or hands	Shy, timid, low self-esteem	SE	Furth (2002), Klepsch and Logie (1982)
Missing legs	Shy, timid, low self-esteem	SE	Furth (2002), Koppitz (1968), di Leo (1983)
Significant erasure marks or scribble outs	Shy, timid, low self-esteem	SE	di Leo (1983), Klepsch and Logie (1982)
Positive accessorisation	High self-efficacy, unhappy	SE	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Negative accessorisation	Low self-efficacy, unhappy	HA	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Positive body language	High self-efficacy, happy	HA	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Negative body language	Low self-efficacy, happy	HA	Farokhi and Hashemi (2011), Klepsch and Logie (1982)
Slanting figures	Low self-efficacy	SE	Koppitz (1968)
Three or more figures spontaneously drawn	Happy, outgoing	HA	Koppitz (1968)
Proper and clean alignment of figure	Low self-efficacy	SE	Farokhi and Hashemi (2011)
Long arms	Aggressive or reaching out	HA	Koppitz (1968)
Legs pressed together	Low self-efficacy	SE	Koppitz (1968)

Notes: The "category" column shows the characteristic that relates most closely to self-efficacy (SE), Optimism (O) or Happiness (HA).

4.5 Randomisation

Randomisation was performed before the collection of baseline information on the outcome variables. It was performed using Microsoft Excel, to allocate the students into two group (treatment and placebo). This information regarding the treatment assignment was not shared with anyone outside the research team.

Students were seated in front of the computer screens during the intervention on the basis of their treatment. This was accomplished with the help of field-workers that were present for the entire duration in the computer laboratory. This also avoided any risks on grounds of spillovers from interactions between students that were prohibited by design in the computer laboratory. The surveyors also facilitated the implementation of this (pre-existing) rule.

Balancing checks

To ensure that the groups are comparable, I report the balancing checks in table 5. The p-values in the last column correspond to the p-values under the null of equality of means between the treatment and placebo group. I find that the two groups are similar to each other, based on the survey covariates and the baseline measures of the outcome variables (hope, SE/Optimism, effort and achievement). The survey covariates include age, gender, religion, household size and past performance, among other things as shown in column 1 of table 5.

The experimental design, prevents any interactions among students between the intervention and endline. This does not preclude the possibility of such interactions between the follow-up surveys (any time after the endline phase). Although, the treatment videos were deleted on the day of the intervention, spillovers can stem from these interactions over the 6-weeks following endline[84]. Nevertheless, if any such spillovers do exist from conversations between students and peers (like Duflo

[84]To be able to unearth these potential spillovers, I would have needed additional treatment arms which were not a part of this study and poses to be a topic of further study.

and Saez, 2003), they strengthen the cost-effectiveness argument for the intervention because of the social learning mechanisms at play (Conley and Udry, 2010, and Macours and Vakis, 2014).

Attrition and Compliance

As most of the information is collected as part of a continuous class-room exercise, the study does not introduce any additional risks that can contribute towards problems of attrition. Further to this, since nobody apart from the research team is aware about the design or treatment assignments, there is a small chance of prevalence of any compliance issues[85].

Table 21 shows that attrition was balanced as well for hope, SE/optimism and the substitution class. As all of the instruments were administered subsequently on the same day, the balance holds for effort in the remedial class and achievement in Mathematics and English too.

[85] All the steps were completed in the presence of the surveyors and the direct supervision of the PI. This reduces any risks of compliance too.

Table 5: Balancing checks

Variable	Label	N		Mean		Difference	T value	p-value
		Control (C)	Treat (T)	C	T	C - T		
Baseline data on covariates								
Age	# years	226	226	9.066	9.036	0.031	0.45	0.658
				(0.048)	(0.051)	(0.07)		
Gender	1 -male, 0-female	226	226	0.633	0.589	0.044	0.95	0.336
				(0.032)	(0.033)	(0.046)		
Private tuition	1 - yes, 0 - no	226	225	0.438	0.449	-0.011	-0.25	0.818
				(0.033)	(0.033)	(0.047)		
Private tuition	# hrs/week	99	101	11.101	10.916	0.185	0.3	0.748
				(4.255)	(3.878)	(0.576)		
Religion	1 - Hindu, 0 - o/w	226	225	0.898	0.858	0.041	1.3	0.19
				(0.020)	(0.023)	(0.031)		
Native	1 - Jaipur, 0 - o/w	226	225	0.929	0.898	0.032	1.2	0.236
				(0.017)	(0.020)	(0.026)		
Hh size	# people	225	224	8.627	8.558	0.069	0.15	0.878
				(0.306)	(0.324)	(0.446)		
Past perform	% in class 3	221	223	77.93	76.781	1.149	0.8	0.421
				(1.045)	(0.975)	(1.429)		
Baseline data on indicators								
Hope score	CHS (0-36)	222	222	27.14	27.523	-0.383	-0.75	0.457
				(0.359)	(0.368)	(0.513)		
Effort	SC (0-3)	216	216	1.11	1.106	0.004	0.04	0.96
				(0.071)	(0.074)	(0.103)		
Achievement	Substitution class ASER (0-100)	216	216	64.185	62.315	1.871	0.8	0.427
				(1.630)	(1.697)	(2.353)		
Baseline data from EFA on children's drawings								
SE/Optimism	factor analysis (EFA)	207	207	0.002	-0.114	0.116	1.11	0.266
				(0.067)	(0.080)	(0.105)		

Notes: The sample contains primary school students surveyed at baseline (N=452). The p-value corresponds to p-values of the test under the null hypothesis of the equality of means between the treatment and placebo (here, control) groups. Standard errors are reported in parenthesis with * significant at 10 percent, ** significant at 5 percent, and *** significant at 1 percent.

4.6 Empirical Strategy

For estimating the treatment effect, I use a difference-in-differences (DiD) approach as shown below in equation 4.

$$Y_{it} = \alpha_0 + \alpha_1 T_t + \alpha_2 D_i + \alpha_3 (D_i T_t) + \alpha_4 X_{it}^{'} + \epsilon_{it} \tag{4}$$

where the main outcome variable Y_{it} corresponds to the variable of interest[86] for individual i at time t. D_i is the dummy for individual treatment, being 1 if the the individual is in the treatment group and 0 for placebo. T_t is a dummy for time or sessions[87]. $X_{it}^{'}$ is a vector of covariates[88]. The coefficient α_3 of the interaction term $D_i T_t$ captures the treatment effect. Same specification is used for the self-portrait analysis.

As indicated in the theory of change, the study aims to assess the effects of the treatment on student hope, effort and achievement. This informs the hypothesis, which is:

H_o: The treatment has no effect on the outcome variable ($\alpha_3 = 0$).

In cases where the outcome variables do not possess strong autocorrelation, ancova offers higher power (McKenzie, 2012). So, I also use ancova to estimate the intent-to-treat (iTT) treatment effect. I use equation 5, with the following specification:

$$Y_{it} = \beta_0 + \beta_1 Y_{i0} + \beta_2 X_{it}^{'} + \beta_3 D_i + e_{it} \tag{5}$$

where Y_{i0} is the baseline measure of the outcome variable. Y_{it} corresponds to the dependent variable, which is the outcome variable in the follow-up rounds, including endline. β_3 captures the treatment effect[89].

[86] This can be hope, SE/Optimism, happiness, effort (SC or RC) or achievement (Mathematics or English).

[87] Overall there are four sessions from baseline to the final follow-up survey.

[88] As included in the PAP and incorporated in the list of STATA commands in appendix A.10.

[89] With the hypothesis being, $\beta_3 = 0$, much like the DiD in equation (4).

To estimate the overall average treatment effect across the subsequent waves of data, I use equation 6. By pooling the several rounds of follow-up data, not only does ancova allows an examination of the overall effect, but also offers additional power in the process. This can be seen in the equation below:

$$Y_{it} = \sum_{t=1}^{q} \delta_t + \beta_1 Y_{i0} + \beta_2 X_{it}^{'} + \beta_3 D_i + e_{it} \tag{6}$$

where q is the number of follow-up surveys and δ_t is the survey round dummy, with β_3 capturing the overall average treatment effects.

In equations (4), (5) and (6), the individual characteristics that I include as controls (X_{it}') are age (in years), gender (1 for male and 0 for female), household size (number of individuals), students' past academic performance (percentage in class 3 examinations) and religion (1 for Hindu and 0 otherwise). These were also recorded in the PAP. To account for heteroskedasticity, I report clustered standard errors (at individual level). Results from the RCT are presented in the next chapter and discussed in chapter 6[90].

[90]Majority of chapter 5 and 6 are included in my working paper: `https://www.gla.ac.uk/media/Media_769145_smxx.pdf`.

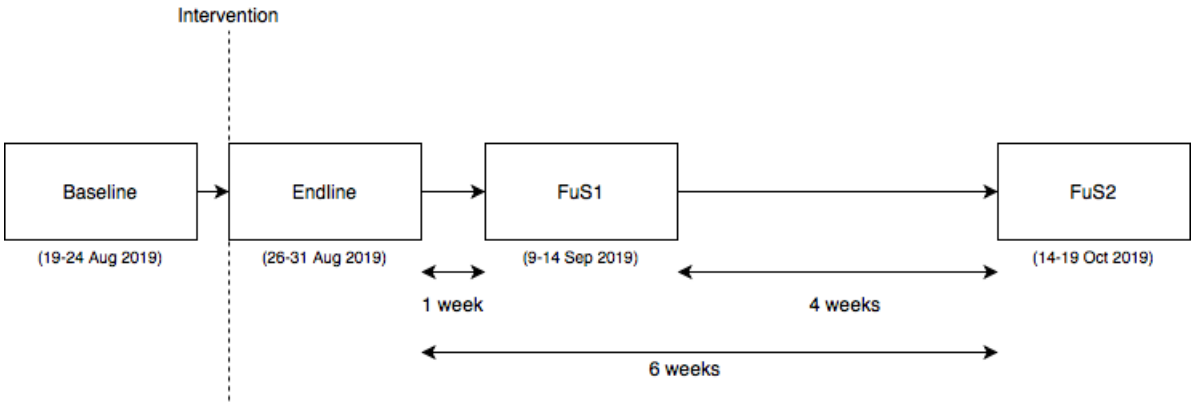
5 Do role models increase student hope and effort?

"Hope is a good thing, may be the best of things, and no good thing ever dies"

- Andy Dufresne in The Shawshank Redemption; Darabont and King (1994)

I present evidence on the effectiveness of a role modelling intervention on students' psychological outcomes, effort and achievement. Following the sample selection and balancing checks, I have two comparable treatment and placebo groups of 226 students. I perform and present the results for DiD and Ancova on the main outcome variables following the timeline in figure 4 and the pre-registered estimation strategy[91].

Figure 4: A sketch of the timeline



5.1 Results

In table 6, I present the estimates from a (descriptive) DID. All the estimates, presented in sd[92], are demeaned and standardised. Column (3) and (6) report the differences before and after the treatment across the control and treatment groups, respectively. Column (7) shows the differences in differences[93] in means only. Column

[91] see PAP, chapter 2, 3 and 4.
[92] Cohen's D
[93] between column (6) and (3)

(8) and (9), show the treatment effects without and with the controls, respectively.

Hope increases by 0.17 sd, accompanied by a 0.26 sd increase in effort in substitution class. Self-efficacy or optimism (SE/optimism) improves by 0.28 sd. These are significant at 5 percent. I do not find any effect on Effort in the remedial class. As learning outcomes do not change overnight, I do not find any significant changes in achievement in Mathematics or English. These improvements have instead been found to pursue a rather gradual process.

Table 7, summarises the estimation results from equation 4. The columns with even numbers show the results with the controls[94]. DID estimates in column (1) and (2) correspond to the endline, conducted immediately after the intervention. DID estimates 1-week after the intervention are in column (3) and (4). Column (5) and (6) record the estimates from the second follow-up survey that was conducted 6-weeks after the intervention.

As expected, the estimates in column (1) and (2) of table 7 are identical to column (8) and (9) of table 6. Although the treatment effects on hope and effort in substitution class fade away within a week, SE/optimism records a strong and lasting effect that becomes stronger in magnitude and significance over time. In column (6), I detect a strongly significant[95] 0.34 sd treatment effect.

There are lagged benefits from the intervention, in the form of modest (1-week after) and strong[96] (6-weeks after) improvements in English scores of the magnitude 0.12 sd and 0.16 sd, respectively. After adding controls, the effects are significant at 10 (1-week after) and 5 (6-week after) percent. Unlike English, Mathematics scores do not change.

[94]Columns 1, 3 and 5, report the estimates without any controls.
[95]At 1 percent level of significance.
[96]In terms of statistical significance.

In table 8, I summarise the treatment effects using ancova (equation 5 and 6) much in the lines with McKenzie (2012), Riley (2017), and Glewwe et al. (2018). An analysis of covariances was not a part of my originally recorded PAP and this marks an extension to it. Column (1), (2) and (3) report treatment effects for each individual wave of data collection (from baseline to follow-up survey 2) by controlling for the baseline variations in the outcome variables. These are similar to the findings in table 7. However, the short-term effects in column (1) are significant at 1 percent. This is to hint towards the additional power that ancova offers (Wydick et al., 2018).

Column (4) and (5) present the overall treatment effects without and with controls, respectively, after pooling the different waves of collected data. This is similar to Bloom et al. (2013), De Mel et al. (2014) and Beath et al. (2013). I find that in column (5) the overall treatment effect on average is 0.17 sd for the remedial class and 0.11 sd for English. Both of these effects are significant at 1 percent.

There are two main takeaways from these findings. Firstly, the role modelling video has a direct effect on student motivation (measured by hope and SE/optimism), effort (remedial and substitution class) and learning outcomes in English. We can establish with confidence that there is a causal impact of the intervention on the outcome variables. Secondly, there is descriptive evidence that motivation precedes action and performance[97]. In light of the lagged improvements in effort (remedial class) and achievement (English) —following improvements in hope and self-efficacy —it is prudent to argue that even temporarily detectable[98] or short-lived boosts of hope can have lasting effects in the medium run. A long-run evaluation of such effects pertains to be a matter of further analysis.

[97]Demonstrated in the theory of change in Chapter 2.

[98]The overall treatment effect on hope is also positive, although insignificant. This is discussed later.

5.1.1 Psychological outcomes

5.1.1.1 Hope

Hope recorded an increase of 0.17 sd immediately after the intervention, as can be seen in figure 5. There is a sizeable increase in the hope scores of the treatment group students compared to the ones in the placebo group, on average.

Upon plotting the kernel density of the sample distribution, shown in figure 6, I discover a small rightward bump in the blue line. This bump in the treatment group students' hope in the overall s-shaped curve (Banerjee and Duflo, 2011), predicts the effect. The largest shift happens in the bottom most part of the curve. This heterogeneity in the treatment effects based on the baseline hope levels is discussed later.

Figure 5: Hope histogram (before/after)

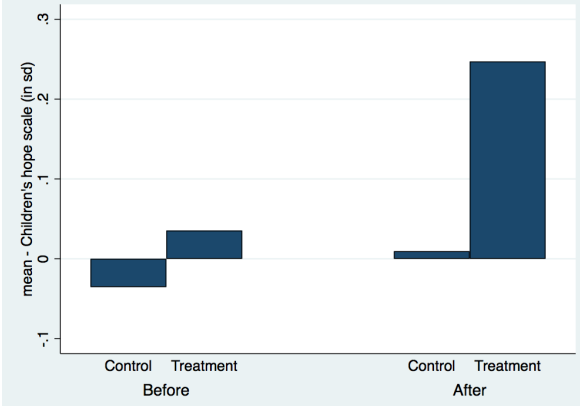
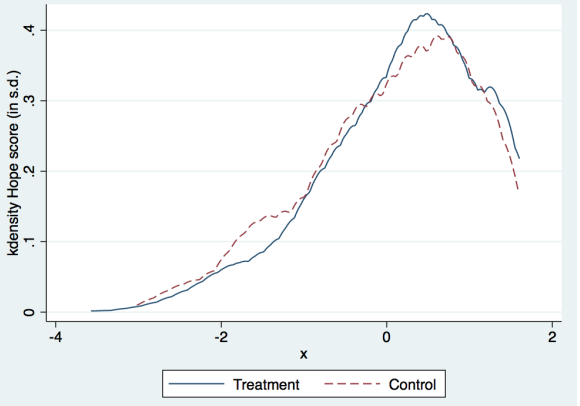


Figure 6: Hope K-density plot



A small 'push' in hope (La Ferrara, 2019) can be accompanied by improvements in other psychological factors. It can contribute towards the heightening of effort in the short and/or medium run; eventually leading to improvements in achievement in the longer run. I argue that a small increase in hope can act as a fundamental capability. It can fuel and sustain other psychological characteristics.

To support my argument, I present the point estimates of the treatment and placebo group students across the four waves in figure 7. Effects for hope, self-efficacy, effort

in remedial class and achievement in English scores are shown in panel (a), (b), (c) and (f), respectively.

As seen in panel (a), there is a drastic increase in hope of the treatment group (in blue) after the intervention. Despite the overall effect sustained over time, I do not detect this effect as hope of the control group students (in green) rises after endline. As mentioned before, it can be due to peer effects and spillovers from the more hopeful treated cohort. In panel (b), there is somewhat smaller increase in the placebo group's SE/optimism, allowing detectable treatment effects (in the follow-ups). Measures of effort and achievement in panel (c), (d), (e) and (f) are expected to not be prone to spillover effects by design.

5.1.1.2 Self-portrait analysis

Children's drawings are useful tools to gather subtle information about their mental health and well-being (Koppitz, 1968). Asking direct questions may not result is an appropriate elicitation of accurate information on children's emotions for several reasons[99]. Farokhi and Hashemi (2011) argue that drawings are communicative tools that can be observed and analysed to draw insights on child psychology. Their intellectual, social, emotional and physical development can also be tracked using proper identification of different characteristics of kid's drawings (Farokhi and Hashemi, 2011).

Empirical correlations between emotions (of joy, comfort, distress and many others) and their manifestations in drawings or paintings have long existed. For example, choosing dark over light colours; drawing a figure without a mouth, nose or eyes or with a crying face; are associated to depression, insecurity and anxiety (Koppitz, 1968; Klepsch and Logie, 1982; Di Leo, 1983). Contrarily, using cheerful colours or drawing a smiling face corresponds to happiness (Furth, 2002). Tiny figures are

[99] Inattention, lack of comprehension, language barriers, issues of numeracy or literacy, to name a few (List et al., 2021).

correlated to low self-esteem and the use of monstrous figures or genitals with aggression (Koppitz, 1968).

These characteristics (along with several others), are summarised in table 4 along with their empirical correlations based on the literature. When manifested in a drawing, their code received a score of 1 (and 0 otherwise). Data entry for each drawing was performed by two fieldworkers[100]. In case of any disagreements, a third surveyor would also score the drawing and the process would continue up until a consensus regarding the scores was reached.

Glewwe et al. (2018), in addition to the indices prepared by factor analysis, generated two additional standardised indices. I reproduce my indices of SE/optimism and happiness following their approach.

I start by ordering the characteristic codes in a single direction of impact on a psychological trait[101]. Each factor is normalised by demeaning it and dividing by the baseline standard deviation.

For the first index, I follow Kling et al. (2007) and prepare a simple average of these normalised variables. This is referred to as the Kling's index. Secondly, like Anderson (2008), I multiply the normalised index with an inverted variance-covariance matrix that results in the Anderson's Generalised Least Squares (GLS) index[102]. This step allocates a higher weight to the drawing characteristics, within a given variable, that carry more independent information (or a lower covariance with respect to other characteristics) vis-a-vis others. Alternatively, each variable i in a group j receives a weight of $\bar{s}_{ij} = (1' \sum^{-1} 1)^{-1} (1' \sum^{-1} y_{ij})$.

[100] under the constant supervision of the field-manager and PI.

[101] In my case, I focus only on SE/optimism and happiness. In the preliminary steps, I perform the exploratory factor analysis and plot the eignen values. I see a hump in an elbow-shaped screeplot that allows me to retain these two factors with confidence in their ability to possess independent information about the factor.

[102] For simplicity, in the rest of the thesis, it is also called Anderson's index.

Three different indices for the same psychological trait, i.e. SE/Optimism are used for the analysis due to their relative merit for variable creation. While, orthogonally rotated loadings that create the variable in factor analysis is a clean and robust measure, one may argue that the component loadings may or may not be entirely uncorrelated. Kling's index gives equal weight to each characteristic. On the contrary, it is also plausible to argue, that within its construct different weights should be ascribed to different latent component loadings based on these correlations for a given variable. Andreson's index addresses this by assigning lower weight to characteristics that are strongly correlated with others in the same factor.

In sum, EFA results in an index that is an amalgamation of characteristics based on their correlated component loadings to a latent psychological trait. Kling and Anderson's index are more theory driven. While the former eliminates unrelated codes within this variable, the latter adds higher weight to them, and vice-versa. A combination of the three, adds to the precision of the reported findings.

Figure 9 in appendix A.8 includes a set of kid's drawings. These depict the baseline variations in these factors. In panel A, drawings from two kids ranked at the 5th (figure a) and 95th (figure b) percentile of SE/optimism illustrate the stark distinctions in their self-portrait characteristics. Figure (b) on the right uses cheerful colours, has a smiling face and positive body language with positive accessorisation. Oppositely, figure (a) is plane-faced, drawn in a single colour without a smile or limbs. Panel B, shows two drawings at the 5th (a) and 95th (b) percentile of the baseline happiness index. The figure on the left (c) is rife with erasure marks, disproportionate figures and devoid of any colour. However, figure (d) depicts a student that is smiling, pleasantly seated in a car ride with her/his father (positive accessorisation). As shown above, with reference to table 4, drawings are a useful instrument for information elicitation without any risk of respondent bias.

I summarise the treatment effects measured using self-portraits in table 9. I find that SE/optimism rose by 0.28 sd immediately after the intervention in case of the first row estimates from EFA. The effect mellows down in a week (0.24 sd) and loses some significance. Nevertheless, after six weeks, the effects is sustained at 0.34 sd and becomes stronger in terms of significance at 1 percent. As seen in the second and third row of table 9, the effects follow a similar trend for the Kling's and Anderson's index, albeit smaller in magnitude.

Happiness index is seen to rise a week after the intervention. I argue that the immediate effects of high hope and optimism seep into heightened feelings of happiness. The effect on happiness is constant and sustained after 6-weeks at 0.20 sd, being significant at 10 percent.

5.1.2 Effort

To identify any treatment effects on in-class and out-of-class effort, I monitor student engagement in a productive activity during a substitution class period and their attendance in an optional after school remedial class, respectively. I use equation 4 and 5 to estimate any treatment effects over the different waves of data collection.

In table 6, I find that effort in substitution class increases by 0.26 sd at 5 percent level of significance. Students in general were motivated to engage in productive work[103], right after the intervention, when the occasion came in the form of a free-period. However, this effect was short-lived and was not detected in a weeks time (as shown in table 7).

In table 7, I find no treatment effects on effort in remedial class. However, the point estimates in figure 7 (c) and the effect sizes in column (6) of table 7, compel further analysis. Even though the attendance of the treatment group students was higher

[103]Ranging from completing homework, reading a book or newspaper or making notes or art work.

on an average in the final follow-up, I do not detect any effect in table 7.

Upon using equation 6, I find that the overall treatment effect, in column (5) of table 8, is highly positive and significant for remedial class attendance. The attendance rose for treated students by 0.17 sd overall, at 1 percent level of significance. This is jointly explained using table 8 and the qualitative information collected from school teachers.

Firstly, a quick glance at the number of observations in column 1, 2, 3 and 5 of table 8 show the additional power attained by using equation 6[104]. Due to this higher power (Bloom et al., 2013 and McKenzie, 2012), I am capable of detecting smaller effects when looking at the overall effect vis-a-vis the effects from individual rounds. Secondly, it takes effort from the kids to attend the class and also to convince their parents to let them. Parents are facilitators in this case with binding constraints of time and resources. Most of the students travel using public transport[105] to and back from school. If any student were to stay back for an extra hour to attend the remedial class, alternative arrangements for their pick-up were to be made and borne by their parents. This inflicted an additional cost of effort. Therefore, attendance in remedial class –unlike the substitution period –required effort from both the parents and the students. This conjecture was later validated, using the school-teacher interviews. The lack of effort in the short run was largely a result of this interplay. Nevertheless, after an adjustment window of 5 weeks, a larger number of treatment students, on an average, attended the remedial class in the sixth week. Overtime, the otherwise willing students, were able to convince their parents to find alternative means to facilitate their attendance. Simultaneously, during this period of adjustment, parents also had a window of opportunity to explore ways in which they could have their kid(s) picked up at a new time. This systematically delayed effect is captured in column 5 of table 8 and illustrated in between period 3 and 4 of figure 7 (c).

[104]Overall average treatment effect using ancova.
[105]Or transport arranged by the school - like school bus, auto-rickshaw or vans.

Marking an extension to my PAP, I collected and analysed administrative data on student attendance delivered from the schools. Attendance –the physical act of attending the school on a given day –is observed to be an objective measure of student effort. For each day that the school is operative and a student attends it, a score of '1' is awarded. If the student is absent, s/he receives a '0'. The same practice was followed consistently across all schools. I track the students' attendance from July 2019 to January 2020[106]. I use equation 5 to estimate the treatment effects on student attendance. The outcome variable is a monthly fraction prepared by dividing the total number of days in a month that the student attended the school with the total number of days in that given month that the school was functioning.

The intervention was conducted in the last week of August, 2019. So, the month of August is treated as baseline. Table 10, records the treatment effects using ancova. I find no effect for the months of September, October, November or December. However, there is a significant treatment effect of 0.024 sd in the month of January. As in column (6), the overall treatment effect is also positive (0.022 sd) and significant at 1 percent. Table 23 in appendix A.7 shows that the findings are similar for a DID estimation using equation 4. I find an increase of 0.02 sd in treatment group students' attendance, five months after the treatment (in January, 2020). This effect is significant at 5 percent. Panel (d) of figure 7 demonstrates this lasting effect of the intervention on treatment group students having a higher attendance.

5.1.3 Achievement

In table 7, I find that English scores start to improve after 1-week and the effect becomes stronger after 6 weeks. In the second follow-up survey after six weeks, I find that there is a 0.16 sd increase in student performance in English significant at 5 percent (see column 6).

[106]An average academic year in India runs from April to March with summer holidays in the months of May and June. Schools usually conduct final examinations in the month of February or March. Due to the onset of the Covid-19 pandemic, many schools did not conduct the final examinations in 2020, with most schools shutting down in February, 2020. Therefore, I have student records for a period of seven months, between July 2019 and February 2020.

The point estimates in figure 7 (e) and (f) show that the learning outcomes of the students as a whole improve over time[107]. However, I do not find any effects on Mathematics scores. It is only in English that the treatment group students perform markedly better. There is a twofold explanation for this that is detailed in the next chapter.

Firstly, English and Mathematics, as distinct disciplines follow different curriculum. While, English tests having a key component of comprehension are more flexible in the short-run, Mathematics relies strongly on hard-work and practice. This in turn makes it relatively less sensitive to short-run fluctuations. It can be easily argued that by paying a bit more attention on grammar or comprehension a student can perform better on the floor-based test[108]. Fuchs and Woessmann (2008), in a study on the assessment of international PISA scores find that for children under 15, performance within grades usually improves more rapidly for reading (or languages) than math or science. This is not to say that the treatment only affected language learning[109]. Instead, I suggest that due to the relative flexibility of performance by subject, I am able to only detect changes in English.

Secondly, I find that within the sample of all the teachers, English teachers on an average have a higher hope score, measured using an Adult Trait Hope Scale (Snyder, 2002). In table 2, the average hope score of English teachers is 56.64, while the score for Math teachers is 54.13. This suggests that teacher motivation can play a role in the efficacy of purely psychological treatment interventions. This summary statistic ought to be dealt with caution, as the average hope score of Mathematics teachers is also in the range of the global averages of individuals (Snyder, 1998).

[107]It is naturally expected, as they go to school.

[108]The same does not imply in test for Mathematics that focused on problems of number recognition, division or subtraction that involve learning-by-practice.

[109]Note that the treatment was delivered in the regional language ('Hindi') and not in English.

Point estimates of the academic performance of students in Mathematics and English are reported in figure 7 (e) and (f). As evident, in (e) both the green (placebo group) and blue (treatment group) lines follow a path not systematically different from each other. However, in case of English, as in (f), there is a larger improvement in the fourth period (i.e. follow-up survey 2).

5.1.4 Potential spillovers

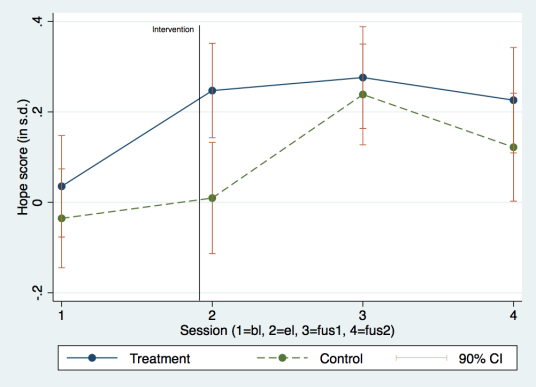
As a part of the research design to carefully pre-empt threats from spillovers, the surveyors uploaded and deleted the videos on the school computers a day before[110] and right after the intervention. In figure 7, spillovers are non-existent between the baseline and endline. However, after the endline, the students could interact and as mentioned formerly, presence of social learning mechanisms (Conley and Udry, 2010; Duflo and Saez, 2003; and Macours and Vakis, 2014) resulting from such conversations cannot be disregarded completely. Nevertheless, if such interactions are present, my analysis reports a lower-bound of the actual treatment effects.

Three factors about such potential spillover effects are to be carefully kept in mind before moving ahead with the discussion on these finding. Firstly, it is highly unlikely for these interactions to have an effect on the objective indicators of effort and performance in a short span of 6-weeks. Secondly, indicators like remedial class or school attendance require effort on part of the parents too, making it all the more unlikely to be affected by such interactions that are limited between the students. Thirdly, hope is easier to be influenced vis-a-vis optimism by such conversations. Optimism is the aspirational subset of hope, devoid of the agentic component[111]. Optimism or self-efficacy depicted in panel b of figure 7, is largely driven by pathways that are strenuous to be influenced by talks with peers compared to agency. Therefore, I argue that unlike optimism, the effect on hope disappears over the medium run with the main effect of such conversations residing over agency.

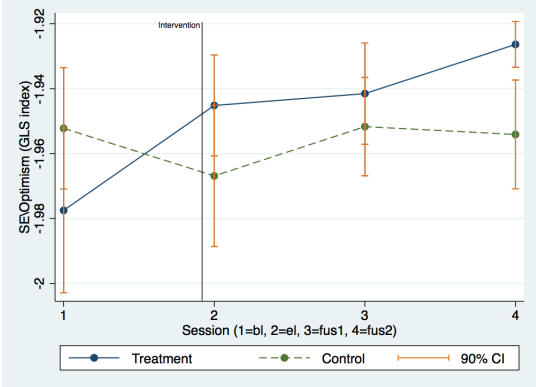
[110] At the end of the school hours.
[111] likely to be most sensitive to such interactions.

Figure 7: Point estimates by treatment status over time

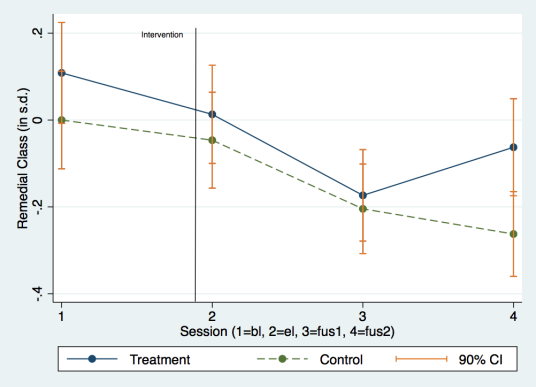
(a) Hope



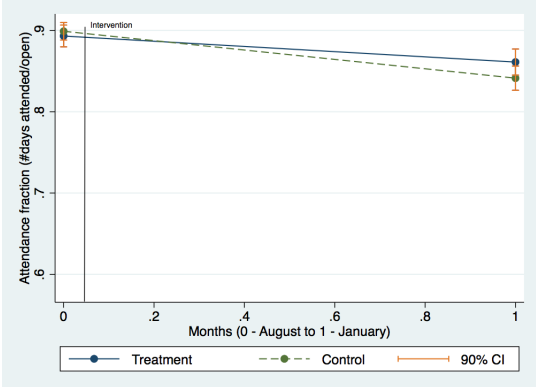
(b) SE/Optimism



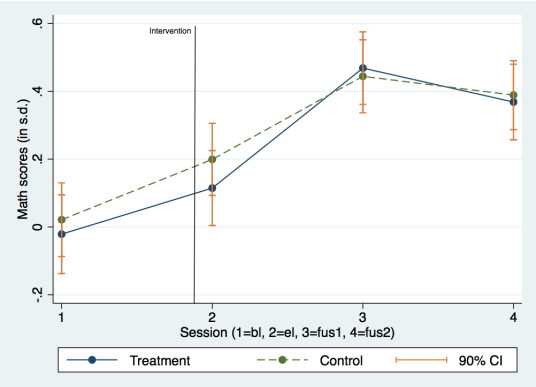
(c) Remedial class



(d) School attendance



(e) Mathematics



(f) English

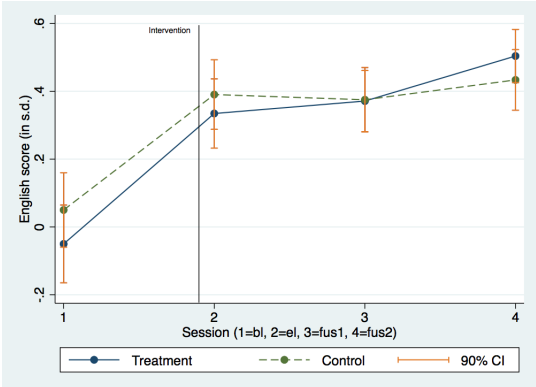


Table 6: Difference-in-differences (DiD) estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Before			After			DiD	DiD	DiD
Variable	Control (N)	Treatment (N)	Difference (D) (s.e)	Control (N)	Treatment (N)	Difference (D') (s.e)	(D' - D) Means only	Tr*Post Clustered s.e.	Tr*Post Clustered s.e. Controls
Hope (CHS)	-0.035 222	0.035 222	0.071 (0.096)	0.10 217	0.247 217	0.238** (0.097)	0.167 (0.136)	0.170** (0.078)	0.170** (0.078)
Self-efficacy/Optimism (EFA)	0.002 207	-0.114 207	-0.117 (0.099)	-0.099 209	0.049 209	0.148 (0.098)	0.265* (0.139)	0.270** (0.126)	0.279** (0.128)
Substitution class (SC) - Effort	0.002 216	-0.002 216	-0.004 (0.096)	-0.176 215	0.068 215	0.244** (0.096)	0.248* (0.136)	0.252** (0.128)	0.259** (0.131)
Remedial class (RC) - Effort	-0.000 216	0.109 216	0.109 (0.097)	-0.046 215	0.013 215	0.059 (0.097)	-0.049 (0.137)	-0.053 (0.108)	-0.066 (0.110)
Mathematics (ASER) - Achievement	0.021 216	-0.021 216	-0.042 (0.095)	0.199 215	0.115 215	-0.084 (0.095)	-0.042 (0.134)	-0.060 (0.062)	-0.072 (0.062)
English (ASER) - Achievement	0.050 216	-0.050 216	0.100 (0.092)	0.390 215	0.335 215	-0.056 (0.092)	0.044 (0.130)	0.043 (0.072)	0.054 (0.073)

Notes: The table displays difference-in-differences (DiD) results for baseline and endline data. The endline was conducted immediately after the intervention. I present simple means in column (1)-(7). Column (8) displays DiD estimates with standard errors in parenthesis, as in the next tables. The regression coefficients in column (9) are robust with controls and clustered standard errors at individual level - the unit of randomisation. The estimates are reported as being significant at * p <0.1 , ** p <0.05 and*** p <0.01.

Table 7: Treatment effects - DiD

Variable	Before/After		1 week later		6 weeks later	
	(1)	(2)	(3)	(4)	(5)	(6)
Hope (CHS)	0.170**	0.170**	-0.031	-0.042	0.024	0.028
	(0.078)	(0.078)	(0.081)	(0.083)	(0.090)	(0.092)
N	878	858	855	835	859	840
SE/Optimism (EFA)	0.270**	0.279**	0.225*	0.237*	0.313**	0.340***
	(0.126)	(0.128)	(0.126)	(0.128)	(0.131)	(0.133)
N	832	814	824	808	825	810
Effort (SC)	0.252**	0.259**	-0.053	-0.071	-0.046	-0.040
	(0.128)	(0.131)	(0.131)	(0.133)	(0.138)	(0.139)
Effort (RC)	-0.053	-0.066	-0.063	-0.044	0.069	0.056
	(0.108)	(0.110)	(0.105)	(0.106)	(0.107)	(0.109)
Achievement (Mathematics)	-0.060	-0.072	0.067	0.073	0.008	-0.014
	(0.062)	(0.062)	(0.069)	(0.069)	(0.076)	(0.077)
Achievement (English)	0.043	0.054	0.092	0.119*	0.158**	0.160**
	(0.072)	(0.073)	(0.732)	(0.073)	(0.071)	(0.072)
N	862	843	843	824	847	829
Controls	No	Yes	No	Yes	No	Yes

Notes: The table displays difference-in-differences (DiD) results for the entire study, including 4 data collection rounds. Robust standard errors clustered at individual level are reported in parenthesis. Estimates are reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01.

Table 8: Treatment effects - Ancova

Variable	(1) Before/After	(2) 1 week later	(3) 6 weeks later	(4) Overall effect	(5) Overall effect
Hope	0.191***	-0.004	0.051	0.019	0.027
	(0.072)	(0.073)	(0.082)	(0.043)	(0.043)
N	430	405	409	1189	1168
SE/optimism	0.152***	0.115	0.216**	0.147***	0.146***
	(0.040)	(0.095)	(0.083)	(0.044)	(0.044)
N	387	380	381	1148	1129
Effort (SC)	0.268***	-0.077	-0.035	-0.035	-0.0306
	(0.097)	(0.106)	(0.106)	(0.062)	(0.062)
Effort (RC)	0.009	0.003	0.129	0.162***	0.175***
	(0.090)	(0.084)	(0.086)	(0.049)	(0.050)
Math	-0.072	0.052	-0.016	0.002	0.0176
	(0.058)	(0.063)	(0.068)	(0.037)	(0.036)
English	0.006	0.046	0.102*	0.093***	0.110***
	(0.063)	(0.060)	(0.053)	(0.027)	(0.027)
N	414	396	399	1176	1155
Controls	Yes	Yes	Yes	No	Yes

Notes: The table displays the treatment effects using ANCOVA that controls for baseline values of the outcome variables. Column (1)-(3) present estimates for each wave. Column (4) and (5) present the overall average treatment effects using a pooled sample. This pooled sample results in higher power to detect an overall effect. Standard errors are in parenthesis. The estimates are reported as being significant at * p <0.1, ** p <0.05 and *** p <0.01.

Table 9: Treatment effects for self-portraits (DiD estimates)

Variable	Before/After		After 1 week		After 6 weeks	
	(1)	(2)	(3)	(4)	(5)	(6)
SE/Optimism Factor Analysis	0.270**	0.279**	0.225*	0.237*	0.313**	0.340***
	(0.126)	(0.128)	(0.126)	(0.128)	(0.131)	(0.133)
SE/Optimism Kling's index	0.055**	0.055**	0.052**	0.053**	0.066**	0.068***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.026)	(0.027)
SE/Optimism Anderson's index	0.048**	0.046**	0.035	0.039*	0.053**	0.059***
	(0.023)	(0.23)	(0.022)	(0.023)	(0.022)	(0.022)
Happiness Factor Analysis	0.176	0.173	0.197*	0.202*	0.184*	0.199*
	(0.138)	(0.140)	(0.116)	(0.118)	(0.105)	(0.107)
N	832	814	824	808	825	810
Controls		Yes		Yes		Yes

Notes: The table reports DiD estimates for the indices created from children's drawings. See section 3.3.1 and 5.2.2 for details. Standard errors, in parenthesis, are clustered at individual level. Estimates are reported as being significant at * p <0.1, ** p <0.05 and *** p <0.01.

Table 10: Treatment effect on student attendance

	(1)	(2)	(3)	(4)	(5)	(6)
September	-0.005					
	(0.010)					
October		0.011				
		(0.010)				
November			-0.008			
			(0.012)			
December				-0.004		
				(0.011)		
January					0.024 **	
					(0.011)	
Overall						0.022 ***
						(0.005)
Controls	✓	✓	✓	✓	✓	✓
Adjusted r-square	0.190	0.301	0.255	0.263	0.267	0.222
N	452	452	452	452	452	2260

Notes: The intervention was conducted in the last week of August. I compare the effect of treatment on each month's attendance (in fraction) after the intervention using Ancova. The last row presents the overall treatment effect from the pooled sample. Standard errors are in parentheses with *** p <0.01, **p<0.05 and *p<0.1.

5.2 Heterogeneity Analysis

I estimate heterogeneous effects due to gender, age or past performance. The treatment consisted of different protagonists. Gender, age or the goal-setting of these role models can result in differential treatment effects. It is possible to experience different stimuli within the sample of treated students based on individual characteristics that are time-invariant (gender, religion, household size or past performance)[112] or otherwise (age).

I modify equation (4), as shown below, for the heterogeneity analysis:

$$Y_{it} = \alpha_0 + \alpha_1 T_t + \alpha_2 D_i + \alpha_3 (D_i T_t) + \alpha_4 X_{it}^{'} + \alpha_5 (X_{it}^{'} D_i) + u_{it} \tag{7}$$

where α_5, the coefficient of the interaction term $(X_{it}^{'} D_i)$ captures the heterogeneity in treatment.

Firstly, I create a dummy for gender, which is 1 for boys and 0 for girls. Secondly, I create a dummy for those that are above the median age (9 years). The students above this threshold receive a score 1 and 0 if they are below 9 years of age. Thirdly, I prepare a dummy on the basis of the past performance of students in class 3 examinations. Above median scorers receive 1 and 0 otherwise. Lastly, I prepare hope quantiles using the baseline hope scores of the sample population.

Table 11 summarises the above-mentioned heterogeneous treatment effects. In panel (a) I report the psychological outcomes of hope, SE/optimism and happiness. Results from a similar analysis on effort (substitution and remedial class) and achievement (Mathematics and English) are in panel (b).

In panel (a), younger students have a higher treatment effect of the order 0.49 sd

[112] I do not find any heterogeneous effects for religion, household size or place of residence. These are not reported as they were also not a part of the PAP.

on their SE/optimism significant at 1 percent, vis-a-vis the above median age students (see column 5). Much in lines with Heckman et al. (2013) this suggests the importance of early age interventions (even with such a young sample). Several studies find that honing the soft skills or motivating children at an early age, can translate into improved later adulthood outcomes (Heckman et al., 2006, 2013 and Heckman and Kautz, 2012). A short motivational intervention in my case, illustrates the power of early-age intervention on an important psychological trait among kids: self-efficacy or optimism. I do not find any heterogeneous effects of age on effort or achievement, after the intervention. In fact, overall, I do not find any heterogeneous effects on effort or achievement as shown in panel (b)[113].

The intervention consisted of two female and one male role model. Lockwood and Kunda (1997) propose that female respondents are more susceptible to female role models, whereas male respondents are almost equally influenced by role models of either gender. That been said, I do not find any heterogeneous effects across gender on psychological traits or on effort and achievement. Nevertheless, the empirical evidence in the literature suggested that gender, often is a strong predictor in such role modelling interventions. Bettinger and long (2005), in Ohio, find female course instructors to be highly influential in the choices of courses and fields of major , unlike their male counterparts. Riley (2017), finds a stronger treatment effect on girls' academic performance than boys, after watching a motivational film in Uganda ('*Queen of Katwe*').

At a cursory glance of table 11, it is likely to resolve into the conclusion that the mixture of two female and one male role models, balances the treatment effects across the sample of students, both male and female. However, upon adding a further interaction between age and gender, I find that gender plays a role in the below median age students. In table 12, I report a higher treatment effect (0.42 sd significant at 10 percent) for younger girls compared to younger boys.

[113] Although the effect is positive and significant in column 6 for effort in remedial class for students with an above median past performance, the overall treatment effect is insignificant.

Based on the baseline hope scores, I split the sample into subsection of hope quantiles, composing a single dummy. This dummy, when interacted with treatment, reveals the treatment heterogeneity on the basis of prior hope of the students. I report my findings in table 13.

In column (1) of table 13, I find that the lowest quantile of students have the highest treatment effect. Although moderately significant at 10 percent, these students increased their hope scores by 0.23 sd. There are no other treatment effects based on these hope quantiles[114], except for the effort in substitution class. Column (3) shows that the students in third quantile have a larger effect in their effort in the substitution class (0.28 sd at 10 percent level of significance).

Interestingly, students in the highest quantile have a negative effect of 0.32 sd significant at 10 percent and do not increase their effort. It is important to note that too much hope can result into over-confidence and this aspect requires further exploration. The underlying distinction between hope that can be a facilitator of effort; and false hope that can undermine hard work due to complacency or overconfidence[115] is yet to be studied. An optimal level of hope and its complementarity with effort (and other achievement parameters) depends on this dichotomous relation, which commands more research as the field grows.

To summarise, in this study, age is a strong determinant of heterogeneity (Heckman et al., 2013). Similarly, like Lockwood and Kunda (1997) and Lockwood (2006), gender also plays a key role in treatment heterogeneity. Furthermore, I find evidence that it is the lowest hope students that respond the most to the same treatment, over and above those is higher hope quantiles.

[114]Second quantile students showed higher effort in remedial class and performed better on the ASER tests, but the treatment effects in the first row are insignificant to have any meaningful inference. The same applies to the students in fourth quantile for ASER scores in column (5) and (6).

[115]Or for numerous other reasons.

Table 11: Heterogeneous effects by gender, age and past performance

Panel (a): Psychological outcomes

	(1) Hope	(2) Hope	(3) Hope	(4) SE/Optimism	(5) SE/Optimism	(6) SE/Optimism	(7) Happiness	(8) Happiness	(9) Happiness
Treatment	0.170**	0.171**	0.171**	0.278**	0.279**	0.283**	0.176	0.176	0.176
	(0.078)	(0.078)	(0.078)	(0.126)	(0.126)	(0.126)	(0.137)	(0.138)	(0.137)
Male	0.142	0.121	0.118	-0.381***	-0.318***	-0.308***	0.043	0.057	0.054
	(0.135)	(0.091)	(0.091)	(0.094)	(0.068)	(0.068)	(0.091)	(0.074)	(0.073)
Above median age	0.037	-0.037	0.033	0.060	0.302***	0.051	-0.077	-0.130	-0.081
	(0.108)	(0.160)	(0.108)	(0.096)	(0.112)	(0.095)	(0.088)	(0.116)	(0.088)
Above median baseline exam record	0.215**	0.218**	0.321**	0.015	0.003	0.089	-0.099	-0.097	-0.056
	(0.087)	(0.087)	(0.129)	(0.075)	(0.074)	(0.108)	(0.070)	(0.070)	(0.081)
Tr*male	-0.047			0.146			0.023		
	(0.183)			(0.136)			(0.140)		
Tr*age		0.151			-0.490***			0.103	
		(0.215)			(0.183)			(0.172)	
Tr*baseline exam			-0.214			-0.151			-0.086
			(0.174)			(0.148)			(0.146)
Constant	-0.249**	-0.220**	-0.289**	0.215***	0.125	0.132	0.069	0.071	0.041
	(0.117)	(0.103)	(0.112)	(0.071)	(0.082)	(0.088)	(0.099)	(0.081)	(0.093)
N	878	878	878	832	832	832	832	832	832

Panel (b): Effort and Achievement

	(1) SC	(2) SC	(3) SC	(4) RC	(5) RC	(6) RC	(7) English	(8) English	(9) English	(10) Math	(11) Math	(12) Math
Treatment	0.261**	0.261**	0.262**	-0.051	-0.052	-0.053	-0.053	-0.053	-0.054	0.053	0.053	0.053
	(0.128)	(0.129)	(0.128)	(0.109)	(0.109)	(0.109)	(0.062)	(0.062)	(0.062)	(0.072)	(0.072)	(0.072)
Male	-0.195*	-0.178**	-0.177**	-0.135	-0.056	-0.053	-0.008	0.071	0.070	-0.238**	-0.193**	-0.194**
	(0.104)	(0.0747)	(0.0744)	(0.119)	(0.085)	(0.084)	(0.110)	(0.079)	(0.079)	(0.106)	(0.076)	(0.076)
Above median age	-0.104	-0.073	-0.108	-0.026	0.018	-0.023	-0.376***	-0.407***	-0.379***	-0.371***	-0.392***	-0.373***
	(0.083)	(0.114)	(0.083)	(0.095)	(0.130)	(0.094)	(0.098)	(0.148)	(0.098)	(0.097)	(0.135)	(0.097)
Above median baseline Exam performance	0.109	0.108	0.174*	0.050	0.047	-0.096	0.806***	0.806***	0.774***	0.642***	0.642***	0.629***
	(0.070)	(0.071)	(0.096)	(0.081)	(0.081)	(0.110)	(0.078)	(0.079)	(0.108)	(0.077)	(0.078)	(0.108)
Tr*male	0.035			0.158			0.152			0.085		
	(0.149)			(0.167)			(0.158)			(0.151)		
Tr*age		-0.062			-0.097			0.054			0.038	
		(0.167)			(0.186)			(0.197)			(0.191)	
Tr*baseline exam			-0.131			0.291*			0.062			0.025
			(0.142)			(0.161)			(0.158)			(0.154)
Constant	0.097	0.080	0.053	0.068	0.008	0.092	-0.315***	-0.358***	-0.347***	-0.053	-0.076	-0.074
	(0.099)	(0.088)	(0.091)	(0.111)	(0.098)	(0.104)	(0.099)	(0.090)	(0.100)	(0.098)	(0.091)	(0.102)
N	862	862	862	862	862	862	862	862	862	862	862	862

Notes: Treatment effects on a host of dependent variables as in columns (1)-(9) in panel (a) and columns (1)-(12) in panel (b) are presented. In panel (a) column (1), (4) and (7) show the heterogeneous effect from gender. Similar effects on gender in panel (b) are in column (1), (4), (7) and (10). The effect of age in panel (a) is captured in columns (2), (5) and (8). Similarly, for panel (b) the effect of age is in columns (2), (5), (8) and (11). Columns (3), (6), and (9) capture the heterogeneous effects on the basis of past performance in panel (a). Similar effects on effort and achievement are in columns (3), (6), (9) and (12). See section 5.2 for more details. Standard errors, in parenthesis, are clustered at individual level. The estimates are reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01. Confounding factors are controlled for in all the estimates.

Table 12: Heterogeneous effects on optimism by age and gender

	(1) SE/Optimism	(2) SE/Optimism
Treatment	0.287**	0.282**
	(0.126)	(0.126)
Above median age	0.112	0.134
	(0.101)	(0.111)
Male	-0.286***	
	(0.067)	
Female		0.357***
		(0.069)
tr*(above median age*male)	-0.201	
	(0.221)	
tr*(above median age*female)		-0.422*
		(0.228)
Constant	0.095	-0.237*
	(0.107)	(0.121)
R-square	0.031	0.034
Observations	829	829

Notes: Treatment effects on self-efficacy or optimism by age and gender are presented in the former table. An interaction between gender and above median age is presented in this table. See section 5.2 for details. Standard errors are clustered at individual level. The estimates include controls and are reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01.

Table 13: Heterogeneous effects by hope quantiles

	(1) Hope	(2) SE/Optimism	(3) Effort (sc)	(4) Effort (rc)	(5) Math	(6) English
treatment	0.174 **	0.299 **	0.270 **	-0.054	-0.064	0.055
	(0.078)	(0.126)	(0.129)	(0.109)	(0.061)	(0.072)
tr* quantile 1	0.232 *	-0.184	-0.138	-0.093	0.015	0.129
	(0.137)	(0.183)	(0.159)	(0.175)	(0.185)	(0.186)
tr* quantile 2	-0.224	0.180	0.158	0.360 *	0.311 *	0.275 *
	(0.140)	(0.193)	(0.154)	(0.188)	(0.172)	(0.165)
tr* quantile 3	-0.150	0.030	0.281 *	-0.102	-0.133	-0.100
	(0.137)	(0.150)	(0.168)	(0.181)	(0.177)	(0.171)
tr* quantile 4	-0.099	-0.065	-0.319 *	-0.256	-0.309 *	-0.341 **
	(0.118)	(0.160)	(0.176)	(0.188)	(0.164)	(0.163)
Observations	874	829	858	858	858	858
R-squared	0.44	0.031	0.033	0.026	0.237	0.217

Notes: Treatment effects on the dependent variables in column (1)-(6) by baseline hope scores. These scores are split by quantiles. Standard errors, in parenthesis, are clustered at individual level and reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01. Confounding factors are controlled for in all the estimates.

5.3 Robustness

Robustness of findings is of significance in RCTs. I follow a threefold approach and acknowledge that the main results are unfettered. Firstly, in case of index compositions using several factors, I compare my naive p-values with FWER-adjusted p-values. Secondly, to minimise the impact of any outliers on my averages and variances, I winsorise my sample. This step enables me to satisfactorily negate any claims that the findings are driven due to any outliers. Thirdly and finally, I cross-check my empirical findings with qualitative data collected from school teachers. A complementarity between teacher[116] observations and my findings signals the latter's credibility in this case.

FWER-adjusted p-values for self-portraits

As indicated in table 19, several factors contribute towards the creation of meaningful variables from kid's drawings. I focus on the main outcome variable –SE/optimism –from the psychometric analysis of children's self-portraits. Following Anderson (2008), I sort observed p-values and run 10,000 simulations to generate simulated p-values. In a step-wise ordering process, I replace the simulated p-values with the least simulated p-value associated with that outcome, possessing an observed p-value that is greater than or equal to the ones being replaced. A count is kept for all such replacements. A final ordering adjustment[117] results in the FWER-adjusted p-values that correspond to the naive p-value of that outcome. Table 14, reports the naive p-values in column (2) and the slightly higher FWER-adjusted p-values in column (3) for comparison. Following this comparison, I argue that the findings are robust albeit slightly less significant even with the FWER p-values. It is safe to infer that I can reject the null hypothesis that the treatment has no effect on self-efficacy or optimism at 10 percent level of significance.

[116] Unaware of the treatment assignments.
[117] This enforces monotonicity by arranging the p-values in an ascending order.

Winsorization

I winsorize my sample outcome variables at 1 (and 99) and 5 (and 95) percent and perform a DiD estimation. Table 15 shows that the results are unaffected for effort and achievement. Similarly, table 16 shows that the effects are unchanged for psychological traits in panel (a). In panel (b) of table 16, the effects are slightly smaller and less-significant, which is expected at 5 percent level of winsorizing.

Teacher interviews

As an additional round of robustness check, I conducted several interviews[118] with the teachers in the six schools. The objective of these respondent verification interviews[119] was to cross-validate my findings.

The teachers unanimously pointed out that for a short period of time after the study, there were marked improvements in overall student behaviour, punctuality and homework completion rates. As teachers did not have access to neither effort, CHS or ASER scores of students, nor the knowledge of the intent of the study, these findings are credible.

2SLS estimates

Following Acharya et al. (2016, 2018) and assuming any treatment effect on performance being mediated through effort, I perform a 2SLS analysis. I instrument effort with the treatment status that is randomly assigned. The results are presented in table 23. To prepare an effort index the two outcomes of substitution and remedial class are combined[120] and standardised.

[118] A 1-page summary is available in appendix A.9

[119] The translated versions of these interviews are available in english upon request via access to a project dropbox folder.

[120] If a student is reported to exert effort in either a substitution class (SC) or a remedial class (RC),

In table 23, panel (a) estimates the effect of effort in a remedial class on performance using treatment assignment as an instrument, while panel (b) estimates the effect of a composite index of substitution and remedial class[121]. Column (2) in both the panels, shows the reduced form estimates, with the treatment having a positive and significant effect on performance in English[122]. I find that although the treatment has an effect on effort[123], the effect of the treatment on performance in English through effort, in column (4) is non-significant. Although the OLS estimates in table 20, suggest a strong positive association between effort and performance at baseline, the first column of table 23 has a negative relationship. This is due to the fact that over time the effort of students on an average is falling (with the treatment group exerting higher effort) as in panel (c) of figure 7. Student performance is improving in general (see panel (e) and (f) of figure 7) as the students are going to school.

The findings do not rule out the role of heightened effort in elevating student performance. Instead, they offer evidence on the presence of other channels. Effort is not the sole channel through which, the intervention affects performance. Failing to acknowledge the presence of other channels that can have a direct effect on performance[124] is imprudent. In table 23, the exclusion restrictions are not satisfied and this supports the predicted mechanisms in figure 1. Thus, as a final robustness check, table 23 illustrates the essence of the different mechanisms at play. It justifies the presence of direct effects of psychological factors on performance, in addition to effort.

s/he receives a score of 1 and 0 otherwise.

[121]With respect to the suggestion of the committee, I have created this index. However, given the design and timeline of the study, it is infeasible and incorrect to create an index using attendance data too. The variables of SC and RC capture information in the span of 6-weeks, (and are ordinal) but the attendance variable is used for predicting aggregated medium-run effects.

[122]As in panel (f) of figure 7.

[123]First stage in column (3).

[124]For instance, a more hopeful student can be more confident and mentally relaxed during an exam and perform better than another student who would have prepared the same number of hours.

Table 14: FWER test

Variable	(1) Effect	(2) Naive p-value	(3) FWER p-value	(4) N
Self-esteem/Optimism (Anderson's Index)	0.048 (0.023)	0.037	0.064	832
Self-esteem/Optimism (Kling's index)	0.055 (0.025)	0.028	0.064	832
Self-esteem/Optimism (EFA)	0.27 (0.125)	0.032	0.064	832

Notes: I reproduce the family wise error rate adjusted p-values based on Anderson (2008). Column (1) reports the treatment effect. Column (2) and (3) report the naive and FWER-adjusted p-values, respectively. See section 5.4 for details. Clustered standard errors are present in parenthesis.

Table 15: Winsorized sample - DiD for effort and achievement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Before			After		DiD	DiD	DiD	DiD
Variable	Control	Treatment	Difference (D)	Control	Treatment	Difference (D')	(D' - D)	Before/After	1 week later	6 weesk later
	(N)	(N)	(s.e)	(N)	(N)	(s.e)	Mean only	Tr*Post	Tr*Post	Tr*Post
Panel (a) winsorized data at 1 and 99 percent										
Effort	0.002	-0.002	-0.004	-0.176	0.068	0.244**	0.248*	0.258**	-0.073	-0.039
(Substitution class)	216	216	(0.096)	215	215	(0.096)	(0.136)	(0.131)	(0.134)	(0.140)
Effort	-0.0001	0.109	0.109	-0.046	0.013	0.059	-0.049	-0.063	-0.042	0.062
(Remedial class)	216	216	(0.097)	215	215	(0.097)	(0.137)	(0.110)	(0.106)	(0.109)
Achievement	0.021	-0.021	-0.042	0.199	0.115	-0.084	-0.042	-0.070	0.078	-0.006
(Maths)	216	216	(0.095)	215	215	(0.095)	(0.134)	(0.062)	(0.069)	(0.077)
Achievement	0.05	-0.05	-0.1	0.39	0.355	-0.056	0.044	0.057	0.119	0.166**
(English)	216	216	(0.092)	215	215	(0.092)	(0.130)	(0.073)	(0.074)	(0.073)
Panel (b) winsorized data at 5 and 95 percent										
Effort	0.002	-0.002	-0.004	-0.176	0.068	0.244**	0.248*	0.258**	-0.073	-0.039
(Substitution class)	216	216	(0.096)	215	215	(0.096)	(0.136)	(0.131)	(0.134)	(0.140)
Effort	-0.0001	0.109	0.109	-0.046	0.013	0.059	-0.049	-0.063	-0.042	0.062
(Remedial class)	216	216	(0.097)	215	215	(0.097)	(0.137)	(0.110)	(0.106)	(0.109)
Achievement	0.053	0.014	-0.039	0.227	0.136	-0.092	-0.053	-0.076	0.054	-0.008
(Maths)	216	216	(0.088)	215	215	(0.089)	(0.125)	(0.060)	(0.067)	(0.075)
Achievement	0.069	-0.036	-0.105	0.403	0.341	-0.062	0.043	0.057	0.119	0.163**
(English)	216	216	(0.089)	215	215	(0.090)	(0.126)	(0.071)	(0.072)	(0.071)
Controls								Yes	Yes	Yes
Clustered s.e.								Yes	Yes	Yes
N	216	216		215	215		862	843	824	829

Notes: Robust standard errors in parenthesis. The estimates are reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01.

Table 16: Winsorized sample - DiD for psychological outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variable	Control (N)	Before Treatment (N)	Diff. (D) (s.e)	Control (N)	After Treatment (N)	Diff. (D') (s.e)	DiD (D' - D) Means only	DiD Before/After Tr*Post	DiD 1 week later Tr*Post	DiD 6 weeks later Tr*Post
Panel (a) winsorized data at 1 and 99 percent										
SE/Optimism	0.002	-0.112	-0.114	-0.095	0.051	0.146	0.260 *	0.265 **	0.237*	0.327**
(EFA)	207	207	(0.097)	209	209	(0.097)	(0.137)	(0.126)	(0.127)	(0.130)
SE/Optimism	-0.803	-0.829	-0.026	-0.826	-0.797	0.029	0.055 *	0.055 **	0.054**	0.068**
(Kling's index)	207	207	(0.020)	209	209	(0.020)	(0.028)	(0.025)	(0.025)	(0.026)
SE/Optimism	-1.952	-1.977	-0.025	-1.967	-1.945	0.022	0.047 *	0.046 **	0.039*	0.059***
(Anderson's index)	207	207	(0.018)	209	209	(0.018)	(0.025)	(0.023)	(0.023)	(0.022)
Happiness	0.048	-0.137	-0.185***	0.017	0.024	0.007	0.192*	0.191**	0.159*	0.168**
(EFA)	207	207	(0.070)	209	209	(0.070)	(0.099)	(0.095)	(0.093)	(0.085)
Hope	-0.033	0.040	0.072	0.017	0.249	0.232 **	0.159	0.162 **	-0.031	0.031
(CHS)	222	222	(0.095)	217	217	(0.096)	(0.135)	(0.076)	(0.082)	(0.091)
Panel (b) winsorized data at 5 and 95 percent										
SE/Optimism	0.071	-0.003	-0.074	-0.009	0.090	0.098	0.172 *	0.177 **	0.177**	0.216**
(EFA)	207	207	(0.066)	209	209	(0.066)	(0.094)	(0.084)	(0.084)	(0.087)
SE/Optimism	-0.784	-0.799	-0.015	-0.802	-0.787	0.015	0.030 *	0.031 *	0.039**	0.039**
(Kling's index)	207	207	(0.013)	209	209	(0.013)	(0.019)	(0.016)	(0.017)	(0.017)
SE/Optimism	-1.939	-1.949	-0.010	-1.945	-1.938	0.007	0.018	0.017	0.023*	0.028**
(Anderson's index)	207	207	(0.009)	209	209	(0.009)	(0.012)	(0.011)	(0.012)	(0.011)
Happiness	0.084	0.051	-0.032	0.077	0.079	0.002	0.034	0.029	-0.024	-0.016
(EFA)	207	207	(0.031)	209	209	(0.031)	(0.044)	(0.036)	(0.039)	(0.037)
Hope	-0.010	0.069	0.078	0.054	0.263	0.210 **	0.131	0.133 *	-0.036	0.021
(CHS)	222	222	(0.089)	217	217	(0.090)	(0.127)	(0.073)	(0.080)	(0.087)
Controls								Yes	Yes	Yes
Clustered s.e.								Yes	Yes	Yes
N (Drawings)	207	207		209	209		816	816	809	814
N (CHS)	222	222		217	217		858	858	835	840

Notes: Robust standard errors in parenthesis. The estimates are reported as being significant at * p <0.1 , ** p <0.05 and *** p <0.01.

6 Discussion and Concluding Remarks

6.1 Discussion

Hopeful thoughts and attitudes are a guide towards self-worth (preceding self-esteem and self-efficacy) by increasing a child's perception regarding their goal-attainability (Snyder et al., 1997). The treatment has short-term effects on hope scores and longer-lasting effects on SE/optimism. Although in panel (a) of figure 7, the overall effect on the hope scores of the treatment group students is positive, it is not detected after 6-weeks.

Hopeful children can stay mentally energised, constantly driving inspiration from their past acquaintances with role models to channel feelings of learned optimism and self-efficacy in their lives (Kliewer and Lewis, 1995). This segregation of the findings and the eventual decomposition of constituting motivational parameters is beyond the scope of this thesis. However, figure 7 (a) and (b) suggest that it is not an exaggeration to acknowledge the possibility that a small (possibly transient) shock in hope, can percolate into sustained feelings of learned optimism and efficacy. Similarly, happiness, significant at 10 percent, follows a gradual positive adjustment over the six week period. It could be solely explained by the treatment[125] or partly due to the improvements in the psychological traits of hope and optimism that eventually seep into a feeling of happiness.

Third party observations in a substitution class experience a short-lived increase immediately after the intervention. This is not the case for remedial class attendance. This is partly because, (i) effort in the remedial class is not solely determined by the willingness of the student and (ii) the associated constraints take time to undergo an adjustment. This adjustment is reflected in figure 7 (c), in which, after the first follow-up there is a spike in the attendance of the treatment group students over

[125]Independent of the improvements in hope or self-efficacy.

and above the control group. It is later detected that the overall average treatment effect on the student attendance in the remedial class or school attendance in general, is positive and strongly statistically significant (at 1 percent).

In achievement, I find that an effect of 0.16 sd on a standardised English test and no effect on Mathematics. Accruing largely to three arguments, I reason that in the short span of 6-weeks, English scores are more flexible, especially for the given sample. Firstly, Fuchs and Woesmann (2008) find that reading and language learning outcomes increase relatively quicker than mathematics for students below the age of 15 years. Secondly, teacher interviews suggested that the two curriculum follow distinct patterns and with it, the associated learning curves. Hard work and effort dictate much of the progress that is observed in math learning. Whereas, English, being less sequential, is rather susceptible to attention during class. Lastly, I find that English teachers in the sample of schools, on an average, were more hopeful than Mathematics teachers[126]. I believe that the intervention –catered to foster 'hope' –resonated in some ways to re-iterate the motivational components of talks that would have otherwise been offered by the English teachers. This added layer of relatability, in terms of the content and past experiences in the classroom, could propel the treatment effects in English (and the overall findings).

To summarise the key findings, I narrate the chain of treatment effects. Immediately after the intervention, there is an increase in student motivation (measured by hope and SE/optimism). This is accompanied by a short-lived increase in student effort in substitution class. Later on, while the effect on hope evaporates, the effect on SE/optimism is sustained. Happiness starts to increase moderately too. After a brief window of adjustment, students' effort in remedial class increases. These improvements in motivation and effort are also paired with an increase in student's achievement in English. This suggests that motivation and effort precede performance appraisals. Later on, I also find that even after 5-months, the increase in

[126]See table 2.

student effort is significant, as measured by their school attendance.

Next, I discuss the cost-effectiveness of the treatment. Alongside, I also present the key policy takeaways from this research.

6.1.1 Cost-effectiveness and policy implications

Experimental evidence in the developmental literature has unequivocally underlined the importance of both supply-side[127] and demand-side[128] interventions. Especially in education, there has been a rise in international aid. Impact assessment methods, that rely largely on program evaluations using natural or quasi-experiments have been a useful tool in informing public policies. Similarly, RCTs that aim to assess the causal effects of well-intentioned interventions have amassed a lot of attention in guiding public policies.

In this section, I focus my attention to the recent studies in education that use experimental evidence from RCTs to improve children's psychological, academic and overall development. I premise the main cost-effectiveness argument of this chapter in lines with Kremer et al. (2013)[129]. The authors present an analysis of the effect sizes of such studies after extrapolating the effect sizes in terms of per 100 USD spent. Before presenting (and comparing) the cost-effectiveness of my findings in a similar fashion, I summarise below similar studies that have been undertaken in different parts of the world.

In an assessment of a conditional cash transfer (CCT) program, Baird et al. (2011) find that English test scores of students in Malawi improved by 0.14 sd. However, pecuniary incentives in Ohio, as studied by Bettinger (2012), affected only Mathematics scores. Such financial incentives in elementary school children, rose their

[127] Those that address material constraints.

[128] Addressing psychological barriers towards economic development in general and internal constraints to be precise.

[129] This comparison is mainly in terms of the effect sizes, key parameters of interest and sample populations.

math performance in school tests by 0.15 sd. In an extensive study in India, Banerjee et al. (2007) find that a remedial school education program (using *Balsakhis*) increased the overall average test scores of students by 0.28 sd, with the lowest quantile of students having the highest effect. Another part of the study by Banerjee et al. (2007) focused on a computer-assisted learning (CAL) program, which inflated student's math test scores by 0.47 sd. This effect persisted at 0.10 sd even after one year (ibid.).

Recent literature points towards similar effects on behavioural outcomes and from psychological interventions. Glewwe et al. (2018) evaluate the impact of compassion international child sponsorship program in Indonesia using kid's drawings and find significant improvements in their psychological outcomes. Riley (2017) tested the effects of a motivational film on secondary school students in Uganada and found an increase of 0.11 sd in their mathematics scores. These have paved ways for numerous ongoing evaluations and RCTs focusing largely on a host of treatments and outcome variables[130]. If anything, purely psychological role modelling intervention are at least as cost-effective as other supply side interventions amounting for largely similar effects[131].

In order to compare my findings with the formerly mentioned studies, like Kremer et al. (2013), I convert my results in terms of effect sizes in sd per $100 spent. The sample size in this study was 452 students in primary schools of Jaipur, Rajasthan. Although, this is representative of all the students in class 4 (aged 8-11 years on average) in urban areas of Rajasthan, for simplicity, I restrict the calculations for the these 452 students[132]. Ideation, production and scripting costs of the intervention

[130]These treatments include role modelling (edutainment and pedagogical innovations), growth mindsets, participatory approaches, among many others (Islam et al., 2021; Biswas et al., 2020; and Kipchumba et al., 2021).

[131]Chong and La Ferrara (2009) and La Ferrara et al. (2012) show that these are also sustained over large intervals of time. In this paper, I also find lasting effects after five months in student attendance.

[132]It is noteworthy, that the same intervention requires barely any additional cost to be delivered to all these students in Rajasthan. Similarly, a repeated delivery of the same intervention has no marginal cost in monetary terms. It might be worthwhile to design an RCT to assess the optimal duration and extent of exposure to one or similar such treatments.

amounted to a total of £1200, which at that time, was roughly equal to $1630. Additional administrative costs included the purchase of earphones and card-board boxes, and were of estimated to be roughly $450[133]. Therefore, the cost of treatment per student was 4.6 USD.

It is safe to say, that to increase the english test score for an average student by 0.16 sd, it costed 4.6 USD. So, for every 100 USD spent, the English score increased by 3.5 sd[134]. Akin to this approach, every 100 USD spent, corresponds to 3.6 sd, 6 sd and 4 sd improvements in hope, SE/optimism and happiness, respectively. These findings are similar to those in Glewwe et al. (2018) in terms of their actual magnitude (hope: 0.32 sd, self-efficacy or optimism: 0.68 sd and happiness at: 0.40 sd) in Indonesia.

In Kenya, Duflo et al. (2011) find a 0.16 sd increase in English scores (along with a 0.17 sd total score improvement) from a teacher tracking and incentive program. This finding pertains to 18-months after the intervention started. In Glewwe et al. (2010), another teacher incentive program in Kenya, had similar effects (0.15 sd) two-years through the program implementation. The effects in Banerjee et al. (2007) were detected 2-years after the treatment and lasted for over a year after in another follow-up. My treatment effects, detectable as soon as, 1-week after the treatment and strongly significant 6-weeks after, are comparable to Baird et al. (2011), Riley (2017) or Duflo et al. (2011). This highlights the significance of such role modelling interventions, not only in terms of their efficacy but also, the immediacy of this impact.

6.1.2 Extensions

I exploit the effect of role models on the viewers, given that they are relatable and showcase reasonable goal-attainability. Strong improvements in the psychological

[133]This is an upper-bound.

[134]With 4.6 sd, score for 1 student can be increased. Thus, scores for 22 students can be increased in the same manner for $100.

traits of children are complemented by an increase in their effort and academic performance. Psychological improvements in hope and SE/optimism are followed by improvements in student attendance (in remedial class by 0.17 sd and overall school attendance by 0.02 sd) and better test performance (0.16 sd in English).

In this subsection, I talk about three valuable strands of extensions. Firstly, a further decomposition of the treatment effects using additional treatment arms can inform about the independent role played by different performance parameters (psychological and otherwise). Secondly, the predictions regarding testing for an optimal level of hope, such that it does not, in any way, is translated as false hope. And thirdly, the durability of such role modelling treatment effects along with their sustainability.

The implicit significance of a "big push" to escape aspiration traps, much like material constraints, has received a lot of attention recently (Sachs, 2005; Balboni et al., 2019; Ghosal et al., 2020; and La Ferrara, 2019). I propose that such a push if administered exogenously on individual hope can be beneficial in two ways: (i) improving the psychological outcomes, like optimism and happiness, within the broader construct of hope, and with it (ii) elevate individual effort[135]. Together, hope and effort, in the presence of several other factors, are expected to improve achievement[136]. A decomposition of these effects of hope on other traits, including aspirations that is beyond the scope of this thesis, poses to be a crucial extension. Hope has been argued to fuel and sustain other traits like aspirations (Duflo, 2012). If such an association exists, hope can be premised as a capability in Sen's terms.

Experimenting with hope also holds a twofold advantage over aspirations: (a) devoid of a close association with positive expectations, it is less likely to foster unrealistic aspirations and the consequential disappointments[137], and (b) it can be un-

[135]Proposition 1 chapter 3.
[136]See theory of change in chapter 3.
[137]Ray (2006), cautions that expanding the aspiration windows too much can lead to frustration.

dertaken in a highly cost efficient manner, as shown in the former subsection. However, it is also important to be wary on the grounds of '*How much hope, can be too much hope?*'. Determination of an optimal level of hope, that further serves as an instigator of effort, is the second main avenue of future experimentation.

It will be equally, if not of paramount immediate importance, to assess the sustainability of these treatment effects in the long run. It could be the case that the effects amplify or completely dissipate over years. The same treatment can affect other non-pre-specified outcomes over different time intervals. Moreover, it may be possible that the shift in hope or effort levels of these students in the short run, cause later adulthood changes. It will be useful to pursue these.

6.2 Concluding Remarks

This thesis pertains to explaining the significance of role models in increasing student motivation, heightening their effort and improve their academic performance. Offering experimental evidence, it illustrates the impact of an intervention on these psychological and non-psychological attributes.

In chapter 1 and 2, I provide the underlying motivation for this research and an in-depth review of the existing literature. Spanning from the state of education in India to the role of aspirations and the newly found concept of hope in developmental economics, the literature in so far, lacks treatment interventions that solely focus on the latter. In an attempt to contribute towards it, I then present a theory of change and a brief explanation of the experimental set-up in Chapter 3.

Before presenting the results from the RCT, chapter 4 sheds light on the data collection methodology and the empirical strategy. A detailed analysis of the findings constitutes Chapter 5. I find that exposure to optimistic and hard-working role models, led the viewers to believe in themselves, become hopeful, optimistic and

happy. In time they became more hard-working, eventually increasing their academic scores on a standardised English test. I look further into the heterogeneity of these findings to highlight the need for such treatments at an age as early as 7-8 years. The same intervention had the highest effect on the lowest hope students. It is not far-fetched to argue that students at such an early age can stand to gain from simple psychological interventions if designed and delivered appropriately.

In order to look into the cost-effectiveness, I compare my findings against similar behavioural or supply-side interventions. Chapter 6, shows that the treatment had strong effects as immediately as 6-weeks for achievement and effort, and within a week for the psychological outcomes. Although some of these dissipate over time, it is encouraging to find that the effects on school attendance are long-lasting (even after 5 months).

The study contributes to three strands of economics literature. Firstly, it offers the first piece of evidence using an RCT in the *Economics of Hope* and contributes to its empirical and theoretical importance. I find that hope is malleable and holds predictive capabilities for effort and achievement. Secondly, it adds to the evidence base on the efficacy of *role models*. Thirdly and finally, it offers behavioural insights to developmental *public policies in education* that can benefit from synthesising cheap and easily scalable constituents of motivation in their broader framework.

Growing up, kids are exposed to world-views through human interactions and audio-visual content[138]. Hope is simple and profound. This thesis tests its malleability and finds an easy way to transfer hope in the lives of children. In that attempt, the thesis also unearths its developmental consequences. Exposing Indian students to relevant role models makes them more hard-working and better performing in English. Hope and effort, can play a critical role in early childhood development and later adulthood outcomes.

[138]Films, TV shows, podcasts and media, to name a few.

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7 Appendix

A.1 Proof of proposition 1

Agent solves the following maximization problem[139]:

$$\max_{e} U(e,\delta) = p(e,\delta)[\bar{\theta} - \underline{\theta}] + \underline{\theta} - \ c(e)$$

Consider a solution point for this maximization problem (e^* , δ^*). At this point,

$$\frac{\partial\ U(e,\delta)}{\partial e} = 0$$

from the necessary first order condition. That is,

$$\frac{\partial\ p(e,\delta)}{\partial e}[\bar{\theta} - \underline{\theta}] - \frac{\partial\ c(e)}{\partial e} = 0 \tag{8}$$

Then, by applying the Implicit Function Theorem, we have

$$\frac{\partial\ e}{\partial \delta} = -\frac{\partial^2\ p(e,\delta)}{\partial e \partial \delta} \Big/ \frac{\partial^2\ p(e,\delta)}{\partial\ e^2} \tag{9}$$

Moreover, at (e^* , δ^*), by the sufficient condition of the maximization problem, we have:

$$\frac{\partial^2\ p(e,\delta)}{\partial\ e^2} < 0,$$

Also, by assumption 3:

$$\frac{\partial^2\ p(e,\delta)}{\partial e \partial \delta} > 0$$

Hence,

$$\frac{\partial\ e}{\partial \delta} = -\frac{\partial^2\ p(e,\delta)}{\partial e \partial \delta} \Big/ \frac{\partial^2\ p(e,\delta)}{\partial\ e^2} > 0$$

[139]This is a part of my job market paper, which is in the ASBS working paper series: Bhan, P. C. (2020). Do role models increase student hope and effort? Evidence from India (No. 2021_01).

A.2 Pre-analysis plan

Pre-Analysis Plan

Do role models increase student hope and effort? Evidence from India

Prateek Chandra Bhan

1. Introduction
2. Research Strategy
   - **Research Questions**
   - **Sampling**
     - Sampling Frame
     - Statistical Power
     - Assignment to Treatment
   - **Fieldwork**
     - Instruments
     - Data Collection
3. Empirical Analysis
   - **Variables**
   - **Theory of Change**
   - **Treatment Effects**
   - **Heterogeneous Effects**
   - **Robustness Checks**
4. Organisation and Deliverables
   - **Research Team**
   - **Deliverables**
   - **Budget**
   - **Time-line**
5. Bibliography

Introduction

Already included in Chapter 2 and 3.

Research Strategy

Research Questions

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

Sampling

Sampling Frame

Same as in Chapter 4.

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 452.

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.

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 school's 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[140].

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.

[140]If permissible.

Fieldwork

Instruments

All the details are already included in Chapter 3 and 4.

Data Collection

Data-collection process is detailed in Chapter 3 and 4.

Empirical Analysis

Variables

Included in Chapter 3.

Theory of Change

Same as in Chapter 3.

Treatment Effects

Same as in Chapter 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.

Robustness Checks

- Clustering is avoided by experimental design, as the treatment is offered at individual level[141].
- Estimations are performed with and 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 is run with only the interaction term ($D_i T_t$).

Oraginsation and Deliverables

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.

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 empirical

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

evidences to answer the formerly mentioned research questions.

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. Also, 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.

Budget

A comprehensive budget predicts a total cost of £ 9000[142]. The budget[143] is tailored to produce a back-of-the-envelope estimate of the intervention's cost-effectiveness.

Time-line

Same as in Chapter 3.

Bibliography

Included in the Thesis bibliography.

A.3 Survey material

Informed consent[144] was sought from children, their teachers and parents prior to the data collection. Also attached is the ethical approval form and NGO agreement.

[142] I received subsequent rounds of funding to total it to £ 13000.
[143] Available through a confidential dropbox link upon request.
[144] The participant information sheets and consent forms are presented herewith.

Consent Form

Title of Project:	Does hope increase effort? Evidence from India
Name of Researchers:	Prateek Chandra Bhan (PI)
Name of Supervisor 1:	Prof. Sayantan Ghosal
Name of Supervisor 2:	Dr. Theodore Koutmeridis
Name of Supervisor 3:	Prof. Michele Schweisfurth

I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

I consent to some part of the study, as chosen by the researcher, being audio and video recorded.

I acknowledge that:

- All names and other material likely to identify individuals will be anonymised.
- The material will be retained in secure storage for use in future academic research.
- The material may be used in future publications, both print and online.
- I agree to waive my copyright to any data collected as part of this project.

I agree to take part in the above study.

Name of Participant_____ Signature_____

Designation_____ Date _____

Name of Researcher Prateek Chandra Bhan Signature_____

Date _____

University of Glasgow

Media Consent Form

Photographer (and Photo Unit ref)

Description of activity	Photograph and video of yourself to promote University of Glasgow research	Date:	June 2019

The University of Glasgow is committed to controlling and processing personal information in accordance with the General Data Protection Regulation (GDPR) and the Data Protection laws. The personal data collected as detailed below will therefore be controlled and processed in line with the relevant Data Protection laws and Regulations in the way(s) and purpose(s) detailed in the accompanying Privacy Notice.

I consent to my personal data being used in each of the following formats: ***(tick all that you consent to)***

Photographic images – printed and digital (I understand that images may contain metadata including personal data which could be accessible to others when images are processed/shared, including beyond the University of Glasgow.)	
Film/video images and audio	
Written comments/testimonials	

I consent to this personal data being used (processed) in the following ways: ***(tick all that you consent to)***

University of Glasgow web pages	
Email and online marketing including e-newsletters; online and email adverts; online advertorials and editorial features in digital publications	
Social media posts	
Printed materials including leaflets; flyers; posters; banners; brochures, magazines and prospectuses;	
PowerPoint presentations	
Teaching materials	

Signed: _____ Print Name: _____

Date: _____ Email: _____

University of Glasgow

College of Social Sciences

Participant Information Sheet (Pupil/Teachers/Parents)

Title of project and researcher details

Title:	Does Hope Increase Effort? Evidence from India
Researcher:	Prateek Chandra Bhan
Supervisors:	Prof. Sayantan Ghosal
	Dr. Theodore Koutmeridis
	Prof. Michele Schweisfurth
Course:	PhD Economics

Why are you invited to take part

You are being invited to take part in a research project about primary school students in India. A research project is a way to learn more about something. You are being asked to take part because the study wants to investigate the role of behaviour in performance.

Before you decide if you want to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the information on this page carefully and discuss it with your parents/carers/teachers if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What will happen if you take part

The purpose of this study is to find out information on you and your future plans.

If you decide to take part, I will ask you some questions about you. I will also ask you to draw a portrait of yourself. You do not have to answer any questions that you don't want to. This will take about 15 minutes. I will record your answers on a survey questionnaire so that afterwards I can read carefully to what you said.

You do not have to take part in this study, and if you decide not to. If, after you have started to take part, you change your mind, just let me know and I will not use any information you have given me.

Keeping information confidential

I will keep the information from the questionnaires in a locked cabinet or in a locked file on my computer. When I write about what I have found out, your name will not be mentioned. If you like you can choose another name for me to use when I am writing about what you said. No-one else will know which name you have chosen. Confidentiality will be respected subject to legal and regulatory constraints and professional guidelines.

However, if during our conversation I hear anything which makes me worried that you might be in danger of harm, I might have to tell other people who need to know about this.

The results of this study

When I have gathered all of the information from everyone who is taking part, I will write about what I have learned in my PhD thesis, which is a long essay, which I have to complete for the course I am studying. This will be read and marked by my teachers at university. I will tell you and the other children who have taken part what I have found out.

Review of the study

This study has been reviewed and agreed by the College of Social Sciences Research Ethics Committee, University of Glasgow

Contact for further Information

If you have any questions about this study, you can ask me, Prateek Chandra Bhan (p.bhan.1@research.gla.ac.uk) or my supervisor, Prof. Sayantan Ghosal (Sayantan.Ghosal@glasgow.ac.uk), Dr. Theodore Koutmeridis (theodore.koutmeridis@glasgow.ac.uk), Prof. Michele Schweisfurth (Michele.Schweisfurth@glasgow.ac.uk) or the Ethics officer for the College of Social Sciences. Muir.Houston@glasgow.ac.uk

Thank you for reading this!

University of Glasgow

College of Social Sciences

Consent Form (Parents/Teachers)

Title of Project:	Does Hope Increase Effort? Evidence from India
Name of Researcher:	Prateek Chandra Bhan
Name of Supervisor 1:	Prof. Sayantan Ghosal
Name of Supervisor 2:	Dr. Theodore Koutmeridis
Name of Supervisor 3:	Prof. Michele Schweisfurth

I confirm that I have read and understood the Participant Information Sheet for the above study and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

I consent on behalf of my child/children (students) that they take part in the study.

I acknowledge that

- All names and other material likely to identify individuals will be anonymised.
- The material will be retained in secure storage for use in future academic research.
- The material may be used in future publications, both print and online.
- I agree to waive my copyright to any data collected as part of this project.

I agree to take part in the above study.

Name of Participant …… Signature ……..

Date ……

Name of Researcher Prateek Chandra Bhan Signature ……..

Date ……

University of Glasgow

College of Social Sciences

Consent Form (Pupil)

I would like to hear what you think about yourself and your future.

- You do not have to answer any questions you do not like.
- You can stop talking to me at any time.

Do you want to talk to me about yourself, your family, future plans and share some information about how much you study?

Please put a circle around your answer.

Can I record information from our chat?

Please put a circle around your answer.

Can I tell other people what you think? I will not tell them your name.

Please put a circle around your answer.

Please write your name in the box below.

Survey Questionnaire: Children

Survey Identification Code	
Location & School	
Respondent (Name and school id) (in block letters)	

Name of Surveyor (in block letters)			
ID no. of Surveyor			
Date of Interview	Day	Month	Year
Starting time of Interview	Hour: Min:		
Ending time of Interview	Hour: Min:		
Did you go back a second time to complete interview?	1) Yes 2) No		
When did you go back for the second time?	Day	Month	Year
Signature of Surveyor			

Individual Consent

I have come to conduct a survey. I would like to get some information about you and your friends. Hence, I would like to interview you. The survey usually takes about 10-15 minutes to complete. The information you will provide will be confidential and will be used for research purposes only.

Your participation in this survey is voluntary. You may choose not to answer any question at any time or stop the interview at any time.

Would you like to participate in the survey?

1) YES ---------- BEGIN INTERVIEW
2) NO ---------- END

If the interview was not taken, mention why:

1) Respondent not available
2) Refused to participate
3) Others (specify)…..

Social Network Mapping

Please give the following details about your friends, who are in grade 4 in this school and/or living in your locality, and with whom you interact with at least once a day each week:

S.No	Name of friend (could be sibling as well)	Does s/he study in your class? 1 - Yes 0 - No	If no, in which class does s/he study?	Same School 1 -Yes 0 - No	Does s/he live near your house? 1 - Yes 0 - No
1.					
2.					
3.					
4.					
5.					

Survey Information

S. No.	Question	Response	Instruction
1	How old are you?	☐☐ years	Age in years
2	What is your gender?	1) M 2) F	1 = Male and 0 = Female
3	How many days in the last two weeks did you miss the school?	☐☐ days	Number of days in the 5 working days of school missed (in the last two weeks)
4	Do you take private coaching or tuitions?	1) Yes 2) No	1 = Yes and 0 = No
5	If yes, how many hours per day?	☐☐ hours	Average out the hours per day (*for eg. 14 hours a week would be 2 hours everyday Mon-Sun*)
6	If yes, how many hours in total per week?	☐☐ hours	Total number of hours per week
7	What is your religion?	1) Hindu 2) Muslim 3) Christian 4) Sikh 5) Buddhist 6) Other, specify.....	
8	Number of siblings?	1) 0 2) 1 3) 2 4) more than 2, specify number……	Mention the number of siblings and their gender in this space (M/F):
9	Which number are you?	☐☐	The oldest sibling being number 1; so if there are two kids: the second born will be number 2 and so on
10	Did you grow up in the city?	1) Yes 2) No	1 = Yes and 0 = No
11	If no, how many years ago did you move to the city?	☐☐ years	
12	How many members are there in your household?	☐☐	The number of people who live with you in the same house
13	How do you come to school?	1) Walk 2) Bus 3) Van/auto 4) Private vehicle 5) Other, specify…	
14	How many days was the school open in the last two weeks?	☐☐ days	
15	Do your parents help you with school work and preparation?	1) Yes 2) No	1 = Yes and 0 = No
16	If no, why not?		

17	If yes, how many hours in total per week?	☐☐ hours	Aggregate the hours per day (*for eg. 1 hour a day will be 7 hours per week*)
18	How many hours every day after school, do you spend on doing homework and studying on an average?	☐☐ hours	Average out the hours per day (*for eg. 7 hours a week would be 1 hours everyday Mon-Sun*)
19	How many hours per week, do you spend time studying or doing homework after school?	☐☐ hours	Aggregate the hours per day (*for eg. 1 hour a day will be 7 hours per week*)

Survey questionnaire: Teacher

Survey Identification Code	
Location & School	
Respondent Name **Name, class and school id** (in block letters)	

Name of Surveyor (in block letters)						
ID no. of Surveyor						
Date of Interview	Day		Month		Year	
Starting time of Interview	Hour:		Min:			
Ending time of Interview	Hour:		Min:			
Did you go back a second time to complete interview?	1) Yes 2) No					
When did you go back for the second time?	Day		Month		Year	
Signature of Surveyor						

Individual Consent

Greetings! I have come to conduct a survey. I would like to get some information and interview you. The survey usually takes about 10-15 minutes to complete. The information you will provide will be confidential and will be used for research purposes only.

Your participation in this survey is voluntary. You may choose not to answer any question at any time or stop the interview at any time.

Would you like to participate in the survey?

1) YES ---------- BEGIN INTERVIEW
2) NO ---------- END

If the interview was not taken, mention why:

1) Respondent not available
2) Refused to participate
3) Others (specify)…..

S. No.	Question	Response	Instruction
1	What is your position at this school?	1) Headmaster 2) Class teacher 3) Teacher 4) Volunteer teacher 5) Other	If class-teacher, which class …….
2	How long have you held this position in this school?	☐☐ Years	
3	How long have you been in this position in this school and before?	☐☐ Years	Total years of teaching experience
4	How many students are enrolled in your section of grade 4?	☐☐☐ Boys ☐☐☐ Girls	
5	How many students in your section of class 4 are absent on any average day?	☐☐☐ Boys ☐☐☐ Girls	
6	How many students are retained every year in grade 4 due to insufficient learning level?	☐☐☐ Boys ☐☐☐ Girls	
7	Does the school have scholarships for students?	1) Yes 2) No	1 = Yes, 0 = No
8	If yes, how many students in grade 4 have scholarships?	☐☐☐ Boys ☐☐☐ Girls	
9	Generally, what is the time period the school is open for teaching during an average day?	From ☐☐:☐☐ To ☐☐:☐☐	Use hours (railway-style time)
10	Generally, what is the time period for lunch?	From ☐☐:☐☐ To ☐☐:☐☐	Use hours (railway-style time)
11	How many days in the last month did you take leave(s)?	☐☐ Days	
12	How many days of paid leave can teachers take on average, per year?	☐☐ Days	
13	How many days of unpaid leave do teachers take on average, per year?	☐☐ Days	
14	Have you heard of *Sarva Siksha Abhiyaan* (SSA)?	1) Yes 2) No	1 = Yes, 0 = No
15	Is your school entitled to receive resources from SSA?	1) Yes 2) No 3) Don't know	1 = Yes, 0 = No, 2 = Do not know

16	Did you complete professional teacher training course before starting the position?	1) Yes 2) No	1 = Yes, 0 = No
17	If yes, was it a pre-requisite for the role?	1) Yes 2) No	1 = Yes, 0 = No
18	How long for the training program?	☐☐ Years	
19	Does it come with a certificate or degree?	1) Yes 2) No	1 = Yes, 0 = No
20	Do parents regularly attend parent teacher meets (PTM)?	1) Yes 2) No	1 = Yes, 0 = No (What %)? -
21	On average, approximately how many parents of 4th graders missed the last PTM?	☐☐	
22	In the last 12 months, have parents of current 4th grade students ever come voluntarily to the school?	1) Yes 2) No 3) Don't know	1 = Yes, 0 = No, 2 = Do not know
23	Do the parents discuss any of the following issues with great interest?		1 = Yes, 0 = No
23.1	Child performance/achievement and learning		
23.2	School infrastructure		
23.3	Teacher attendance		
23.4	Teacher quality		
23.5	Child behaviour		
23.6	Child attendance		
23.7	Volunteering to work in school		
23.8	Books and study material		
23.9	Scholarships		
23.10	Psychology of children		
24.	Which of these topics do you think are very important to be discussed with the parents?		1 = Yes, 0 = No
24.1	Child performance/achievement and learning		
24.2	School infrastructure		
24.3	Teacher attendance		
24.4	Teacher quality		
24.5	Child behaviour		
24.6	Child attendance		
24.7	Volunteering to work in school		
24.8	Books and study material		
24.9	Scholarships		
24.10	Psychology of children		

25	General information		
	Read each of the item carefully and using the scale shown below, please select the number that best describes you and put that number in the blank provided 1 = Definitely False 2 = Mostly False 3 = Somewhat False 4 = Slightly False 5 = Slightly True 6 = Somewhat True 7 = Mostly True 8 = Definitely True		
	Question	**Code**	**Notes**
25.1	I can think of many ways to get out of a jam		
25.2	I energetically pursue my goals		
25.3	I feel tired most of the time		
25.4	There are lots of ways around any problem		
25.5	I am easily downed in an argument		
25.6	I can think of many ways to get the things in life that are important to me		
25.7	I worry about my health		
25.8	Even when others get discouraged, I know I can find a way to solve the problem		
25.9	My past experiences have prepared me well for my future		
25.10	I've been pretty successful in life		
25.11	I usually find myself worrying about something		
25.12	I meet the goals that I set for myself		
	Total		

Baseline Survey Questionnaire: HH

Survey Identification Code	
Location & School	
Respondent Name **Name and school id of the child** (in block letters)	

Name of Surveyor (in block letters)						
ID no. of Surveyor						
Date of Interview	Day		Month		Year	
Starting time of Interview	Hour:		Min:			
Ending time of Interview	Hour:		Min:			
Did you go back a second time to complete interview?	1) Yes 2) No					
When did you go back for the second time?	Day		Month		Year	
Signature of Surveyor						

Individual Consent

I have come to conduct a survey. I would like to get some information by interviewing you. The survey usually takes about 10-15 minutes to complete. The information you will provide will be confidential and will be used for research purposes only.

Your participation in this survey is voluntary. You may choose not to answer any question at any time or stop the interview at any time.

Would you like to participate in the survey?

1) YES ---------- BEGIN INTERVIEW
2) NO ---------- END

If the interview was not taken, mention why:

1) Respondent not available
2) Refused to participate
3) Others (specify)…..

S.No.	Question	Response	Instruction
1	General information		
1.1	What is your age?	☐☐ years	A precise number in years
1.2	What is your religion?	1) Hindu 2) Muslim 3) Christian 4) Sikh 5) Buddhist 6) Other, specify.....	
1.3	What is your caste?	1) SC 2) ST 3) OBC 4) General caste 5) Other, specify.....	(To be associated with the kids, as we do not ask the students for their caste)
1.4	What is your educational qualification?	☐☐	*Codes:* *No education-0; 1 to 12; College-(13); PG or Higher - (14); Vocational-15*
1.5	What is your marital status?	1) Married 2) Separated 3) Divorced 4) Widowed	
2	Children		
2.1	How many children do you have?	1) 1 2) 2 3) More than 2	
2.2	If you selected 3), how many?	☐☐	Mention their gender (M/F)
2.3	How many children do you have studying in grade 4?	1) 1 2) 2 3) More than 2	
2.4	If 2 or 3, do they study in the same class and school?	1) Yes 2) No	1 = Yes, 0 = No
2.5	Information on children		

S.No.	Number of child (oldest = 1, so on)	Age	Sex (M/F) (1/0)	Lives with you (Y/N) (1/0)	Studying (Y/N) (1/0)	Working (Y/N) (1/0)	Education level (codes)
1)							
2)							
3)							
4)							
5)							

3	History and family		
3.1	Did you grow up in this region?	1) Yes 2) No	1 = Yes, 0 = No
3.2	If no, where?		

3.3	If no, how many years ago did you move here?	☐☐ years	
3.4	How many people live in your house?	☐☐	Number of people residing in the house
3.5	Information on family members:		

S. No.	Relation (to the child)	Sex (M/F) (1/0)	Studying (Y/N) (1/0)	Working (Y/N) (1/0)	Education level (codes)
1)					
2)					
3)					
4)					
5)					
6)					
7)					
8)					

4	Profession, earning and other		
4.1	What is your principal occupation?	1) Housewife/doing domestic chores 2) Agricultural worker 3) Non agricultural labour (like construction labour) 4) Employed in informal sector (e.g. maidservant) 5) Employee in govt. sector 6) Employee in private sector 7) Self employed 8) Student 9) Other, specify……	
4.2	What is the principal occupation of your partner?	1) Housewife/doing domestic chores 2) Agricultural worker 3) Non agricultural labour (like construction labour) 4) Employed in informal sector (e.g. maidservant) 5) Employee in govt. sector 6) Employee in private sector 7) Self employed 8) Student 9) Other, specify……	
4.3	What are the household earnings (aaprox.) per year?	☐☐☐☐☐☐☐☐	In INR
4.4	How long have you been in this profession?	☐☐ years	
4.5	Does your work give you time to help your child(ren) with studies?	1) Yes 2) No	1 = Yes, 0 = No
4.6	Does your partner help the kids with studies?	1) Yes 2) No	1 = Yes, 0 = No

4.7	How many hours on an average in one day do you or your partner help your children with studying?	☐☐ hours	
4.8	How many hours in an average in week do you or your partner help your children with studying?	☐☐ hours	
4.9	Do you feel that in general, you get enough time to spend on the education of your children?	1) Yes 2) No 3) Indifferent	1 = Yes, 0 = No, 2 = Indifferent
4.10	If no, how many more hours on average per day would you think will be sufficient?	☐☐ hours	
4.11	If no, how many more hours on average in 1 week would you think will be sufficient?	☐☐ hours	
4.12	Are you satisfied with their schooling?	1) Yes 2) No	1 = Yes, 0 = No
4.13	Are you satisfied with their learning?	1) Yes 2) No	1 = Yes, 0 = No
4.14	On a scale from 1-10 how significant is primary education for the future of your child?	☐☐	1 – not that important 10 - most important
4.15	Do you make savings?	1) Yes 2) No	1 = Yes, 0 = No
4.16	If no, what other sources do you seek?	1) Bank 2) Informal loans	1= Bank, 0 = Informal or other
5	Health and welfare		
5.1	What do you think of your health in general?	1) Excellent 2) Good 3) Average 4) Bad 5) Very bad	
5.2	How would you rate your child's health state?	1) Excellent 2) Good 3) Average 4) Bad 5) Very bad	
5.3	When was the last time you visited the doctor for your child?	1) A week or less ago 2) A month or less ago 3) A year or less ago 4) More than a year ago 5) More than 5 years ago 6) Never visited	

5.4	Is your child frequently sick? (frequent – once a month)	1) Yes 2) No	1 = Yes, 0 = No
5.5	Are you covered by any health insurance scheme?	1) Yes 2) No	1 = Yes, 0 = No
5.6	Do you have an insurance for your child?	1) Yes 2) No	1 = Yes, 0 = No
5.7	Does your child engage in outdoor sport activities?	1) Yes 2) No	1 = Yes, 0 = No
5.8	Approx. for how many hours each day do you let your child play outdoor sports?	☐☐ hours	
6	Information about your behaviour		

6.1 Read each of the item carefully and using the scale shown below, please select the number that best describes you and put that number in the blank provided

1 = Definitely False
2 = Mostly False
3 = Somewhat False
4 = Slightly False
5 = Slightly True
6 = Somewhat True
7 = Mostly True
8 = Definitely True

	Question	**Code**
6.1.1	I can think of many ways to get out of a jam	
6.1.2	I energetically pursue my goals	
6.1.3	I feel tired most of the time	
6.1.4	There are lots of ways around any problem	
6.1.5	I am easily downed in an argument	
6.1.6	I can think of many ways to get the things in life that are important to me	
6.1.7	I worry about my health	
6.1.8	Even when others get discouraged, I know I can find a way to solve the problem	
6.1.9	My past experiences have prepared me well for my future	
6.1.10	I've been pretty successful in life	
6.1.11	I usually find myself worrying about something	
6.1.12	I meet the goals that I set for myself	
6.1.13	**Total**	

6.2	On a scale of 1 to 5, how happy would you classify yourself?	☐	1 – very unhappy; 2 – somewhat unhappy, 3 – indifferent, 4 – somewhat happy, 5 – very happy
6.3	Are you confident that your child will do good in life?	1) Yes 2) No 3) Do not know	1 = Yes, 0 = No, 2 = do not know

Baseline: Information about yourself

Instructions:

- Read each sentence carefully.
- For each sentence, please think about how you are in most situations.
- Place a check inside the circle that describes YOU the best. For example, place a check (√) in the circle (O) above "None of the time," if this describes you. Alternatively, if you are this way "All of the time," check this circle. Please answer every question by putting a check in one of the circles.
- There are no right or wrong answers.

Survey Identification Code	
Location	
School	
Class	
Student Name and School ID Number (in block letters)	

Name of Surveyor (in block letters)						
ID no. of Surveyor						
Date	Day		Month		Year	
Starting time	Hour:		Min:			
Ending time	Hour:		Min:			
Signature of Surveyor						

Individual Consent

I have come to conduct a survey. I would like to get some information about you. Hence, I would like to interview you. The survey usually takes about 10 minutes to complete. The information you will provide will be confidential and will be used for research purposes only.

Student name: Sign:

Information about yourself

1. *I think I am doing pretty well.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

2. *I am usually hungry.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

3. *I play outdoor games with my friends after school.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

4. *I can think of many ways to get the things in life that are most important to me*.

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

5. *When I am painting, I use colours.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

6. *I enjoy watering plants in and around my house.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

7. *I am doing just as well as other kids my age*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

8. *I enjoy playing football.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

9. *I like to eat fruits for breakfast.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

10. When I have a problem, I can come up with lots of ways to solve it.

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

11. *I usually finish my lunch-box.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

12. *When I watch cartoon films, I can understand them.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

13. *I think the things I have done in the past will help me in the future*.

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

14. *I tie my shoelaces.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

15. *Even when it is sunny, I like to play outdoor games when I have time.*

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

16. *Even when others want to quit, I know that I can find ways to solve the problem*.

O	O	O	O	O	O
None of the time	A little of the time	Some of the time	A lot of the time	Most of the time	All of the time

Baseline: A portrait of yourself

Instructions for students: please read all the instructions carefully

- Please draw a picture of yourself
- Situation: "***Imagine yourself on last Sunday and draw a picture of yourself***"
- You should feel free to use any material that you want to complete the sketch
- You have 15 minutes to complete the picture

Notes for surveyor:

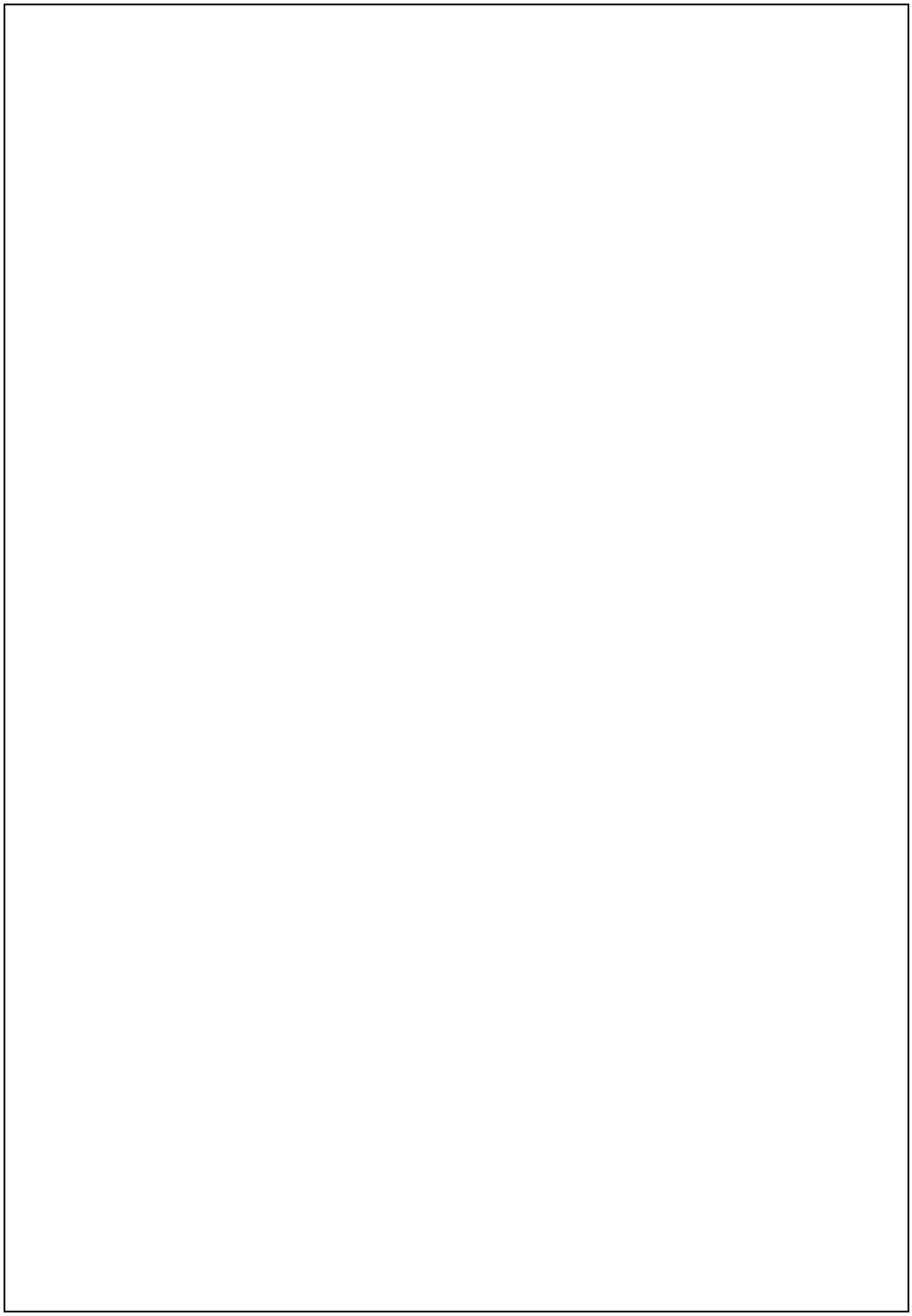
- Each student should have access to a clean separate seating spot
- Each student should have a clean white sheet of paper with a full set of 24 coloured pencils
- Each student should have 15 minutes for completing the picture
- Make the announcements: "Greetings! You have to draw a picture of yourself on last Sunday. You will have 15 minutes to do the task and all the resources are provided at your desk. Please take 5 minutes first to fill the following information. You will be notified when you can start the picture."
- Wait for 5 minutes and check if all the students have provided the information
- Announce: "you can start drawing now"
- After 15 minutes announce: "you may stop drawing now and please remain quietly seated where you are"
- Collect all the drawings

Information (to be filled by student)

Location	
School	
Class	
Student Name and School ID Number (in block letters)	

Name of Surveyor (in block letters)						
ID no. of Surveyor						
Date	Day		Month		Year	
Starting time	Hour:		Min:			
Ending time	Hour:		Min:			
Signature of Surveyor						

You may use this page for the drawing



BL ASER

Date:

Student Name	
Student roll no.	
Student ID	
School	
Class	
Math Score	
English Score	

Instructions (Please read all the instructions):

1. Please attempt all the questions (including subparts)
2. Please adhere to the choices in the questions
3. You have to select 5 sub questions in each question type out of the 6 options and attempt them
4. You have 25 minutes to attempt this exam
5. If you finish early, remain seated till the exam paper is collected

For the use of examiner/instructor:

Name of Surveyor (in block letters)	
ID no. of Surveyor	
Date	Day / Month / Year
Starting time	Hour: Min:
Ending time	Hour: Min:
Signature of Surveyor	

I. Quantitative

Note: Please attempt 5 questions out of the 6 options in each question

Q. 1 Recognise the numbers and write them in English? (1*5 = 5 Marks)

(i) 8 _____

(ii) 4 _____

(iii) 2 _____

(iv) 1 _____

(v) 9 _____

(vi) 7 _____

Q. 2 Recognise the numbers and write them in English? (2*5 = 10 Marks)

(i) 58 _____

(ii) 44 _____

(iii) 13 _____

(iv) 20 _____

(v) 35 _____

(vi) 98 _____

Q. 3 Solve any of the 5 subtraction questions? (3*5 = 15 Marks)

(i) 59
- 35
_____

(ii) 66
- 25
_____

(iii) 27
- 19
_____

(iv) 87
- 79
_____

(v) 36
- 10
_____

(vi) 97
- 78
_____

Q. 4Solve any of the 5 division questions with indicating the remainder, dividend and quotient? (4*5 = 20 Marks)

(i) $5\overline{)\,987}$

(ii) $6\overline{)\,\mathbf{786}}$

(iii) $3\overline{)\,\mathbf{454}}$

(iv) $7\overline{)\,\mathbf{53}}$

(v) $9\overline{)\,\mathbf{921}}$

(vi) $3\overline{)\,\mathbf{261}}$

II Language

Q. 1 Complete the following in alphabetical order? (1*5 = 5 Marks)

(i) a b ___
(ii) ___ f ___
(iii) p ___ r
(iv) x ___ z
(v) u v ___
(vi) l m ___

Q. 2 Write the opposites for 5 out of the 6 of the questions? (2*5 = 10 Marks)

(i) hate X _____
(ii) white X _____
(iii) left X _____
(iv) front X _____
(v) up X _____
(vi) subtract X _____

Q. 3 Read the following paragraph and answer 5 out of 6 questions based on your understanding of the paragraph in one or two words? (3*5 = 15 Marks)

Rani likes her school. Her class is in a big room. Rani has a bag and a book. She also has a pen.

(i) Rani has a _____ and a book .
(ii) Rani also has a _____ .
(iii) Rani goes to _____ .
(iv) Rani keeps her book and pen in a _____ .
(v) _____ likes her _____.
(vi) Rani has her class in _____ big _____.

Q. 4 Read the following story and answer 5 out of 6 questions based on your understanding of the paragraph in one or two words? (4*5 = 20 Marks)

A big tree stood in a garden. It was alone and lonely. One day a bird came and sat on it. The bird held a seed in its beak. It dropped the seed near the tree. A small plan grew there. Soon there was another tree. The big tree was happy.

(i) Where is the big tree?

Ans. _____

(ii) What sat on the tree?

Ans. _____

(iii) Where was the seed?

Ans. _____

(iv) What happened to the seed?

Ans. _____

(v) What did the seed become into?

Ans. _____

(vi) How did the big tree feel?

Ans. _____

Baseline: Substitution Class

Instructions:

- Please do not disturb the students or interrupt their activity mid-way through the class
- When you enter the class, announce: "This is a substitution period. As the teacher is not able to take this period, I have come as your substitution teacher. You are free to do whatever you want but please do not make too much noise that may disturb others." After making the announcement, you may take a seat and mark the students on the observation list
- Please look at your watch and mark three intervals of 10 minute each (three rounds)
- Observe one student at a time and follow the same sequence of observations in every round
- For each time a student is observed to be working, please give a score of 1, and 0 otherwise
- When the class is over you may leave with all the observations, once the next teacher is in the classroom

Survey Identification Code	
Location	
School	
Class	
Student Name and School ID Number (in block letters)	

Name of Surveyor (in block letters)								
ID no. of Surveyor								
Date	Day		Month		Year			
Starting time	Hour:		Min:					
Ending time	Hour:		Min:					
Signature of Surveyor								

Student Id	Student name	Obs # 1	Obs # 2	Obs # 3	Total

Baseline: Remedial Class

Instructions for surveyor:

- Please do not disturb the students or interrupt their activity mid-way through the class.
- You must be there throughout the class but outside the classroom.
- Please collect the attendance sheet marked by the relevant teacher conducting the class at the end of the class.
- When the class is over you may leave with all the observations, once all the students and teachers have left the school premises.

Survey Identification Code	
Location	
School	
Class	
Class Name and School ID Number (in block letters)	

Name of Surveyor (in block letters)						
ID no. of Surveyor						
Date	Day		Month		Year	
Starting time	Hour:		Min:			
Ending time	Hour:		Min:			
Signature of Surveyor						

Remedial Class					
S No	**Name**	**BL (Date:)**	**EL (Date:)**	**FUS 1 (Date:)**	**FUS 2 (Date:)**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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A.4 Organisational team

A.5 Intervention content

Treatment video

Sneha's story

This is the story of Sneha from India. She loved playing badminton. Saina Nehwal was her idol. And much like her, she aspired to be a badminton champion. Every morning, she used to cut newspaper clippings, which she later pasted on the walls of her room.

However, there was one small problem. Her badminton racket was broken. She couldn't ask her parents for a new one either.

This meant that Sneha couldn't play badminton during the games period. Seeing those beautiful rackets in the hands of other kids made her feel lesser.

She had a friend, Ashmita. A kind and warm-hearted friend, who always wished her best. Ashmita had been noticing that Sneha was not playing for a while now. She knew how talented Sneha was and wanted to help her.

One such day at school, Ashmita asked Sneha to play with her racket during the games period. Sneha refused at first but couldn't say no when Ashmita insisted. She then hesitantly proceeded towards the court. Maybe it was her lucky day, and the coach asked her to come forward to play a game with him.

She was nervous but went forward. The moment she stepped on the court, she was a different person. Her focus was at its peak –posture perfect and breathing in control –things she had learned from watching the games of Saina Nehwal. The coach couldn't guess her moves. And once Sneha took the lead, she didn't look back and sealed the match in less than 30 minutes. The coach was impressed and congratulated her. Sneha thought she ended up playing the best game of her life. It was just the beginning.

That day Sneha felt more confident than ever. She felt that maybe she had what it took. She could be the next Saina Nehwal.

But winning that match made Sneha wonder something. She might have won the match, but she would not have Ashmita's racket with her at all times. This made Sneha worried. What would she do now? Where will she get a racket from?

And then suddenly it struck her. She ran towards the store room. She collected all her old toys and sold them off. She got some money from it. On counting it, she found that it wasn't enough. So she decided to sell off her old bicycle as well.

With all the money, she went to a sports store. She selected a racket that she really

liked. She gave all the money she had to the shopkeeper. But it wasn't enough. Disappointed, she was about to leave.

The shopkeeper could see a glimmer of hope in Sneha's eyes. He could see that she had the passion. He just couldn't let her down. He asked her to come back, and gave her a second-hand racket. He told her that it wasn't a new racket but it would do the job. He congratulated her on her persistence and told her to never give up. He even handed her a small photo of her idol Saina Nehwal. She was thrilled. She thanked the shopkeeper and started her training with the coach.

Sneha's passion started soaring. She was determined, and trained day and night. She realized the harder she trains, the better are her chances of winning the big game. The coach was very pleased with her and believed that she was ready for the big tournament. He told her that her optimism, perseverance and hard-work will take her places. To swim new horizons, she must have the courage to lose sight of the shore.

At the tournament, her second-hand racket did wonders. Sneha was beaming with confidence. She was in full form. She was a delight for the spectators and a fierce opponent to the competitors. She won all her matches in straight sets.

During the semi-finals, her racket got damaged beyond repair. The coach told her that she could in no way use it for the finals. Sneha was heartbroken. She could see her dreams shatter. Where could she get another racket at the last minute? She did not have any money or any other way to get a new racket. In her heart, She waited for a miracle.

It was stupid to hope, she knew. But sometimes hope is all you have.

When Ashmita saw Sneha sitting alone, she asked her what happened. But it was difficult for Sneha to talk about it. Without saying anything, she showed Ashmita her broken racket. Without wasting a single second, Ashmita handed Sneha her racket. This was the same racket that she had used to play her match with the coach. Ashmita told Sneha that the racket was hers to keep now. Moved with Ashmita's kindness and filled with hope, Sneha hugged her.

With this racket, she felt confident again. Sneha went on to play the finals. "Yes I can attain success", "I will not stop", "I will not lose my focus" were the only thoughts she had. It was a tough competition but Sneha seized the victory in the end.

Days, months and years passed.

Today, Sneha is an excellent player. Her speed and timing are lauded by all. Sneha –in the footsteps of her role model, Saina Nehwal –won multiple badminton tournaments, and brought glory to her country. Humility came with success. She remembers Ashmita and the shopkeeper everyday. They gave her hope, which fueled her efforts. If not for hope and hard work, she would not have achieved her dream. Her dream of becoming the next Saina Nehwal.

"When you know what you hope for the most, and hold it like a light within you, you can definitely make things happen, always, like magic."

Tarun's story

Tarun was an aimless and careless student of class 4. Carefree about everything, he had no interest in academics or sports. He was least bothered in performing well in exams. Fooling around had become an essential part of his daily routine. Completing his homework, and attending extra classes were the things he was least bothered

about.

Tarun always stayed far away from books. He did use them to make paper planes in the class. Even though his grades were not good, he was quite satisfied with the Cs and Ds on his tests. He just wanted to pass. Probably this was the reason why he never scored better than that. In a homework assignment titled, 'your goal in life', he left the paper blank, and used it only to make yet another paper plane.

On one fine day at school, Tarun was sitting at the back, making paper planes as usual. The teacher walked in to tell them about a guest who was coming to the class to meet them. It wasn't long after that a man wearing an air-force uniform walked in. This was Wing Commander Arjun Thapar. He was happy to meet the students. He talked about airplanes, and his personal experiences with great passion. Tarun seemed quite attentive during the session. Perhaps this was the first time he had ever paid so much attention in class. Long after other students left, he stood in the class and stared at the airplane on the board.

Right at that moment, he saw a plane from the classroom window. Tarun's eyes glittered with hope and excitement. He immediately rushed out of the class to find Wing Commander Arjun Thapar. Dashing towards him, barely catching his breath, he did not say anything, but just handed his paper plane to him. Arjun cheerfully told him that perhaps he was also meant to fly. Arjun ruffled his hair and told him to study with all his heart. He also explained the importance of discipline, diligence and hope. Arjun said, "You will be what you will to be". Wing Commander's words touched Tarun and inspired him to take action.

Upon reaching home, Tarun kept on thinking about Wing Commander Arjun Thapar's words. Tarun felt as if he had suddenly found a new purpose. He got up, took a big sheet of paper, and sketched out a timeline. He had realised that, to achieve his dreams, he would have to study and get good grades. Tarun could feel the power

of Hope. And once Tarun chose Hope, everything felt attainable.

He changed his routine. He started studying, sat in the front row, made notes, and went to extra classes. His enthusiasm increased manifolds when he got good grades that only encouraged him to work harder. “It is not our abilities that show what we truly are. It is our choices.”

He would look at aeroplanes in the sky whenever he was tired. He remembered each and every word from the Wing Commander ‘discipline, diligence and hope’. Optimism, hard-work and discipline were adding new colors in his life.

His parents, who were earlier deeply concerned about his behavior were now content to notice these changes in him. He would study until late night. His parents were proud of him and this motivated Tarun to work harder. He knew that Mathematics wasn’t his strongest subject and he would have to work harder to stay on top of his game. He studied day and night, and was eventually able to get selected for the Mathematics Olympiad at school.

This was Tarun’s big win. Not just the selection but the fact that he was able to achieve his goals by sheer hard work was something he could take pride in. He would stay back after every maths extra class and solve countless problems. Perhaps this was the reason why he was able to solve a tricky question in the final exam and win the Olympiad. Something that was a pleasant surprise for all and a remarkable achievement for Tarun.

That day, Tarun looked at the sky and thought of Hope. The only thing that kept him going. It’s like a drop of honey, a field of tulips blooming in the springtime. Like a fresh rain, a whispered promise, a cloudless sky, the perfect punctuation mark at the end of a sentence. Simple and profound.

This time, on being given the same 'Your dream?' assignment, he wrote down 'Air Force Pilot' and submitted the assignment with confidence.

Tarun never forgot his dream and kept working hard to fulfil it. His efforts paid off and he became 'Wing Commander Tarun Sharma'.

Time passed and he returned home after twenty years. As soon as he entered his room, his childhood memories and dreams came gushing back to him. The time-line remained as it was. The paper planes were still flying around. He brushed the dust off his old photograph with Wing Commander Arjun Thapar and thanked him. Right before leaving, he looked at the words 'Air Force Pilot' written on the chart paper and put a tick mark next to it.

As Alan Turing once said, "Sometimes, it's the people no one imagines anything of who do the things that no one can imagine."

Nandini's story

This is the story of Nandini. A little girl from Rajasthan, India. Her mother was a housemaid, and her father worked in a hospital. They barely made a living yet they were content. They lived near a hospital. Since childhood, Nandini was in awe of doctors that she came across. Whenever she visited the hospital, they asked her about her well being. She wanted to be one of them. She wanted to save lives of people. It was her dream. She was the brightest one in her class. All her teachers admired her. She was hardworking and she always completed her homework in the free periods itself, so that she could have more time to study at home. She was motivated and driven by her goal.

As her heart beat, hope lingered.

One day, when she came back from school, she could hear her mother cry. She went inside wondering what was wrong. Her mother told her that she had been fired from work. Nandini got worried. With barely any savings, they did not have enough money to pay for her schooling. As a result, she would have to quit the school soon. This broke Nandini's heart. Her dreams faded away in an instant. She wanted to help her mother. Nandini had her own box of savings but it wasn't nearly enough. Nandini wasn't able to take it. She felt helpless and hopeless.

The situation at home demotivated Nandini. She stopped paying attention in class. She even stopped doing her homework. She couldn't see the point in studying, knowing she would have to leave the school soon.

The final exams were about to commence soon and Nandini had no preparation in place. She was just letting the time pass by, and let the circumstances determine her fate. She was hopeless.

One day, while passing through the corridor, she saw a bunch of kids gathered around the notice board. Making her way in, she saw a notice for a scholarship test. It said that its winner's tuition fee would be waived. This filled Nandini's heart with hope. Her eyes sparked and she smiled after a very long time. This could end all her problems. She could dream of becoming a doctor again.

Nandini was back on track. She left for home, and started preparing for the test. She studied day and night. During intervals, and free periods. Nothing stopped her. Even her teachers could see the change in her. They praised her efforts, which made her even more confident. Finally, she gave the scholarship test.

Time passed, and Nandini knew that any of the coming weeks at school could be her last. But she was happy that she tried. She had put in all her efforts. And she knew, maybe, just maybe, her hard work would pay off. This hope, kept her happy and content.

One morning, she received a letter at home. The moment she opened it, it seemed as if her heart skipped a beat. She exclaimed with joy. She had received the scholarship. She called her parents and announced the news with great pride. Overjoyed, they couldn't believe it. Nandini had secured the first position. Her dream had found its wings again.

Nothing could stop her now. In the coming years, Nandini kept performing well and got accepted in the best medical college of the country with full scholarship.

Today, Nandini is a successful doctor, who has saved hundreds of lives. She supports her family financially and her parents don't have to work now. Sometimes she thinks about the little Nandini, who - using hope and effort fulfilled her dream. She kept faith in herself and always thought "Yes, I can attain success". "Yes, I can work wonders". "I will become a doctor". "No matter what happens, I won't stop". "I will keep on working hard". Because that is what without a doubt - makes all the difference.

Hope glides, hope floats, hope is real.

And if you choose hope, anything's possible.

Placebo video

The story[145] revolves around a boy named Swami who is 9 years old raised in a simple family. His father is a barrister. He always emphasizes on the importance of studying.

Swami has three friends, who find a new boy in school named Rajan arrogant and pompous because he belongs to a rich family. But Swami finds him pleasant to talk to and, eventually, they become friends. However, Swami's friends do not appreciate his friendship with Rajan and start to ignore him. Swami naively does not understand the reason for their ignorance. But he enjoys Rajan's company. In order to win over their friendship, Rajan invites them to his mansion and lures them to become his friends with delicious cakes and toys. This works and they all become friends.

One day, Rajan also goes to Swami's place, which is a big affair for Swami and he makes the best arrangements for his welcome. He also keeps on telling his grandmother about Rajan and his father, who is a police officer.

Rajan and his friends pro-actively plan to create an official cricket team in Malgudi for themselves. All the formalities for the creation of the team such as purchase of bat, ball, stumps and tax payments are made accruing to the successful creation of the team.

[145]'Swami and friends' is one of the most popular stories of 'Malgudi Days'. It is a Hindi language television series based on the eponymous works of R.K. Narayan. The story revolves around the daily lives of Swami and his friends, set in a fictional town named Malgudi in India. The story is suitable for kids of all ages and can in no way cause any feelings of distress or psychological harm. It is a fictional story about a group of kids who decide to form a cricket team in their village. Different scenes are compiled from the series to make a short 30-minute film that has no priming effects.

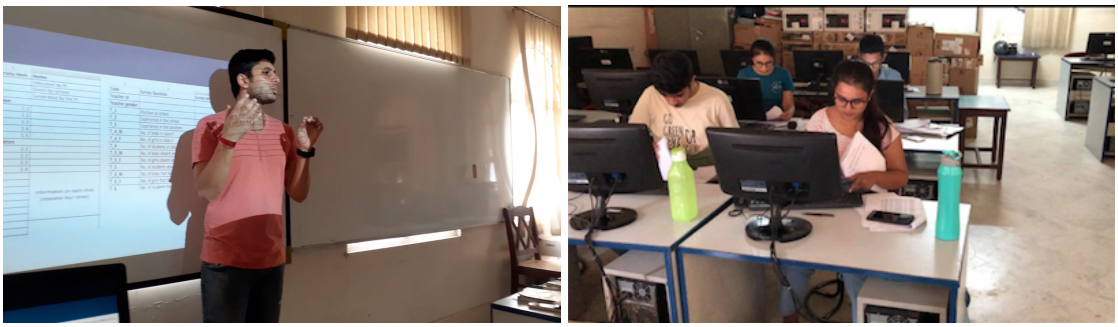
A.6 Fieldwork at a glimpse

The three panels depict images from different stages of the fieldwork. Panel (a) shows images from the data collection at baseline, panel (b) shows scenes from the intervention and endline phase, and (c) contains images from the data entry period.

Panel (a): Sample and baseline surveys

Panel (b): Data collection and intervention

Panel (c): Training and data entry



A.7 Tables

Table 17: Sample composition

School identification criteria											
School	# Boys	# Girls	Total	# Teachers	>3 kms apart	<8 kms apart	Class 0-12	CBSE	Private	Tarined teachers	>40 students
1	23	18	41	11	✓	✓	✓	✓	✓	✓	✓
2	57	37	94	10	✓	✓	✓	✓	✓	✓	✓
3	54	24	78	5	✓	✓	✓	✓	✓	✓	✓
4	54	37	91	5	✓	✓	✓	✓	✓	✓	✓
5	57	46	103	9	✓	✓	✓	✓	✓	✓	✓
6	31	14	45	6	✓	✓	✓	✓	✓	✓	✓

Table 18: Rotated factor loadings

Variable	Label	Factor1	Factor2	Factor3	Uniqueness
v_1	Huge figure (>15 cm)	-0.012	-0.089	-0.031	0.991
v_2	Tiny figure (<5 cm)	0.212	0.204	0.132	0.896
v_3	Monster, grotesque, genitals	0.102	0.011	0.084	0.983
v_4	Shading of face or body	0.174	0.059	0.078	0.960
v_5	Missing mouth	0.812	0.320	-0.055	0.235
v_6	Missing nose	0.455	0.219	0.061	0.742
v_7	No neck	0.218	0.219	0.072	0.899
v_8	No eyes	0.766	0.238	-0.063	0.353
v_9	Frowning, sad or crying	0.169	-0.297	-0.302	0.792
v_10	Disproportionate body parts	0.063	0.057	0.119	0.979
v_11	Poor integration of body parts	0.164	0.101	0.166	0.935
v_12	Tiny head (<$1/6^{th}$ body size)	-0.058	0.008	-0.024	0.996
v_13	Drawn in dark colours	0.342	-0.396	0.447	0.526
v_14	Drawn in single colour	0.293	-0.386	0.294	0.679
v_15	Drawn in light /cheery colours	-0.421	0.543	-0.462	0.315
v_16	Bad weather	-0.005	-0.033	-0.040	0.997
v_17	Good weather	-0.082	0.110	-0.083	0.974
v_18	Smiling	-0.780	-0.145	0.126	0.354
v_19	Missing arms or hands	0.463	0.190	0.147	0.728
v_20	Missing legs	0.349	0.222	0.139	0.810
v_21	Erasure marks or scribbles	0.075	-0.026	0.083	0.987
v_22	Positive accessorisation	-0.200	0.142	0.084	0.933
v_23	Negative accessorisation	0.241	-0.269	-0.392	0.717
v_24	Positive body language	-0.674	0.229	0.281	0.415
v_25	Negative body language	0.470	-0.400	-0.424	0.439
v_26	Slanting figures	0.048	-0.039	0.049	0.994
v_27	Three or more figures	0.086	0.124	0.008	0.977
v_28	Proper and clean alignment	-0.259	-0.073	-0.176	0.897
v_29	Long arms	-0.028	0.015	0.060	0.996
v_30	Legs pressed together	0.042	0.056	0.041	0.994

Notes: This table displays the orthogonally rotated factor loadings for the pre-coded drawing characteristics, discussed in section 3.3.1. Loadings greater than 0.33 (in magnitude) are retained for factor composition to have meaningfully inferable factors. These are presented in the next table. The last column on 'Uniqueness', reports the proportion of the common variance that is not related to any of the other factors.

Table 19: Factor composition

Panel (a): Self-efficacy or Optimism

Variable	Variable label	Factor1 (SE/Optimism)	Factor2	Factor3	Uniqueness	Associated characteristic
v_1	Huge figure (>15 cm)				0.991	
v_2	Tiny figure (<5 cm)				0.896	
v_3	Monster, grotesque, genitals				0.983	
v_4	Shading of face or body				0.960	
v_5	Missing mouth	0.873			0.235	Optimism
v_6	Missing nose	0.501			0.742	Optimism
v_7	No neck				0.899	
v_8	No eyes	0.796			0.353	Optimism
v_9	Frowning, sad or crying			-0.451	0.792	Happiness
v_10	Disproportionate body parts				0.979	
v_11	Poor integration of body parts				0.935	
v_12	Tiny head ($<1/6^{th}$ body size)				0.996	
v_13	Drawn in dark colours		0.679		0.526	Optimism
v_14	Drawn in single colour		0.551		0.679	Optimism
v_15	Drawn in light /cheery colours		-0.812		0.315	Happiness
v_16	Bad weather				0.997	
v_17	Good weather				0.974	
v_18	Smiling	-0.773			0.354	Happiness
v_19	Missing arms or hands	0.492			0.728	Self-efficacy
v_20	Missing legs	0.402			0.810	Self-efficacy
v_21	Erasure marks or scribbles				0.987	
v_22	Positive accessorisation				0.933	
v_23	Negative accessorisation			-0.52	0.717	SE/HA
v_24	Positive body language	-0.525		0.52	0.415	Happiness
v_25	Negative body language			-0.68	0.439	Happiness
v_26	Slanting figures				0.994	
v_27	Three or more figures				0.977	
v_28	Proper and clean alignment				0.897	
v_29	Long arms				0.996	
v_30	Legs pressed together				0.994	

Notes: Retained loadings from table 18 and the empirical correlations of these variables are presented in column (3) and (7), respectively. The last column on 'Uniqueness', is the same as in table 18.

Table 19: Factor composition (table continued)

Panel (b): Happiness

Variable	Variable label	Factor1	Factor2	Factor3 (Happiness)	Uniqueness	Associated characteristic
v_1	Huge figure (>15 cm)				0.991	
v_2	Tiny figure (<5 cm)				0.896	
v_3	Monster, grotesque, genitals				0.983	
v_4	Shading of face or body				0.960	
v_5	Missing mouth	0.873			0.235	Optimism
v_6	Missing nose	0.501			0.742	Optimism
v_7	No neck				0.899	
v_8	No eyes	0.796			0.353	Optimism
v_9	Frowning, sad or crying			-0.451	0.792	Happiness
v_10	Disproportionate body parts				0.979	
v_11	Poor integration of body parts				0.935	
v_12	Tiny head ($<1/6^{th}$ body size)				0.996	
v_13	Drawn in dark colours		0.679		0.526	Optimism
v_14	Drawn in single colour		0.551		0.679	Optimism
v_15	Drawn in light /cheery colours		-0.812		0.315	Happiness
v_16	Bad weather				0.997	
v_17	Good weather				0.974	
v_18	Smiling	-0.773			0.354	Happiness
v_19	Missing arms or hands	0.492			0.728	Self-efficacy
v_20	Missing legs	0.402			0.810	Self-efficacy
v_21	Erasure marks or scribbles				0.987	
v_22	Positive accessorisation				0.933	
v_23	Negative accessorisation			-0.52	0.717	SE/HA
v_24	Positive body language	-0.525		0.52	0.415	Happiness
v_25	Negative body language			-0.68	0.439	Happiness
v_26	Slanting figures				0.994	
v_27	Three or more figures				0.977	
v_28	Proper and clean alignment				0.897	
v_29	Long arms				0.996	
v_30	Legs pressed together				0.994	

Notes: Retained loadings from table 18 and the empirical correlations of these variables are presented in column (5) and (7), respectively. The last column on 'Uniqueness', is the same as in table 18.

Table 20: Baseline relationships

Variable	(1) Math	(2) English	(3) Hope	(4) Effort (sc)	(5) Effort (rc)
Hope	0.427***	0.154		0.007	0.002
	(0.088)	(0.124)		(0.009)	(0.004)
Substitution class	0.593	1.665**	0.185		0.024
	(0.443)	(0.618)	(0.245)		(0.022)
Remedial class	2.716***	2.084	2.80	0.119	
	(0.989)	(1.377)	(0.547)	(0.110)	
Past perform.	0.384***	0.452***	-0.002	-0.001	-0.001
records	(0.031)	(0.044)	(0.020)	(0.004)	(0.001)
Age	-2.098**	-2.027*	0.876*	-0.141	-0.003
	(0.645)	(0.898)	(0.355)	(0.072)	(0.032)
Gender	2.306*	-1.651	0.400	-0.222*	0.014
	(0.962)	(1.340)	(0.528)	(0.106)	(0.047)
Private tuition	2.135*	0.858	-0.166	-0.111	0.003
	(0.965)	(1.344)	(0.531)	(0.107)	(0.048)
Religion	-0.495	-0.179	1.210	-0.053	0.041
	(1.437)	(2.002)	(0.786)	(0.159)	(0.071)
Hh size	0.007	-0.439**	0.018	-0.006	-0.011*
	(0.105)	(0.146)	(0.057)	(0.011)	(0.005)
Hours studied	0.023	0.114	0.037	-0.008	-0.001
at home/week	(0.106)	(0.148)	(0.058)	(0.011)	(0.005)
Achievement			0.042**	0.006*	0.003*
(Total)			(0.013)	(0.002)	(0.001)
Constant	9.331	14.23	13.89***	2.229**	0.189
	(6.706)	(9.343)	(3.630)	(0.736)	(0.334)
N	423	423	423	423	423

Notes: The table displays the baseline associations between the confounding factors and the main outcome variables in columns (1)-(5). Standard errors are in parentheses with *** p <0.01, **p<0.05 and *p<0.1.

Table 21: Attrition balance test

Attrition rate	Control mean	sd	Treatment mean	sd	Difference (C - T)	p-value
CHS	0.0176	0	0.017	0	0	.
N	222		222			
Drawings	0.084	0	0.084	0	0	.
N	207		207			
Effort (sc)	0.044	0	0.044	0	0	.
N	216		216			

Notes: Difference in mean attrition between treatment and placebo (here, control) over hope (chs), drawings and substitution class (sc). Attrition for learning outcomes is same as effort (substitution class).

Table 22: DiD for student attendance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Before		Diff	After		Diff	Treatment	Treatment
	C	T	(T-C)	C	T	(T-C)	effect	effect
Attendance	0.899	0.893	-0.006	0.841	0.861	0.020*	0.026	0.025**
(fraction)			(0.012)			(0.012)	(0.017)	(0.012)
Controls								✓
Clustered se								✓
N	226	226	452	226	226	452	452	904

Notes: I compare the attendance fractions before (August) and after 5-months (January) the intervention. Column (1)-(6) display simple mean comparisons. Column (8) reports the DiD estimates. Standard errors are in parantheses with *** p <0.01, **p<0.05, and *p<0.1.

Table 23: IV estimates of the effect of student effort on performance

Difference-in-differences	(1) OLS Performance	(2) Reduced form Performance	(3) First stage Effort*Post	(4) IV structure Performance
Panel (a): Instrumenting on effort in remedial class				
Effort*post	-0.006			1.267
(Remedial class)	(0.049)			(1.114)
	[0.900]			[0.255]
Treatment		0.177**	0.185**	
(Treatment*Post)		(.076)	(0.092)	
		[0.020]	[0.043]	
Mean of Dependent variables	0.239	0.239	-0.053	0.239
Panel (b): Instrumenting on an effort index (substitution and remedial class)				
Effort				0.015
(RC and SC)				(1.320)
				[0.991]
Treatment	-0.037	0.177**	0.159	
(Treatment*Post)	(0.058)	(.076)	(0.106)	
	[0.522]	[0.020]	[0.133]	
Mean of Dependent variables	0.239	0.239	-0.072	0.239
Controls	Yes	Yes	Yes	Yes
Observations	829	829	829	829

Notes: This table presents the instrumental variable (IV) estimates of the models relating to students' academic performance in English and effort, where the random treatment assignment is used as an instrument. Standard errors, clustered at individual level are in parenthesis with p-values in brackets.

A.8 Figures

Figure 8: Mapping study locations

Panel (a) Panel (b)

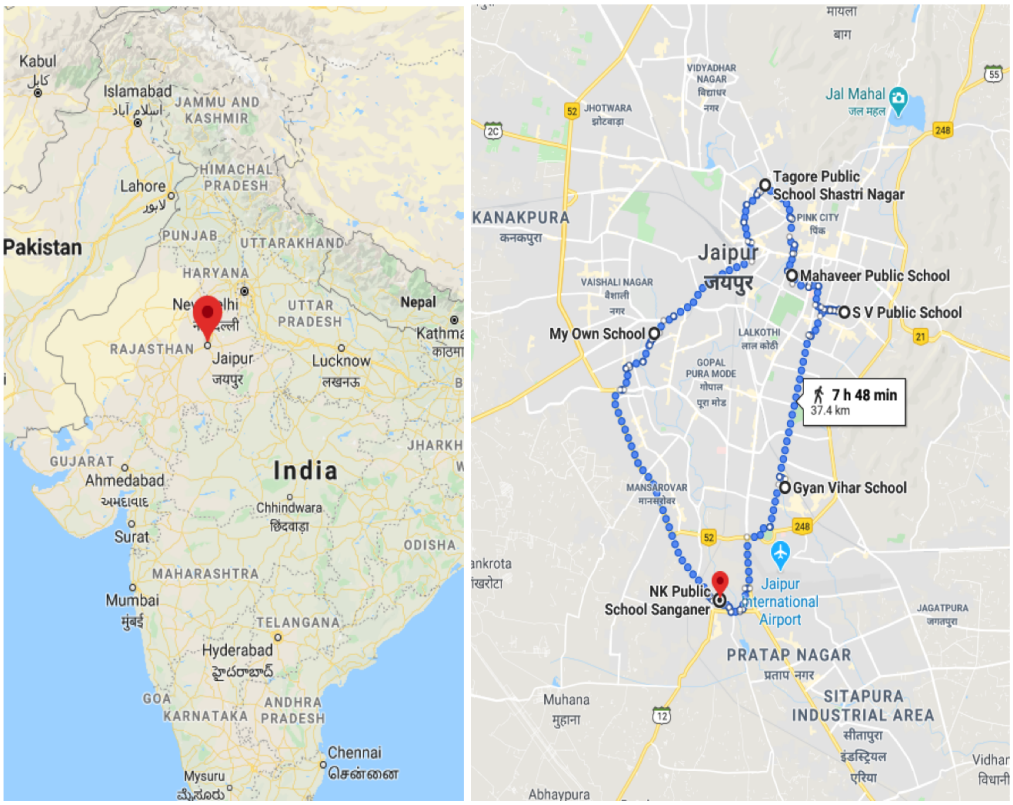


Figure 9: A sample of self-portraits

Panel A

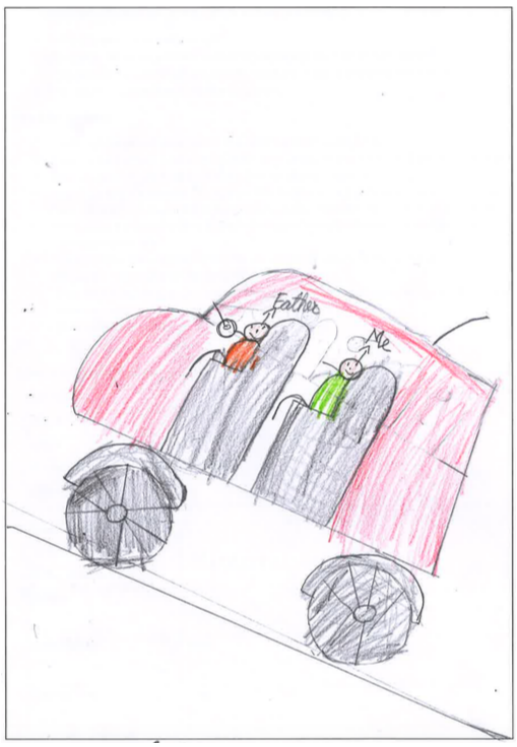
(a) Self-efficacy/Optimism - 5 percentile

(b) SE/Optimism - 95 percentile

Panel B

(c) Happiness - 5 percentile

(d) Happiness - 95 percentile



A.9 Qualitative Data: Teacher Interviews Summary

"Many students perform very well if we motivate them. I feel this after teaching for so many years."

- Teacher, Tagore Public School[146] *(August, 2020)*

This document contains a summary of the key findings obtained during the interviews conducted with the teachers of schools within the study titled 'Do Role Models Increase Student Hope and Effort? Evidence from India'. Interviews were conducted to understand the perspective of teachers, validate the findings and identify any changes in the students beyond the scope of the study. These interviews[147] were held in the 2nd and 3rd week of August 2020.

Findings

The key findings during the interviews were: (i) the students enjoyed activity-based learning[148], and (ii) these kids seemed motivated in class after the intervention.

From the experience of the teachers, students make choices about how much effort to exert on the basis of their interest. Many teachers pointed out that hope has a direct relation to confidence. Occasionally kids with high hope become overconfident and this could result in slackening of their efforts. Students with low hope put in extra effort if adequate support mechanisms are in place. Teachers also observed an enhancement in overall happiness amongst the students.

One of the teachers in SV public school mentioned that some of the students became more polite and self-disciplined. '*One of the students started doing well in studies. Ear-*

[146]Following data protection rules and the CoSS research ethics code of conduct, no names are revealed from these interviews. The name of schools are revealed descriptively in other parts of the thesis, but the information about the name of teachers in not available as the data is anonymised.

[147]Some of the interviews were recorded physically on the premises of the school and some were conducted on a virtual meeting platform - zoom.

[148]Teacher, unaware about the intent of the intervention, referred to it as 'activity'. To them any observable improvements in the students were a result of this activity-based learning, which conforms to the absence of any experimenter demand effects.

lier he was irregular' but after the intervention, teachers noticed '*a lot of improvement in him*'. Some of the students improved their ability to ask questions and give answers in the classroom. Attendance in the remedial classes increased after 6 weeks as initially, parents were under pressure to collect their wards after the extra class[149].

Teachers also shared that by the end of a session or in the middle of the session all of the students seemed to be more responsible and confident. Although, this depends to a large extent on how responsible the teacher was. One of the major changes found in the students was that they became more confident and they started performing well in class and also improved their writing skills in English.

Conclusion and lessons for future

Schools were thankful for the study, as it was altogether, a different experience for them as well as the students. The interviews conducted with all the partner schools played an important role in assessing the findings from the perspective of the teacher after the intervention. Overall, students in all the schools became more hard working, and improved their academic performance.

According to the teachers, this study could be improved by incorporating an assessment of disciplinary factors (like student obedience, homework completion or punctuality). The study had an impact on students of every school in one-way or another. They believe that the intervention will have a long-lasting impact on the students. They agreed that the intervention played a major role in motivating students of this age group, and resulted in improved student performance.

A.10 Do file

The commands as recorded in my do-file to perform the analysis for chapter 4 and 5 are below.

[149] much in lines with my conjecture in chapter 5.

Do file

(Stata Commands)

```
// This is a do-file for the analysis performed by Prateek Chandra Bhan for a doctoral thesis in Economics in The University of Glasgow.
// Thesis title: Essays on Hope and Economic Development

// Date: 20 October 2020
// Date of revision: 21 June 2021

// I have a merged file with information on: Covariates (Parents, Social Networks and Children, Secondary data on student scores) and pre-registered Indicators (Hope, Effort and Achievement)
// A separate file on administrative data supplied by schools on student attendance is used for one outcome variable.

// An example of the merging commands used:
// On Date: 27 March 2020:
// merge m:m id studentname using "/Users/apple/Documents/PhD Economics/Year 3/Main experiment/Data/Stata files/Attendance1.dta"

** The variable studentname was used only for the merging and deleted thereafter to ensure anonymity in the dataset.
** It is important to note that some of the following commands are purely for the purpose of intermediate analysis and the outputs are not reported in the thesis.

// Using the merged dataset:
use "/Users/apple/Documents/PhD Economics/Year 3/Main experiment/Data/Stata files/MergedData_BLParentsKidsTeachers_Indicators_Rev5.dta"

// sorting
// gsort id session

// Dataset was cleaned and variables were labeled in Feb-Sep 2020

// Sample summary statistics (Mean, s.d., median, n & range)
// In the order: age, gender, past performance in class 3(percentage), taking pvt tuition, tution hours/wk, religion, native, hh size, hrs study/week, hope score, remedial class attendance, substitution class score, aser scores in math, english and total, hope score of father and mother

tabstat age gender  past_record sem1_result c_4 c_6 c_7_1 c_10 c_12 c_19 chs rc sc aser_m aser_e aser_t p1_h p2_h if session == 1, statistics( count mean sd min max median ) by(tr) columns(statistics)
```

///// Table for balancing checks

// A. Using survey information on baseline characteristics
asdoc ttest age if session == 1, by(tr)
asdoc ttest gender if session == 1, by(tr)
asdoc ttest c_4 if session == 1, by(tr)
asdoc ttest c_6 if session == 1, by(tr)
asdoc ttest c_7_1 if session == 1, by(tr)
asdoc ttest c_10 if session == 1, by(tr)
asdoc ttest c_12 if session == 1, by(tr)
asdoc ttest c_19 if session == 1, by(tr)
asdoc ttest f_1_2 if session == 1, by(tr)
asdoc ttest july_fraction if session == 1, by(tr)
asdoc ttest p1_h if session == 1, by(tr)
asdoc ttest p2_h if session == 1, by(tr)

// B. Using information on baseline indicators & secondary data

asdoc ttest past_record if session == 1, by(tr)
asdoc ttest chs if session == 1, by(tr)
asdoc ttest rc if session == 1, by(tr)
asdoc ttest sc if session == 1, by(tr)
asdoc ttest gls_index if session == 1, by(tr)
asdoc ttest aser_m if session == 1, by(tr)
asdoc ttest aser_e if session == 1, by(tr)
asdoc ttest aser_t if session == 1, by(tr)
asdoc ttest aser_t if session == 1, by(tr)

// Depicting the balancing checks using figures
histogram age if session == 1, discrete frequency by(tr)
histogram age1 if session == 1, discrete frequency by(tr)
histogram gender if session == 1, discrete frequency by(tr)
histogram c_7_1 if session == 1, discrete frequency by(tr)
histogram c_4 if session == 1, discrete frequency by(tr)
histogram c_10 if session == 1, discrete frequency by(tr)

// One can draw many other figures to illustrate the balance across the two groups (tr = 0 & tr = 1)

// Baseline correlation matrix
// One can use Pearson's correlation i.e. pwcorr for continuous variables
// For ordinal variables like likert scales (or index) we need to use Spearman's correlation

(non-parametric test) and it doesn't require the monotonicity in relationships

```
// General correlation matrix: possible relationships between variables
corr chs rc sc aser_m aser_e aser_t age gender past_record total_sem1 c_4 c_7_1 c_10  c_12 c_19 if session == 1

// Pearson's pairwise correlation: tells us about possible multicollinearity
pwcorr chs rc sc aser_m aser_e aser_t age gender past_record total_sem1 c_4 c_7_1 c_10 c_12 c_19 if session == 1, obs sig star(5)

pwcorr aser_m aser_e aser_t age past_record july_fraction c_12 c_19 if session == 1, obs sig star(5)

// Spearman's correlation: non-parametric test

spearman chs aser_t rc sc c_4 c_7_1 c_10 gender if session == 1, stats(rho obs p) star(0.05)
spearman chs rc sc aser_m aser_e aser_t age gender past_record total_sem1 c_4 c_7_1 c_10 c_12 c_19 if session == 1, stats (rho obs p) star(0.05)

/// Defining the sample as panel
xtset id session

// Generating the outcome variables from the drawings
/// Factor analysis (EFA)
global port v_1 - v_30
global ncomp 3
factor $port
screeplot
factor $port, mineigen(1)
factor $port, comp($ncomp) blanks(.3)
rotate, varimax
rotate, varimax blanks(.3)
estat common
predict f1 f2 f3
estat kmo
alpha $port

/// Kling's index
foreach k1 in v_5 v_6 v_8 v_18 v_19 v_20 v_24 {
	quietly sum `k1' if tr == 0
	gen `k1'_es = `k1' / r(sd)
	local csd = r(sd)
	quietly sum `k1' if tr == 0
	local cmean = r(mean)
```

```
	replace `k1'_es = `k1' - `cmean' / `csd'
}

egen k1 = rsum(v_5_es v_6_es v_8_es v_18_es v_19_es v_20_es v_24_es)
replace k1 = k1/7

/// Anderson's index

foreach a1 in v_5 v_6 v_8 v_18 v_19 v_20 v_24 {
	quietly sum `a1' if tr == 0 & session == 1
	gen `a1'_es = `a1' / r(sd)
	local csd1 = r(sd)
	quietly sum `a1' if tr == 0 & session == 1
	local cmean1 = r(mean)
	replace `a1'_es = `a1' - `cmean1' / `csd1'
}

// Generate and invert the correlation matrix
matrix accum R = v_5_es v_6_es v_8_es v_18_es v_19_es v_20_es v_24_es, nocons dev // Form
cross-product (Y'Y) matrix from outcome variables
matrix R = R / r(N) // Generate correlation matrix for outcomes
matrix R = syminv(R) // Invert correlation matrix
local counter = 1
matrix J = J(colsof(R),1,1) // Column vector of correct dimension
while `counter' <= colsof(R) {
	matrix T = R[`counter',1..colsof(R)]
	matrix A = T * J // Sum of row of inverted correlation matrix
	local weight`counter++' = A[1,1]
}

// Generate total number of variables per observation, replacing missing ones with zeros
gen sample_p1 = 0
local counter = 1
foreach a1 in v_5 v_6 v_8 v_18 v_19 v_20 v_24 {
	replace sample_p1 = sample_p1 + `weight`counter++''    if    `a1' != .
	replace `a1'_es = 0    if `a1' == .
}


// Generate the GLS index variable
quietly gen gls_index = 0
local counter = 1
foreach a1 in v_5 v_6 v_8 v_18 v_19 v_20 v_24 {
	replace gls_index = `a1'_es *    `weight`counter++''    +    gls_index
```

```
}
replace gls_index = gls_index / sample_p1
//// Baseline associations for the drawing characteristics (not including Kling's index because we have two variables from the exploratory factory analysis and the Anderson's index)

eststo clear

eststo: reg chs gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 aser_t sc f1    if v_5!= . & chs! = . & session2 == 0
eststo: reg chs gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 aser_t sc gls_index    if v_5!= . & chs! = . & session2 == 0

eststo: reg sc gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 chs aser_t rc f1 if v_5!=. &    chs! = . & session2 == 0
eststo: reg sc gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 chs aser_t rc gls_index if v_5!=. &    chs! = . & session2 == 0

eststo: reg aser_t gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 chs rc sc f1 if v_5!=. & chs! = . & session2 == 0
eststo: reg aser_t gender age    past_record july_fraction c_4    c_7_1 c_10 c_12 c_19 f_1_2 chs rc sc gls_index if v_5!=. & chs! = . & session2 == 0

esttab using table1.rtf, starlevels(* 0.10 ** 0.05    *** 0.001) se label

*** The table numbers used to save the tables do not correspond to those used in the thesis.

/// Mean comparison using DiD (before/after)
diff chs if session2 != ., t(tr) p(session2)
diff sc if session2 != ., t(tr) p(session2)
diff rc if session2 != ., t(tr) p(session2)
diff aser_m if session2 != ., t(tr) p(session2)
diff aser_e if session2 != ., t(tr) p(session2)
diff f1 if v_5!= ., t(tr) p(session2)
diff k1 if v_5!= ., t(tr) p(session2)
diff gls_index if v_5!= ., t(tr) p(session2)


//// Main results

*** Standardised set of outcome indicators are created for hope, effort (RC & SC) and Achievement (English, Maths and total test performance)
//// we will proceed with the standardisation by demeaning and normalising the outcome variables i.e. (x - mean of all baseline data)/all baseline s.d.
```

```
// I use this for hope

summ chs if session == 1
egen chs_sd = sd(chs) if session == 1
replace chs_sd = 5.409283
egen chs_bl_mean = mean(chs) if session == 1
replace chs_bl_mean = 27.331081
replace chs_bl_mean = . if chs == .
gen chs_d = chs - chs_bl_mean
replace chs_d = chs_d/chs_sd
replace chs_d = . if chs == .
xtreg chs_d interact session2 tr if chs!= . & session2 != ., re cl(id) robust
xtreg chs_d interact1 ses tr if ses != . , re cl(id) robust
xtreg chs_d interact2 ses2 tr if ses2 != ., re cl(id) robust

// I use this for substitution class

summ sc if session == 1
egen sc_sd = sd(sc) if session == 1
replace sc_sd =    1.068302
egen sc_bl_mean = mean(sc) if session == 1
replace sc_bl_mean =    1.108796
replace sc_bl_mean = . if sc == .
gen sc_d = sc - sc_bl_mean
replace sc_d = sc_d/sc_sd
replace sc_d = . if sc == .
xtreg sc_d interact session2 tr if session2 != ., re cl(id) robust
xtreg sc_d interact1 ses tr if ses != . , re cl(id) robust
xtreg sc_d interact2 ses2 tr if ses2 != ., re cl(id) robust

// I use this for remedial class

summ rc if session == 1
egen rc_sd = sd(rc) if session == 1
replace rc_sd =      .4773766
egen rc_bl_mean = mean(rc) if session == 1
replace rc_bl_mean =    .349537
replace rc_bl_mean = . if rc == .
gen rc_d = rc - rc_bl_mean
replace rc_d = rc_d/rc_sd
replace rc_d = . if rc == .
xtreg rc_d interact session2 tr if session2 != ., re cl(id) robust
```

```
xtreg rc_d interact1 ses tr if ses != . , re cl(id) robust
xtreg rc_d interact2 ses2 tr if ses2 != ., re cl(id) robust
// I use this for Mathematics

summ aser_m if session == 1
egen aser_m_sd = sd(aser_m) if session == 1
replace aser_m_sd =       11.77973
egen aser_m_bl_mean = mean(aser_m) if session == 1
replace aser_m_bl_mean = 32.28704
replace aser_m_bl_mean = . if aser_m == .
gen aser_m_d = aser_m - aser_m_bl_mean
replace aser_m_d = aser_m_d/aser_m_sd
replace aser_m_d = . if aser_m == .
xtreg aser_m_d interact session2 tr if session2 != ., re cl(id) robust
xtreg aser_m_d interact1 ses tr if ses != . , re cl(id) robust
xtreg aser_m_d interact2 ses2 tr if ses2 != ., re cl(id) robust

// I use this for English

summ aser_e if session == 1
egen aser_e_sd = sd(aser_e) if session == 1
replace aser_e_sd =       15.57966
egen aser_e_bl_mean = mean(aser_e) if session == 1
replace aser_e_bl_mean = 31.0162
replace aser_e_bl_mean = . if aser_e == .
gen aser_e_d = aser_e - aser_e_bl_mean
replace aser_e_d = aser_e_d/aser_e_sd
replace aser_e_d = . if aser_e == .
xtreg aser_e_d interact session2 tr if session2 != ., re cl(id) robust
xtreg aser_e_d interact1 ses tr if ses != . , re cl(id) robust
xtreg aser_e_d interact2 ses2 tr if ses2 != ., re cl(id) robust
```

*** Instead of doing the above manually, one can use the command 'global' or 'collapse'.
*** Because I have multiple outcome variables, for robustness, I decided to approach each variable manually, one at a time, to avoid any ambivalence.

```
/// Plotting point estimates
preserve
collapse chs_d, by(tr session)
scatter chs_d session if  tr == 1, connect(l) lpattern (solid) || scatter chs_d session if  tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse gls_index, by(tr session)
scatter gls_index session if  tr == 1, connect(l) lpattern (solid) || scatter gls_index session if  tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse f3, by(tr session)
scatter f3 session if  tr == 1, connect(l) lpattern (solid) || scatter f3 session if  tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse rc_d, by(tr session)
scatter rc_d session if  tr == 1, connect(l) lpattern (solid) || scatter rc_d session if  tr == 0, connect(l) lpattern (dash)
restore
ed id attending m1 m8 ses
preserve
collapse attending, by(tr ses)
scatter attending ses if tr == 1, connect(l) lpattern (solid) || scatter attending ses if tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse sc_d, by(tr session)
scatter sc_d session if  tr == 1, connect(l) lpattern (solid) || scatter sc_d session if  tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse aser_e_d, by(tr session)
scatter aser_e_d session if  tr == 1, connect(l) lpattern (solid) || scatter aser_e_d session if  tr == 0, connect(l) lpattern (dash)
restore
preserve
collapse aser_m_d, by(tr session)
scatter aser_m_d session if  tr == 1, connect(l) lpattern (solid) || scatter aser_m_d session if  tr == 0, connect(l) lpattern (dash)
restore
```

```
/// Plotting point estimates with 90% confidence intervals (by treatment) for all sessions

// For hope
preserve
local varname chs_d
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
**** for 95% CI - one can use 1.96 instead of 1.65
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session, lwidth(.2)) ||
(scatter y session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session, lwidth(.1))
restore


//// For SE/Optimism
preserve
local varname gls_index
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session) ||    (scatter y
session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session)
restore


//// For RC
preserve
local varname rc_d
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session) ||    (scatter y
session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session)
restore


//// For Attendance
preserve
local varname attend
```

```
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session) ||    (scatter y
session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session)
restore


//// For Mathematics
preserve
local varname aser_m_d
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session) ||    (scatter y
session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session)
restore


//// For English
preserve
local varname aser_e_d
local group session tr
collapse (mean) y = `varname' (semean) se_y = `varname', by(`group')
gen yu = y + 1.65*se_y
gen yl = y - 1.65*se_y
twoway (scatter y session if    tr == 1, connect(l) lpattern (solid)) (rcap yu yl session) ||    (scatter y
session if    tr == 0, connect(l) lpattern (dash)) (rcap yu yl session)
restore
```

///// Estimations for treatment effects using difference-in-differences (DiD) and (Ancova)

//// DiD

```
eststo clear
eststo: xtreg chs_d interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg chs_d interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg chs_d interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg chs_d interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg f1 interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f1 interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f1 interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f1 interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg k1 interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg k1 interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg k1 interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg k1 interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg gls_index interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg gls_index interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg gls_index interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg gls_index interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg f3 interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f3 interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f3 interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f3 interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust
```

```
eststo: xtreg sc_d interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg sc_d interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg sc_d interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg sc_d interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg rc_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg rc_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg aser_m_d interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg aser_m_d interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_m_d interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg aser_m_d interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg aser_e_d interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg aser_e_d interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_e_d interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg aser_e_d interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

esttab using table2.rtf, starlevels(* 0.10 ** 0.05  *** 0.01) se label

///// Ancova

**** Ancova main results

** bl to el
// Hope
preserve
gen chs_d1 = chs
replace chs_d1 = . if session2 != 1
replace chs_d1 = chs_d[_n+1] if missing(chs_d1)
```

```
replace chs_d1 = . if session2 != 0
reg chs_d1 chs_d tr    if session2 == 0
restore

// Effort - sc
preserve
gen sc_d1 = sc_d
replace sc_d1 = . if session2 != 1
replace sc_d1 = sc_d[_n+1] if missing(sc_d1)
replace sc_d1 = . if session2 != 0
reg sc_d1 sc_d tr    if session2 == 0
restore

// Effort - rc
preserve
gen rc_d1 = rc_d
replace rc_d1 = . if session2 != 1
replace rc_d1 = rc_d[_n+1] if missing(rc_d1)
replace rc_d1 = . if session2 != 0
reg rc_d1 rc_d tr if session2 == 0
restore

// Mathematics
preserve
gen aser_m_d1 = aser_m_d
replace aser_m_d1 = . if session2 != 1
replace aser_m_d1 = aser_m_d[_n+1] if missing(aser_m_d1)
replace aser_m_d1 = . if session2 != 0
reg aser_m_d1 aser_m_d tr if session2 == 0
restore

// English
preserve
gen aser_e_d1 = aser_e_d
replace aser_e_d1 = . if session2 != 1
replace aser_e_d1 = aser_e_d[_n+1] if missing(aser_e_d1)
replace aser_e_d1 = . if session2 != 0
reg aser_e_d1 aser_e_d tr if session2 == 0
restore

** bl to fus1

//Hope
preserve
```

```
gen chs_d1 = chs_d
replace chs_d1 = . if ses2 != 1
replace chs_d1 = chs_d[_n+2] if missing(chs_d1)
replace chs_d1 = . if session2 != 0

//SE/Optimism
gen f1_d1 = f1
replace f1_d1 = . if ses2 != 1
replace f1_d1 = f1[_n+2] if missing(f1_d1)
replace f1_d1 = . if session2 != 0

//Effort - sc
gen sc_d1 = sc_d
replace sc_d1 = . if ses2 != 1
replace sc_d1 = sc_d[_n+2] if missing(sc_d1)
replace sc_d1 = . if session2 != 0

//Effort - rc
gen rc_d1 = rc_d
replace rc_d1 = . if ses2 != 1
replace rc_d1 = rc_d[_n+2] if missing(rc_d1)
replace rc_d1 = . if session2 != 0

//Mathematics
gen aser_m_d1 = aser_m_d
replace aser_m_d1 = . if ses2 != 1
replace aser_m_d1 = aser_m_d[_n+2] if missing(aser_m_d1)
replace aser_m_d1 = . if session2 != 0

//English
gen aser_e_d1 = aser_e_d
replace aser_e_d1 = . if ses2 != 1
replace aser_e_d1 = aser_e_d[_n+2] if missing(aser_e_d1)
replace aser_e_d1 = . if session2 != 0

eststo: reg chs_d1 chs_d tr    if session2 == 0
eststo: reg f1_d1 f1 tr if session2 == 0
eststo: reg sc_d1 sc_d tr if session2 == 0
eststo: reg rc_d1 rc_d tr    if session2 == 0
eststo: reg aser_m_d1 aser_m_d tr    if session2 == 0
eststo: reg aser_e_d1 aser_e_d tr    if session2 == 0
esttab using table3.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

restore
```

```
** bl to fus2

//Hope
preserve
gen chs_d1 = chs_d
replace chs_d1 = . if ses2 != 1
replace chs_d1 = chs_d[_n+3] if missing(chs_d1)
replace chs_d1 = . if session2 != 0

//SE/Optimism
gen f1_d1 = f1
replace f1_d1 = . if ses2 != 1
replace f1_d1 = f1[_n+3] if missing(f1_d1)
replace f1_d1 = . if session2 != 0

//Effort - sc
gen sc_d1 = sc_d
replace sc_d1 = . if ses2 != 1
replace sc_d1 = sc_d[_n+3] if missing(sc_d1)
replace sc_d1 = . if session2 != 0

//Effort - rc
gen rc_d1 = rc_d
replace rc_d1 = . if ses2 != 1
replace rc_d1 = rc_d[_n+3] if missing(rc_d1)
replace rc_d1 = . if session2 != 0

//Mathematics
gen aser_m_d1 = aser_m_d
replace aser_m_d1 = . if ses2 != 1
replace aser_m_d1 = aser_m_d[_n+3] if missing(aser_m_d1)
replace aser_m_d1 = . if session2 != 0

//English
gen aser_e_d1 = aser_e_d
replace aser_e_d1 = . if ses2 != 1
replace aser_e_d1 = aser_e_d[_n+3] if missing(aser_e_d1)
replace aser_e_d1 = . if session2 != 0

eststo: reg chs_d1 chs_d tr    if session2 == 0
eststo: reg f1_d1 f1 tr if session2 == 0
```

```
eststo: reg sc_d1 sc_d tr if session2 == 0
eststo: reg rc_d1 rc_d tr    if session2 == 0
eststo: reg aser_m_d1 aser_m_d tr    if session2 == 0
eststo: reg aser_e_d1 aser_e_d tr    if session2 == 0
esttab using table4.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

restore


//// I estimate the overall average treatment effects using a pooled sample (Sessions: 1 - baseline, 2 - endline, 3 - follow-up survey 1, and 4 - follow-up survey 2):
/// First, I create session dummies.
/// Second, I repopulate a variable with all the follow-up 2 values of the outcome variables (Hope, SE/Optimism, RC, SC, Mathematics and English).
/// Finally, I regress the outcome value on treatment controlling for the session dummies and the outcome values in different time periods.

preserve

gen s0 = 1 if session == 1
replace s0 = 0 if session != 1
gen chs_bl_d = s0*chs_d

gen s1 = 1 if session == 2
replace s1 = 0 if session != 2
gen chs_el_d = s1*chs_d

gen s2 = 1 if session == 3
replace s2 = 0 if session != 3
gen chs_f1_d = s2*chs_d

gen s3 = 1 if session == 4
replace s3 = 0 if session != 4
gen chs_f2_d = s3*chs_d

reg chs_f2 chs tr chs_el chs_f1

recode chs_f2_d (0 = .)


replace chs_f2_d = chs_f2_d[_n+3] if missing(chs_f2_d) & session == 1
replace chs_f2_d = chs_f2_d[_n+2] if missing(chs_f2_d) & session == 2
replace chs_f2_d = chs_f2_d[_n+1] if missing(chs_f2_d) & session == 3
```

```
gen chs_eltr = chs_el_d*tr
gen chs_f1tr = chs_f1_d*tr

gen f1_bl_d = s0*f1
gen sc_bl_d = s0*sc_d
gen rc_bl_d = s0*rc_d
gen aser_m_bld = s0*aser_m_d
gen aser_e_bld = s0*aser_e_d

gen f1_el_d = s1*f1
gen sc_el_d = s1*sc_d
gen rc_el_d = s1*rc_d
gen aser_m_eld = s1*aser_m_d
gen aser_e_eld = s1*aser_e_d

gen f1_f1_d = s2*f1
gen sc_f1_d = s2*sc_d
gen rc_f1_d = s2*rc_d
gen aser_m_f1d = s2*aser_m_d
gen aser_e_f1d = s2*aser_e_d

gen f1_f2_d = s3*f1
gen sc_f2_d = s3*sc_d
gen rc_f2_d = s3*rc_d
gen aser_m_f2d = s3*aser_m_d
gen aser_e_f2d = s3*aser_e_d

recode f1_f2_d (0 = .)
recode sc_f2_d (0 = .)
recode rc_f2_d (0 = .)
recode aser_m_f2d (0 = .)
recode aser_e_f2d (0 = .)

replace f1_f2_d = f1_f2_d[_n+3] if missing(f1_f2_d) & session == 1
replace f1_f2_d = f1_f2_d[_n+2] if missing(f1_f2_d) & session == 2
replace f1_f2_d = f1_f2_d[_n+1] if missing(f1_f2_d) & session == 3

replace sc_f2_d = sc_f2_d[_n+3] if missing(sc_f2_d) & session == 1
replace sc_f2_d = sc_f2_d[_n+2] if missing(sc_f2_d) & session == 2
replace sc_f2_d = sc_f2_d[_n+1] if missing(sc_f2_d) & session == 3

replace rc_f2_d = rc_f2_d[_n+3] if missing(rc_f2_d) & session == 1
replace rc_f2_d = rc_f2_d[_n+2] if missing(rc_f2_d) & session == 2
replace rc_f2_d = rc_f2_d[_n+1] if missing(rc_f2_d) & session == 3
```

```
replace aser_m_f2d = aser_m_f2d[_n+3] if missing(aser_m_f2d) & session == 1
replace aser_m_f2d = aser_m_f2d[_n+2] if missing(aser_m_f2d) & session == 2
replace aser_m_f2d = aser_m_f2d[_n+1] if missing(aser_m_f2d) & session == 3

replace aser_e_f2d = aser_e_f2d[_n+3] if missing(aser_e_f2d) & session == 1
replace aser_e_f2d = aser_e_f2d[_n+2] if missing(aser_e_f2d) & session == 2
replace aser_e_f2d = aser_e_f2d[_n+1] if missing(aser_e_f2d) & session == 3


eststo: reg chs_f2_d s0 s1 chs_bl_d chs_el_d chs_f1_d tr      if session!= 4
eststo: reg f1_f2_d s0 s1 f1_bl_d f1_el_d f1_f1_d tr        if session!= 4
eststo: reg sc_f2_d s0 s1 sc_bl_d sc_el_d sc_f1_d tr        if session!= 4
eststo: reg rc_f2_d s0 s1 rc_bl_d rc_el_d rc_f1_d tr        if session!= 4
eststo: reg aser_m_f2d s0 s1 aser_m_bld aser_m_eld aser_m_f1d tr        if session!= 4
eststo: reg aser_e_f2d s0 s1 aser_e_bld aser_e_eld aser_e_f1d tr      if session!= 4
esttab using table5.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label


restore

//// Heterogeneity analysis

/// I give an example on how the dummies were created for above and below median age.
** The same is followed for Gender (male/female) and previous academic performance (above/below median performance).

tabstat age if session == 1, statistics( mean count sd min max median ) columns(statistics)
gen age11 = 1 if age>9
replace age11 = 0 if age<= 9
gen age_int1 = age11*tr

eststo clear
eststo: xtreg chs_d tr interact session2 age11 gender past_record c_19 age_int1 if session2!=., re cl(id) robust
eststo: xtreg f1 tr interact session2 age11 gender past_record c_19 age_int1 if session2!=., re cl(id) robust
eststo: xtreg sc_d tr interact session2 age11 gender past_record c_19 age_int1 if session2!=., re cl(id) robust
eststo: xtreg rc_d tr interact session2 age11 gender past_record c_19 age_int1 if session2!=., re cl(id) robust
eststo: xtreg aser_m_d tr interact session2 age11 gender past_record c_19 age_int1 if session2!=., re cl(id) robust
eststo: xtreg aser_e_d tr interact session2 age11 gender past_record c_19 age_int1 if session2!=.,
```

```
re cl(id) robust
esttab using table6.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

tabstat past_record if session == 1, statistics( mean count sd min max median ) columns(statistics)
gen exam = 1 if past_record > 80.25
replace exam = 0 if past_record <= 80.25
gen exam_tr = exam*tr

/// For psychological outcomes (Hope, SE/Optimism and Happiness)
eststo clear
eststo: xtreg chs_d tr interact session2 age11 gender exam   age_int1 if session2!=., re cl(id) robust
eststo: xtreg chs_d tr interact session2 age11 gender exam    male_tr if session2!=., re cl(id) robust
eststo: xtreg chs_d tr interact session2 age11 gender exam    exam_tr if session2!=., re cl(id) robust
eststo: xtreg f1 tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg f1 tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg f1 tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id) robust
eststo: xtreg f3 tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg f3 tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg f3 tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id) robust
esttab using table7.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

/// For Effort (Substitution and Remedial Class) and Achievement (Mathematics and English)
eststo clear
eststo: xtreg sc_d tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg sc_d tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg sc_d tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id) robust
eststo: xtreg rc_d tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg rc_d tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg rc_d tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id) robust
eststo: xtreg aser_m_d tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg aser_m_d tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg aser_m_d tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id) robust
eststo: xtreg aser_e_d tr interact session2 age11 gender exam     male_tr if session2!=., re cl(id) robust
eststo: xtreg aser_e_d tr interact session2 age11 gender exam    age_int1 if session2!=., re cl(id) robust
eststo: xtreg aser_e_d tr interact session2 age11 gender exam     exam_tr if session2!=., re cl(id)
```

```
robust
esttab using table8.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label
```

*** Exploring heterogeneity on the basis of baseline hope quantiles.

** Other possible sources of heterogeneous effects that are not recorded in the PAP were explored. No effect was detected.

```
xtile chs_d_quin = chs_d if session ==1 , nq(4)

gen hope_q1 = 1 if chs_d_quin == 1
replace hope_q1 = 0 if hope_q1 != 1
bys id: replace hope_q1 = sum(hope_q1)
gen hopeq1_tr = hope_q1*tr

gen hope_q2 = 1 if chs_d_quin == 2
replace hope_q2 = 0 if hope_q2 != 1
bys id: replace hope_q2 = sum(hope_q2)
gen hopeq2_tr = hope_q2*tr

gen hope_q3 = 1 if chs_d_quin == 3
replace hope_q3 = 0 if hope_q3 != 1
bys id: replace hope_q3 = sum(hope_q3)
gen hopeq3_tr = hope_q3*tr

gen hope_q4 = 1 if chs_d_quin == 4
replace hope_q4 = 0 if hope_q4 != 1
bys id: replace hope_q4 = sum(hope_q4)
gen hopeq4_tr = hope_q4*tr


xtreg chs_d tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg chs_d tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12    if session2!=., re cl(id) robust
xtreg chs_d tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg chs_d tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

xtreg f1 tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg f1 tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12    if session2!=., re cl(id) robust
xtreg f1 tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id)
```

robust
xtreg f1 tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

xtreg sc_d tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg sc_d tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg sc_d tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg sc_d tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

xtreg rc_d tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg rc_d tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg rc_d tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg rc_d tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

xtreg aser_m_d tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_m_d tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_m_d tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_m_d tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

xtreg aser_e_d tr session2 interact hope_q1 hopeq1_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_e_d tr session2 interact hope_q2 hopeq2_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_e_d tr session2 interact hope_q3 hopeq3_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust
xtreg aser_e_d tr session2 interact hope_q4 hopeq4_tr age gender exam c_19 c_12 if session2!=., re cl(id) robust

```
///// Robustness checks

//// A. FWER-adjusted p-values for family-wise error rate adjustment for self-portrait analysis
** I follow the commands suggested by Prof. M.L. Anderson at UC Berkeley.
** The instructions and explanations with the commands were also kindly offered by Prof. Anderson. I am thankful to him for this support.
preserve

rename tr treated

local counter = 1
gen str20 varname = ""
gen float tstat = .
gen float act_pval = .
gen float tstatsim = .
gen float pvalsim = .
gen float pvals = .

// I run the original regressions for all of the different outcomes tested.
// I store the actual (observed) p-vals/t-stats.

foreach lhsvar in f1 k1 gls_index    {
      quietly xtreg `lhsvar' interact session2 treated if v_1 !=., re cl(id)
      quietly replace tstat = abs( _b[interact] / _se[interact] ) in `counter'
      quietly replace act_pval = 2 * ttail( e(N), abs( tstat ) ) in `counter'
      quietly replace varname = "`lhsvar'" in `counter'
      local `lhsvar'_ct_0 = 0
      local counter = `counter' + 1
}

// I sort the p-vals by the actual (observed) p-vals.
// It does not matter but this step reorders some of the observations in the dataset.
//gsort id session act_pval
gsort act_pval
/// It is also permissible to use "gsort act_pval id session2".

local endvar = `counter' - 1

// I create a variable that stores the simulated (placebo) treatments.

gen byte simtreatment = .
gen float simtreatment_uni = .
```

```
local count = 1

// I run 10,000 iterations of the simulation; and record results in p-val storage counters.
while `count' <= 10000 {
// In this section, I assign the placebo treatments and run regressions using the placebo treatments.
	quietly replace simtreatment_uni = uniform()
	quietly replace simtreatment = ( simtreatment_uni > 0.5 )
	quietly replace tstatsim = .
	quietly replace pvalsim = .
	foreach lhsvar of numlist 1/`endvar' {
		local depvar = varname[`lhsvar']
		quietly reg `depvar' simtreatment
		quietly replace tstatsim = abs( _b[simtreatment] / _se[simtreatment] ) in `lhsvar'
		quietly replace pvalsim = 2 * ttail( e(N), abs( tstatsim ) ) in `lhsvar'
	}
// In this section, I perform the "step down" procedure.
// It replaces simulated p-vals with the minimum of the set of simulated p-vals associated with outcomes that had actual p-vals greater than or equal to the one being replaced.
// For each outcome, I keep count of how many times the ultimate simulated p-val is less than the actual observed p-val.
	local countdown = `endvar'
	while `countdown' >= 1 {
		quietly replace pvalsim = min( pvalsim, pvalsim[_n+1] ) in `countdown'
		local depvar = varname[`countdown']
		if pvalsim[`countdown'] <= act_pval[`countdown'] {
			local `depvar'_ct_0 = ``depvar'_ct_0' + 1
		}
		local countdown = `countdown' - 1
	}
	local count = `count' + 1
}

// I perform the final adjustment that ensures that the ordering to adjusted p-vals is the same as the original ordering of actual p-vals.
// Note: this code enforces monotonicity below by going from the smallest (most significant) to the largest (least significant) p-value, but the original 2008 JASA paper describes the algorithm on p. 1486 as going from the largest p-value to the smallest p-value. The code is correct; the paper has a typo.

foreach lhsvar of numlist 1/`endvar' {
	local depvar = varname[`lhsvar']
	quietly replace pvals = max( round( ``depvar'_ct_0' / 10000, 0.001 ), pvals[`lhsvar'-1] ) in `lhsvar'
}
```

```
restore

//// B. Attrition balance
/// Attrition balance test
** Since the data collection on a given day was a continuous classroom exercise format, attrition on any given variable of interest is representative of other variables too.
gen attrition_sc = 1 if sc==.
bys tr session: egen att_sc1 = sum(attrition_sc)
gen att_sc2 = att_sc1/226
ttest att_sc2 if session == 1, by(tr)


///// C. Winsorized sample


/// C.1 For effort and achievement
** Winsorising at 5% and 95% to ensure that outliers are not driving the results.
preserve
winsor2 sc_d, suffix(_w) cuts (5 95)

winsor2 rc_d, suffix(_w) cuts (5 95)

winsor2 aser_e_d, suffix(_w) cuts (5 95)

winsor2 aser_m_d, suffix(_w) cuts (5 95)

diff sc_d_w, tr(tr) p(session2)
diff rc_d_w, tr(tr) p(session2)
diff aser_m_d_w, tr(tr) p(session2)
diff aser_e_d_w , t(tr) p(session2)

eststo clear
eststo: xtreg sc_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg sc_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg sc_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record    if ses!=., re cl(id) robust
eststo: xtreg sc_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record    if ses2!=., re cl(id) robust

eststo: xtreg rc_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record    if ses!=., re cl(id)
```

```
robust
eststo: xtreg rc_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record    if ses2!=., re cl(id) robust
esttab using table19.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

eststo clear
eststo: xtreg aser_m_d_w interact session2 tr if session2 !=., re cl(id) robust
eststo: xtreg aser_m_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_m_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record    if ses!=., re cl(id) robust
eststo: xtreg aser_m_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record    if ses2!=., re cl(id) robust

eststo: xtreg aser_e_d_w interact session2 tr if session2 !=., re cl(id) robust
eststo: xtreg aser_e_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_e_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record    if ses!=., re cl(id) robust
eststo: xtreg aser_e_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record    if ses2!=., re cl(id) robust
esttab using table9.rtf, starlevels(* 0.10 ** 0.05    *** 0.01) se label

restore

** Winsorising at 1% and 99% to ensure that outliers are not driving the results.


preserve
winsor2 sc_d, suffix(_w) cuts (1 99)

winsor2 rc_d, suffix(_w) cuts (1 99)

winsor2 aser_e_d, suffix(_w) cuts (1 99)

winsor2 aser_m_d, suffix(_w) cuts (1 99)

diff sc_d_w, tr(tr) p(session2)
diff rc_d_w, tr(tr) p(session2)
diff aser_m_d_w, tr(tr) p(session2)
diff aser_e_d_w , t(tr) p(session2)

eststo clear
eststo: xtreg sc_d_w interact session2 tr if session2!=., re cl(id) robust
```

```
eststo: xtreg sc_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg sc_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg sc_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg rc_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg rc_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg rc_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust
esttab using table21.rtf, starlevels(* 0.10 ** 0.05  *** 0.01) se label

eststo clear
eststo: xtreg aser_m_d_w interact session2 tr if session2 !=., re cl(id) robust
eststo: xtreg aser_m_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_m_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg aser_m_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg aser_e_d_w interact session2 tr if session2 !=., re cl(id) robust
eststo: xtreg aser_e_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg aser_e_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg aser_e_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust
esttab using table10.rtf, starlevels(* 0.10 ** 0.05  *** 0.01) se label

restore

/// C.2 For psychological outcomes


** Winsorising at 5% and 95% to ensure that outliers are not driving the results.
preserve

winsor2 f3, suffix(_w) cuts (5 95)
winsor2 f1, suffix(_w) cuts (5 95)
```

```
winsor2 chs_d, suffix(_w) cuts (5 95)

diff f3_w, tr(tr) p(session2)
diff f1_w, tr(tr) p(session2)
diff chs_d_w, t(tr) p(session2)


eststo clear
eststo: xtreg f3_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f3_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f3_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f3_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg f1_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f1_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f1_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f1_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg chs_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg chs_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg chs_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg chs_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

esttab using table11.rtf, starlevels(* 0.10 ** 0.05  *** 0.01) se label
restore



** Winsorising at 1% and 99% to ensure that outliers are not driving the results.
preserve

winsor2 f3, suffix(_w) cuts (1 99)
winsor2 f1, suffix(_w) cuts (1 99)
winsor2 chs, suffix(_w) cuts (1 99)
```

```
diff f3_w, tr(tr) p(session2)
diff f1_w, tr(tr) p(session2)
diff chs_d_w, tr(tr) p(session2)

eststo clear
eststo: xtreg f3_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f3_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f3_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f3_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg f1_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg f1_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg f1_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg f1_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

eststo: xtreg chs_d_w interact session2 tr if session2!=., re cl(id) robust
eststo: xtreg chs_d_w interact session2 tr age gender c_19 c_12 c_7_1 past_record if session2!=., re cl(id) robust
eststo: xtreg chs_d_w interact1 ses tr age gender c_19 c_12 c_7_1 past_record  if ses!=., re cl(id) robust
eststo: xtreg chs_d_w interact2 ses2 tr age gender c_19 c_12 c_7_1 past_record  if ses2!=., re cl(id) robust

esttab using table12.rtf, starlevels(* 0.10 ** 0.05  *** 0.01) se label


restore


//// D. Attendance data (Worked upon in a separate file)
*** Schools offered this administrative data at a later date (April-July 2020).
*** This was not recorded in the PAP.
** Attendance data is available from July 2019 to February 2020.
* Open the relevant file
use "/Users/apple/Documents/PhD Economics/Year 3/Main experiment/Data/Stata files/AttendanceTrialAncova.dta"

/// Data was cleaned and useful variables for the analysis were created.
```

** The main outcome variable is a fraction of number of days that a student attended the school in a given month and the number of days that the school was open in that month.

```
reg sep_f aug_f tr age gender if m1 == 1
reg oct_f aug_f tr age gender if m1 == 1
reg nov_f aug_f tr age gender if m1 == 1
reg dec_f aug_f tr age gender if m1 == 1
reg jan_f aug_f tr age gender if m1 == 1
reg feb_f aug_f tr age gender if m1 == 1
gen ses = 1 if m7 == 1
replace ses = 0 if m2 == 1
gen interact = ses*tr
ttest aug_f if m1==1, by(tr)
```

// I perform a DiD analysis between the month of August 2019 (pre-treatment) and January 2020 (post-treatment).

```
xtset id ses
egen attend = rsum (august january)
diff attend if ses!=., t(tr) p(ses)
xtreg attend ses tr interact gender age if ses!=.
xtreg attend ses tr interact gender age if ses!=. , cl(id) robust
gen ses1 = 1 if m2 == 1
replace ses1 = 2 if m3 == 1
replace ses1 = 3 if m4 == 1
replace ses1 = 4 if m5 == 1
replace ses1 = 5 if m6 == 1
replace ses1 = 6 if m7 == 1
replace ses1 = . if m1 == 1
replace ses1 = .    if m8 == 1
gen attending1 = attending*100
replace ses_j = 1 if m7 == 1
egen attending2 = rsum(july august sept october novem decem january)
replace ses1 = 0 if m1== 1
```

// For overall effect on student attendance, I perform ancova.

```
reg jan1 august sept october novem decem    m2 m3 m4 m5 tr if ses1!= . & ses1!=0 & ses1!= 6
```

//// Data on teachers' was collected in baseline (including their hope scores).
//// Administrative data on teachers' subjects was received in April 2021.
** Using this data, information on English and Math teachers is segregated
// Some steps in cleaning are included here to serve as an example of the comprehensive data cleaning process. Similar procedure was followed for several other variables. However, to avoid repetition, it is not included.

```
ed id school tr t1_h t2_h t3_h t4_h t5_h t6_h t7_h t8_h t9_h t10_h if session == 1
gen sub_codetry = 1
order sub_codetry, after (t1_h)
replace sub_codetry = 2 if school == 6 & t1_h == 36
replace sub_codetry = 6 if school == 4 & t1_h == 59
replace sub_codetry = 1 if school == 1 & t1_h == 55

gen t7_sub = 1
order t7_sub, after(t7_h)
ed school    t1_h t1_sub t2_h t2_sub t3_h t3_sub t4_h t4_sub t5_h t5_sub t6_h t6_sub t7_h t7_sub
t8_h t9_h t10_h if session == 1
replace t7_sub = 0 if t7_h == .
replace t7_sub = 2 if school == 1 & t7_h == 59
replace t7_sub = 5 if school == 2 & t7_h == 54
replace t7_sub = 2 if school == 5 & t7_h == 52
gen t8_sub = 1
order t8_sub, after(t8_h)
gen t9_sub = 1
order t9_sub, after(t9_h)
replace t8_sub = 0 if t8_h == .
replace t9_sub = 0 if t9_h == .
ed school    t1_h t1_sub t2_h t2_sub t3_h t3_sub t4_h t4_sub t5_h t5_sub t6_h t6_sub t7_h t7_sub
t8_h t8_sub t9_h t9_sub t10_h if session == 1
replace t8_sub = 5 if school == 1 & t8_h == 48
replace t9_sub = 7 if school == 2 & t9_h == 60
gen t10_sub = 1
replace t10_sub = 0 if t10_h == .
order t10_sub, after(t10_h)
replace t10_sub = 3 if school == 2 & t10_h == 56
replace t8_sub = 2 if school == 5 & t8_h == 60
replace t9_sub = 4 if school == 5 & t9_h == 55
////These steps above are followed for all the 10 subject codes created per teach t1_sub to t10_sub.
///// Creating a dummy for English teacher's average hope scores:
gen    t1_sub1 =    t1_sub
order t1_sub1, after(t1_sub)
recode t1_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t2_sub1 =    t2_sub
order t2_sub1, after(t2_sub)
recode t2_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t3_sub1 =    t3_sub
order t3_sub1, after(t3_sub)
recode t3_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0)
```

```
gen    t4_sub1 =    t4_sub
order t4_sub1, after(t4_sub)
recode t4_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t5_sub1 =    t5_sub
order t5_sub1, after(t5_sub)
recode t5_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t6_sub1 =    t6_sub
order t6_sub1, after(t6_sub)
recode t6_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t7_sub1 =    t7_sub
order t7_sub1, after(t7_sub)
recode t7_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t8_sub1 =    t8_sub
order t8_sub1, after(t8_sub)
recode t8_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t9_sub1 =    t9_sub
order t9_sub1, after(t9_sub)
recode t9_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t10_sub1 =    t10_sub
order t10_sub1, after(t10_sub)
recode t10_sub1 (1=1) (2=0) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)

egen eng_sub = rsum(t1_sub1 t2_sub1 t3_sub1 t4_sub1 t5_sub1 t6_sub1 t7_sub1 t8_sub1 t9_sub1
t10_sub1)

///// Creating a dummy for Mathematics teacher's average hope scores:
gen    t1_sub2 =    t1_sub
order t1_sub2, after(t1_sub1)
recode t1_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t2_sub2 =    t2_sub
order t2_sub2, after(t2_sub1)
recode t2_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t3_sub2 =    t3_sub
order t3_sub2, after(t3_sub1)
recode t3_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t4_sub2 =    t4_sub
order t4_sub2, after(t4_sub1)
recode t4_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0)
gen    t5_sub2 =    t5_sub
order t5_sub2, after(t5_sub1)
recode t5_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t6_sub2 =    t6_sub
order t6_sub2, after(t6_sub1)
recode t6_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
```

```
gen    t7_sub2 =    t7_sub
order t7_sub2, after(t7_sub1)
recode t7_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t8_sub2 =    t8_sub
order t8_sub2, after(t8_sub1)
recode t8_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t9_sub2 =    t9_sub
order t9_sub2, after(t9_sub1)
recode t9_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)
gen    t10_sub2 =    t10_sub
order t10_sub2, after(t10_sub1)
recode t10_sub2 (1=0) (2=1) (3=0) (4=0) (5=0) (6=0) (7=0) (0=0)

egen math_sub = rsum(t1_sub2 t2_sub2 t3_sub2 t4_sub2 t5_sub2 t6_sub2 t7_sub2 t8_sub2
t9_sub2 t10_sub2)

///// Creating average hope per English teacher for each student:
gen e1 = t1_sub1*t1_h
gen e2 = t2_sub1*t2_h
gen e3 = t3_sub1*t3_h
gen e4 = t4_sub1*t4_h
gen e5 = t5_sub1*t5_h
gen e6 = t6_sub1*t6_h
gen e7 = t7_sub1*t7_h
gen e8 = t8_sub1*t8_h
gen e9 = t9_sub1*t9_h
gen e10= t10_sub1*t10_h

egen eng_t_h = rsum(e1 e2 e3 e4 e5 e6 e7 e8 e9 e10)
gen eng_t_hope = eng_t_h/eng_sub

///// Creating average hope per Math teacher for each student:
gen math1 = t1_sub2*t1_h
gen math2 = t2_sub2*t2_h
gen math3 = t3_sub2*t3_h
gen math4 = t4_sub2*t4_h
gen math5 = t5_sub2*t5_h
gen math6 = t6_sub2*t6_h
gen math7 = t7_sub2*t7_h
gen math8 = t8_sub2*t8_h
gen math9 = t9_sub2*t9_h
gen math10= t10_sub2*t10_h
egen math_t_h = rsum(math1 math2 math3 math4 math5 math6 math7 math8 math9 math10)
gen math_t_hope = math_t_h/math_sub
```

```
summ eng_t_hope math_t_hope if session == 1
tabstat  eng_t_hope math_t_hope if session == 1, statistics( count mean sd min max median ) by(tr) columns(statistics)

///// Just by looking at these two summaries it is clear that the English teacher hopes are higher than that of Mathematics.
///// Also across the two treatment groups the hope scores are balanced for both subjects.
//// I do not find any heterogeneity across above median hope score teachers (in English).
//// I do not find any heterogeneity across above median hope score teachers (in Mathematics).

// gen eng_abovemedian = 1 if eng_t_hope>56
// replace eng_abovemedian = 0 if eng_t_hope<= 56
// gen eng_interact = eng_abovemedian*tr

// gen math_abovemedian = 1 if math_t_hope>56
// replace math_abovemedian = 0 if math_t_hope<= 56
// gen math_interact = math_abovemedian*tr

//Suggested corrections: including a 2SLS estimate (effort on performance using treatment as an instrument) [Dated: December, 2021]
gen rc_d_ses2 = rc_d*ses2
gen effort_d_ses2 = effort_d*ses2

ivreg2 aser_e_d (rc_d  rc_d_ses2 = tr interact2)  ses2  age gender  c_4  c_10  c_19 c_12 c_7_1 past_record if (ses2!=. & chs_d!=.) , robust first rf cl(id)
ivreg2 aser_e_d (effort_d  effort_d_ses2 = tr interact2)  ses2  age gender  c_4  c_10  c_19 c_12 c_7_1 past_record if (ses2!=. & chs_d!=.) , robust first rf cl(id)

reg aser_e_d effort_d effort_d_ses2 ses2 age gender  c_4  c_10  c_19 c_12 c_7_1  if (ses2!=. & chs_d!=.) , robust  cl(id)
reg aser_e_d rc_d rc_d_ses2 ses2 age gender  c_4  c_10  c_19 c_12 c_7_1  if (ses2!=. & chs_d!=.) , robust  cl(id)

**** Notes:
// This file is comprehensive and indicative, but not exhaustive of all the commands used in the cleaning and analysis process.
// The file was saved on 21 June 2021 on the personal computer of the author and on dropbox as a back-up.
// Data is anonymous (following CoSS research ethics guidelines).
// Table and figure numbers in the thesis do not correspond to those in the file.
// For any questions, please contact the author at: p.bhan.1@research.gla.ac.uk

*** End of do-file ***
```